SOUTHWEST RESEARCH INSTITUTE

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Chemistry and Chemical Engineering Division
Department of Analytical and Environmental Chemistry

August 31, 2011

Fluor-B&W Portsmouth LLC
3930 U.S. Route 23 South
Bldg. X-1000
Piketon, OH 45661

Attn: Gerald Fulkerson

Subject:	Client ID:	FXP02234L04
	SwRI Project Number:	16526.05.00X
	SDG:	469498
	SwRI Task Order Number:	110614-8
	SwRI Sample Receipt Number:	44937
	Samples Received:	June 14, 2011
	Fraction:	Distribution Coefficient Results

Dear Mr. Fulkerson:

Please find the enclosed results for the seven (07) samples received on the above referenced date. Should you have any questions, please feel free to contact me at 210-522-3242.

Sincerely,

Radonna Spies
Group Leader

APPROVED:

Michael J. Dammann
Director

RS:aa

Encl

000001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110614-8
SRR: 44937
CASE: FXP02234L04
VTSR: 06.14.11
PROJECT#: 16526.05.00X

NARRATIVE

G70002

Client: Fluor-B&W Portsmouth LLC
SDG: 469498
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110614-8

INORGANICS ANALYSIS

The Distribution Coefficients (K_d) for Tc-99 and Total Uranium (U) were determined using the following modification to ASTM C1733.

The contact solution was be prepared by mixing two contaminated ground waters immediately prior to testing. The groundwater contaminated with Tc-99 (749-EPE-02) contained a significant amount of sediment and was filtered through a Whatman #1810-125 acid treated TCLP filter prior to combining at a 50:50 ratio, by mass, with the uranium contaminated groundwater (231A-01G-01). Only the minimum volume needed for the sample batch was prepared. Samples were weighted in duplicate for 8 time points (24 hr, 48 hr, Day 4, Day 7, Day 10, Day 14, Day 21 and Day X). The method specifies a 1:25 soil to contact solution test ratio; therefore, 200 mL of contact solution was added to 8 g of soil in a 250-mL Nalgene bottle. Samples were tumbled using the TCLP tumbler for 12-hours a day. For each time point, a 200 mL of the contact solution was added to an empty Nalgene and processed alongside the sample as a time point "Blank" for each Day n.

At each time point, the sample duplicates and time point "Blank" were filtered using a Whatman #1810-125 acid treated TCLP filter. The filtrate was preserved with nitric acid and stored for analysis. After the 5th time point (Day 10), all samples and "Blanks" were submitted for Tc-99 and total uranium analysis.

To calculate Kd in C1733, the following equation is used:

$$K_d = \frac{\frac{(C_s \, x \, V) - (C_f x \, V)}{m}}{C_f}$$

Where:
Cs = Starting Concentration of analyte of interest in contact solution
Cf = Final Concentration of analyte of interest in contact solution
V = Total Volume of contact liquid (mL)
m = Dry Mass of Solid (g)

For the purposes of this modified analysis at multiple time points, the concentrations of all "Blanks" analyzed were averaged and used as the starting concentration of the contact solution. The samples were not dried prior to the sample analysis; therefore, a percent solids was performed, and the results are reported on a dry weight basis. Therefore, following equation was used:

$$K_d = \frac{\frac{(C_{avg\ blk} x \, V) - (C_{day\ x} \, x \, V)}{m \, x \, \%\ soilds}}{C_{day\ x}}$$

Client: Fluor-B&W Portsmouth LLC
SDG: 469498
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110614-8

Where:
$C_{avg\ blk}$ = average "Blank" concentration which represents the starting concentration of analyte of interest in contact solution
$C_{day\ x}$ = concentration of analyte of interest in contact solution at time point x
V = total volume of contact liquid (mL)
m = weight of Solid (g)

In addition to the K_d values, the propagated uncertainties were also calculated. The K_d values and the uncertainties for the sample duplicates were averaged for each time point. By evaluating these values, it was established when the Tc-99 and U sorption equilibrium had been reached. With the exception of for sample WDPZ05-06-2.0 (SwRI #469500), all samples had reached equilibrium by Day 10. Since just the Total U had not reach equilibrium by Day 10, the total uranium analysis of Day 14 and Day 21 sample duplicates and blanks was necessary for SwRI #469500.

The final K_d value reported is an average of all K_d time points values once equilibrium was achieved. The uncertainty reported was also the average from these time points. For Tc-99, equilibrium was achieved by Day 2; therefore, the final K_d and uncertainties values are the averages of Days 2-10. With the exception of SwRI #469500, the uranium sorption reached equilibrium by Day 4; therefore, the average of Days 4-10 was reported. For SwRI #469500, the uranium sorption reached equilibrium by Day 14; therefore, the average of Days 14 and 21 was reported.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

D Pace
Group Leader

8/30/11
Date

Client: Fluor – B&W Portsmouth LLC
SDG: 469498
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110614-8

TOTAL URANIUM ANALYSIS

The acidified leachates were analyzed directly (no digestion was required) for total uranium by ICP-MS. All instrument QC criteria were met. The percent recoveries for the initial and continuing calibration verifications were within 90-110%. Total uranium was not detected above SwRI's reporting limit in the initial and continuing calibration blanks. The low level, CRI standard recoveries were within 50-150%. The percent recoveries for the interference check sample ICSABs were within 80-120%. The internal standard recoveries were within 80-120% for the ICV/CCV/ICB/CCBs and within 30-120% for all samples.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

JKruger — **Group Leader**

5/29/14 — **Date**

000005

Client: Fluor B&W Portsmouth
SDG: 469498
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110614-8

RADIOLOGICAL ANALYSIS

The sample SDG 469498 consisted of seven soil samples received for radiological analysis. The water samples for radiological analysis were reported on an "as received" basis. The recommended sample holding time of six months was met.

The sample was analyzed for the following:

Matrix	Analysis	Method
Soil	^{99}Technetium	Liquid Scintillation Spectroscopy

^{99}Technetium

A 100ml aliquot of each sample fraction was analyzed for ^{99}Technetium. The sample aliquots were digested at 80°C for 4 hours with nitric acid and then one additional hour with hydrogen peroxide. The aliquots were then brought to a final volume of 50ml and then chemically separated using resins. A preparation blank and two laboratory control samples were analyzed with each sample batch. Each sample fraction was analyzed in duplicate.

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

For ^{99}Tc analysis, the ^{99}Tc was separated from the digestion using chemical separation resins. After chemical separation, the resin containing the ^{99}Tc was placed into a liquid scintillation vial and 15 ml of scintillation cocktail was added. The samples were counted on a liquid scintillation counter programmed to count only the ^{99}Tc region of interest. The liquid scintillation counter ^{99}Tc program was standardized using ^{99}Tc as the radioisotope to establish a specific efficiency quench curve. Four preparation blanks and eight laboratory control samples were analyzed with the sample batches. The preparation blank result for SwRI sample ID PBWG26JV1 was less than 1.65 times the TPU, the MDA, and the RL. The preparation blank results for SwRI sample ID PBWG25JV1, PBWG25JV2, and PBWG26JV2 were greater than 1.65 times the TPU, but were less than the MDA and the RL. The results for all of the laboratory control samples were within the recovery control limits of 75-125%. Each sample fraction was analyzed in duplicate and the sample duplicate evaluation ratio was less than three for all duplicates. A matrix spike and matrix spike duplicate were not performed with any of the analyses.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Warren G. Naegeli

Research Scientist

8/25/11

Date

0000006

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110614-8
SRR: 44937
CASE: FXP02234L04
VTSR: 06.14.11
PROJECT#: 16526.05.00X

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

660007

Sample Receipt

Sample Receipt Number: 44937

Southwest Research Institute | VTSR: 06/14/11 | Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Revision: 1

This Receipt was Revised Jul 12 2011 10:00AM

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 06/13/11

Notes

Samples were received intact 3.0 °C (wet & blue ice)
Fed Ex Tracking #s:
875591108881
875591108892

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Jun 14 2011 9:35AM ***
Rev. 1
Corrected 469486.
*** DRoman Jul 12 2011 10:00AM ***

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
469486	231A-01G-01	06/09/11	WG	1	
469487	749-WPW-01	06/09/11	WG	1	
469488	WDMW02B-04-12.0	06/12/11	SO	1	
469489	WDMW02B-04-19.5	06/12/11	SO	1	
469490	WDMW02B-04-2.0	06/12/11	SO	1	
469491	WDMW02B-04-4.5	06/12/11	SO	1	
469492	WDMW02B-14-2.0	06/12/11	WQ	3	
469493	WDMW02B-26-12.0	06/12/11	WQ	3	
469494	WDPZ05-04-12.0	06/09/11	SO	1	
469495	WDPZ05-04-19.5	06/10/11	SO	1	
469496	WDPZ05-04-2.0	06/09/11	SO	1	
469497	WDPZ05-04-4.5	06/09/11	SO	1	
469498	WDPZ05-06-12.0	06/09/11	SO	1	
469499	WDPZ05-06-19.5	06/10/11	SO	1	
469500	WDPZ05-06-2.0	06/09/11	SO	1	
469501	WDPZ05-06-4.5	06/09/11	SO	1	
469502	WDPZ05-08-12.0	06/09/11	SO	1	
469503	WDPZ05-08-19.5	06/10/11	SO	1	
469504	WDPZ05-08-2.0	06/09/11	SO	1	
469505	WDPZ05-08-4.5	06/09/11	SO	1	
469506	WDPZ05-20-12.0	06/09/11	SO	1	
469507	WDPZ05-21-12.0	06/09/11	SO	1	
Containers: 26				**Samples: 22**	

These documents are associated with this receipt: 102770[COC for SRR 44937], 100762[FXP02234L04]

Thermometer: 027
Temperature: 3.0

Page Printed: 31 Aug 2011 15:08:39

Client: Fluor-B&W Ports
SR#: 44937
FRM-002

Southwest Research Institute

Laboratory Task Order

TO #: 110614-8 Revision: 1

SDG: 469498
VTSR: 06/14/11
CASE: FXP02234L04

SRR #'s: 44937
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 07/11/11
To QA: 07/11/11
To Client: 07/11/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 469498. SDG IS OPEN

28 day TAT HARDCOPY. Using 27-day TAT for Report/EDD.
CURRENTLY, FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 07/12/11.

22 overall SO/WG/WQ samples (26 containers) received on 06/14/11 for SOW FXP02234L04.
OUT of the 22 samples, only the 5 SO for the DISTRIBUTION COEFFICIENT and the 2 WG Uranium and Tc99 Spiked samples are listed in this task order.

SEE GROUP LEADERS before starting.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc 99 LSC - Technetium-99 (to support ASTM D4646; see summary)
Total U by ICP-MS (to support ASTM D4646; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #1 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 06/17/11: Task Order revised to indicate additional samples received on 06/17/11, which have been grouped with SDG 469498, located in Task Order # 110617-9, SRR 44975. Also, ASTM C4646 replaced with ASTM C1733 by the client.

Documents Related to this task order: 102770[COC for SRR 44937], 100762[FXP02234L04]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 7

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
469486	U	1	WG	231A-01G-01	09 Jun 11	06 Dec 11
469487	Tc99	1	WG	749-WPW-01	09 Jun 11	06 Dec 11
469498	UTc99	1	SO	WDPZ05-06-12.0	09 Jun 11	06 Dec 11
469499	UTc99	1	SO	WDPZ05-06-19.5	10 Jun 11	07 Dec 11
469500	UTc99	1	SO	WDPZ05-06-2.0	09 Jun 11	06 Dec 11
469501	UTc99	1	SO	WDPZ05-06-4.5	09 Jun 11	06 Dec 11
469506	UTc99	1	SO	WDPZ05-20-12.0	09 Jun 11	06 Dec 11

Test: DIG-TOTALDISS_ISOU Holding: 180 days from VTSR
Section: METALPREP **Digestion Method Total Dissolution for Isotopic Uranium** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
469498	UTc99	1	SO	WDPZ05-06-12.0	14 Jun 11	11 Dec 11

Southwest Research Institute

Laboratory Task Order

TO #: 110614-8 Revision: 1

SDG: 469498
VTSR: 06/14/11
CASE: FXP02234L04

SRR #'s: 44937
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 07/11/11
To QA: 07/11/11
To Client: 07/11/11

System ID	Type	Cont	Matrix	Customer ID	VTSR	Method Date
469499	UTc99	1	SO	WDPZ05-06-19.5	14 Jun 11	11 Dec 11
469500	UTc99	1	SO	WDPZ05-06-2.0	14 Jun 11	11 Dec 11
469501	UTc99	1	SO	WDPZ05-06-4.5	14 Jun 11	11 Dec 11
469506	UTc99	1	SO	WDPZ05-20-12.0	14 Jun 11	11 Dec 11

Test: ICPMS-SWRI-ISO_U Holding: 180 days from CED
Section: METALS **ICPMS SwRI Method Isotopic Uranium** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
469498	UTc99	1	SO	WDPZ05-06-12.0	09 Jun 11	06 Dec 11
469499	UTc99	1	SO	WDPZ05-06-19.5	10 Jun 11	07 Dec 11
469500	UTc99	1	SO	WDPZ05-06-2.0	09 Jun 11	06 Dec 11
469501	UTc99	1	SO	WDPZ05-06-4.5	09 Jun 11	06 Dec 11
469506	UTc99	1	SO	WDPZ05-20-12.0	09 Jun 11	06 Dec 11

Test: LSC-TC99_SWRI Holding: 180 days from CED
Section: RADCHEM **Technetium-99 by liquid scintillation counting** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
469498	UTc99	1	SO	WDPZ05-06-12.0	09 Jun 11	06 Dec 11
469499	UTc99	1	SO	WDPZ05-06-19.5	10 Jun 11	07 Dec 11
469500	UTc99	1	SO	WDPZ05-06-2.0	09 Jun 11	06 Dec 11
469501	UTc99	1	SO	WDPZ05-06-4.5	09 Jun 11	06 Dec 11
469506	UTc99	1	SO	WDPZ05-20-12.0	09 Jun 11	06 Dec 11

002770

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC46LL**

Page: 1 for OSDC46LL
Date: 06/13/2011 07:33 AM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDPZ05-04-12.0	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1501		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDPZ05-04-19.5	OSDC46	SS	SO	REG	8	OZ	AGLS	1	10-JUN-2011	1040		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDPZ05-04-2.0	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1412		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDPZ05-04-4.5	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1425		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDPZ05-06-12.0	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1501		Distribution Coefficient	DEG4C	
WDPZ05-06-19.5	OSDC46	SS	SO	REG	8	OZ	AGLS	1	10-JUN-2011	1040		Distribution Coefficient	DEG4C	
WDPZ05-06-2.0	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1412		Distribution Coefficient	DEG4C	
WDPZ05-06-4.5	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1425		Distribution Coefficient	DEG4C	
WDPZ05-08-12.0	OSDC46	SS	SO	REG	4	OZ	AGLS	1	09-JUN-2011	1501		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDPZ05-08-19.5	OSDC46	SS	SO	REG	4	OZ	AGLS	1	10-JUN-2011	1040		Cation-Exchange Capacity (SW846-	DEG4C	

000010

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC46LL**

Page: 2 for OSDC46LL
Date: 06/13/2011 07:33 AM

												9081)		
WDPZ05-08-2.0	OSDC46	SS	SO	REG	4	OZ	AGLS	1	09-JUN-2011	1412		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDPZ05-08-4.5	OSDC46	SS	SO	REG	4	OZ	AGLS	1	09-JUN-2011	1425		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDPZ05-20-12.0	OSDC46	SS	SO	REG	8	OZ	AGLS	1	09-JUN-2011	1501		Distribution Coefficient	DEG4C	
WDPZ05-21-12.0	OSDC46	SS	SO	REG	4	OZ	AGLS	1	09-JUN-2011	1501		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	**Date Submitted To Lab:**	**Ship Container No:**	**SSG ID:**	**Cooler Temperature:**	**Airbill No:**	**SOW**
SWRI - Southwest Research Institute, San Antonio, TX	13-JUN-2011	OSDC	OSDC46LL	DEG C		FXP02234L04

Relinquished by: Stacy Glasgow	Date(mm/dd/yyyy): 6-13-11	Time: 0940	Received by: FedEx	Date(mm/dd/yyyy): 6/13/11	Time: 0940
Relinquished by: FedEx	Date(mm/dd/yyyy): 6/13/11	Time: 1700	Received by: FedEx	Date(mm/dd/yyyy): 6/13/11	Time: 1700
Relinquished by: FedEx	Date(mm/dd/yyyy): 6/14/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 6/14/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check <100 cpm
Temp 3.0 C / #027

000011

102770

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC48LL**

Page: 1 for OSDC48LL
Date: 06/09/2011 05:06 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
231A-01G-01	OSDC48	5UA	WG	REG	2.5	GAL	CUBI	1	09-JUN-2011	932		Distribution Coefficient	None	WATER CONTAINING URANIUM TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	13-JUN-2011	231 5UA	OSDC48LL	DEG C		FXP02234L04

Relinquished by: Stacy Gonzalez	Date(mm/dd/yyyy): 6-13-11	Time: 0900	Received by:	Date(mm/dd/yyyy): 6-13-11	Time: 0900
Relinquished by:	Date(mm/dd/yyyy): 6/13/11	Time: 1200	Received by:	Date(mm/dd/yyyy): 6/13/11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 6/14/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 6/14/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp 3.0 °C / #027

LP

000012

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC50LL**

Page: 1 for OSDC50LL
Date: 06/09/2011 05:07 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-01	OSDC50	X-749	WG	REG	2.5	GAL	CUBI	1	09-JUN-2011	1047		Distribution Coefficient	None	WATER CONTAINING Tc-99 TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	13-JUN-2011	WPW 749	OSDC50LL	DEG C		FXP02234L04

Relinquished by: Stacy Glasgow	Date(mm/dd/yyyy): 6-13-11	Time: 0900	Received by:	Date(mm/dd/yyyy): 6/13/11	Time: 0900
Relinquished by:	Date(mm/dd/yyyy): 6/13/11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 6/13/11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 6/14/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 6/14/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe <100 cpm
Total cpm-mR/h (samples) <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp 3.0 °C / #027

000013

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC40LL**

Page: 1 for OSDC40LL
Date: 06/13/2011 08:22 AM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp 3.0 C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDMW02B-04-12.0	OSDC40	SS	SO	REG	8	OZ	AGLS	1	12-JUN-2011	1112		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDMW02B-04-19.5	OSDC40	SS	SO	REG	8	OZ	AGLS	1	12-JUN-2011	1153		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDMW02B-04-2.0	OSDC40	SS	SO	REG	8	OZ	AGLS	1	12-JUN-2011	1045		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDMW02B-04-4.5	OSDC40	SS	SO	REG	8	OZ	AGLS	1	12-JUN-2011	1055		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	13-JUN-2011	OSDC	OSDC40LL	DEG C		FXP02234L04

Relinquished by: Stacy Flaggert	Date(mm/dd/yyyy): 6-13-11	Time: 0940	Received by: AMS	Date(mm/dd/yyyy): 61311	Time: 0940
Relinquished by: AMS	Date(mm/dd/yyyy): 61311	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 61311	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 6/14/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 6/14/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

0000014

2770

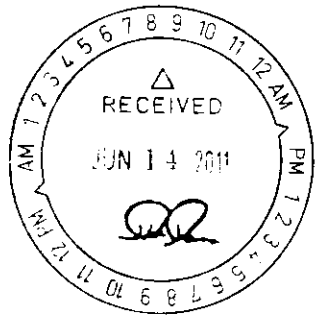
Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC40LL**

Page: 2 for OSDC40LL
Date: 06/13/2011 08:22 AM



Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC43LL**

Page: 1 for OSDC43LL
Date: 06/13/2011 07:59 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDMW02B-14-2.0	OSDC43	SS	WQ	FB	1	L	HDPE	3	12-JUN-2011	1045		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3 ✓	
WDMW02B-26-12.0	OSDC43	SS	WQ	RIN	1	L	HDPE	3	12-JUN-2011	1112		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3 ✓	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	13-JUN-2011	OSDC	OSDC43LL	DEG C		FXP02234L04

Relinquished by: Stacy Claycomb	Date(mm/dd/yyyy): 6-13-11	Time: 0940	Received by: FedEx	Date(mm/dd/yyyy): 6/13/11	Time: 0940
Relinquished by: FedEx	Date(mm/dd/yyyy): 6/13/11	Time: 1200	Received by:	Date(mm/dd/yyyy): 6-13-11	Time: 1200
Relinquished by: FedEx	Date(mm/dd/yyyy): 6/14/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 6/14/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 06/14/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #44937
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp: 3.0 °C / #027

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

000017

Case: FXP02234L04 / SDG: _____

Sample Receipt: 44937

Airbill: 875591108881 875591108892

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	23A-01G-01	None	469486	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	749-WPW-01	None	469487	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-04-12.0	None	469488	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-14-2.0	None	469492	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-26-12.0	None	469493	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-04-12.0	None	469494	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-04-19.5	None	469495	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-04-2.0	None	469496	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-04-4.5	None	469497	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-06-12.0	None	469498	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-06-19.5	None	469499	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-04-19.5	None	469489	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-04-2.0	None	469490	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDMW02B-04-4.5	None	469491	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-21-12.0	None	469507	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-06-2.0	None	469500	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-06-4.5	None	469501	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-08-12.0	None	469502	YES	Intact

WO: 44937 Po[illegible]thFluor-B&W
FRM-217

Southwest Research Institute

000018

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 44937

Airbill: 875591108881 875591108892

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-08-19.5	None	469503	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-08-2.0	None	469504	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-08-4.5	None	469505	YES	Intact
06/14/11	08:30:00	OCDC40LL 43LL 46LL 48LL 50LL	WDPZ05-20-12.0	None	469506	YES	Intact

PolishSouthFluor-B&W
WO: 44937
FRM-217

SAMPLE LOG-IN SHEET

050019

Lab Name: Southwest Research Institute

Page 1 of 1

Received By (Print Name): DINO ROMAN

Received By (Signature):

Log-in Date: 06/13/2011

Case Number: FXP02234L04

Sample Delivery Group No.: N/A

SAS Number: N/A

Remarks: 16526.05.00X

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent
5.	Airbill	Airbill/Sticker Present/Absent*
6	Airbill No.	875591108881 875591108892
7.	Sample Tags	Present/Absent
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	~~Intact~~/Broken*/ Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	06/14/2011
12.	Time Received	08:30:00

Sample Transfer		
Fraction	Fraction	
Area # From R-13	Area #	
By DINO ROMAN	By	
On 06/14/2011	On	

Corresponding			
EPA Sample #	Sample Tag #	Assigned Lab #	Remarks: Condition of Sample Shipment, etc
23A-01G-01	None	469486	Intact
749-WPW-01	None	469487	Intact
WDMW02B-04-12.0	None	469488	Intact
WDMW02B-04-19.5	None	469489	Intact
WDMW02B-04-2.0	None	469490	Intact
WDMW02B-04-4.5	None	469491	Intact
WDMW02B-14-2.0	None	469492	Intact
WDMW02B-26-12.0	None	469493	Intact
WDPZ05-04-12.0	None	469494	Intact
WDPZ05-04-19.5	None	469495	Intact
WDPZ05-04-2.0	None	469496	Intact
WDPZ05-04-4.5	None	469497	Intact
WDPZ05-06-12.0	None	469498	Intact
WDPZ05-06-19.5	None	469499	Intact
WDPZ05-06-2.0	None	469500	Intact
WDPZ05-06-4.5	None	469501	Intact
WDPZ05-08-12.0	None	469502	Intact
WDPZ05-08-19.5	None	469503	Intact
WDPZ05-08-2.0	None	469504	Intact
WDPZ05-08-4.5	None	469505	Intact
WDPZ05-20-12.0	None	469506	Intact
WDPZ05-21-12.0	None	469507	Intact

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (44937)
Date: 6.15.11	Logbook Page No.: 7659 SEC 2 OF 2

000020

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110614-8
SRR: 44937
CASE: FXP02234L04
VTSR: 06.14.11
PROJECT#: 16526.05.00X

pH TABLE

SwRI

pH Preservation Report

Sample Receipt Report 44937

Project: 16526.05.00X

Case: FXP022341.04

Customer: Fluor-B&W Portsmouth LLC

Received: Jun 14 2011 8:30AM

pH Adjuster:

Adjusted:

SwRI #	Customer's ID	pH
469486 1/1	23A-01G-01	Login
Container ID	Adjustment	Final
469487 1/1	749-WPW-01	Login
Container ID	Adjustment	Final
469488 1/1	WDMW02B-04-12.0	Login
Container ID	Adjustment	Final
469489 1/1	WDMW02B-04-19.5	Login
Container ID	Adjustment	Final
469490 1/1	WDMW02B-04-2.0	Login
Container ID	Adjustment	Final
469491 1/1	WDMW02B-04-4.5	Login
Container ID	Adjustment	Final
469492 1/3	WDMW02B-14-2.0	Login <2
Container ID	Adjustment	Final
469492 2/3	WDMW02B-14-2.0	Login <2
Container ID	Adjustment	Final
469492 3/3	WDMW02B-14-2.0	Login <2
Container ID	Adjustment	Final
469493 1/3	WDMW02B-26-12.0	Login <2
Container ID	Adjustment	Final
469493 2/3	WDMW02B-26-12.0	Login <2
Container ID	Adjustment	Final
469493 3/3	WDMW02B-26-12.0	Login <2
Container ID	Adjustment	Final
469494 1/1	WDPZ05-04-12.0	Login
Container ID	Adjustment	Final
469495 1/1	WDPZ05-04-19.5	Login
Container ID	Adjustment	Final
469496 1/1	WDPZ05-04-2.0	Login
Container ID	Adjustment	Final
469497 1/1	WDPZ05-04-4.5	Login
Container ID	Adjustment	Final
469498 1/1	WDPZ05-06-12.0	Login
Container ID	Adjustment	Final
469499 1/1	WDPZ05-06-19.5	Login
Container ID	Adjustment	Final
469500 1/1	WDPZ05-06-2.0	Login
Container ID	Adjustment	Final

SwRI #	Customer's ID	pH
469501 1/1	WDPZ05-06-4.5	Login
Container ID	Adjustment	Final
469502 1/1	WDPZ05-08-12.0	Login
Container ID	Adjustment	Final
469503 1/1	WDPZ05-08-19.5	Login
Container ID	Adjustment	Final
469504 1/1	WDPZ05-08-2.0	Login
Container ID	Adjustment	Final
469505 1/1	WDPZ05-08-4.5	Login
Container ID	Adjustment	Final
469506 1/1	WDPZ05-20-12.0	Login
Container ID	Adjustment	Final
469507 1/1	WDPZ05-21-12.0	Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
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Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110614-8
SRR: 44937
CASE: FXP02234L04
VTSR: 06.14.11
PROJECT#: 16526.05.00X

SAMPLE DATA

SOUTHWEST RESEARCH INSTITUTE 010002

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

SOW: FXP02234L04

SRR #: 44937

Date Received: 06/14/11

Method: ASTM C1733

Task Order #: 110614-8

		Tc99		Total Uranium	
Sample ID	Lab System ID	K_d Results (mL/g)	Uncertainty	K_d Results (mL/g)	Uncertainty
Prep Blank	Blank	0.155	0.872	0.157	0.677
WDPZ05-06-12.0	469498	4.88	1.03	0.079	0.629
WDPZ05-06-19.5	469499	4.55	0.917	0.884	0.645
WDPZ05-06-2.0	469500	5.87	0.959	58.9	2.55
WDPZ05-06-4.5	469501	4.69	0.916	1.47	0.655
WDPZ05-20-12.0	469506	3.35	0.893	1.01	0.649

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010003

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110614-8
SRR: 44937
CASE: FXP02234L04
VTSR: 06.14.11
PROJECT#: 16526.05.00X

RAW DATA

DOE/PPPO/03-0246&D3
FBP-ERC-RIFS-WD-RI-1-0036
FXP022254L04
February 2014

Fluor-B&W Portsmouth, LLC

010004

Distribution Coefficient Tabulation

Fluor 16526.05.006
110614-8

TC-99

Sample ID	Day 0		Day 1		Day 2		Day 4		Day 7		Day 10		$C_{avg\ blk}$	err	Rel Err
	pCi/mL	err	pCi/mL	err	pCi/L	err	pCi/L	err	pCi/L	err	pCi/L	err			
Blank	154	10.0	149	9.74	147	9.66	148	9.72	147	9.67	152	9.93	**149.500**	**4.00**	**2.67%**
469498			137	9.08	134	8.93	126	8.53	120	8.22	127	8.57			
469498D			138	9.17	135	8.97	138	9.16	126	8.48	145	11.5			
469499			138	9.14	138	9.16	128	8.62	133	8.86	130	8.69			
469499D			137	9.08	133	8.90	135	9.01	127	8.58	127	8.54			
469500			130	8.74	125	8.47	130	8.69	124	8.42	121	8.27			
469500D			127	8.58	134	8.94	124	8.38	121	8.22	129	8.67			
469501			139	9.21	132	8.82	131	8.75	129	8.65	126	8.47			
469501D			131	8.78	136	9.06	125	8.43	137	9.14	133	8.90			
469506			135	9.02	130	8.72	138	9.18	130	8.72	130	8.70			
469506D			136	9.02	138	9.14	131	8.78	141	9.31	130	8.72			

Sample ID			Day 1		Day 2		Day 4		Day 7		Day 10		Report Kd (pooled)	
			K_d, mL/g	*U*	K_d, mL/g	*U*	K_d, mL/g	*U*	K_d, mL/g	*U*	K_d, mL/g	*U*	K_d, mL/g	*U*
Blank			0.08	1.94	0.43	1.97	0.25	1.96	0.43	1.97	-0.41	1.90	**0.155**	**0.872**
469498			2.52	2.12	3.21	2.17	5.18	2.33	6.83	2.46	4.91	2.30		
469498D			2.29	2.11	2.98	2.15	2.32	2.11	5.18	2.32	(rejected pt)			
469498-avg			2.41	1.49	3.10	1.53	3.75	1.57	6.00	1.69	4.91	1.15	**4.88**	**1.03**
469499			2.32	2.10	2.52	2.11	5.06	2.28	3.76	2.19	4.53	2.24		
469499D			2.77	2.12	3.74	2.19	3.23	2.16	5.37	2.31	5.34	2.30		
469499-avg			2.54	1.49	3.13	1.52	4.15	1.57	4.57	1.59	4.93	1.60	**4.55**	**0.917**
469500			4.45	2.25	5.82	2.35	4.43	2.24	6.06	2.37	6.95	2.43		
469500D			5.24	2.31	3.41	2.17	6.07	2.36	6.97	2.42	4.72	2.26		
469500-avg			4.84	1.61	4.62	1.60	5.25	1.63	6.51	1.69	5.84	1.66	**5.87**	**0.959**
469501			2.23	2.09	4.18	2.21	4.42	2.22	4.97	2.26	5.87	2.31		
469501D			4.19	2.23	3.13	2.14	6.12	2.34	2.85	2.13	3.89	2.19		
469501-avg			3.21	1.53	3.65	1.54	5.27	1.61	3.91	1.55	4.88	1.59	**4.69**	**0.916**
469506			3.19	2.16	4.12	2.24	2.28	2.11	4.09	2.24	4.13	2.24		
469506D			2.94	2.13	2.28	2.10	3.87	2.23	1.65	2.06	4.10	2.24		
469506-avg			3.06	1.52	3.20	1.54	3.08	1.53	2.87	1.52	4.11	1.59	**3.35**	**0.893**

$$Kd = \frac{\frac{200\ (C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids}}{C_{day\ x}}$$

Sample calc 469498 Day 7

$$\frac{\frac{200\ (1495 - 120)}{8.016 \times 0.8986}}{120} = 6.83\ mL/g$$

AR Sparks 8/24/11

010005

Fluor 16526.05.006
110614-8

Total U

Sample ID	Day 0		Day 1		Day 2		Day 4		Day 7		Day 10		Day 14		Day 21		$C_{avg\ blk}$	err	Rel Err
	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err			
Blank	4970	298	4560	274	4610	277	4660	280	4730	284	4660	280	4680	281	4510	271	**4672.50**	**99.16**	**2.12%**
469498			4470	268	4570	274	4570	274	4640	278	4720	283							
469498D			4480	269	4680	281	4740	284	4740	284	4650	279							
469499			4420	265	4500	270	4610	277	4560	274	4510	271							
469499D			4520	271	4550	273	4560	274	4470	268	4560	274							
469500			3550	213	3000	180	2200	132	2040	122	1810	109	1550	93	1860	112			
469500D			3780	227	3040	182	2180	131	1860	112	1910	115	1570	94	1360	82			
469501			4570	274	4450	267	4490	269	4420	265	4290	257							
469501D			4510	271	4530	272	4510	271	4320	259	4720	283							
469506			4500	270	4530	272	4580	275	4580	275	4480	269							
469506D			4400	264	4440	266	4570	274	4480	269	4400	264							

1.13

Sample ID			Day 1		Day 2		Day 4		Day 7		Day 10		Day 14		Day 21		Report Kd (pooled)		
			K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	U	K_d, mL/g	*U*	
Blank			0.617	1.82	0.339	1.80	0.067	1.78	-0.304	1.76	0.067	1.78	-0.040	1.77	0.901	1.83	**0.157**	**0.677**	
469498			1.25	1.85	0.622	1.81	0.623	1.81	0.194	1.79	-0.279	1.76							
469498D			1.18	1.85	-0.045	1.77	-0.396	1.75	-0.294	1.75	0.202	1.78					**0.079**	**0.629**	
469498-avg			1.22	1.31	0.289	1.27	0.114	1.26	-0.050	1.25	-0.038	1.25							Day 2-10
469499			1.74	1.87	1.16	1.84	0.409	1.80	0.748	1.82	1.09	1.83							
469499D			1.02	1.83	0.812	1.82	0.741	1.82	1.37	1.85	0.744	1.82					**0.884**	**0.645**	
469499-avg			1.38	1.31	0.985	1.29	0.575	1.28	1.06	1.30	0.916	1.29							Day 2-10
469500			9.38	2.29	16.5	2.69	33.2	3.63	38.0	3.90	46.7	4.39	59.7	5.11	44.9	4.27			
469500D			6.98	2.16	15.9	2.65	33.7	3.66	44.7	4.27	43.0	4.16	58.8	5.05	72.1	5.82	**58.9**	**2.55**	
469500-avg			8.18	1.57	16.2	1.89	33.5	2.57	41.4	2.89	44.8	3.02	59.2	3.59	58.5	3.61			Day 14-21
469501			0.70	1.81	1.57	1.86	1.27	1.84	1.79	1.87	2.81	1.92							
469501D			1.13	1.83	0.99	1.83	1.13	1.83	2.55	1.91	-0.32	1.76					**1.47**	**0.655**	
469501-avg			0.92	1.29	1.28	1.30	1.20	1.30	2.17	1.34	1.25	1.30							Day 2-10
469506			1.05	1.84	0.86	1.83	0.55	1.81	0.55	1.81	1.18	1.85							
469506D			1.69	1.88	1.44	1.86	0.62	1.81	1.18	1.85	1.69	1.88					**1.01**	**0.649**	
469506-avg			1.37	1.31	1.15	1.30	0.58	1.28	0.86	1.29	1.44	1.32							Day 2-10

$$Kd = \frac{200\ (C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids \times C_{day\ x}}$$

Sample calc 469498 Day 1

$$\frac{200\ (4672.5 - 4470)}{8.045 \times 0.898 \times 4470} = 1.25\ mL/g$$

8/24/11

010006

EXP 0234007

Distribution Coefficient pH Data

010008

Fluor 16526.05.006
110614-8

pH Data

Sample ID	Day 0	Day 1	Day 2	Day 4	Day 7	Day 10	Day 14	Day 21
	pH	pH	pH	pH	pH	pH	pH	pH
Blank	7.20	8.28	8.18	8.24	8.15	8.27	8.22	8.36
469498		7.99	8.49	8.49	8.45	8.54		
469498D		8.09	8.50	8.50	8.47	8.56		
469499		8.45	8.50	8.51	8.47	8.52		
469499D		8.30	8.51	8.51	8.45	8.53		
469500		8.22	8.30	8.27	8.17	8.07	8.16	8.29
469500D		8.30	8.28	8.24	8.16	8.16	8.05	8.04
469501		8.38	8.46	8.51	8.42	8.52		
469501D		8.37	8.45	8.52	8.46	8.50		
469506		8.45	8.51	8.53	8.52	8.55		
469506D		8.51	8.48	8.52	8.51	8.53		

R Spitz 8/25/11

Southwest Research Institute® Logbook: pH

010009

Analysis/Method: pH – Day 0 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110614-8; 110617-9

QC Source: p165-977 INOR#8310 01 7/12/11 mm TV: 7.13

Notes: QC range 6.99 - 7.27

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA				
4.0	4.01	8564	6/1/12	23.0
7.0	7.01	8562	8/1/12	23.0
10.0	10.02	8560	7/1/12	23.0
NA				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.18	NA	NA	NA	24.2
469486d469487	7.20 7/12/11 mm	NA	NA	NA	23.3
CCV	7.14	NA	NA	NA	24.2

7/12/11 mm

Analyst Signature: M. Mendoza Date: 7/12/11

Reviewed by: James Brodie Date: 7/19/11

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FRM-241 (Rev 2/Feb 04)

Southwest Research Institute® Logbook: pH

010010

Analysis/Method: PH DAY 1 9040B Project#: 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110614-8, 110617-9

QC Source: pH65-977 INORG#8301 TV: 7.13

Notes: QC Range 6.99-7.27

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8564	6/1/12	22.1
7.0	7.01	8562	8/1/12	22.1
10.0	10.03	8560	7/1/12	22.1
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.15	N/A	N/A	N/A	22.0
DAY1 Blank	8.28				23.7
469498 DI	7.99				23.6
469498D DI	8.09				23.5
469499 DI	8.45				23.5
469499D DI	8.30				23.5
469500 DI	8.22				23.6
469500D DI	8.30				23.5
469501 DI	8.38				23.4
469501D DI	8.37				23.4
469506 DI	8.45				23.4
469506D DI	8.51				23.5
CCV	7.16				22.1

mrp 7/18/11

Analyst Signature: James Moden Date: 7/13/11

Reviewed by: Mary Herrera Date: 08/08/11

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Southwest Research Institute® Logbook: pH 110011

TO JAM 7/14/11

Analysis/Method: PH 9040B Project#: 16526.03.006, 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110624-8, 110614-8, 110617-9

QC Source: P165-977 INORG# 8301 TV: 7.13

Notes: QC Range 6.99-7.27

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8564	6/1/12	22.6
7.0	7.01	8562	8/1/12	22.4
10.0	10.03	8560	7/1/12	22.6
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.15	N/A	N/A	N/A	22.6
IDAB Adjust	4.85	N/A	N/A	5.39	23.4
CCV	7.16	N/A	N/A	N/A	22.6
					QA 08/8/11
ICV	7.14	N/A	N/A	N/A	22.6
DAY 2 Blank	8.18				23.5
469498 D2	8.49				23.8
469498D D2	8.50				23.9
469499 D2	8.50				23.9
469499D D2	8.51				23.9
469500 D2	8.30				23.5
469500D D2	8.28				23.2
469501 D2	8.46				24.3
469501D D2	8.45				23.5
469506 D2	8.51				23.2
469506D D2	8.48				23.5
CCV	7.14				23.0
					QA 09/8/11

Analyst Signature: James Graham Date: 7/14/11

Reviewed by: Mary Clemens Date: 08/8/11

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Southwest Research Institute® Logbook: pH

010012

Analysis/Method: pH DAY 4 9040B Project#: 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110614-8, 110617-9

QC Source: P165-977 INORG # 8301 TV: 7.13 S.U.

Notes: QC Range 6.99 - 7.27 S.U.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA				
4.0	4.00	8564	6/1/12	22.2
7.0	7.01	8562	8/1/12	22.2
10.0	10.03	8560	7/1/12	22.2
NA				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.15	N/A	N/A	N/A	22.0
DAY4 Blank	8.24				22.4
469498 DH	8.49				23.1
469498D DH	8.50				22.9
469499 DH	8.51				23.2
469499D DH	8.51				23.0
469500 DH	8.27				23.3
469500D DH	8.24				23.2
469501 DH	8.51				23.1
469501D DH	8.52				23.3
469506 DH	8.53				23.4
469506D DH	8.52				23.2
CCV DH	7.17	↓	↓	↓	23.2
		MRC 7/18/11			

Analyst Signature: [signature] Date: 7/16/11

Reviewed by: [signature] Date: 08/25/11

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Southwest Research Institute® Logbook: pH 0013

Analysis/Method: pH Day 7 90403 Project#: 16526.05.0006, 16622.01.0006

Client: Fluor-B&W Portsmouth [redacted] Environmental TO#: 110614-8, 110617-9, 110705-4

QC Source: P165977 INORG# 8301 TV: 7.13

Notes: QC Range 6.99 - 7.27

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
2.0	2.00	8904	6/1/12	22.3
4.0	4.00	8564	6/1/12	22.4
7.0	7.00	8562	8/1/12	22.4
10.0	10.00	8560	7/1/12	22.4

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.19	N/A	N/A	N/A	22.9
Day 7 Blank	8.15				23.4
469448 D7	8.45				23.3
469448D D7	8.47				23.3
469449 D7	8.47				23.6
469449D D7	8.45				23.6
469500 D7	8.17				23.1
469500D D7	8.16				23.2
469501 D7	8.42				23.1
469501D D7	8.46				23.1
469506 D7	8.52				23.2
469506D D7	8.51				23.1
CCV	7.18				23.0
470776	2.04				23.1
CCV2	7.19				23.1
		RSS 7/19/11			

Analyst Signature: [signature] Date: 7/19/11

Reviewed by: [signature] Date: 7/19/11

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Southwest Research Institute® Logbook: pH

010014

Analysis/Method: PH DAY 10 9040B Project#: 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110614-X, 110617-9

QC Source: P165-977 INORG# 8301 TV: 7.13 S.U.

Notes: QC Range 6.99 - 7.27 S.U.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A	—	—	—	—
4.0	4.00	8564	6/1/12	22.2
7.0	7.01	8562	8/1/12	22.2
10.0	10.03	8560	7/1/12	22.2
N/A	—	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.17	N/A	N/A	N/A	22.2
DAY 10 Blank	8.27				22.9
469498 DIO	8.54				22.8
469498D DIO	8.56				23.0
469499 DIO	8.52				22.9
469499D DIO	8.53				22.9
469500 DIO	8.07				23.1
469500D DIO	8.16				22.9
469501 DIO	8.52				22.9
469501D DIO	8.50				22.9
469506 DIO	8.55				22.9
469506D DIO	8.53				22.9
CCV	7.16				22.2
			08/18/11		

Analyst Signature: James Mother Date: 7/22/11

Reviewed by: Jay Turner Date: 08/18/11

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Southwest Research Institute® Logbook: pH

010015

Analysis/Method: pH DAY 14 9040B TIOAB Project#: 16526.05.0006

Client: Fluor B&W Portsmouth TO#: 110614-8, 110617-9

QC Source: P165-977 INORG#8301 TV: 7.13 S.U.

Notes: QC Range 6.99 - 7.27 S.U.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A	—	—	—	—
4.0	4.00 TEJAM 7/26/11	8564	6/1/12	22.3
7.0	7.01	8562	8/1/12	22.2
10.0	10.03	8560	7/1/12	22.3
N/A	—	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.16	N/A	N/A	N/A	22.2
32-01-WC05	4.82	N/A	N/A	7.37	23.1
DOY14 Blank	8.22			N/A	22.4
469498	8.50				22.4
469498D	8.46				22.4
469499	8.46				22.5
469499D	8.50				22.5
469500	8.16				22.4
469500D	8.05				22.4
469501	8.54				22.4
469501D	8.52				22.6
469506	8.54				22.5
469506D	8.53				22.5
CCV	7.14	↓	↓	↓	22.2

Analyst Signature: James Waters Date: 7/26/11

Reviewed by: [signature] Date: 08/25/11

Southwest Research Institute® Logbook: pH

010016

Analysis/Method: pH DAY 21 9040B Project#: 16526.05.006

Client: Fluor - B&W Portsmouth TO#: 110614-8, 110617-9

QC Source: PIGS-977 INORG# 8301 TV: 7.13 S.U.

Notes: QC Range 6.99-7.27 S.U.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A	—	—	—	—
4.0	4.01	8564	6/1/12	22.8
7.0	7.01	8562	8/1/12	22.6
10.0	10.02	8560	7/1/12	22.8
N/A	—	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.16	N/A	N/A	N/A	22.7
DAY21 BLANK	8.36				22.9
*~~469998~~ 469498	8.67				23.2
*~~469998D~~ 469498D	8.67				23.4
469499	8.66				23.1
469499D	8.64				23.1
469500	8.29				23.4
469500D	8.04				23.1
469501	8.63				23.1
469501D	8.62				23.1
469506	8.66				23.1
469506D	8.64				23.1
CCV	7.15	↓	↓	↓	22.8
		QCU 08/25/11			
* REJAM 8/2/11					

Analyst Signature: James Nolan Date: 8/2/11

Reviewed by: Mary Herrera Date: 08/25/11

OTS 00 269

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Distribution Coefficient Prep

Fluor 16526.05.006
110614-8

Prep Information

Sample ID			Day 1		Day 2		Day 4		Day 7		Day 10		Day 14		Day 21	
		% Solids	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL
Blank				200		200		200		200		200				
469498		89.86%	8.045	200	8.027	200	8.015	200	8.016	200	8.033	200				
469498D		89.86%	8.084	200	8.012	200	8.008	200	8.020	200	8.026	200				
469499		82.29%	8.001	200	8.045	200	8.060	200	8.012	200	8.056	200				
469499D		82.29%	8.017	200	8.062	200	8.091	200	8.017	200	8.058	200				
469500		84.00%	8.026	200	8.023	200	8.065	200	8.083	200	8.065	200	8.039	200	8.019	200
469500D		84.00%	8.050	200	8.066	200	8.067	200	8.051	200	8.012	200	8.008	200	8.039	200
469501		79.34%	8.025	200	8.004	200	8.059	200	8.066	200	8.010	200				
469501D		79.34%	8.012	200	8.001	200	8.068	200	8.058	200	8.044	200				
469506		90.84%	8.047	200	8.022	200	8.049	200	8.070	200	8.006	200				
469506D		90.84%	8.052	200	8.030	200	8.028	200	8.025	200	8.048	200				

RSplis 8/24/11

0100018

0010019

Southwest Research Institute

Electronic Bench Sheet

% Solids

7/15/11

Project #: 16526.05.002
Client: Fluor - B&W Portsmouth LLC
Method: %solid
TO# 110614-8

Date: 07/01/11
Analyst: James Moken

Sample ID	A Tare Wt(g)	B Wet Sample + Tare Wt(g)	(B - A) Wet Sample Wt(g)	C Dried Sample + Tare Wt(g)	(C - A) Dried Sample Wt(g)	% Solids	RPD
PB	0.9522	0.9522	0.0000	0.9523	0.0001	<0.05	
469498	0.9517	11.3262	10.3745	10.2747	9.3230	89.86	
469499	0.9499	11.1465	10.1966	9.3404	8.3905	82.29	
469499	0.9524	11.1573	10.2049	9.5244	8.5720	84.00	2.06%
469500	0.9534	11.3916	10.4382	9.2348	8.2814	79.34	
469501	0.9535	11.4234	10.4699	10.2631	9.3096	88.92	
469506	0.9509	11.3357	10.3848	10.3841	9.4332	90.84	

% Solids = Dried Sample Wt(g)*100 / Wet Sample Wt(g)

Sample calculation : 469498

$$\frac{9.3230\,g \times 100}{10.3745\,g} = 89.86\%$$

010020

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid Project# 16526.05.002

Client: Fluor - B&W Portsmouth LLC TO# 110614-8

LCS Info: N/A TV= N/A Balance#: 12

Notes: in oven #31 8:05 am 7/1/11

out oven #31 7:30 am 7/5/11

Sample ID	tare wt (g)	sample + tare (g)	dried + tare (g)		
PB	0.9522	0.9522	0.9523		
469498	0.9517	11.3262	10.2747		
469499	0.9499	11.1465	9.3404		
469499D	0.9524	11.1573	9.5244		
469500	0.9534	11.3916	9.2348		
469501	0.9535	11.4234	10.2631		
469506	0.9509	11.3357	10.3841		

mm 7/27/11

Calculation:

WD SAM 7/11/11

Analyst Signature: James Mateka Date: 7/1/11

Reviewed by: [signature] Date: 7/15/11

Logbook # Page # 10 145

Southwest Research Institute
WC Sample Prep Logbook

Book/Page:_15_ 0082_ Book I.D. # _I0-0406-057_

Analysis: ASTM-C1733 Project #: 16526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110614-8
Client: Floor-Portsmouth TAP#:

Balance ID: RE JAM 7/11/11 88 89 Pipette ID: 5000-____ 1000-____ 200-____
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: started shaking 6:15pm

Sample ID	Sample Wt (g) Sample Vol (ml)	Final Volume (ml)			
469498 D1	8.0458 g RE JAM 7/11/11	200mL	filtered, took pH, and adjusted to <2 with nitric acid 7/13/11		
469498D D1	8.084 g				
469498 D2	8.027 g		7/14/11		
469498D D2	8.012 g				
469498 D4	8.015 g		7/16/11		
469498D D4	8.008 g				
469498 D7	8.016 g		7/19/11		
469498D D7	8.020 g				
469498 D10	8.033		7/22/11		
469498D D10	8.026				
469498 D14	8.049		7/26/11		
469498D D14	8.054				
469498 D21	8.047		8/2/11		
469498D D21	8.037				
469498 DX	8.056				
469498D DX	8.066				
469499 D1	8.001		filtered, took pH, and adjusted pH <2 with nitric acid 7/13/11		
469499D D1	8.045 17 JE SAM 7/11/11				
469499 D2	8.045		7/14/11		
469499D D2	8.062				
469499 D4	8.060		7/16/11		

Analyst Signature: [signature] Date: weighed 7/11/11 volumes 7/12/11
Reviewed by: [signature] Date: 7/21/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 0083_ Book I.D. # _10-0406-057_

Analysis: ASTM - C1733 Project #: 16526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110614-8
Client: Fluor- B&W Portsmouth TAP#:

Balance ID: 89 Pipette ID: 5000-____ 1000-____ 200-____
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: started shaking 6:15

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	filtered, took pH, and adjusted to <2 with nitric acid		
469499D D4	8.091	200mL	7/16/11		
469499 D7	8.012		7/19/11		
469499D D7	8.017				
469499 D10	8.056		7/22/11		
469499D D10	8.058				
469499 D14	8.018		7/26/11		
469499D D14	8.065				
469499 D21	8.032		8/2/11		
469499D D21	8.021				
469499 DX	8.010				
469499D DX	8.023				
469500 D1	8.026		7/13/11		
469500D D1	8.050				
469500 D2	8.023		7/14/11		
469500D D2	8.066				
469500 D4	8.065		7/16/11		
469500D D4	8.067				
469500 D7	8.083		7/19/11		
469500D D7	8.051				
469500 D10	8.065		7/22/11		
469500D D10	8.012				

Analyst Signature: James Martin Date: weighed 7/11/11 volumed 7/13/11
Reviewed by: RAmer Date: 7/21/11

Southwest Research Institute
WC Sample Prep Logbook

010023

Book/Page:_15_ 0084_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733 Project #: 160526.05.0006

Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110614-8

Client: Fluor-B&W Portsmouth TAP#:

Balance ID: 89 Pipette ID: 5000-____ 1000-____ 200-____

Digestion Apparatus: N/A Temperature: N/A

LCS ID: N/A LCS TV = N/A

Notes / Prep: started shaking @ 15gm

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	filtered, took pH, adjusted to <2 with nitric acid		
469500 D14	8.039	200mL	7/26/11		
469500D D14	8.008				
469500 D21	8.019		8/2/11		
469500D D21	8.039				
469500 DX	8.023				
469500D DX	8.043				
469501 D1	8.025		7/13/11		
469501 D D1	8.012				
469501 D2	8.004		7/14/11		
469501 D D2	8.001				
469501 D4	8.059		7/16/11		
469501D D4	8.068				
469501 D7	8.066		7/19/11		
469501 D D7	8.058				
469501 D10	8.010		7/22/11		
469501D D10	8.044				
469501 D14	8.036		7/26/11		
469501D D14	8.031				
469501 D21	8.089		8/2/11		
469501D D21	8.072				
469501 DX	8.048				

Analyst Signature: James Madera Date: weight: 7/11/11 volumed 7/12/11

Reviewed by: [signature] Date: 7/21/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 0085_

Book I.D. # _10-0406-057_

Analysis: ASTM- C1733
Method (circle) Digestion / Distillation / Extraction / Bomb
Client: Fluor-B&W Portsmouth

Project #: 166526.05.006
Task Order#: 110614-8
TAP#:

Balance ID: 89
Digestion Apparatus: N/A
LCS ID: N/A

Pipette ID: 5000-___ 1000-___ 200-___
Temperature: N/A
LCS TV = N/A

Notes / Prep: started shaking 6:15pm

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	filtered, took pH, adjusted ph <2 with nitric acid
469501 D DX	8.051	200mL	
469506 D1	8.047		7/13/11
469506D D1	8.052		
469506 D2	8.022		7/14/11
469506D D2	8.030		
469506 D4	8.049		7/16/11
469506D D4	8.028		
469506 D7	8.070		7/19/11
469506D D7	8.025		
469506 D10	8.006		7/22/11
469506D D10	8.048		
469506 D14	8.064		7/26/11
469506D D14	8.068		
468506 D21	8.069		8/2/11
469506D D21	8.047		
469506 DX	8.078		
469506D DX	8.069		
Day1 Blank	—	- 7/13/11	
Day2 Blank	—	- 7/14/11	
Day4 Blank	—	- 7/16/11	
Day7 Blank	—	- 7/19/11	

Analyst Signature: James Maher
Date: weighed: 7/11/11 volumed 7/12/11

Reviewed by: [illegible]
Date: 7/21/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 0086_ Book I.D. # _I0-0406-057_

Analysis: ASTM C1733 Project #: 16526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110614-8
Client: Fluor - B&W Portsmouth TAP#:

Balance ID: 84 Pipette ID: 5000-____ 1000-____ 200-____
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: started shaking 6:15pm

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	filtered thru 0.45 pH, acidified to pH<2 with Nitric Acid		
Day 10 Blank	—	200mL	-7/22/11		
Day 14 Blank	—	↓	-7/26/11		
Day 21 Blank	—		-8/2/11		
Day X Blank	—				

ASTM 7/12/11

Analyst Signature: James Mahen Date: weighed: 7/11/11 volumed 7/12/11
Reviewed by: [signature] Date: 7/21/11

Tc99 Data for Distribution Coefficient

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11 WAN

✓ JW 08/25/11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWG25JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG25JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG25JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
469498-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469498D-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469499-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469499D-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469500-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469500D-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469501-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469501D-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469506-1	0.10	50.0	0.00200	50.0	0.100	10.00		
469506D-1	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-0	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-1	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010027

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	350.54	14.42	8.73	14.62	98.66	
BKG-2	Tc-99	Water	60	338.02	13.86	8.87	14.09	98.37	
				AVG BKG	14.14	AVG BKG	14.35		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWG25JV1	Tc-99	Water	60	331.83	15.55	8.30	1.44	98.11		6.47E+00	3.25E+00	1.06E+01	3.23E+00		PB > 1.65*TPU	
LCSWG25JV1	Tc-99	Water	60	365.87	1110.02	0.78	1107.29	98.97		4.99E+03	2.88E+02	1.05E+01	1.97E+01	5000	99.8%	-0.002
LCSWG25JV2	Tc-99	Water	60	349.38	1100.77	0.78	1101.72	98.63		4.96E+03	2.87E+02	1.05E+01	1.97E+01	5000	99.3%	-0.007
469498-1	Tc-99	Water	60	336.66	43.97	4.29	30.34	98.31		1.37E+02	9.08E+00	1.06E+01	4.51E+00	RPD	Dup Evaluation	
469498D-1	Tc-99	Water	60	351.63	44.48	4.26	30.75	98.68		1.38E+02	9.17E+00	1.05E+01	4.51E+00	1.32	0.14	Pass
469499-1	Tc-99	Water	60	341.71	44.27	4.28	30.60	98.48		1.38E+02	9.14E+00	1.06E+01	4.51E+00	RPD	Dup Evaluation	
469499D-1	Tc-99	Water	60	336.77	43.97	4.30	30.34	98.32		1.37E+02	9.08E+00	1.06E+01	4.51E+00	0.84	0.09	Pass
469500-1	Tc-99	Water	60	320.37	42.35	4.39	28.89	97.63		1.30E+02	8.74E+00	1.06E+01	4.48E+00	RPD	Dup Evaluation	
469500D-1	Tc-99	Water	60	331.35	41.86	4.43	28.26	98.09		1.27E+02	8.58E+00	1.06E+01	4.44E+00	2.22	0.23	Pass
469501-1	Tc-99	Water	60	343.19	44.55	4.26	30.87	98.51		1.39E+02	9.21E+00	1.06E+01	4.52E+00	RPD	Dup Evaluation	
469501D-1	Tc-99	Water	60	342.87	42.83	4.36	29.13	98.50		1.31E+02	8.78E+00	1.06E+01	4.46E+00	5.81	0.62	Pass
469506-1	Tc-99	Water	60	317.92	43.42	4.33	30.02	97.52		1.35E+02	9.02E+00	1.07E+01	4.52E+00	RPD	Dup Evaluation	
469506D-1	Tc-99	Water	60	336.13	43.71	4.31	30.08	98.29		1.36E+02	9.02E+00	1.06E+01	4.50E+00	0.20	0.02	Pass
Blank-0	Tc-99	Water	60	331.92	47.75	4.08	34.26	98.11		1.54E+02	1.00E+01	1.06E+01	4.66E+00			
Blank-1	Tc-99	Water	60	340.16	46.68	4.15	33.06	98.44		1.49E+02	9.74E+00	1.06E+01	4.61E+00			

Notes: _____

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	**5.77%**

010023

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11 WMN

✓ JLW 08/25/11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWG25JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG25JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG25JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
469498-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469498D-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469499-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469499D-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469500-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469500D-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469501-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469501D-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469506-2	0.10	50.0	0.00200	50.0	0.100	10.00		
469506D-2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-2	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010029

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	Raw cpm	Raw %error	Raw dpm	Raw eff-1	
BKG-1	Tc-99	Water	60	350.54	14.42	8.73	14.62	98.66	
BKG-2	Tc-99	Water	60	338.02	13.86	8.87	14.09	98.37	
				AVG BKG	14.14	AVG BKG	14.35		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWG25JV2	Tc-99	Water	60	355.60	15.37	8.37	1.25	98.76		**5.61E+00**	**3.22E+00**	**1.05E+01**	**3.20E+00**		PB > 1.65*TPU	
LCSWG25JV3	Tc-99	Water	60	345.86	1098.42	0.78	1100.12	98.56		**4.96E+03**	**2.86E+02**	**1.05E+01**	**1.97E+01**	5000	99.1%	-0.009
LCSWG25JV4	Tc-99	Water	60	334.73	1102.23	0.78	1107.70	98.23		**4.99E+03**	**2.88E+02**	**1.06E+01**	**1.98E+01**	5000	99.8%	-0.002
469498-2	Tc-99	Water	60	340.92	43.42	4.32	29.74	98.46		**1.34E+02**	**8.93E+00**	**1.06E+01**	**4.48E+00**	RPD	Dup Evaluation	
469498D-2	Tc-99	Water	60	350.29	43.67	4.30	29.93	98.65		**1.35E+02**	**8.97E+00**	**1.05E+01**	**4.48E+00**	0.66	0.07	Pass
469499-2	Tc-99	Water	60	317.17	43.99	4.28	30.62	97.49		**1.38E+02**	**9.16E+00**	**1.07E+01**	**4.55E+00**	RPD	Dup Evaluation	
469499D-2	Tc-99	Water	60	343.57	43.31	4.33	29.61	98.51		**1.33E+02**	**8.90E+00**	**1.06E+01**	**4.47E+00**	3.34	0.36	Pass
469500-2	Tc-99	Water	60	344.34	41.59	4.43	27.86	98.53		**1.25E+02**	**8.47E+00**	**1.05E+01**	**4.41E+00**	RPD	Dup Evaluation	
469500D-2	Tc-99	Water	60	314.74	43.05	4.34	29.68	97.39		**1.34E+02**	**8.94E+00**	**1.07E+01**	**4.52E+00**	6.34	0.67	Pass
469501-2	Tc-99	Water	60	332.22	42.86	4.36	29.27	98.12		**1.32E+02**	**8.82E+00**	**1.06E+01**	**4.47E+00**	RPD	Dup Evaluation	
469501D-2	Tc-99	Water	60	356.35	44.05	4.30	30.28	98.78		**1.36E+02**	**9.06E+00**	**1.05E+01**	**4.49E+00**	3.39	0.36	Pass
469506-2	Tc-99	Water	60	357.79	42.70	4.37	28.90	98.81		**1.30E+02**	**8.72E+00**	**1.05E+01**	**4.44E+00**	RPD	Dup Evaluation	
469506D-2	Tc-99	Water	60	326.72	44.05	4.30	30.55	97.89		**1.38E+02**	**9.14E+00**	**1.06E+01**	**4.53E+00**	5.55	0.59	Pass
Blank-2	Tc-99	Water	60	346.84	46.38	4.16	32.70	98.58		**1.47E+02**	**9.66E+00**	**1.05E+01**	**4.59E+00**			

Notes: _____

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	**5.77%**

010030

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11 WAN

✓ JW 08/25/11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWG26JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG26JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG26JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
469498-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469498D-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469499-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469499D-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469500-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469500D-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469501-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469501D-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469506-4	0.10	50.0	0.00200	50.0	0.100	10.00		
469506D-4	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-4	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010031

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	350.54	14.42	8.73	14.62	98.66	
BKG-2	Tc-99	Water	60	338.02	13.86	8.87	14.09	98.37	
				AVG BKG	14.14	AVG BKG	14.35		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWG26JV1	Tc-99	Water	60	347.09	14.52	8.75	0.39	98.59		**1.74E+00**	**3.16E+00**	**1.05E+01**	**3.16E+00**		PB < 1.65*TPU	
LCSWG26JV1	Tc-99	Water	60	333.19	1097.72	0.78	1103.89	98.16		**4.97E+03**	**2.87E+02**	**1.06E+01**	**1.98E+01**	5000	99.4%	-0.006
LCSWG26JV2	Tc-99	Water	60	348.79	1093.58	0.78	1094.54	98.62		**4.93E+03**	**2.85E+02**	**1.05E+01**	**1.96E+01**	5000	98.6%	-0.014
469498-4	Tc-99	Water	60	341.24	41.79	4.43	28.08	98.47		**1.26E+02**	**8.53E+00**	**1.06E+01**	**4.42E+00**	RPD	Dup Evaluation	
469498D-4	Tc-99	Water	60	350.59	44.42	4.26	30.69	98.66		**1.38E+02**	**9.16E+00**	**1.05E+01**	**4.51E+00**	8.89	0.94	Pass
469499-4	Tc-99	Water	60	338.75	42.13	4.41	28.45	98.40		**1.28E+02**	**8.62E+00**	**1.06E+01**	**4.43E+00**	RPD	Dup Evaluation	
469499D-4	Tc-99	Water	60	337.47	43.69	4.31	30.05	98.34		**1.35E+02**	**9.01E+00**	**1.06E+01**	**4.50E+00**	5.48	0.58	Pass
469500-4	Tc-99	Water	60	353.15	42.54	4.39	28.77	98.71		**1.30E+02**	**8.69E+00**	**1.05E+01**	**4.44E+00**	RPD	Dup Evaluation	
469500D-4	Tc-99	Water	60	346.41	41.22	4.45	27.47	98.57		**1.24E+02**	**8.38E+00**	**1.05E+01**	**4.39E+00**	4.62	0.48	Pass
469501-4	Tc-99	Water	60	347.28	42.73	4.37	29.00	98.59		**1.31E+02**	**8.75E+00**	**1.05E+01**	**4.45E+00**	RPD	Dup Evaluation	
469501D-4	Tc-99	Water	60	340.86	41.41	4.44	27.70	98.46		**1.25E+02**	**8.43E+00**	**1.06E+01**	**4.40E+00**	4.59	0.48	Pass
469506-4	Tc-99	Water	60	336.21	44.35	4.26	30.74	98.29		**1.38E+02**	**9.18E+00**	**1.06E+01**	**4.52E+00**	RPD	Dup Evaluation	
469506D-4	Tc-99	Water	60	350.37	42.88	4.35	29.13	98.65		**1.31E+02**	**8.78E+00**	**1.05E+01**	**4.45E+00**	5.35	0.57	Pass
Blank-4	Tc-99	Water	60	321.55	46.28	4.17	32.90	97.68		**1.48E+02**	**9.72E+00**	**1.06E+01**	**4.63E+00**			

Notes:

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	**5.77%**

0100032

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11
WAN

✓ JTW 08/25/11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWG26JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG26JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWG26JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
469498-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469498D-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469499-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469499D-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469500-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469500D-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469501-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469501D-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469506-7	0.10	50.0	0.00200	50.0	0.100	10.00		
469506D-7	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-7	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010033

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	Raw cpm	Raw %error	Raw dpm	Raw eff-1	
BKG-1	Tc-99	Water	60	350.54	14.42	8.73	14.62	98.66	
BKG-2	Tc-99	Water	60	338.02	13.86	8.87	14.09	98.37	
				AVG BKG	14.14	AVG BKG	14.35		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWG26JV2	Tc-99	Water	60	349.31	15.52	8.30	1.40	98.63		**6.30E+00**	**3.23E+00**	**1.05E+01**	**3.21E+00**		PB > 1.65*TPU	
LCSWG26JV3	Tc-99	Water	60	330.63	1099.09	0.78	1106.41	98.06		**4.98E+03**	**2.88E+02**	**1.06E+01**	**1.98E+01**	5000	99.7%	-0.003
LCSWG26JV4	Tc-99	Water	60	344.98	1098.36	0.78	1100.28	98.54		**4.96E+03**	**2.86E+02**	**1.05E+01**	**1.97E+01**	5000	99.1%	-0.009
469498-7	Tc-99	Water	60	318.22	40.23	4.52	26.75	97.54		**1.20E+02**	**8.22E+00**	**1.07E+01**	**4.40E+00**	RPD	Dup Evaluation	
469498D-7	Tc-99	Water	60	345.60	41.62	4.42	27.88	98.56		**1.26E+02**	**8.48E+00**	**1.05E+01**	**4.41E+00**	4.15	0.43	Pass
469499-7	Tc-99	Water	60	360.46	43.30	4.33	29.50	98.86		**1.33E+02**	**8.86E+00**	**1.05E+01**	**4.46E+00**	RPD	Dup Evaluation	
469499D-7	Tc-99	Water	60	339.75	42.00	4.42	28.30	98.44		**1.27E+02**	**8.58E+00**	**1.06E+01**	**4.43E+00**	4.13	0.44	Pass
469500-7	Tc-99	Water	60	297.99	40.95	4.47	27.55	97.30		**1.24E+02**	**8.42E+00**	**1.07E+01**	**4.44E+00**	RPD	Dup Evaluation	
469500D-7	Tc-99	Water	60	329.53	40.38	4.53	26.77	98.01		**1.21E+02**	**8.22E+00**	**1.06E+01**	**4.38E+00**	2.88	0.30	Pass
469501-7	Tc-99	Water	60	333.54	42.18	4.39	28.56	98.18		**1.29E+02**	**8.65E+00**	**1.06E+01**	**4.45E+00**	RPD	Dup Evaluation	
469501D-7	Tc-99	Water	60	315.53	43.87	4.29	30.52	97.42		**1.37E+02**	**9.14E+00**	**1.07E+01**	**4.55E+00**	6.63	0.70	Pass
469506-7	Tc-99	Water	60	327.12	42.36	4.38	28.82	97.91		**1.30E+02**	**8.72E+00**	**1.06E+01**	**4.46E+00**	RPD	Dup Evaluation	
469506D-7	Tc-99	Water	60	335.90	44.87	4.24	31.27	98.28		**1.41E+02**	**9.31E+00**	**1.06E+01**	**4.55E+00**	8.14	0.86	Pass
Blank-7	Tc-99	Water	60	335.22	46.31	4.16	32.74	98.25		**1.47E+02**	**9.67E+00**	**1.06E+01**	**4.60E+00**			

Notes:

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	**5.77%**

010034

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11
WAN

✓ JTW 08/25/11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
469498-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469498D-10	0.10	50.0	0.00200	25.0	0.050	20.00		
469499-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469499D-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469500-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469500D-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469501-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469501D-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469506-10	0.10	50.0	0.00200	50.0	0.100	10.00		
469506D-10	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-10	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

0100035

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110614-8
Prep Page: 12-077, 12-078, 12-079, 12-080
Prep Date: 25-Jul-11

Project #: 16526.05.00X
SRR: 44937
RL: 12 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	Raw cpm	Raw %error	Raw dpm	Raw eff-1	
BKG-1	Tc-99	Water	60	350.54	14.42	8.73	14.62	98.66	
BKG-2	Tc-99	Water	60	338.02	13.86	8.87	14.09	98.37	
				AVG BKG	14.14	AVG BKG	14.35		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
469498-10	Tc-99	Water	60	343.09	41.97	4.41	28.25	98.50		**1.27E+02**	**8.57E+00**	**1.06E+01**	**4.42E+00**	RPD	Dup Evaluation	
469498D-10	Tc-99	Water	60	352.47	30.07	5.40	16.14	98.70		**1.45E+02**	**1.15E+01**	**2.11E+01**	**7.84E+00**	13.30	1.27	Pass
469499-10	Tc-99	Water	60	355.31	42.56	4.37	28.78	98.75		**1.30E+02**	**8.69E+00**	**1.05E+01**	**4.43E+00**	RPD	Dup Evaluation	
469499D-10	Tc-99	Water	60	365.91	42.03	4.42	28.18	98.97		**1.27E+02**	**8.54E+00**	**1.05E+01**	**4.40E+00**	2.10	0.22	Pass
469500-10	Tc-99	Water	60	322.23	40.47	4.51	26.95	97.70		**1.21E+02**	**8.27E+00**	**1.06E+01**	**4.40E+00**	RPD	Dup Evaluation	
469500D-10	Tc-99	Water	60	325.68	42.15	4.39	28.63	97.85		**1.29E+02**	**8.67E+00**	**1.06E+01**	**4.46E+00**	6.03	0.63	Pass
469501-10	Tc-99	Water	60	346.39	41.61	4.43	27.87	98.57		**1.26E+02**	**8.47E+00**	**1.05E+01**	**4.41E+00**	RPD	Dup Evaluation	
469501D-10	Tc-99	Water	60	337.43	43.27	4.32	29.62	98.34		**1.33E+02**	**8.90E+00**	**1.06E+01**	**4.48E+00**	6.10	0.64	Pass
469506-10	Tc-99	Water	60	336.45	42.45	4.38	28.80	98.30		**1.30E+02**	**8.70E+00**	1.06E+01	**4.45E+00**	RPD	Dup Evaluation	
469506D-10	Tc-99	Water	60	354.99	42.69	4.37	28.91	98.75		**1.30E+02**	**8.72E+00**	**1.05E+01**	**4.44E+00**	0.39	0.04	Pass
Blank-10	Tc-99	Water	60	344.28	47.46	4.11	33.82	98.53		**1.52E+02**	**9.93E+00**	**1.05E+01**	**4.63E+00**			

Notes: _____

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	**5.77%**

010036

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20110727_1111\Replay_20110825_134149
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20110727_1111\20110727_1111.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Floor BtW Portsmouth
165126.05.00K
TO# 110614-8
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010037

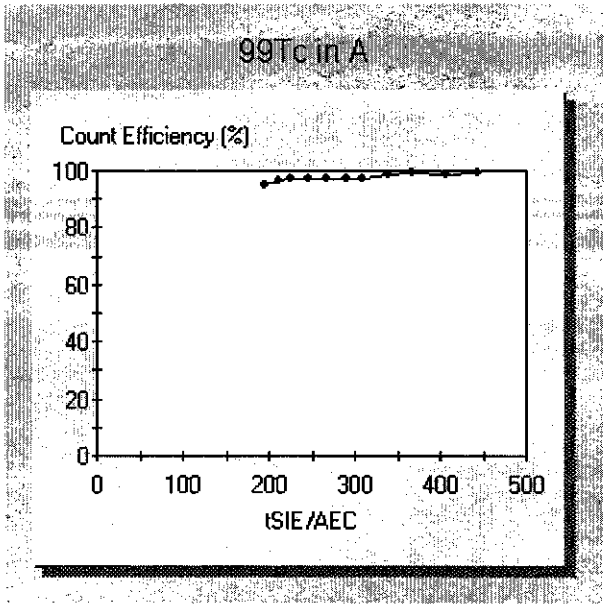
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 18.93 Date Processed: 8/25/2011 12:33:32 PM
14C Chi Square: 11.73 Date Processed: 8/25/2011 12:33:32 PM
3H E^2/B (1-18.6 keV): 1341.70 Date Processed: 8/25/2011 12:33:32 PM
14C E^2/B (4-156 keV): 5184.47 Date Processed: 8/25/2011 12:33:32 PM
3H Efficiency (1-18.6 keV): 64.75 Date Processed: 8/25/2011 12:33:32 PM
14C Efficiency (4-156 keV): 93.59 Date Processed: 8/25/2011 12:33:32 PM
IPA Background Date Processed: 8/25/2011 12:33:32 PM
3H Background CPM (1-18.6 keV): 3.13 Date Processed: 8/25/2011 12:33:32 PM
14C Background CPM (4-156 keV): 1.69 Date Processed: 8/25/2011 12:33:32 PM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

0110038



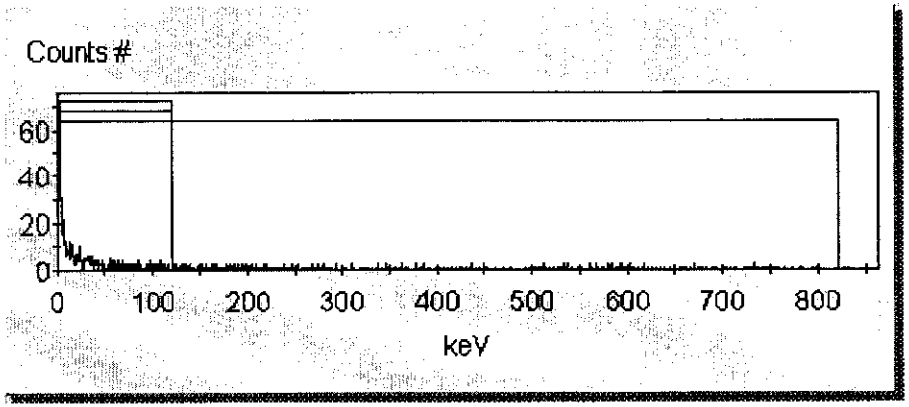
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL_ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE		TIME	Eff Nucl In A									
1	5	1	60.00	Bkg-1	14.42	15	462.66	350.54		8.73	0:00:02	18
7/27/2011		11:12:29 AM	98.66									

0140039

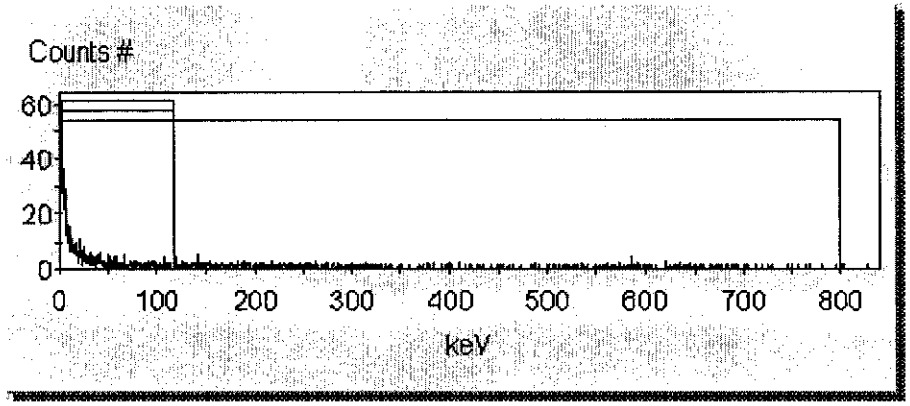
SpectraView Block Data



---

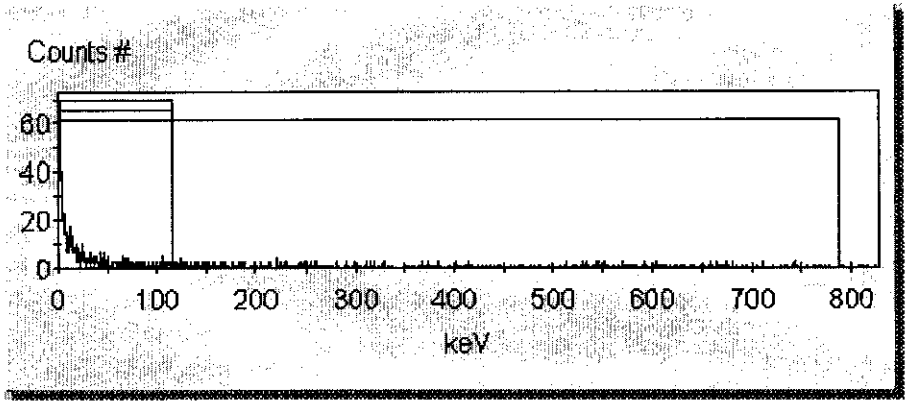
2 5 1 60.00 Bkg-2 13.86 14 433.50 338.02 8.87 0:00:03 17
7/27/2011 12:14:01 PM 98.37

SpectraView Block Data



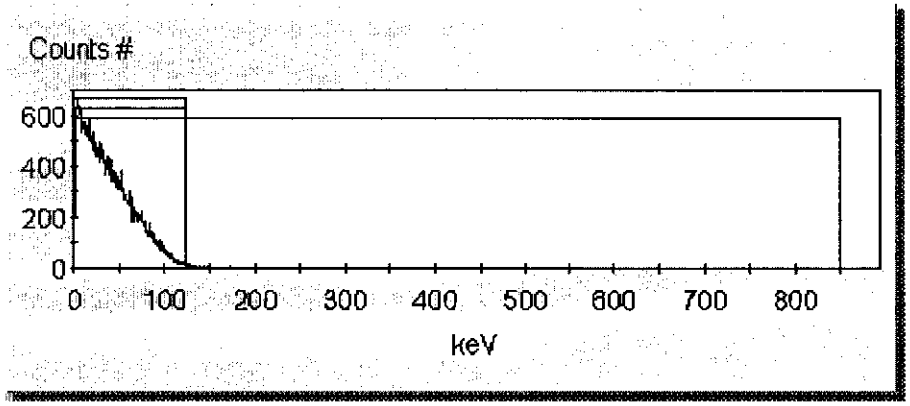
Missing vial 3.
4 5 1 60.00 PBWG25JV1 15.55 16 452.73 331.83 8.30 0:00:04 17
7/27/2011 1:15:32 PM 98.11

SpectraView Block Data



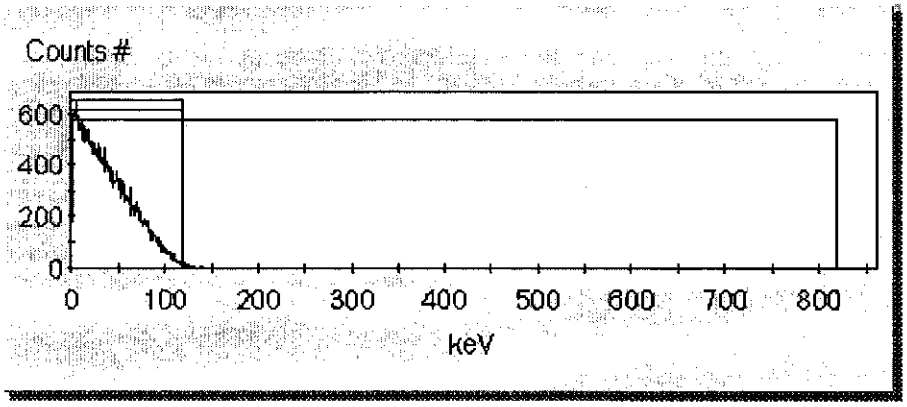
5	5	1	60.00	LCSWG25JV1	1110.02	1122	132.96	365.87		0.78	0:00:05	0
7/27/2011	2:17:04 PM			98.97								

SpectraView Block Data



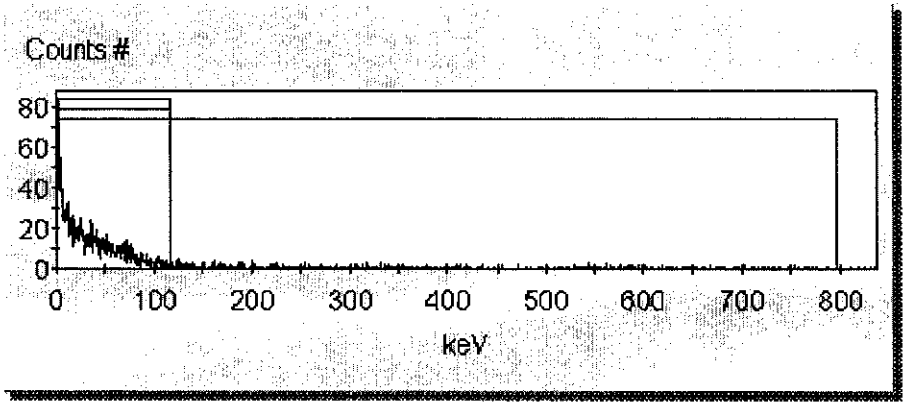
6	5	1	60.00	LCSWG25JV2	1100.77	1116	133.31	349.38		0.78	0:00:06	0
7/27/2011	3:18:37 PM			98.63								

SpectraView Block Data



7	5	1	60.00	469498-1	43.97	45	295.92	336.66		4.29	0:00:08	8
7/27/2011	4:20:11 PM		98.31									

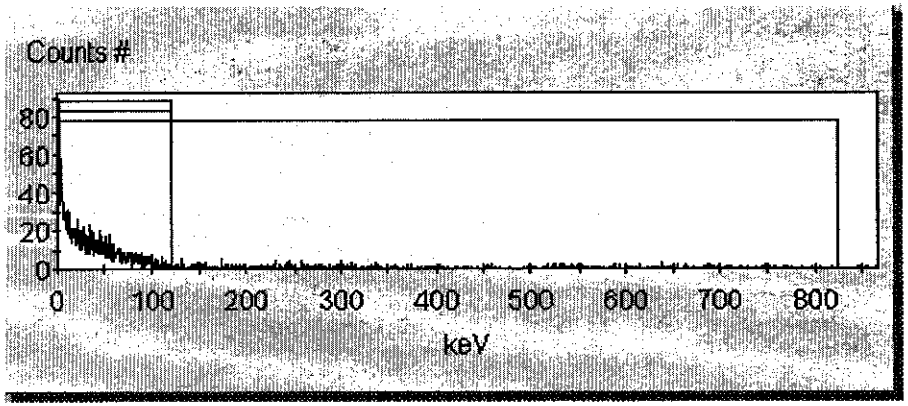
SpectraView Block Data



8	5	1	60.00	469498D-1	44.48	45	284.26	351.63		4.26	0:00:09	8
7/27/2011	5:21:42 PM		98.68									

SpectraView Block Data

010042



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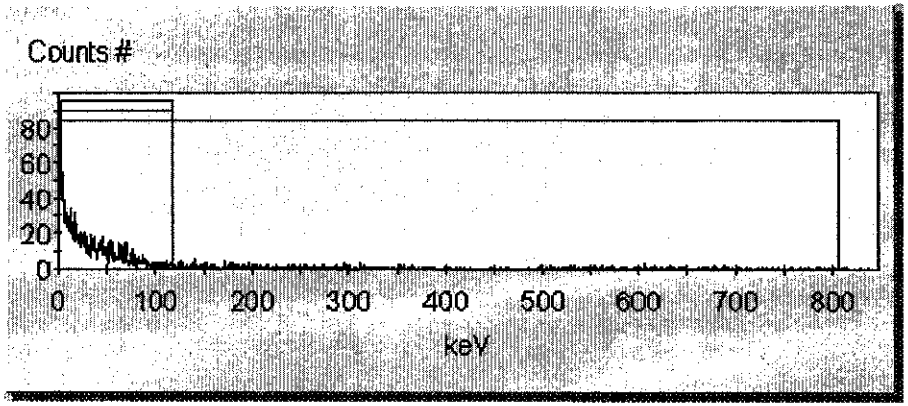
9 5 1 60.00 469499-1 44.27 45 266.94 341.71 4.28 0:00:10 8
7/27/2011 6:23:14 PM 98.48

SpectraView Block Data



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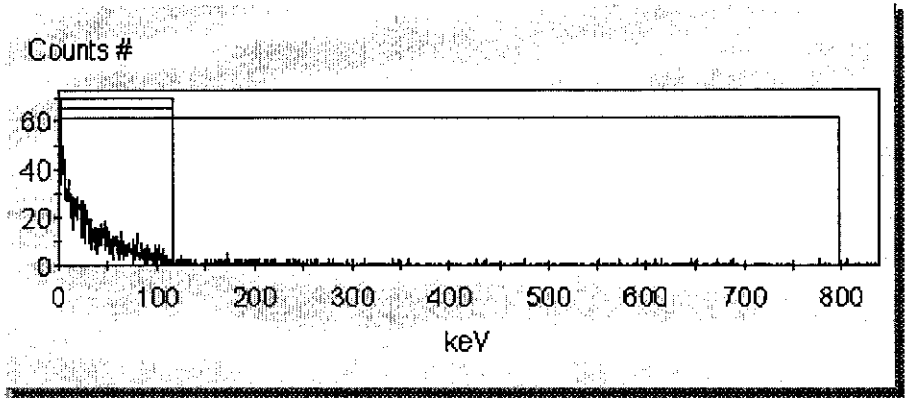
10 5 1 60.00 469499D-1 43.97 45 281.35 336.77 4.30 0:00:11 8
7/27/2011 7:24:46 PM 98.32

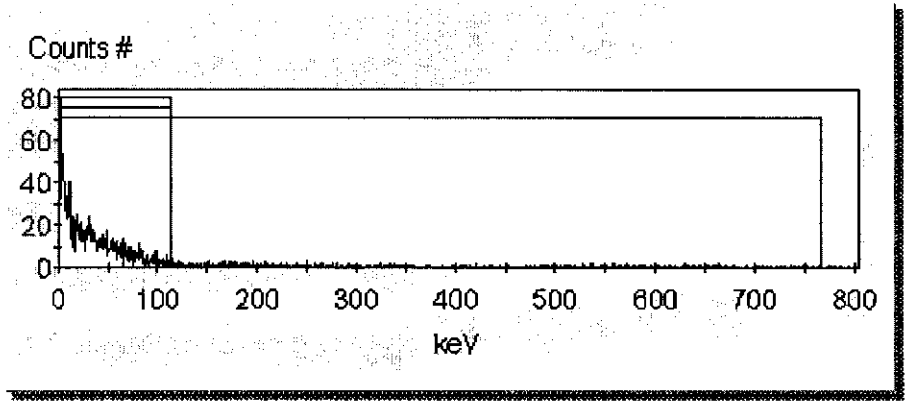
SpectraView Block Data

010043



11	5	1	60.00	469500-1	42.35	43	282.78	320.37		4.39	0:00:12	9
7/27/2011	8:26:18 PM		97.63									

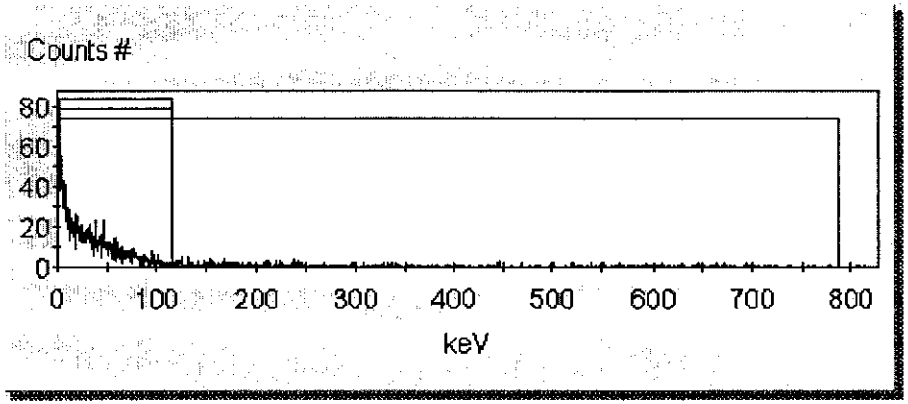
SpectraView Block Data



12	5	1	60.00	469500D-1	41.86	43	279.63	331.35		4.43	0:00:14	9
7/27/2011	9:27:50 PM		98.09									

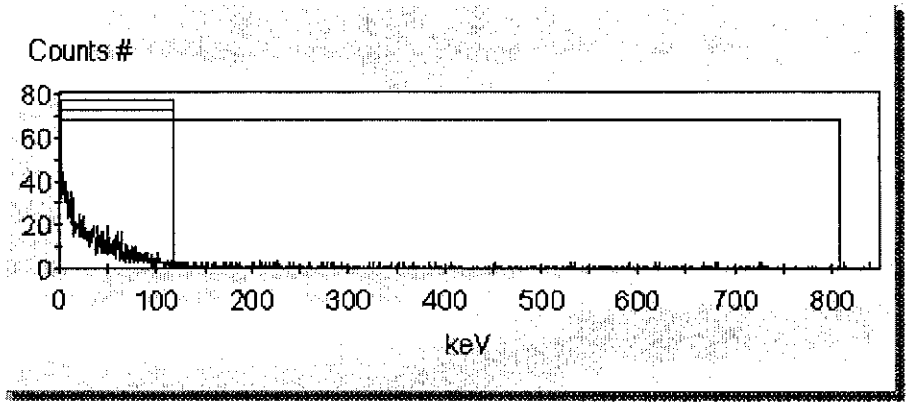
SpectraView Block Data

010044



13 5 19 60.00 469501-1 44.55 45 273.83 343.19 4.26 0:00:15 8
7/27/2011 10:29:27 PM 98.51

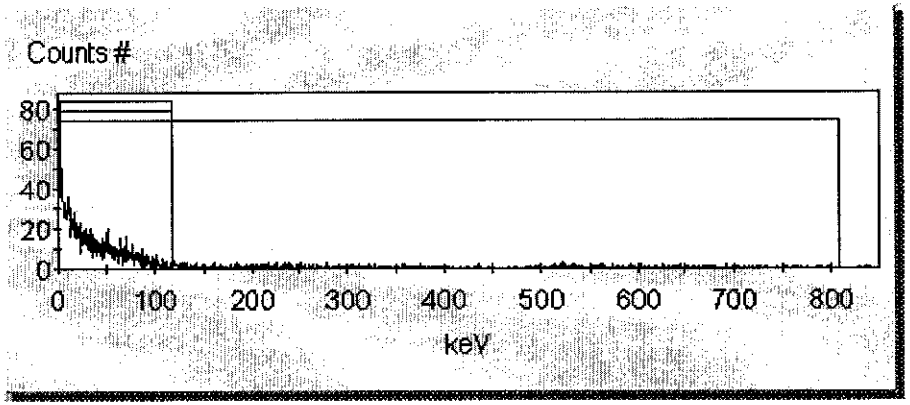
SpectraView Block Data



14 5 19 60.00 469501D-1 42.83 43 298.96 342.87 4.36 0:00:16 9
7/27/2011 11:30:57 PM 98.50

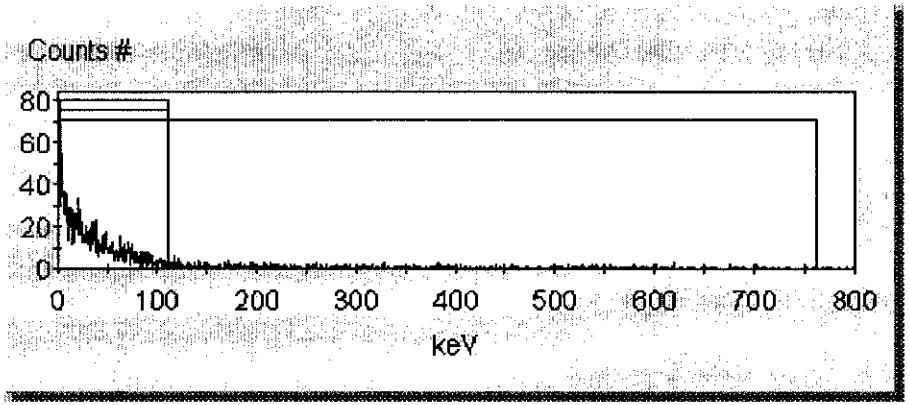
SpectraView Block Data

010045



15	5	19	60.00	469506-1	43.42	45	296.18	317.92		4.33	0:00:17	8
7/28/2011	12:32:29 AM		97.52									

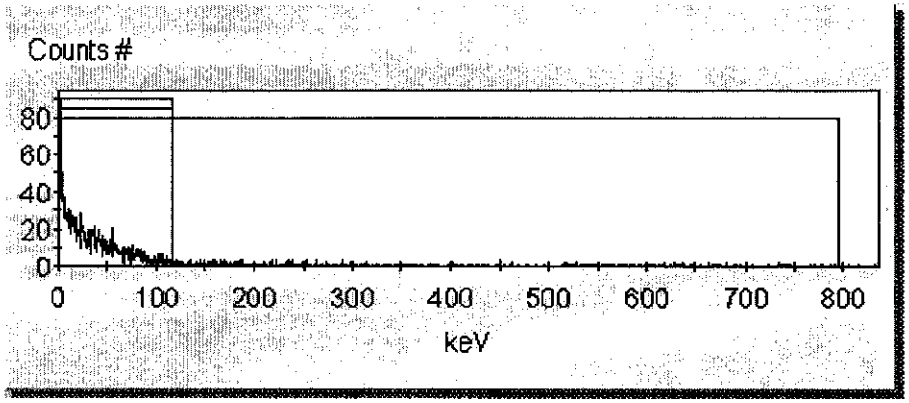
SpectraView Block Data



16	5	19	60.00	469506D-1	43.71	44	264.94	336.13		4.31	0:00:18	9
7/28/2011	1:34:01 AM		98.29									

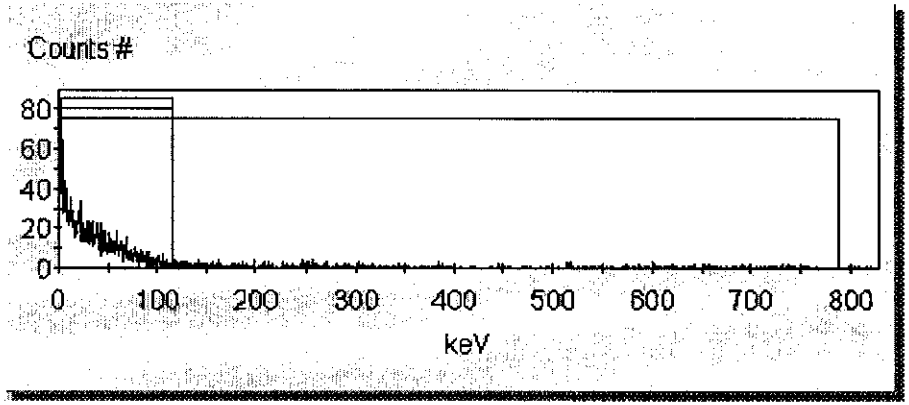
SpectraView Block Data

010046



17 5 19 60.00 BLANK-0 47.75 49 283.28 331.92 4.08 0:00:20 7
7/28/2011 2:35:34 AM 98.11

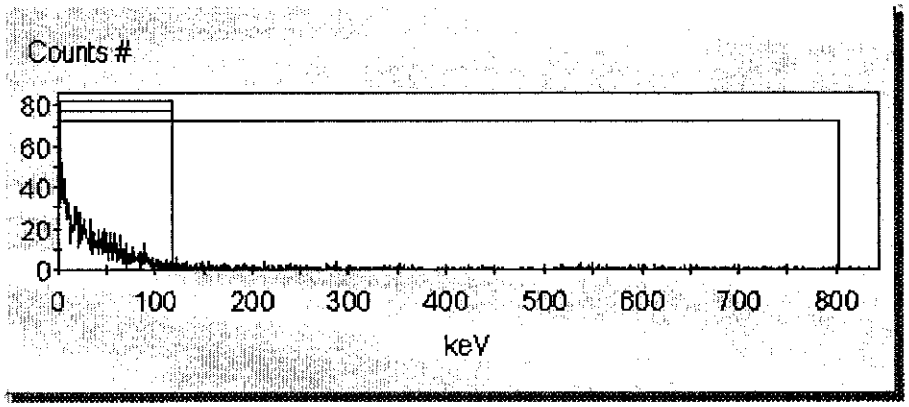
SpectraView Block Data



18 5 19 60.00 BLANK-1 46.48 47 274.05 340.16 4.15 0:00:21 8
7/28/2011 3:37:05 AM 98.44

SpectraView Block Data

010047



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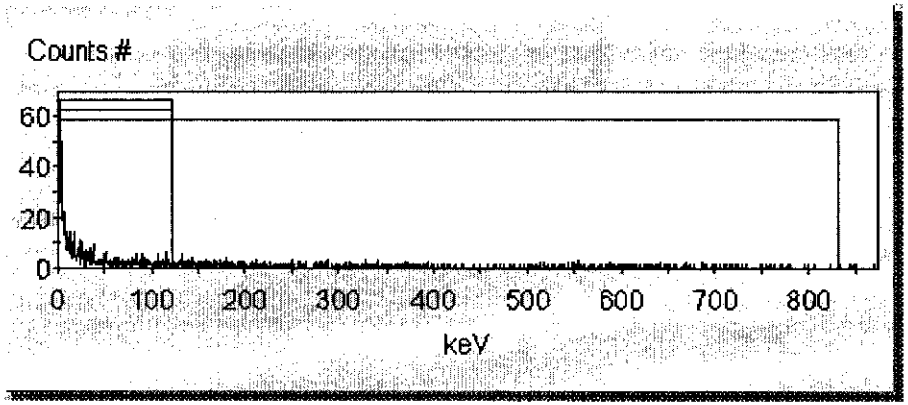
19 5 19 60.00 PBWG25JV2 15.37 16 442.74 355.60 8.37 0:00:22 17
7/28/2011 4:38:37 AM 98.76

SpectraView Block Data



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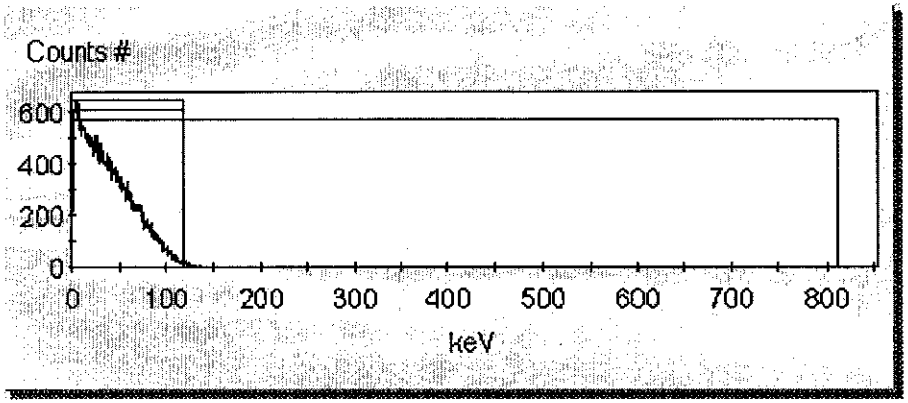
20 5 19 60.00 LCSWG25JV3 1098.42 1114 133.39 345.86 0.78 0:00:23 0
7/28/2011 5:40:07 AM 98.56

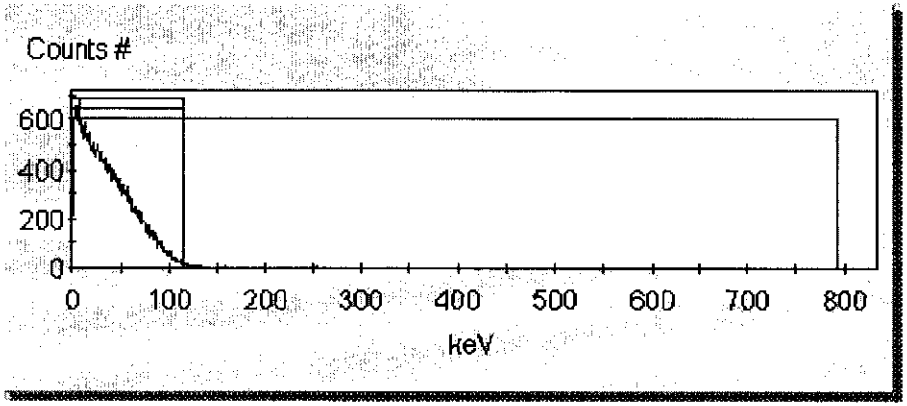
SpectraView Block Data

010048



21	5	19	60.00	LCSWG25JV4	1102.23	1122	128.82	334.73		0.78	0:00:24	0
7/28/2011	6:41:40 AM		98.23									

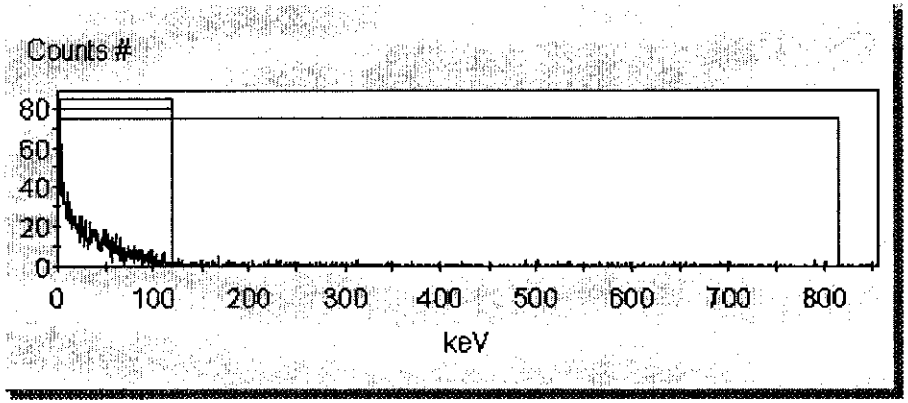
SpectraView Block Data



22	5	19	60.00	BLANK-2	46.38	47	282.55	346.84		4.16	0:00:26	8
7/28/2011	7:43:13 AM		98.58									

SpectraView Block Data

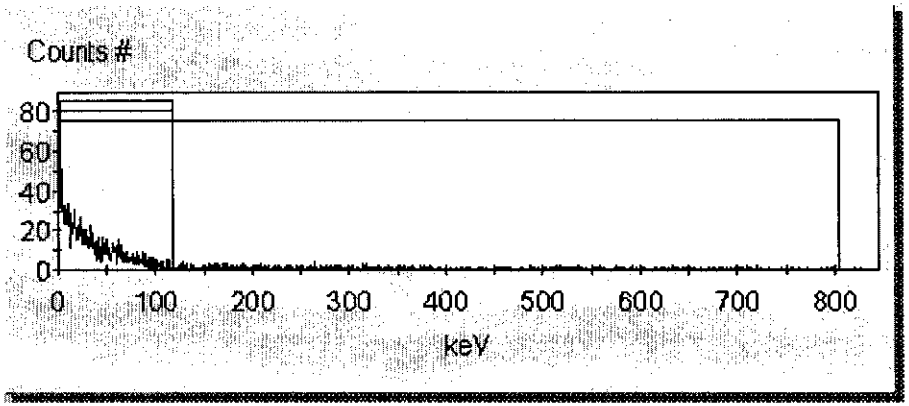
C10049



23	5	19	60.00	469498-2	43.42	44	287.98	340.92		4.32	0:00:27	8

7/28/2011 8:44:43 AM 98.46

SpectraView Block Data

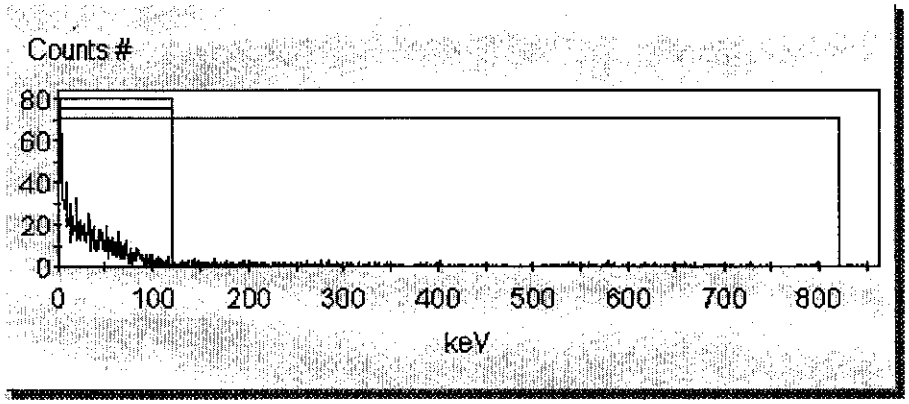


24	5	19	60.00	469498D-2	43.67	44	289.20	350.29		4.30	0:00:28	8

7/28/2011 9:46:14 AM 98.65

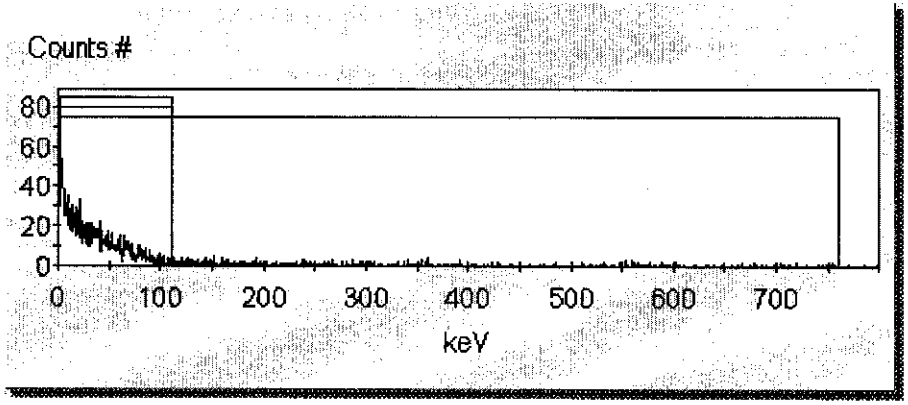
SpectraView Block Data

010050



25 5 6 60.00 469499-2 43.99 45 271.23 317.17 4.28 0:00:29 8
7/28/2011 10:47:51 AM 97.49

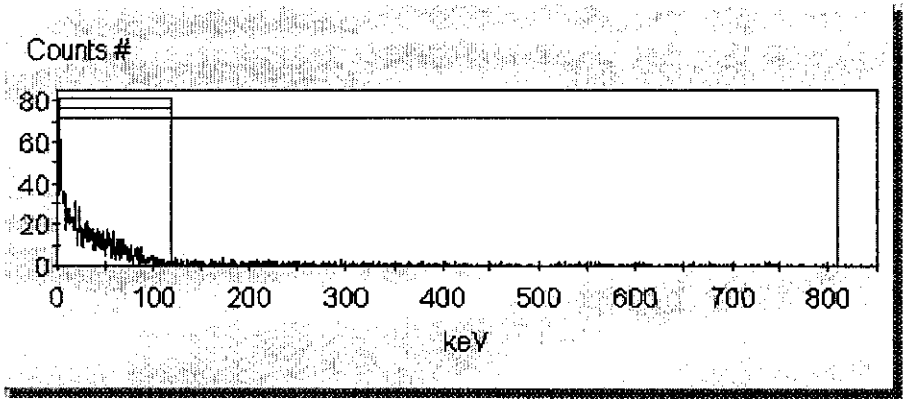
SpectraView Block Data



26 5 6 60.00 469499D-2 43.31 44 278.90 343.57 4.33 0:00:30 9
7/28/2011 11:49:23 AM 98.51

SpectraView Block Data

010051



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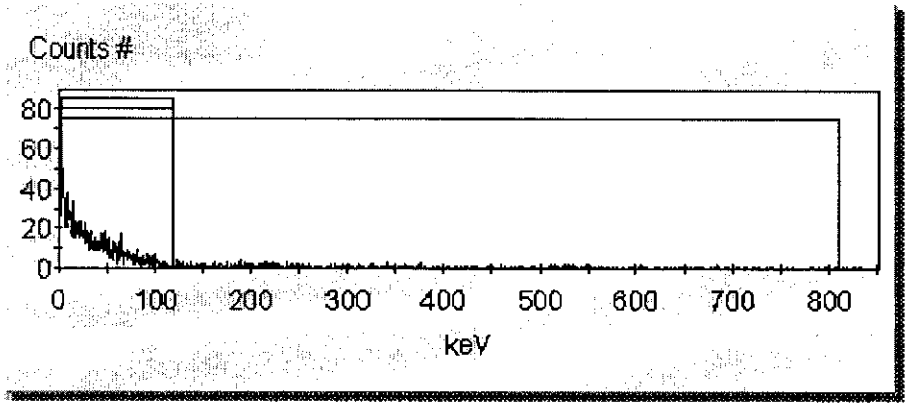
27 5 6 60.00 469500-2 41.59 42 276.84 344.34 4.43 0:00:31 9
7/28/2011 12:50:54 PM 98.53

SpectraView Block Data



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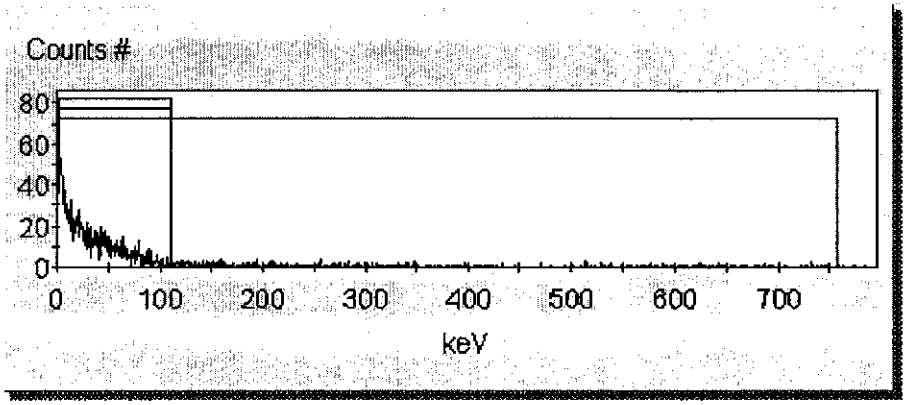
28 5 6 60.00 469500D-2 43.05 44 273.15 314.74 4.34 0:00:32 8
7/28/2011 1:52:25 PM 97.39

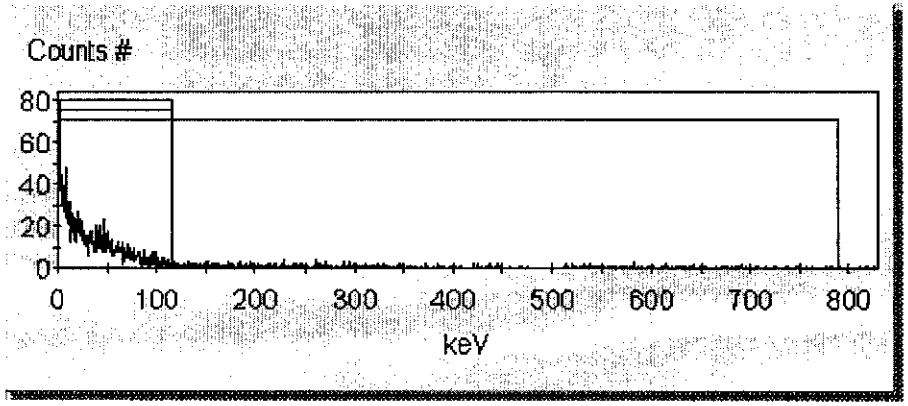
SpectraView Block Data

010052



29	5	6	60.00	469501-2	42.86	44	284.34	332.22		4.36	0:00:34	9
7/28/2011	2:53:55 PM			98.12								

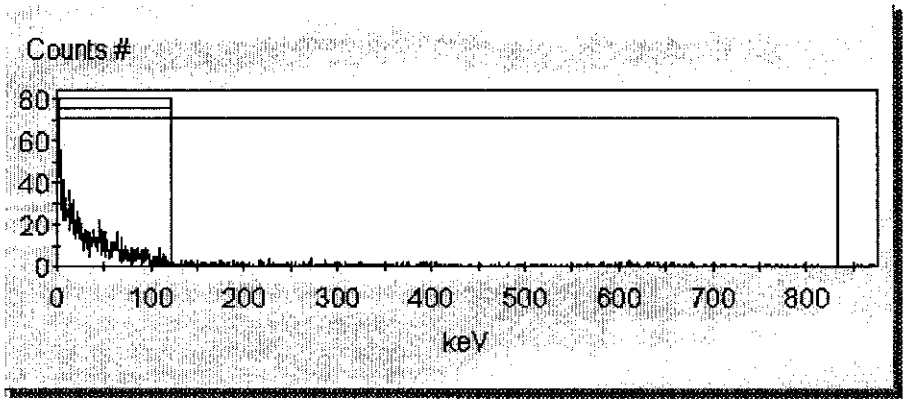
SpectraView Block Data



30	5	6	60.00	469501D-2	44.05	45	296.74	356.35		4.30	0:00:35	9
7/28/2011	3:55:26 PM			98.78								

SpectraView Block Data

010053



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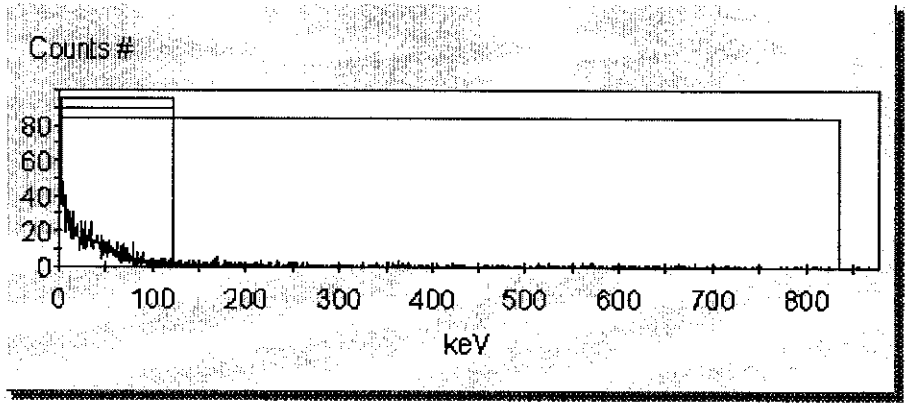
31 5 6 60.00 469506-2 42.70 43 268.30 357.79 4.37 0:00:36 9
7/28/2011 4:56:54 PM 98.81

SpectraView Block Data



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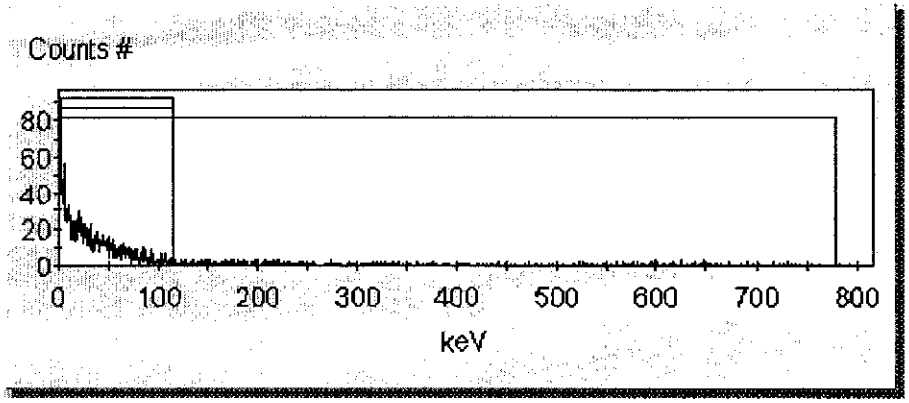
32 5 6 60.00 469506-2 44.05 45 271.98 326.72 4.30 0:00:37 9
7/28/2011 5:58:24 PM 97.89

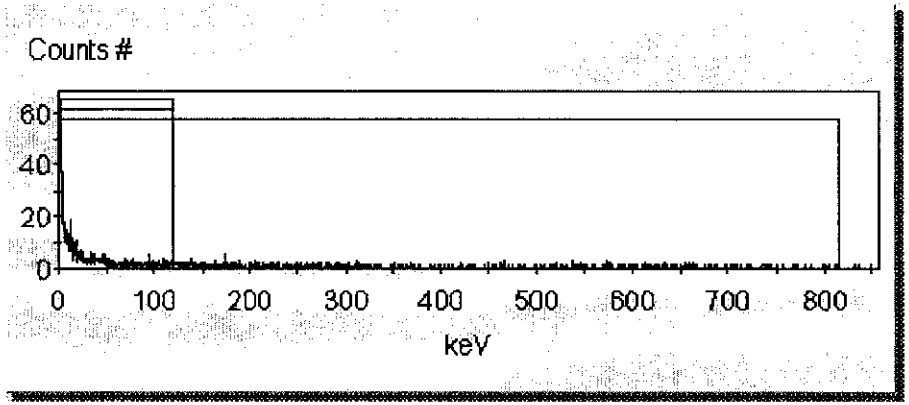
SpectraView Block Data

0100054



33	5	6	60.00	PBWG26JV1	14.52	15	462.40	347.09		8.75	0:00:38	18
7/28/2011	6:59:54 PM			98.59								

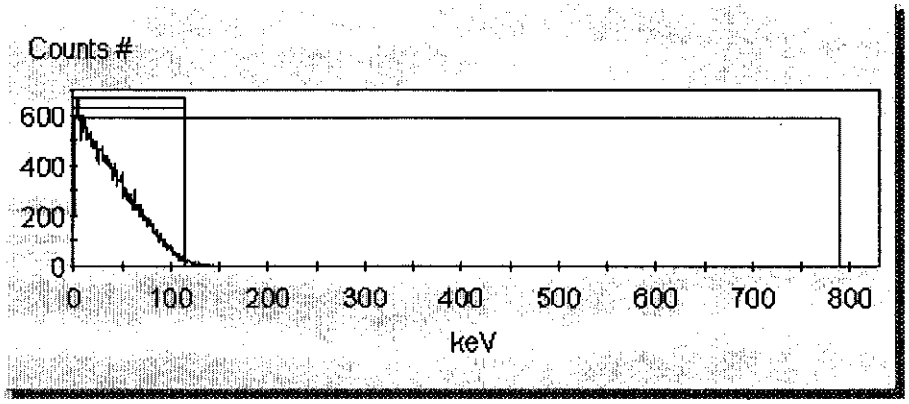
SpectraView Block Data



34	5	6	60.00	LCSWG26JV1	1097.72	1118	132.76	333.19		0.78	0:00:39	0
7/28/2011	8:01:23 PM			98.16								

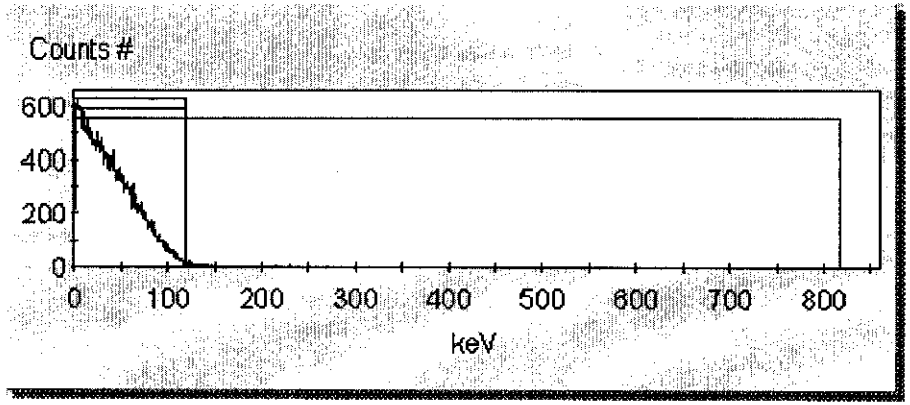
SpectraView Block Data

010055



35 5 6 60.00 LCSWG26JV2 1093.58 1109 134.00 348.79 0.78 0:00:40 0
7/28/2011 9:02:56 PM 98.62

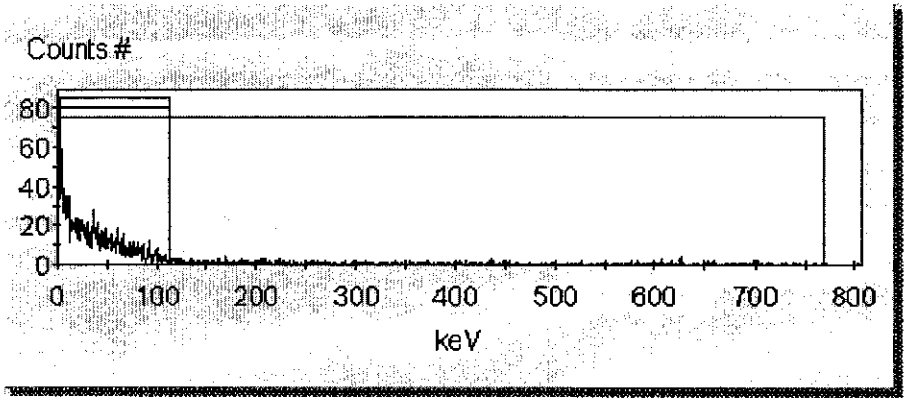
SpectraView Block Data



36 5 6 60.00 BLANK-4 46.28 47 283.40 321.55 4.17 0:00:41 8
7/28/2011 10:04:28 PM 97.68

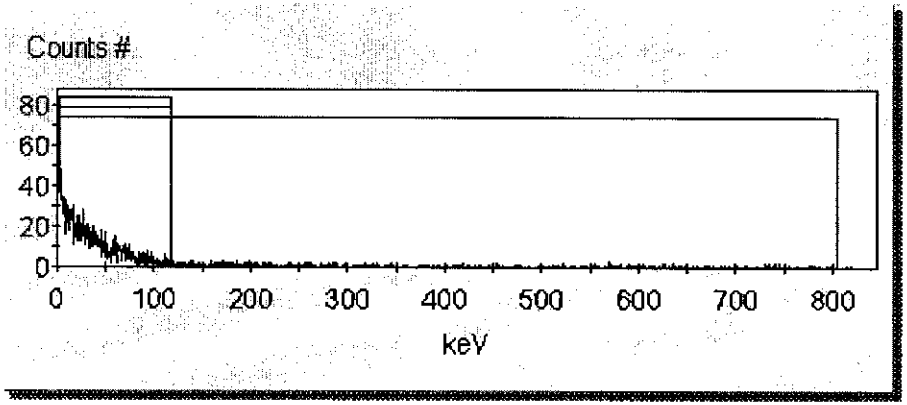
SpectraView Block Data

010056



37	5	7	60.00	469498-4	41.79	42	286.53	341.24		4.43	0:00:42	9
7/28/2011	11:06:05	PM		98.47								

SpectraView Block Data



38	5	7	60.00	469498D-4	44.42	45	294.82	350.59		4.26	0:00:44	8
7/29/2011	12:07:35	AM		98.66								
39	5	7	60.00	469499-4	42.13	43	280.75	338.75		4.41	0:00:44	9
7/29/2011	1:09:04	AM		98.40								
40	5	7	60.00	469499D-4	43.69	44	291.83	337.47		4.31	0:00:44	8
7/29/2011	2:10:34	AM		98.34								

41	5	7	60.00	469500-4	42.54	43	264.60	353.15	4.39	0:00:44	9
7/29/2011	3:12:02	AM	98.71								
42	5	7	60.00	469500D-4	41.22	42	287.93	346.41	4.45	0:00:45	9
7/29/2011	4:13:32	AM	98.57								
43	5	7	60.00	469501-4	42.73	43	292.41	347.28	4.37	0:00:45	9
7/29/2011	5:15:01	AM	98.59								
44	5	7	60.00	469501D-4	41.41	42	300.25	340.86	4.44	0:00:45	9
7/29/2011	6:16:30	AM	98.46								
45	5	7	60.00	469506-4	44.35	45	301.47	336.21	4.26	0:00:45	8
7/29/2011	7:17:59	AM	98.29								
46	5	7	60.00	469506D-4	42.88	43	303.85	350.37	4.35	0:00:46	8
7/29/2011	8:19:28	AM	98.65								
47	5	7	60.00	PBWG26JV2	15.52	16	424.73	349.31	8.30	0:00:46	17
7/29/2011	9:20:57	AM	98.63								
48	5	7	60.00	LCSWG26JV3	1099.09	1121	133.74	330.63	0.78	0:00:46	0
7/29/2011	10:22:26	AM	98.06								
49	5	5	60.00	LCSWG26JV4	1098.36	1115	130.13	344.98	0.78	0:00:46	0
7/29/2011	11:24:04	AM	98.54								
50	5	5	60.00	BLANK-7	46.31	47	278.00	335.22	4.16	0:00:47	8
7/29/2011	12:25:34	PM	98.25								
51	5	5	60.00	469498-7	40.23	41	290.99	318.22	4.52	0:00:47	9
7/29/2011	1:27:04	PM	97.54								
52	5	5	60.00	469498D-7	41.62	42	305.05	345.60	4.42	0:00:47	8
7/29/2011	2:28:34	PM	98.56								
53	5	5	60.00	469499-7	43.30	44	297.90	360.46	4.33	0:00:47	8
7/29/2011	3:30:04	PM	98.86								
54	5	5	60.00	469499D-7	42.00	43	275.45	339.75	4.42	0:00:48	9
7/29/2011	4:31:33	PM	98.44								
55	5	5	60.00	469500-7	40.95	42	280.34	297.99	4.47	0:00:48	9
7/29/2011	5:33:03	PM	97.30								
56	5	5	60.00	469500D-7	40.38	41	296.70	329.53	4.53	0:00:48	9
7/29/2011	6:34:33	PM	98.01								
57	5	5	60.00	469501-7	42.18	43	294.83	333.54	4.39	0:00:48	8
7/29/2011	7:36:04	PM	98.18								
58	5	5	60.00	469501D-7	43.87	45	272.59	315.53	4.29	0:00:49	8
7/29/2011	8:37:32	PM	97.42								
59	5	5	60.00	469506-7	42.36	43	316.64	327.12	4.38	0:00:49	8
7/29/2011	9:39:02	PM	97.91								
60	5	5	60.00	469506D-7	44.87	46	266.71	335.90	4.24	0:00:49	8
7/29/2011	10:40:32	PM	98.28								
61	5	14	60.00	469498-10	41.97	43	282.20	343.09	4.41	0:00:49	9
7/29/2011	11:42:08	PM	98.50								
62	5	14	60.00	469498D-10	30.07	30	327.72	352.47	5.40	0:00:50	11
7/30/2011	12:43:45	AM	98.70								
63	5	14	60.00	469499-10	42.56	43	290.23	355.31	4.37	0:00:50	9
7/30/2011	1:45:15	AM	98.75								

010058

64	5	14	60.00	469499D-10	42.03	42	299.26	365.91	4.42	0:00:50	9
7/30/2011	2:46:47 AM			98.97							
65	5	14	60.00	469500-10	40.47	41	297.72	322.23	4.51	0:00:50	9
7/30/2011	3:48:19 AM			97.70							
66	5	14	60.00	469500D-10	42.15	43	272.94	325.68	4.39	0:00:51	9
7/30/2011	4:49:51 AM			97.85							
67	5	14	60.00	469501-10	41.61	42	306.15	346.39	4.43	0:00:51	9
7/30/2011	5:51:21 AM			98.57							
68	5	14	60.00	469501D-10	43.27	44	283.06	337.43	4.32	0:00:51	8
7/30/2011	6:52:51 AM			98.34							
69	5	14	60.00	469506-10	42.45	43	300.48	336.45	4.38	0:00:51	9
7/30/2011	7:54:22 AM			98.30							
70	5	14	60.00	469506D-10	42.69	43	307.90	354.99	4.37	0:00:52	8
7/30/2011	8:55:53 AM			98.75							
71	5	14	60.00	BLANK-10	47.46	48	272.42	344.28	4.11	0:00:52	8
7/30/2011	9:57:23 AM			98.53							

010059

Tc99
Prep Logs

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

Book I.D. 11-0406-033

BOOK / PAGE: 12 0077 CONTINUED ON PAGE 12-098

CLIENT(S): FLUOR B&W PORTSMOUTH LLC

TASK ORDER(S): 11061-4-8 SDG(S): SRR # 44937

PROJECT NO(S): 116526.05.006

METHOD: TC 99

TAP: 01-0411-049 REV. #4

MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER ___

INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___

ACID INORG #: HNO_3# 9143 HCl# 9143 H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓ 9029

Tracer(s): N/A 07/25/11 * 0.5mL TC 99 SPK: 038 RAD SOL 3

Oven/Hotplate/ Block ID: # 4 Temperature (°C): 125°C

	SAMPLE ID	F.V. FLOW WETCHEM PREP.	VOL TAKEN FOR COLUMNS	F.V. BEFORE COLUMNS (1M HNO_3)			
1	PBL/G25 TV 1	—	—	50mL			
2	LCSL/G25 TV 1 *	—	—				
3	LCSW/G25 TV2 *	—	—				
4	469498-1	~200mL	100mL				
5	498D-1	~200mL	100mL				
6	499-1						
7	499D-1						
8	500-1						
9	500D-1						
10	501-1						
11	501D-1						
12	506-1						
13	506D-1						
14	BLANK DAY-0						
15	BLANK DAY-1						
	FW	07/25/11	VOID LINE				
16	PBW/G25 TV 2	—	—				
17	LCSW/G25 TV3 *	— 07/26/11	—				
18	LCSW/G25 TV4 *	—	—				
19	BLANK DAY-2	~200mL	100mL				
20	469498-2						
21	469498D-2						
22	469499-2						
23	499D-2						
24	500-2						
25	500D-2						

12/25/11

PREPARED BY: ___ DATE: 07/25/11

REVIEWED BY: ___ DATE: 08/01/11

LOCATION: ___ DISPOSAL: ___

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010062

Book I.D. 11-0406-033

BOOK / PAGE: 12 0078

CONTINUED FROM PAGE 12-077

CLIENT(S): FLUOR B&W PORTSMOUTH

TASK ORDER(S): 11061 4-8 SDG(S): SRR # 44937

PROJECT NO(S): 16526.05.006

METHOD: TC 99

TAP: 01-0411-049-REV. #4

MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER ___

INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___

ACID INORG #: HNO_3# ✓ 9143 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓ 9029

Tracer(s): N/A * 0.5mL TC 99 SRK: 038 RAD SOL 3

Oven/Hotplate/ Block ID: # 4 Temperature (°C): 125°C

	SAMPLE ID	F.V. FROM WETCHEM PREP	VOL. TAKEN FOR COLUMNS	1M HNO_3 F.V. BEFORE COLUMNS			
26	46944501-2	~200mL	100mL	50mL			
27	5010-B2						
28	502-2						
29	506D-2	07/25/11					
	PIPETTES: 5000-1, 1000-N, 200-1						

07/25/11

PREPARED BY: DATE: 07/25/11

REVIEWED BY: DATE: 08/01/11

LOCATION: DISPOSAL: ~~FBP/WD RIFS D3 R5 MASTER/02/05/2014~~

C-316

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

C10063

Book I.D._11-0406-033_____ BOOK / PAGE:__12 0079__

CONTINUED ON PAGE # 12-080

CLIENT(S): FLUOR B&W PORTSMOUTH
TASK ORDER(S): 1106 14-8 SDG(S): SRR# 44937
PROJECT NO(S): 16526.05.006
METHOD: TC 99
TAP: 01-0411-049 REV. # 4
MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER _____
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS _____ OTHER _____
ACID INORG #: HNO_3# ✓ 9143 HCl# _____ H_2SO_4# _____ $HClO_4$# _____ HF# _____ H_2O_2# ✓ 9029
Tracer(s): N/A * 0.5mL Tc 99 SPK.: 038 RAD SOL 3
Oven/Hotplate/Block ID: #4:6 Temperature (°C): 125° C

07/26/11 JW (RE) 07/26/11

	SAMPLE ID	F.V. FROM WET CHEM PREP.	VOL TAKEN FOR COLUMNS	1M HNO_3 F.V. BEFORE COLUMNS
1	PBW/626 JV1	~200mL	—	50mL
2	LCSW/626 JV1*	—	—	50mL
3	LCSW/626 JV2*	—	—	50mL
4	BLANK-4	~200mL	100mL	
5	469498-4			
6	498D-4			
7	499-4			
8	499D-4			
9	500-4			
10	500D-4			
11	501-4			
12	501D-4			
13	506-4			
14	506D-4			
15	PBW/626 JV2	—	—	
16	LCSW/626 JV3	—	—	
17	LCSW/626 JV4	—	—	
18	BLANK-7	~200mL	100mL	
19	469498-7			
20	498D-7			
21	499-7			
22	499D-7			
23	500-7			
24	500D-7			
25	501-7			
26	501D-7			

07/26/11

PREPARED BY: _____ DATE: 07/26/11
REVIEWED BY: _____ DATE: 08/01/11
LOCATION: _____ DISPOSAL: _____

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

0110064

Book I.D. 11-0406-033

BOOK / PAGE: 12 0080

CONTINUED FROM PAGE 12-079

CLIENT(S): FLUOR B&W PORTSMOUTH 07/26/11 110614-B

TASK ORDER(S): 16526.05.006 110614-B SDG(S): SRR # 44937

PROJECT NO(S): 16526.05.006

METHOD: TC 99

TAP: OT-0411-049 REV. # 4

MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER ___

INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___

ACID INORG #: HNO_3# 9143 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓ 9029

Tracer(s): * 0.5mL TC 99 SPK: 038 RAD SOL 3

Oven/Hotplate/Block ID: #4 & 6 Temperature (°C): 125°C

	SAMPLE ID	F.V. FROM WETCHEM PREP.	VOL TAKEN FOR COLUMNS	F.V. (1M HNO3) BEFORE COLUMNS			
27	469506-7	~200mL	100mL	50mL			
28	506D-7			50mL			
29	469498-10						
30	498D-10		50mL **		NOTE: ** LIMITED VOLUME ON THIS SAMPLE, DUE TO A SPILL OF THE ORIGINAL ALIQUOT.		
31	499-10		100mL				
32	499D-10						
33	500-10						
34	500D-10						
36	501-10						
36	501D-10						
37	506-10						
38	506D-10						
39	BLANK-10						

07/26/11 RE

PIPETTES: 5000-3, 1000-7, 200-N

07/26/11

PREPARED BY: [signature] DATE: 07/26/11

REVIEWED BY: [signature] DATE: 08/01/11

LOCATION: ___ DISPOSAL: ___

EXT02234L04
010065

ICPMS Total U Data for Distribution Coefficient

469498 d1 for tot U

4467 ng/L x df 1 = 4467 ng/L = 4470 ng/L

Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
S-0	U-tot															0	07/25/11	5:09 PM
S-0	U 236-IS															100	07/25/11	5:09 PM
S-1	U-tot															44984	07/25/11	5:11 PM
S-1	U 236-IS															100.26155	07/25/11	5:11 PM
icv	U-tot	8090			ng/L	40		105.5%	7670	40	8089.73479	8090		1	40	8089.73479	07/25/11	5:14 PM
icv	U 236-IS	98.6			%R	0.5		#DIV/0!	0	0.5	98.58392	98.6		1	0.5	98.58392	07/25/11	5:14 PM
icb	U-tot	40.0	U		ng/L	40				40	-2.64288	-2.64		1	40	-2.64288	07/25/11	5:16 PM
icb	U 236-IS	99.7			%R	0.5				0.5	99.69735	99.7		1	0.5	99.69735	07/25/11	5:16 PM
critotU	U-tot	40.0	U		ng/L	40		97.3%	40.0	40	38.85221	38.9		1	40	38.85221	07/25/11	5:18 PM
critotU	U 236-IS	99.0			%R	0.5		#DIV/0!	0	0.5	98.96877	99		1	0.5	98.96877	07/25/11	5:18 PM
cri235	U-tot									40	718.88813	719		1	40	718.88813	07/25/11	5:21 PM
cri235	U 236-IS									0.5	99.95516	100		1	0.5	99.95516	07/25/11	5:21 PM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	40	7.34334	7.34		1	40	7.34334	07/25/11	5:23 PM
icsa	U 236-IS	88.5			%R	0.5		#DIV/0!	0	0.5	88.47391	88.5		1	0.5	88.47391	07/25/11	5:23 PM
icsab	U-tot	20500			ng/L	40		100.5%	20400	40	20461.97372	20500		1	40	20461.97372	07/25/11	5:25 PM
icsab	U 236-IS	89.3			%R	0.5		#DIV/0!	0	0.5	89.32197	89.3		1	0.5	89.32197	07/25/11	5:25 PM
zzz	U-tot	40.0	U		ng/L	40				40	3.48816	3.49		1	40	3.48816	07/25/11	5:28 PM
zzz	U 236-IS	91.4			%R	0.5				0.5	91.42162	91.4		1	0.5	91.42162	07/25/11	5:28 PM
ccv	U-tot	8140			ng/L	40		106.1%	7670	40	8142.88178	8140		1	40	8142.88178	07/25/11	5:30 PM
ccv	U 236-IS	91.7			%R	0.5		#DIV/0!	0	0.5	91.72051	91.7		1	0.5	91.72051	07/25/11	5:30 PM
ccb	U-tot	40.0	U		ng/L	40				40	0.87667	0.877		1	40	0.87667	07/25/11	5:32 PM
ccb	U 236-IS	92.9			%R	0.5				0.5	92.9198	92.9		1	0.5	92.9198	07/25/11	5:32 PM
Blankd0	U-tot	4970			ng/L	40				40	4967.06515	4970	299	1	40	4967.06515	07/25/11	5:35 PM
Blankd0	U 236-IS	88.9			%R	0.5				0.5	88.9409	88.9		1	0.5	88.9409	07/25/11	5:35 PM
Blankd1	U-tot	4560			ng/L	40				40	4556.3906	4560	274	1	40	4556.3906	07/25/11	5:37 PM
Blankd1	U 236-IS	84.4			%R	0.5				0.5	84.39059	84.4		1	0.5	84.39059	07/25/11	5:37 PM
469498d1	U-tot	4470	✓		ng/L	40				40	4467.36138	4470	269	1	40	4467.36138	07/25/11	5:39 PM
469498d1	U 236-IS	85.4			%R	0.5				0.5	85.42542	85.4		1	0.5	85.42542	07/25/11	5:39 PM
469498d1D	U-tot	4480			ng/L	40	0.2%			40	4479.04515	4480	270	1	40	4479.04515	07/25/11	5:42 PM
469498d1D	U 236-IS	84.3			%R	0.5	1.3%			0.5	84.2561	84.3		1	0.5	84.2561	07/25/11	5:42 PM
469498d1L	U-tot	4450			ng/L	200	0.4%			40	4454.9335	4450	285	5	200	890.9867	07/25/11	5:44 PM
469498d1L	U 236-IS	85.3			%R	0.5	0.1%			0.5	85.32454	85.3		5	0.5	85.32454	07/25/11	5:44 PM
469498d1AS	U-tot	24900			ng/L	40		99.7%	20500	40	24942.8325	24900	1494	1	40	24942.8325	07/25/11	5:46 PM
469498d1AS	U 236-IS	86.3			%R	0.5		#DIV/0!	0	0.5	86.30334	86.3		1	0.5	86.30334	07/25/11	5:46 PM
zzz	U-tot	40.0	U		ng/L	40				40	8.4142	8.41		1	40	8.4142	07/25/11	5:48 PM
zzz	U 236-IS	85.7			%R	0.5				0.5	85.68692	85.7		1	0.5	85.68692	07/25/11	5:48 PM
critotU	U-tot	40.0	U		ng/L	40		94.5%	40.0	40	37.83129	37.8		1	40	37.83129	07/25/11	5:51 PM
critotU	U 236-IS	88.0			%R	0.5		#DIV/0!	0	0.5	88.0368	88		1	0.5	88.0368	07/25/11	5:51 PM
cri235	U-tot									40	713.94839	714		1	40	713.94839	07/25/11	5:53 PM
cri235	U 236-IS									0.5	89.46769	89.5		1	0.5	89.46769	07/25/11	5:53 PM
ccv	U-tot	7880			ng/L	40		102.7%	7670	40	7875.45224	7880		1	40	7875.45224	07/25/11	5:56 PM
ccv	U 236-IS	90.4			%R	0.5		#DIV/0!	0	0.5	90.41663	90.4		1	0.5	90.41663	07/25/11	5:56 PM
ccb	U-tot	40.0	U		ng/L	40				40	-0.5279	-0.528		1	40	-0.5279	07/25/11	5:58 PM
ccb	U 236-IS	89.2			%R	0.5				0.5	89.15759	89.2		1	0.5	89.15759	07/25/11	5:58 PM
469499d1	U-tot	4420			ng/L	40				40	4421.31466	4420	266	1	40	4421.31466	07/25/11	6:00 PM

Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
469499d1	U 236-IS	86.9			%R	0.5				0.5	86.94218	86.9		1	0.5	86.94218	07/25/11	6:00 PM
469499d1D	U-tot	4520			ng/L	40	2.2%			40	4520.02361	4520	272	1	40	4520.02361	07/25/11	6:02 PM
469499d1D	U 236-IS	86.9			%R	0.5	0.0%			0.5	86.91602	86.9		1	0.5	86.91602	07/25/11	6:02 PM
469500d1	U-tot	3550			ng/L	40				40	3550.48427	3550	214	1	40	3550.48427	07/25/11	6:05 PM
469500d1	U 236-IS	86.9			%R	0.5				0.5	86.89735	86.9		1	0.5	86.89735	07/25/11	6:05 PM
469500d1D	U-tot	3780			ng/L	40	6.3%			40	3775.00139	3780	228	1	40	3775.00139	07/25/11	6:07 PM
469500d1D	U 236-IS	88.9			%R	0.5	2.3%			0.5	88.89607	88.9		1	0.5	88.89607	07/25/11	6:07 PM
469501d1	U-tot	4570			ng/L	40				40	4570.26282	4570	275	1	40	4570.26282	07/25/11	6:10 PM
469501d1	U 236-IS	89.7			%R	0.5				0.5	89.73293	89.7		1	0.5	89.73293	07/25/11	6:10 PM
469501d1D	U-tot	4510			ng/L	40	1.3%			40	4513.17065	4510	271	1	40	4513.17065	07/25/11	6:12 PM
469501d1D	U 236-IS	90.8			%R	0.5	1.2%			0.5	90.82386	90.8		1	0.5	90.82386	07/25/11	6:12 PM
469506d1	U-tot	4500			ng/L	40				40	4495.79295	4500	271	1	40	4495.79295	07/25/11	6:14 PM
469506d1	U 236-IS	92.4			%R	0.5				0.5	92.41169	92.4		1	0.5	92.41169	07/25/11	6:14 PM
zzz	U-tot	40.0	U		ng/L	40				40	3.19982	3.2		1	40	3.19982	07/25/11	6:17 PM
zzz	U 236-IS	94.0			%R	0.5				0.5	93.98833	94		1	0.5	93.98833	07/25/11	6:17 PM
critotU	U-tot	41.8			ng/L	40		104.5%	40.0	40	41.80453	41.8		1	40	41.80453	07/25/11	6:19 PM
critotU	U 236-IS	95.2			%R	0.5		#DIV/0!	0	0.5	95.16897	95.2		1	0.5	95.16897	07/25/11	6:19 PM
cri235	U-tot									40	722.30911	722		1	40	722.30911	07/25/11	6:21 PM
cri235	U 236-IS									0.5	97.37336	97.4		1	0.5	97.37336	07/25/11	6:21 PM
ccv	U-tot	8100			ng/L	40		105.6%	7670	40	8098.6229	8100		1	40	8098.6229	07/25/11	6:24 PM
ccv	U 236-IS	96.3			%R	0.5		#DIV/0!	0	0.5	96.27115	96.3		1	0.5	96.27115	07/25/11	6:24 PM
ccb	U-tot	40.0	U		ng/L	40				40	-1.6783	-1.68		1	40	-1.6783	07/25/11	6:26 PM
ccb	U 236-IS	96.5			%R	0.5				0.5	96.45423	96.5		1	0.5	96.45423	07/25/11	6:26 PM
469506d1D	U-tot	4400			ng/L	40	2.2%			40	4397.02556	4400	265	1	40	4397.02556	07/25/11	6:28 PM
469506d1D	U 236-IS	94.2			%R	0.5	1.9%			0.5	94.16768	94.2		1	0.5	94.16768	07/25/11	6:28 PM
Blankd2	U-tot	4610			ng/L	40				40	4612.21562	4610	277	1	40	4612.21562	07/25/11	6:31 PM
Blankd2	U 236-IS	94.0			%R	0.5				0.5	93.96592	94		1	0.5	93.96592	07/25/11	6:31 PM
469498d2	U-tot	4570			ng/L	40				40	4573.61164	4570	275	1	40	4573.61164	07/25/11	6:33 PM
469498d2	U 236-IS	94.8			%R	0.5				0.5	94.80655	94.8		1	0.5	94.80655	07/25/11	6:33 PM
469498d2D	U-tot	4680			ng/L	40	2.4%			40	4676.36577	4680	282	1	40	4676.36577	07/25/11	6:35 PM
469498d2D	U 236-IS	94.6			%R	0.5	0.2%			0.5	94.63469	94.6		1	0.5	94.63469	07/25/11	6:35 PM
469498d2L	U-tot	4530			ng/L	200	0.9%			40	4527.60675	4530	290	5	200	905.52135	07/25/11	6:38 PM
469498d2L	U 236-IS	96.4			%R	0.5	-1.7%			0.5	96.3683	96.4		5	0.5	96.3683	07/25/11	6:38 PM
469498d2AS	U-tot	24800			ng/L	40		98.7%	20500	40	24795.75182	24800	1488	1	40	24795.75182	07/25/11	6:40 PM
469498d2AS	U 236-IS	97.2			%R	0.5		#DIV/0!	0	0.5	97.16786	97.2		1	0.5	97.16786	07/25/11	6:40 PM
zzz	U-tot	40.0	U		ng/L	40				40	5.84177	5.84		1	40	5.84177	07/25/11	6:42 PM
zzz	U 236-IS	96.0			%R	0.5				0.5	95.99841	96		1	0.5	95.99841	07/25/11	6:42 PM
critotU	U-tot	41.6			ng/L	40		104.0%	40.0	40	41.5681	41.6		1	40	41.5681	07/25/11	6:45 PM
critotU	U 236-IS	96.3			%R	0.5		#DIV/0!	0	0.5	96.34214	96.3		1	0.5	96.34214	07/25/11	6:45 PM
cri235	U-tot									40	733.70426	734		1	40	733.70426	07/25/11	6:47 PM
cri235	U 236-IS									0.5	97.53775	97.5		1	0.5	97.53775	07/25/11	6:47 PM
ccv	U-tot	8040			ng/L	40		104.8%	7670	40	8038.23649	8040		1	40	8038.23649	07/25/11	6:49 PM
ccv	U 236-IS	99.6			%R	0.5		#DIV/0!	0	0.5	99.57031	99.6		1	0.5	99.57031	07/25/11	6:49 PM
ccb	U-tot	40.0	U		ng/L	40				40	4.00463	4		1	40	4.00463	07/25/11	6:52 PM
ccb	U 236-IS	99.6			%R	0.5				0.5	99.58153	99.6		1	0.5	99.58153	07/25/11	6:52 PM

Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
S-0	U-tot															0	07/26/11	10:26 AM
S-0	U 236-IS															100	07/26/11	10:26 AM
S-1	U-tot															44984	07/26/11	10:28 AM
S-1	U 236-IS															104.19196	07/26/11	10:28 AM
icv	U-tot	7970			ng/L	40		103.9%	7670	40	7967.95252	7970		1	40	7967.95252	07/26/11	10:31 AM
icv	U 236-IS	102			%R	0.5		#DIV/0!	0	0.5	102.28691	102		1	0.5	102.28691	07/26/11	10:31 AM
icb	U-tot	40.0	U		ng/L	40				40	-0.42413	-0.424		1	40	-0.42413	07/26/11	10:33 AM
icb	U 236-IS	100			%R	0.5				0.5	100.43518	100		1	0.5	100.43518	07/26/11	10:33 AM
critotU	U-tot	40.0	U		ng/L	40		96.5%	40.0	40	38.62154	38.6		1	40	38.62154	07/26/11	10:35 AM
critotU	U 236-IS	101			%R	0.5		#DIV/0!	0	0.5	100.63056	101		1	0.5	100.63056	07/26/11	10:35 AM
cri235	U-tot									40	723.3621	723		1	40	723.3621	07/26/11	10:38 AM
cri235	U 236-IS									0.5	100.81707	101		1	0.5	100.81707	07/26/11	10:38 AM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	40	4.94543	4.95		1	40	4.94543	07/26/11	10:40 AM
icsa	U 236-IS	85.8			%R	0.5		#DIV/0!	0	0.5	85.76441	85.8		1	0.5	85.76441	07/26/11	10:40 AM
icsab	U-tot	20500			ng/L	40		100.5%	20400	40	20510.59552	20500		1	40	20510.59552	07/26/11	10:42 AM
icsab	U 236-IS	90.2			%R	0.5		#DIV/0!	0	0.5	90.16901	90.2		1	0.5	90.16901	07/26/11	10:42 AM
zzz	U-tot	40.0	U		ng/L	40				40	-0.29044	-0.29		1	40	-0.29044	07/26/11	10:45 AM
zzz	U 236-IS	107			%R	0.5				0.5	106.93191	107		1	0.5	106.93191	07/26/11	10:45 AM
ccv	U-tot	8030			ng/L	40		104.7%	7670	40	8032.83471	8030		1	40	8032.83471	07/26/11	10:47 AM
ccv	U 236-IS	109			%R	0.5		#DIV/0!	0	0.5	108.57502	109		1	0.5	108.57502	07/26/11	10:47 AM
ccb	U-tot	40.0	U		ng/L	40				40	-3.18693	-3.19		1	40	-3.18693	07/26/11	10:49 AM
ccb	U 236-IS	107			%R	0.5				0.5	106.74984	107		1	0.5	106.74984	07/26/11	10:49 AM
469499d2	U-tot	4500			ng/L	40				40	4497.19843	4500	271	1	40	4497.19843	07/26/11	10:52 AM
469499d2	U 236-IS	99.0			%R	0.5				0.5	98.95203	99		1	0.5	98.95203	07/26/11	10:52 AM
469499d2D	U-tot	4550			ng/L	40	1.1%			40	4549.84232	4550	274	1	40	4549.84232	07/26/11	10:54 AM
469499d2D	U 236-IS	95.2			%R	0.5	3.9%			0.5	95.19986	95.2		1	0.5	95.19986	07/26/11	10:54 AM
469500d2	U-tot	3000			ng/L	40				40	3003.95632	3000	181	1	40	3003.95632	07/26/11	10:56 AM
469500d2	U 236-IS	89.0			%R	0.5				0.5	89.03676	89		1	0.5	89.03676	07/26/11	10:56 AM
469500d2D	U-tot	3040			ng/L	40	1.3%			40	3036.13068	3040	183	1	40	3036.13068	07/26/11	10:59 AM
469500d2D	U 236-IS	92.1			%R	0.5	3.4%			0.5	92.12715	92.1		1	0.5	92.12715	07/26/11	10:59 AM
469501d2	U-tot	4450			ng/L	40				40	4452.40222	4450	268	1	40	4452.40222	07/26/11	11:01 AM
469501d2	U 236-IS	93.7			%R	0.5				0.5	93.73454	93.7		1	0.5	93.73454	07/26/11	11:01 AM
469501d2D	U-tot	4530			ng/L	40	1.8%			40	4531.10242	4530	273	1	40	4531.10242	07/26/11	11:03 AM
469501d2D	U 236-IS	91.7			%R	0.5	2.2%			0.5	91.6698	91.7		1	0.5	91.6698	07/26/11	11:03 AM
469506d2	U-tot	4530			ng/L	40				40	4528.5724	4530	273	1	40	4528.5724	07/26/11	11:06 AM
469506d2	U 236-IS	89.7			%R	0.5				0.5	89.65394	89.7		1	0.5	89.65394	07/26/11	11:06 AM
zzz	U-tot	40.0	U		ng/L	40				40	1.76571	1.77		1	40	1.76571	07/26/11	11:08 AM
zzz	U 236-IS	91.8			%R	0.5				0.5	91.76749	91.8		1	0.5	91.76749	07/26/11	11:08 AM
critotU	U-tot	40.9			ng/L	40		102.3%	40.0	40	40.93086	40.9		1	40	40.93086	07/26/11	11:10 AM
critotU	U 236-IS	89.3			%R	0.5		#DIV/0!	0	0.5	89.27653	89.3		1	0.5	89.27653	07/26/11	11:10 AM
cri235	U-tot									40	740.19108	740		1	40	740.19108	07/26/11	11:13 AM
cri235	U 236-IS									0.5	89.55182	89.6		1	0.5	89.55182	07/26/11	11:13 AM
ccv	U-tot	8170			ng/L	40		106.5%	7670	40	8168.74615	8170		1	40	8168.74615	07/26/11	11:15 AM
ccv	U 236-IS	89.8			%R	0.5		#DIV/0!	0	0.5	89.80047	89.8		1	0.5	89.80047	07/26/11	11:15 AM
ccb	U-tot	40.0	U		ng/L	40				40	-0.83219	-0.832		1	40	-0.83219	07/26/11	11:17 AM

UT10-03

Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
ccb	U 236-IS	89.1			%R	0.5				0.5	89.09004	89.1		1	0.5	89.09004	07/26/11	11:17 AM
469506d2D	U-tot	4440			ng/L	40	2.0%			40	4442.54235	4440	267	1	40	4442.54235	07/26/11	11:20 AM
469506d2D	U 236-IS	86.5			%R	0.5	3.6%			0.5	86.50147	86.5		1	0.5	86.50147	07/26/11	11:20 AM
Blankd4	U-tot	4660			ng/L	40				40	4657.04206	4660	280	1	40	4657.04206	07/26/11	11:22 AM
Blankd4	U 236-IS	85.5			%R	0.5				0.5	85.46249	85.5		1	0.5	85.46249	07/26/11	11:22 AM
469498d4	U-tot	4570			ng/L	40				40	4571.14777	4570	275	1	40	4571.14777	07/26/11	11:24 AM
469498d4	U 236-IS	85.6			%R	0.5				0.5	85.63121	85.6		1	0.5	85.63121	07/26/11	11:24 AM
469498d4D	U-tot	4740			ng/L	40	3.7%			40	4735.17664	4740	285	1	40	4735.17664	07/26/11	11:27 AM
469498d4D	U 236-IS	84.1			%R	0.5	1.8%			0.5	84.09053	84.1		1	0.5	84.09053	07/26/11	11:27 AM
469498d4L	U-tot	4510			ng/L	200	1.3%			40	4510.76725	4510	288	5	200	902.15345	07/26/11	11:29 AM
469498d4L	U 236-IS	92.1			%R	0.5	-7.6%			0.5	92.13159	92.1		5	0.5	92.13159	07/26/11	11:29 AM
469498d4AS	U-tot	25500			ng/L	40		102.1%	20500	40	25513.08249	25500	1530	1	40	25513.08249	07/26/11	11:32 AM
469498d4AS	U 236-IS	86.6			%R	0.5		#DIV/0!	0	0.5	86.5725	86.6		1	0.5	86.5725	07/26/11	11:32 AM
zzz	U-tot	40.0	U		ng/L	40				40	5.14643	5.15		1	40	5.14643	07/26/11	11:34 AM
zzz	U 236-IS	89.0			%R	0.5				0.5	89.01012	89		1	0.5	89.01012	07/26/11	11:34 AM
critotU	U-tot	51.5			ng/L	40		128.8%	40.0	40	51.45311	51.5		1	40	51.45311	07/26/11	11:36 AM
critotU	U 236-IS	88.8			%R	0.5		#DIV/0!	0	0.5	88.76591	88.8		1	0.5	88.76591	07/26/11	11:36 AM
cri235	U-tot									40	746.9995	747		1	40	746.9995	07/26/11	11:39 AM
cri235	U 236-IS									0.5	87.02539	87		1	0.5	87.02539	07/26/11	11:39 AM
ccv	U-tot	8260			ng/L	40		107.7%	7670	40	8262.50189	8260		1	40	8262.50189	07/26/11	11:41 AM
ccv	U 236-IS	86.6			%R	0.5		#DIV/0!	0	0.5	86.6169	86.6		1	0.5	86.6169	07/26/11	11:41 AM
ccb	U-tot	40.0	U		ng/L	40				40	0.57045	0.57		1	40	0.57045	07/26/11	11:43 AM
ccb	U 236-IS	86.3			%R	0.5				0.5	86.32386	86.3		1	0.5	86.32386	07/26/11	11:43 AM
S-0	U-tot															0	07/26/11	2:39 PM
S-0	U 236-IS															100	07/26/11	2:39 PM
S-1	U-tot															44984	07/26/11	2:42 PM
S-1	U 236-IS															101.63591	07/26/11	2:42 PM
icv	U-tot	8020			ng/L	40		104.6%	7670	40	8023.3488	8020		1	40	8023.3488	07/26/11	2:44 PM
icv	U 236-IS	99.1			%R	0.5		#DIV/0!	0	0.5	99.09363	99.1		1	0.5	99.09363	07/26/11	2:44 PM
icb	U-tot	40.0	U		ng/L	40				40	0.18136	0.181		1	40	0.18136	07/26/11	2:46 PM
icb	U 236-IS	99.0			%R	0.5				0.5	99.02731	99		1	0.5	99.02731	07/26/11	2:46 PM
critotU	U-tot	42.7			ng/L	40		106.8%	40.0	40	42.74207	42.7		1	40	42.74207	07/26/11	2:48 PM
critotU	U 236-IS	97.5			%R	0.5		#DIV/0!	0	0.5	97.52959	97.5		1	0.5	97.52959	07/26/11	2:48 PM
cri235	U-tot									40	727.19517	727		1	40	727.19517	07/26/11	2:51 PM
cri235	U 236-IS									0.5	97.65117	97.7		1	0.5	97.65117	07/26/11	2:51 PM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	40	10.08725	10.1		1	40	10.08725	07/26/11	2:53 PM
icsa	U 236-IS	80.9			%R	0.5		#DIV/0!	0	0.5	80.90648	80.9		1	0.5	80.90648	07/26/11	2:53 PM
icsab	U-tot	20800			ng/L	40		102.0%	20400	40	20796.30627	20800		1	40	20796.30627	07/26/11	2:55 PM
icsab	U 236-IS	83.5			%R	0.5		#DIV/0!	0	0.5	83.53135	83.5		1	0.5	83.53135	07/26/11	2:55 PM
zzz	U-tot	40.0	U		ng/L	40				40	-0.04875	-0.0488		1	40	-0.04875	07/26/11	2:58 PM
zzz	U 236-IS	103			%R	0.5				0.5	102.54231	103		1	0.5	102.54231	07/26/11	2:58 PM
ccv	U-tot	8170			ng/L	40		106.5%	7670	40	8169.88214	8170		1	40	8169.88214	07/26/11	3:00 PM
ccv	U 236-IS	102			%R	0.5		#DIV/0!	0	0.5	102.13332	102		1	0.5	102.13332	07/26/11	3:00 PM
ccb	U-tot	40.0	U		ng/L	40				40	2.67285	2.67		1	40	2.67285	07/26/11	3:02 PM
ccb	U 236-IS	102			%R	0.5				0.5	102.41519	102		1	0.5	102.41519	07/26/11	3:02 PM

Fluor-B&W Portsmouth LLC
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Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
469499d4	U-tot	4610			ng/L	40				40	4613.8445	4610	277	1	40	4613.8445	07/26/11	3:05 PM
469499d4	U 236-IS	91.9			%R	0.5				0.5	91.91466	91.9		1	0.5	91.91466	07/26/11	3:05 PM
469499d4D	U-tot	4560			ng/L	40	1.1%			40	4561.69383	4560	274	1	40	4561.69383	07/26/11	3:07 PM
469499d4D	U 236-IS	91.7			%R	0.5	0.2%			0.5	91.69361	91.7		1	0.5	91.69361	07/26/11	3:07 PM
469500d4	U-tot	2200			ng/L	40				40	2202.45457	2200	134	1	40	2202.45457	07/26/11	3:09 PM
469500d4	U 236-IS	91.0			%R	0.5				0.5	90.95308	91		1	0.5	90.95308	07/26/11	3:09 PM
469500d4D	U-tot	2180			ng/L	40	0.9%			40	2180.17975	2180	132	1	40	2180.17975	07/26/11	3:12 PM
469500d4D	U 236-IS	88.4			%R	0.5	2.9%			0.5	88.39439	88.4		1	0.5	88.39439	07/26/11	3:12 PM
469501d4	U-tot	4490			ng/L	40				40	4486.89855	4490	270	1	40	4486.89855	07/26/11	3:14 PM
469501d4	U 236-IS	89.6			%R	0.5				0.5	89.60465	89.6		1	0.5	89.60465	07/26/11	3:14 PM
469501d4D	U-tot	4510			ng/L	40	0.4%			40	4507.04039	4510	271	1	40	4507.04039	07/26/11	3:16 PM
469501d4D	U 236-IS	87.2			%R	0.5	2.7%			0.5	87.19519	87.2		1	0.5	87.19519	07/26/11	3:16 PM
469506d4	U-tot	4580			ng/L	40				40	4575.65067	4580	276	1	40	4575.65067	07/26/11	3:19 PM
469506d4	U 236-IS	89.0			%R	0.5				0.5	88.97465	89		1	0.5	88.97465	07/26/11	3:19 PM
zzz	U-tot	40.0	U		ng/L	40				40	1.43185	1.43		1	40	1.43185	07/26/11	3:21 PM
zzz	U 236-IS	91.3			%R	0.5				0.5	91.33439	91.3		1	0.5	91.33439	07/26/11	3:21 PM
critotU	U-tot	40.0	U		ng/L	40		93.3%	40.0	40	37.33824	37.3		1	40	37.33824	07/26/11	3:23 PM
critotU	U 236-IS	91.0			%R	0.5		#DIV/0!	0	0.5	91.02491	91		1	0.5	91.02491	07/26/11	3:23 PM
cri235	U-tot									40	729.76952	730		1	40	729.76952	07/26/11	3:26 PM
cri235	U 236-IS									0.5	91.16308	91.2		1	0.5	91.16308	07/26/11	3:26 PM
ccv	U-tot	8180			ng/L	40		106.6%	7670	40	8178.95764	8180		1	40	8178.95764	07/26/11	3:28 PM
ccv	U 236-IS	89.1			%R	0.5		#DIV/0!	0	0.5	89.13492	89.1		1	0.5	89.13492	07/26/11	3:28 PM
ccb	U-tot	40.0	U		ng/L	40				40	0.34403	0.344		1	40	0.34403	07/26/11	3:30 PM
ccb	U 236-IS	90.6			%R	0.5				0.5	90.58834	90.6		1	0.5	90.58834	07/26/11	3:30 PM
469506d4D	U-tot	4570			ng/L	40	0.2%			40	4565.6351	4570	275	1	40	4565.6351	07/26/11	3:33 PM
469506d4D	U 236-IS	85.6			%R	0.5	3.9%			0.5	85.64234	85.6		1	0.5	85.64234	07/26/11	3:33 PM
Blankd7	U-tot	4730			ng/L	40				40	4727.49497	4730	285	1	40	4727.49497	07/26/11	3:35 PM
Blankd7	U 236-IS	86.3			%R	0.5				0.5	86.28336	86.3		1	0.5	86.28336	07/26/11	3:35 PM
469498d7	U-tot	4640			ng/L	40				40	4638.61364	4640	279	1	40	4638.61364	07/26/11	3:37 PM
469498d7	U 236-IS	87.1			%R	0.5				0.5	87.07914	87.1		1	0.5	87.07914	07/26/11	3:37 PM
469498d7D	U-tot	4740			ng/L	40	2.1%			40	4735.42332	4740	285	1	40	4735.42332	07/26/11	3:40 PM
469498d7D	U 236-IS	85.8			%R	0.5	1.5%			0.5	85.82469	85.8		1	0.5	85.82469	07/26/11	3:40 PM
469498d7L	U-tot	4580			ng/L	200	1.3%			40	4582.8453	4580	292	5	200	916.56906	07/26/11	3:42 PM
469498d7L	U 236-IS	91.3			%R	0.5	-4.8%			0.5	91.28465	91.3		5	0.5	91.28465	07/26/11	3:42 PM
469498d7AS	U-tot	25800			ng/L	40		103.2%	20500	40	25806.45717	25800	1548	1	40	25806.45717	07/26/11	3:44 PM
469498d7AS	U 236-IS	86.3			%R	0.5		#DIV/0!	0	0.5	86.30547	86.3		1	0.5	86.30547	07/26/11	3:44 PM
zzz	U-tot	40.0	U		ng/L	40				40	12.47314	12.5		1	40	12.47314	07/26/11	3:47 PM
zzz	U 236-IS	90.6			%R	0.5				0.5	90.61044	90.6		1	0.5	90.61044	07/26/11	3:47 PM
critotU	U-tot	41.7			ng/L	40		104.3%	40.0	40	41.65127	41.7		1	40	41.65127	07/26/11	3:49 PM
critotU	U 236-IS	92.6			%R	0.5		#DIV/0!	0	0.5	92.64415	92.6		1	0.5	92.64415	07/26/11	3:49 PM
cri235	U-tot									40	722.0089	722		1	40	722.0089	07/26/11	3:51 PM
cri235	U 236-IS									0.5	90.54412	90.5		1	0.5	90.54412	07/26/11	3:51 PM
cri235	U-tot									40	748.26173	748		1	40	748.26173	07/26/11	3:57 PM
cri235	U 236-IS									0.5	90.15177	90.2		1	0.5	90.15177	07/26/11	3:57 PM
ccv	U-tot	8240			ng/L	40		107.4%	7670	40	8241.0717	8240		1	40	8241.0717	07/26/11	3:59 PM

Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
ccv	U 236-IS	88.7			%R	0.5		#DIV/0!	0	0.5	88.68728	88.7		1	0.5	88.68728	07/26/11	3:59 PM
ccb	U-tot	40.0	U		ng/L	40				40	-2.85972	-2.86		1	40	-2.85972	07/26/11	4:01 PM
ccb	U 236-IS	90.5			%R	0.5				0.5	90.53307	90.5		1	0.5	90.53307	07/26/11	4:01 PM
S-0	U-tot															0	07/26/11	4:44 PM
S-0	U 236-IS															100	07/26/11	4:44 PM
S-1	U-tot															44984	07/26/11	4:46 PM
S-1	U 236-IS															101.61963	07/26/11	4:46 PM
icv	U-tot	8050			ng/L	40		105.0%	7670	40	8052.08324	8050		1	40	8052.08324	07/26/11	4:49 PM
icv	U 236-IS	99.1			%R	0.5		#DIV/0!	0	0.5	99.12633	99.1		1	0.5	99.12633	07/26/11	4:49 PM
icb	U-tot	40.0	U		ng/L	40				40	3.39163	3.39		1	40	3.39163	07/26/11	4:51 PM
icb	U 236-IS	97.0			%R	0.5				0.5	97.00269	97		1	0.5	97.00269	07/26/11	4:51 PM
critotU	U-tot	40.0	U		ng/L	40		97.8%	40.0	40	39.06871	39.1		1	40	39.06871	07/26/11	4:53 PM
critotU	U 236-IS	97.2			%R	0.5		#DIV/0!	0	0.5	97.18414	97.2		1	0.5	97.18414	07/26/11	4:53 PM
cri235	U-tot									40	716.64713	717		1	40	716.64713	07/26/11	4:56 PM
cri235	U 236-IS									0.5	97.90994	97.9		1	0.5	97.90994	07/26/11	4:56 PM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	40	6.2871	6.29		1	40	6.2871	07/26/11	4:58 PM
icsa	U 236-IS	83.8			%R	0.5		#DIV/0!	0	0.5	83.83129	83.8		1	0.5	83.83129	07/26/11	4:58 PM
icsab	U-tot	20200			ng/L	40		99.0%	20400	40	20227.08382	20200		1	40	20227.08382	07/26/11	5:00 PM
icsab	U 236-IS	88.4			%R	0.5		#DIV/0!	0	0.5	88.37397	88.4		1	0.5	88.37397	07/26/11	5:00 PM
zzz	U-tot	40.0	U		ng/L	40				40	-5.07631	-5.08		1	40	-5.07631	07/26/11	5:03 PM
zzz	U 236-IS	108			%R	0.5				0.5	107.9639	108		1	0.5	107.9639	07/26/11	5:03 PM
ccv	U-tot	8050			ng/L	40		105.0%	7670	40	8052.41098	8050		1	40	8052.41098	07/26/11	5:05 PM
ccv	U 236-IS	107			%R	0.5		#DIV/0!	0	0.5	106.65336	107		1	0.5	106.65336	07/26/11	5:05 PM
ccb	U-tot	40.0	U		ng/L	40				40	-6.60505	-6.61		1	40	-6.60505	07/26/11	5:07 PM
ccb	U 236-IS	106			%R	0.5				0.5	105.55117	106		1	0.5	105.55117	07/26/11	5:07 PM
469499d7	U-tot	4560			ng/L	40				40	4557.76514	4560	274	1	40	4557.76514	07/26/11	5:13 PM
469499d7	U 236-IS	96.8			%R	0.5				0.5	96.82124	96.8		1	0.5	96.82124	07/26/11	5:13 PM
469499d7D	U-tot	4470			ng/L	40	2.0%			40	4471.26764	4470	269	1	40	4471.26764	07/26/11	5:15 PM
469499d7D	U 236-IS	98.5			%R	0.5	1.7%			0.5	98.51479	98.5		1	0.5	98.51479	07/26/11	5:15 PM
469500d7	U-tot	2040			ng/L	40				40	2044.22557	2040	124	1	40	2044.22557	07/26/11	5:17 PM
469500d7	U 236-IS	95.0			%R	0.5				0.5	95.00004	95		1	0.5	95.00004	07/26/11	5:17 PM
469500d7D	U-tot	1860			ng/L	40	9.2%			40	1860.04075	1860	113	1	40	1860.04075	07/26/11	5:20 PM
469500d7D	U 236-IS	93.4			%R	0.5	1.7%			0.5	93.44766	93.4		1	0.5	93.44766	07/26/11	5:20 PM
469501d7	U-tot	4420			ng/L	40				40	4423.83708	4420	266	1	40	4423.83708	07/26/11	5:22 PM
469501d7	U 236-IS	91.2			%R	0.5				0.5	91.23672	91.2		1	0.5	91.23672	07/26/11	5:22 PM
469501d7D	U-tot	4320			ng/L	40	2.3%			40	4321.40847	4320	260	1	40	4321.40847	07/26/11	5:24 PM
469501d7D	U 236-IS	93.7			%R	0.5	2.7%			0.5	93.74335	93.7		1	0.5	93.74335	07/26/11	5:24 PM
469506d7	U-tot	4580			ng/L	40				40	4583.10729	4580	276	1	40	4583.10729	07/26/11	5:26 PM
469506d7	U 236-IS	92.9			%R	0.5				0.5	92.88317	92.9		1	0.5	92.88317	07/26/11	5:26 PM
zzz	U-tot	40.0	U		ng/L	40				40	1.89611	1.9		1	40	1.89611	07/26/11	5:29 PM
zzz	U 236-IS	96.6			%R	0.5				0.5	96.59276	96.6		1	0.5	96.59276	07/26/11	5:29 PM
critotU	U-tot	43.6			ng/L	40		109.0%	40.0	40	43.63327	43.6		1	40	43.63327	07/26/11	5:31 PM
critotU	U 236-IS	97.8			%R	0.5		#DIV/0!	0	0.5	97.7957	97.8		1	0.5	97.7957	07/26/11	5:31 PM
cri235	U-tot									40	755.0435	755		1	40	755.0435	07/26/11	5:33 PM
cri235	U 236-IS									0.5	97.30511	97.3		1	0.5	97.30511	07/26/11	5:33 PM

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to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
ccv	U-tot	7950			ng/L	40		103.7%	7670	40	7949.46501	7950		1	40	7949.46501	07/26/11	5:36 PM
ccv	U 236-IS	98.8			%R	0.5		#DIV/0!	0	0.5	98.75672	98.8		1	0.5	98.75672	07/26/11	5:36 PM
ccb	U-tot	40.0	U		ng/L	40				40	-2.45111	-2.45		1	40	-2.45111	07/26/11	5:38 PM
ccb	U 236-IS	96.6			%R	0.5				0.5	96.64651	96.6		1	0.5	96.64651	07/26/11	5:38 PM
469506d7D	U-tot	4480			ng/L	40	2.2%			40	4483.19105	4480	270	1	40	4483.19105	07/26/11	5:40 PM
469506d7D	U 236-IS	91.4			%R	0.5	1.6%			0.5	91.35769	91.4		1	0.5	91.35769	07/26/11	5:40 PM
Blankd10	U-tot	4660			ng/L	40				40	4660.29506	4660	280	1	40	4660.29506	07/26/11	5:43 PM
Blankd10	U 236-IS	90.2			%R	0.5				0.5	90.20855	90.2		1	0.5	90.20855	07/26/11	5:43 PM
469498d10	U-tot	4720			ng/L	40				40	4724.93621	4720	284	1	40	4724.93621	07/26/11	5:45 PM
469498d10	U 236-IS	92.4			%R	0.5				0.5	92.37915	92.4		1	0.5	92.37915	07/26/11	5:45 PM
469498d10D	U-tot	4650			ng/L	40	1.5%			40	4650.5187	4650	280	1	40	4650.5187	07/26/11	5:47 PM
469498d10D	U 236-IS	93.1			%R	0.5	0.8%			0.5	93.09821	93.1		1	0.5	93.09821	07/26/11	5:47 PM
469498d10L	U-tot	4770			ng/L	200	-1.1%			40	4767.40645	4770	303	5	200	953.48129	07/26/11	5:50 PM
469498d10L	U 236-IS	98.5			%R	0.5	-6.6%			0.5	98.52821	98.5		5	0.5	98.52821	07/26/11	5:50 PM
zzz	U-tot									40	31737.90118	31700		1	40	31737.90118	07/26/11	5:52 PM
zzz	U 236-IS									0.5	93.44768	93.4		1	0.5	93.44768	07/26/11	5:52 PM
zzz	U-tot	40.0	U		ng/L	40				40	5.05228	5.05		1	40	5.05228	07/26/11	5:54 PM
zzz	U 236-IS	97.6			%R	0.5				0.5	97.55376	97.6		1	0.5	97.55376	07/26/11	5:54 PM
critotU	U-tot	40.0	U		ng/L	40		87.8%	40.0	40	35.10825	35.1		1	40	35.10825	07/26/11	5:57 PM
critotU	U 236-IS	95.9			%R	0.5		#DIV/0!	0	0.5	95.87368	95.9		1	0.5	95.87368	07/26/11	5:57 PM
cri235	U-tot									40	715.34312	715		1	40	715.34312	07/26/11	5:59 PM
cri235	U 236-IS									0.5	97.6344	97.6		1	0.5	97.6344	07/26/11	5:59 PM
ccv	U-tot	8090			ng/L	40		105.5%	7670	40	8093.47557	8090		1	40	8093.47557	07/26/11	6:01 PM
ccv	U 236-IS	94.6			%R	0.5		#DIV/0!	0	0.5	94.55651	94.6		1	0.5	94.55651	07/26/11	6:01 PM
ccb	U-tot	40.0	U		ng/L	40				40	6.33547	6.34		1	40	6.33547	07/26/11	6:04 PM
ccb	U 236-IS	92.3			%R	0.5				0.5	92.27837	92.3		1	0.5	92.27837	07/26/11	6:04 PM
S-0	U-tot															0	07/26/11	6:12 PM
S-0	U 236-IS															100	07/26/11	6:12 PM
S-1	U-tot															44984	07/26/11	6:14 PM
S-1	U 236-IS															99.46369	07/26/11	6:14 PM
icv	U-tot	7960			ng/L	40		103.8%	7670	40	7960.30396	7960		1	40	7960.30396	07/26/11	6:16 PM
icv	U 236-IS	98.5			%R	0.5		#DIV/0!	0	0.5	98.49394	98.5		1	0.5	98.49394	07/26/11	6:16 PM
icb	U-tot	40.0	U		ng/L	40				40	2.87673	2.88		1	40	2.87673	07/26/11	6:19 PM
icb	U 236-IS	99.4			%R	0.5				0.5	99.39757	99.4		1	0.5	99.39757	07/26/11	6:19 PM
critotU	U-tot	40.0	U		ng/L	40		97.3%	40.0	40	38.93157	38.9		1	40	38.93157	07/26/11	6:21 PM
critotU	U 236-IS	99.4			%R	0.5		#DIV/0!	0	0.5	99.37554	99.4		1	0.5	99.37554	07/26/11	6:21 PM
cri235	U-tot									40	728.01343	728		1	40	728.01343	07/26/11	6:23 PM
cri235	U 236-IS									0.5	97.12747	97.1		1	0.5	97.12747	07/26/11	6:23 PM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	40	6.1781	6.18		1	40	6.1781	07/26/11	6:26 PM
icsa	U 236-IS	86.2			%R	0.5		#DIV/0!	0	0.5	86.21811	86.2		1	0.5	86.21811	07/26/11	6:26 PM
icsab	U-tot	20500			ng/L	40		100.5%	20400	40	20459.33999	20500		1	40	20459.33999	07/26/11	6:28 PM
icsab	U 236-IS	88.3			%R	0.5		#DIV/0!	0	0.5	88.34851	88.3		1	0.5	88.34851	07/26/11	6:28 PM
zzz	U-tot	40.0	U		ng/L	40				40	-4.31519	-4.32		1	40	-4.31519	07/26/11	6:30 PM
zzz	U 236-IS	108			%R	0.5				0.5	108.27253	108		1	0.5	108.27253	07/26/11	6:30 PM
ccv	U-tot	7920			ng/L	40		103.3%	7670	40	7919.99711	7920		1	40	7919.99711	07/26/11	6:33 PM

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Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
ccv	U 236-IS	108			%R	0.5		#DIV/0!	0	0.5	108.346	108		1	0.5	108.346	07/26/11	6:33 PM
ccb	U-tot	40.0	U		ng/L	40				40	-4.99186	-4.99		1	40	-4.99186	07/26/11	6:35 PM
ccb	U 236-IS	109			%R	0.5				0.5	109.24968	109		1	0.5	109.24968	07/26/11	6:35 PM
469499d10	U-tot	4510			ng/L	40				40	4514.09619	4510	271	1	40	4514.09619	07/26/11	6:37 PM
469499d10	U 236-IS	99.8			%R	0.5				0.5	99.82368	99.8		1	0.5	99.82368	07/26/11	6:37 PM
469499d10D	U-tot	4560			ng/L	40	1.1%			40	4563.01073	4560	274	1	40	4563.01073	07/26/11	6:40 PM
469499d10D	U 236-IS	100			%R	0.5	0.2%			0.5	100.46285	100		1	0.5	100.46285	07/26/11	6:40 PM
469500d10	U-tot	1810			ng/L	40				40	1814.67697	1810	110	1	40	1814.67697	07/26/11	6:42 PM
469500d10	U 236-IS	98.9			%R	0.5				0.5	98.88331	98.9		1	0.5	98.88331	07/26/11	6:42 PM
469500d10D	U-tot	1910			ng/L	40	5.4%			40	1905.28148	1910	116	1	40	1905.28148	07/26/11	6:44 PM
469500d10D	U 236-IS	95.4			%R	0.5	3.6%			0.5	95.37165	95.4		1	0.5	95.37165	07/26/11	6:44 PM
469501d10	U-tot	4290			ng/L	40				40	4288.93484	4290	258	1	40	4288.93484	07/26/11	6:47 PM
469501d10	U 236-IS	93.8			%R	0.5				0.5	93.84359	93.8		1	0.5	93.84359	07/26/11	6:47 PM
469501d10D	U-tot	4720			ng/L	40	9.5%			40	4724.2547	4720	284	1	40	4724.2547	07/26/11	6:49 PM
469501d10D	U 236-IS	95.1			%R	0.5	1.4%			0.5	95.0631	95.1		1	0.5	95.0631	07/26/11	6:49 PM
469506d10	U-tot	4480			ng/L	40				40	4475.3955	4480	270	1	40	4475.3955	07/26/11	6:51 PM
469506d10	U 236-IS	95.0			%R	0.5				0.5	94.96025	95		1	0.5	94.96025	07/26/11	6:51 PM
zzz	U-tot	40.0	U		ng/L	40				40	2.3314	2.33		1	40	2.3314	07/26/11	6:54 PM
zzz	U 236-IS	99.4			%R	0.5				0.5	99.35349	99.4		1	0.5	99.35349	07/26/11	6:54 PM
critotU	U-tot	40.5			ng/L	40		101.3%	40.0	40	40.50859	40.5		1	40	40.50859	07/26/11	6:56 PM
critotU	U 236-IS	99.0			%R	0.5		#DIV/0!	0	0.5	99.03759	99		1	0.5	99.03759	07/26/11	6:56 PM
cri235	U-tot									40	726.86777	727		1	40	726.86777	07/26/11	6:58 PM
cri235	U 236-IS									0.5	99.12575	99.1		1	0.5	99.12575	07/26/11	6:58 PM
ccv	U-tot	8010			ng/L	40		104.4%	7670	40	8005.98823	8010		1	40	8005.98823	07/26/11	7:01 PM
ccv	U 236-IS	97.8			%R	0.5		#DIV/0!	0	0.5	97.83274	97.8		1	0.5	97.83274	07/26/11	7:01 PM
ccb	U-tot	40.0	U		ng/L	40				40	5.33965	5.34		1	40	5.33965	07/26/11	7:03 PM
ccb	U 236-IS	96.8			%R	0.5				0.5	96.81157	96.8		1	0.5	96.81157	07/26/11	7:03 PM

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Note: Uncertainty based on 6% result and 50% RL

8/29/11 469500 d14L for totU

311.57 ng/L x df 5 = 1558 ng/L = 1560 ng/L

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
icv	U-tot	7370			ng/L	40		96.1%	7670	40	7373.89039	7370		1	40	7373.89039	08/15/11	10:56 AM
icv	U 236-IS	103			%R	0.5				0.5	103.31678	103		1	0.5	103.31678	08/15/11	10:56 AM
icb	U-tot	40.0	U		ng/L	40				40	-0.50149	-0.501		1	40	-0.50149	08/15/11	10:58 AM
icb	U 236-IS	101			%R	0.5				0.5	100.91414	101		1	0.5	100.91414	08/15/11	10:58 AM
critotU	U-tot	40.0	U		ng/L	40		96.4%	40.0	40	38.55594	38.6		1	40	38.55594	08/15/11	11:00 AM
critotU	U 236-IS	101			%R	0.5				0.5	101.44061	101		1	0.5	101.44061	08/15/11	11:00 AM
cri235	U-tot									40	671.9954	672		1	40	671.9954	08/15/11	11:03 AM
cri235	U 236-IS									0.5	103.64704	104		1	0.5	103.64704	08/15/11	11:03 AM
icsa	U-tot	40.0	U		ng/L	40			0	40	4.46981	4.47		1	40	4.46981	08/15/11	11:05 AM
icsa	U 236-IS	115			%R	0.5				0.5	115.38333	115		1	0.5	115.38333	08/15/11	11:05 AM
icsab	U-tot	20300			ng/L	40		99.5%	20400	40	20318.8557	20300		1	40	20318.8557	08/15/11	11:07 AM
icsab	U 236-IS	117			%R	0.5				0.5	116.67093	117		1	0.5	116.67093	08/15/11	11:07 AM
zzz	U-tot	40.0	U		ng/L	40				40	-0.46953	-0.47		1	40	-0.46953	08/15/11	11:10 AM
zzz	U 236-IS	96.8			%R	0.5				0.5	96.81253	96.8		1	0.5	96.81253	08/15/11	11:10 AM
ccv	U-tot	7490			ng/L	40		97.7%	7670	40	7490.84539	7490		1	40	7490.84539	08/15/11	11:12 AM
ccv	U 236-IS	98.0			%R	0.5				0.5	97.98508	98		1	0.5	97.98508	08/15/11	11:12 AM
ccb	U-tot	40.0	U		ng/L	40				40	-2.16085	-2.16		1	40	-2.16085	08/15/11	11:14 AM
ccb	U 236-IS	95.8			%R	0.5				0.5	95.7644	95.8		1	0.5	95.7644	08/15/11	11:14 AM
469506d10D	U-tot	4400			ng/L	40				40	4395.04786	4400	265	1	40	4395.04786	08/15/11	11:20 AM
469506d10D	U 236-IS	105			%R	0.5				0.5	104.78137	105		1	0.5	104.78137	08/15/11	11:20 AM
zzz	U-tot	40.0	U		ng/L	40				40	-1.01393	-1.01		1	40	-1.01393	08/15/11	11:22 AM
zzz	U 236-IS	99.3			%R	0.5				0.5	99.27253	99.3		1	0.5	99.27253	08/15/11	11:22 AM
Blankd14	U-tot	4680			ng/L	40				40	4683.75932	4680	282	1	40	4683.75932	08/15/11	11:24 AM
Blankd14	U 236-IS	102			%R	0.5				0.5	101.80915	102		1	0.5	101.80915	08/15/11	11:24 AM
469500d14	U-tot	1550			ng/L	40				40	1549.07397	1550	95.1	1	40	1549.07397	08/15/11	11:27 AM
469500d14	U 236-IS	96.6			%R	0.5				0.5	96.62587	96.6		1	0.5	96.62587	08/15/11	11:27 AM
469500d14D	U-tot	1570			ng/L	40				40	1571.48289	1570	96.3	1	40	1571.48289	08/15/11	11:29 AM
469500d14D	U 236-IS	98.4			%R	0.5				0.5	98.39189	98.4		1	0.5	98.39189	08/15/11	11:29 AM
469500d14L	U-tot	1560	✓		ng/L	200	0.6%			40	1557.86905	1560	137	5	200	311.57381	08/15/11	11:31 AM
469500d14L	U 236-IS	94.6			%R	0.5				0.5	94.56314	94.6		5	0.5	94.56314	08/15/11	11:31 AM
469500d14AS	U-tot	41700			ng/L	40		98.2%	40900	40	41651.23397	41700	2502	1	40	41651.23397	08/15/11	11:33 AM
469500d14AS	U 236-IS	103			%R	0.5				0.5	103.40294	103		1	0.5	103.40294	08/15/11	11:33 AM
zzz	U-tot	40.0	U		ng/L	40				40	9.98935	9.99		1	40	9.98935	08/15/11	11:36 AM
zzz	U 236-IS	94.0			%R	0.5				0.5	93.99841	94		1	0.5	93.99841	08/15/11	11:36 AM
critotU	U-tot	41.1			ng/L	40		102.8%	40.0	40	41.0813	41.1		1	40	41.0813	08/15/11	11:38 AM
critotU	U 236-IS	98.6			%R	0.5				0.5	98.57376	98.6		1	0.5	98.57376	08/15/11	11:38 AM
cri235	U-tot									40	685.18437	685		1	40	685.18437	08/15/11	11:41 AM

8/29/11

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Fluor-B&W Portsmouth LLC
16526.05.006
to#110614-8
Note: Uncertainty based on 6% result and 50% RL

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV
cri235	U 236-IS								
ccv	U-tot	7650			ng/L	40		99.7%	7670
ccv	U 236-IS	98.6			%R	0.5			
ccb	U-tot	40.0	U		ng/L	40			
ccb	U 236-I5	99.9			%R	0.5			
Blankd21	U-tot	4510			ng/L	40			
Blankd21	U 236-I5	107			%R	0.5			
469500d21	U-tot	1860			ng/L	40			
469500d21	U 236-IS	107			%R	0.5			
469500d21D	U-tot	1360			ng/L	40			
469500d21D	U 236-IS	107			%R	0.5			
469500d21L	U-tot	1780			ng/L	200	4.3%		
469500d21L	U 236-IS	105			%R	0.5			
zzz	U-tot								
zzz	U 236-IS								
zzz	U-tot	40.0	U		ng/L	40			
zzz	U 236-IS	105			%R	0.5			
critotU	U-tot	40.0	U		ng/L	40		92.0%	40.0
critotU	U 236-IS	107			%R	0.5			
cri235	U-tot								
cri235	U 236-IS								
ccv	U-tot	7630			ng/L	40		99.5%	7670
ccv	U 236-IS	107			%R	0.5			
ccb	U-tot	40.0	U		ng/L	40			
ccb	U 236-IS	110			%R	0.5			
469500d21AS	U-tot	22000			ng/L	40		98.2%	20500
469500d21AS	U 236-I5	110			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U 236-IS	103			%R	0.5			
critotU	U-tot	40.0	U		ng/L	40		98.8%	40.0
critotU	U 236-I5	107			%R	0.5			
cri235	U-tot								
cri235	U 236-I5								
ccv	U-tot	7620			ng/L	40		99.3%	7670
ccv	U 236-I5	109			%R	0.5			
ccb	U-tot	40.0	U		ng/L	40			
ccb	U 236-IS	110			%R	0.5			

rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
0.5	99.39217	99.4		1	0.5	99.39217	08/15/11	11:41 AM
40	7645.09641	7650		1	40	7645.09641	08/15/11	11:43 AM
0.5	98.55942	98.6		1	0.5	98.55942	08/15/11	11:43 AM
40	0.05676	0.0568		1	40	0.05676	08/15/11	11:45 AM
0.5	99.90428	99.9		1	0.5	99.90428	08/15/11	11:45 AM
40	4514.57816	4510	271	1	40	4514.57816	08/15/11	11:47 AM
0.5	107.43297	107		1	0.5	107.43297	08/15/11	11:47 AM
40	1864.27605	1860	113	1	40	1864.27605	08/15/11	11:50 AM
0.5	107.15537	107		1	0.5	107.15537	08/15/11	11:50 AM
40	1364.12209	1360	84.0	1	40	1364.12209	08/15/11	11:52 AM
0.5	106.71981	107		1	0.5	106.71981	08/15/11	11:52 AM
40	1782.7714	1780	146	5	200	356.55428	08/15/11	11:54 AM
0.5	105.33179	105		5	0.5	105.33179	08/15/11	11:54 AM
40	43483.38761	43500		1	40	43483.38761	08/15/11	11:57 AM
0.5	107.29897	107		1	0.5	107.29897	08/15/11	11:57 AM
40	11.43003	11.4		1	40	11.43003	08/15/11	11:59 AM
0.5	104.93931	105		1	0.5	104.93931	08/15/11	11:59 AM
40	36.79473	36.8		1	40	36.79473	08/15/11	12:02 PM
0.5	106.60493	107		1	0.5	106.60493	08/15/11	12:02 PM
40	693.67754	694		1	40	693.67754	08/15/11	12:04 PM
0.5	106.96392	107		1	0.5	106.96392	08/15/11	12:04 PM
40	7627.6681	7630		1	40	7627.6681	08/15/11	12:06 PM
0.5	106.88255	107		1	0.5	106.88255	08/15/11	12:06 PM
40	0.62658	0.627		1	40	0.62658	08/15/11	12:09 PM
0.5	109.89796	110		1	0.5	109.89796	08/15/11	12:09 PM
40	21991.17681	22000	1320	1	40	21991.17681	08/15/11	12:25 PM
0.5	109.5294	110		1	0.5	109.5294	08/15/11	12:25 PM
40	7.40595	7.41		1	40	7.40595	08/15/11	12:27 PM
0.5	102.79988	103		1	0.5	102.79988	08/15/11	12:27 PM
40	39.53738	39.5		1	40	39.53738	08/15/11	12:29 PM
0.5	107.10751	107		1	0.5	107.10751	08/15/11	12:29 PM
40	703.38607	703		1	40	703.38607	08/15/11	12:32 PM
0.5	107.48564	107		1	0.5	107.48564	08/15/11	12:32 PM
40	7621.59104	7620		1	40	7621.59104	08/15/11	12:34 PM
0.5	109.37624	109		1	0.5	109.37624	08/15/11	12:34 PM
40	-0.90052	-0.901		1	40	-0.90052	08/15/11	12:36 PM
0.5	110.41011	110		1	0.5	110.41011	08/15/11	12:36 PM

Fluor-B&W Portsmouth LLC
16526.05.006
110614-8
Note: Uncertainty based on 6% result and 50% RL

JWainwright 8/29/11

469498 d10 AS for tot U

25513 ng/L x df 1 = 25513 ng/L

= 25500 ng/L

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV
icv	U-tot	7620			ng/L	40		99.3%	7670
icv	U 236-IS	101			%R	0.5			
icb	U-tot	40.0	U		ng/L	40			
icb	U 236-IS	100			%R	0.5			
critotU	U-tot	40.0	U		ng/L	40		96.6%	40.0
critotU	U 236-IS	101			%R	0.5			
cri235	U-tot								
cri235	U 236-IS								
icsa	U-tot	40.0	U		ng/L	40			0
icsa	U 236-IS	98.0			%R	0.5			
icsab	U-tot	20500			ng/L	40		100.5%	20400
icsab	U 236-IS	101			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U 236-IS	94.6			%R	0.5			
469498d10AS	U-tot	25500	✓		ng/L	40		101.4%	20500
469498d10AS	U 236-IS	95.2			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U 236-IS	88.5			%R	0.5			
ccv	U-tot	7530			ng/L	40		98.2%	7670
ccv	U 236-IS	91.9			%R	0.5			
ccb	U-tot	40.0	U		ng/L	40			
ccb	U 236-IS	92.5			%R	0.5			

rl	ng/L	sigwt	uncert	Dilution	Calc RL	ng/L	Date	Time
40	7616.64716	7620		1	40	7616.64716	08/15/11	2:54 PM
0.5	101.21705	101		1	0.5	101.21705	08/15/11	2:54 PM
40	1.40813	1.41		1	40	1.40813	08/15/11	2:56 PM
0.5	100.31133	100		1	0.5	100.31133	08/15/11	2:56 PM
40	38.63029	38.6		1	40	38.63029	08/15/11	2:59 PM
0.5	100.80463	101		1	0.5	100.80463	08/15/11	2:59 PM
40	692.36987	692		1	40	692.36987	08/15/11	3:01 PM
0.5	101.25749	101		1	0.5	101.25749	08/15/11	3:01 PM
40	3.48171	3.48		1	40	3.48171	08/15/11	3:03 PM
0.5	97.99854	98		1	0.5	97.99854	08/15/11	3:03 PM
40	20533.56765	20500		1	40	20533.56765	08/15/11	3:06 PM
0.5	101.41519	101		1	0.5	101.41519	08/15/11	3:06 PM
40	-1.33704	-1.34		1	40	-1.33704	08/15/11	3:08 PM
0.5	94.63861	94.6		1	0.5	94.63861	08/15/11	3:08 PM
40	25513.36876	25500	1530	1	40	25513.36876	08/15/11	3:11 PM
0.5	95.16421	95.2		1	0.5	95.16421	08/15/11	3:11 PM
40	2.21863	2.22		1	40	2.21863	08/15/11	3:13 PM
0.5	88.46483	88.5		1	0.5	88.46483	08/15/11	3:13 PM
40	7529.62203	7530		1	40	7529.62203	08/15/11	3:15 PM
0.5	91.93374	91.9		1	0.5	91.93374	08/15/11	3:15 PM
40	1.19431	1.19		1	40	1.19431	08/15/11	3:18 PM
0.5	92.50786	92.5		1	0.5	92.50786	08/15/11	3:18 PM

0100776

RS per 8/29/11

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SOUTHWEST RESEARCH INSTITUTE

010077

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS tot U

IDL Date: 5/10/2011

ICP-MS CALIB. STD. ID's		**TVs**
		tot U / U238 / U235
S0	11-081-05	
STD. 1	11-064-02	44984 / 44572 / 319 ppt
I. STD	11-064-09	0.5ppb
I. STD		
QC STD. ID's		
ICV/CCV	11-080-06	7666 / 7613 / 54.5 ppt
UCL		
CRI	11-080-04/05	4013.7 / 4.95 ppt
ICSA	11-064-04	
ICSAB	11-076-01	20444 / 20348 / 145 ppt
STD's IV, CCS 1-6 Expires		10-1-11
STD's Spex, ME 1-4 Expires		9-15-11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.00	Fluor	110614-8	7/25/11	SO	WC 15 0082 - 15 0086

INSTRUMENT: DRC II FILENAME: 110725b.rep

Analyst: N. Seiler Date: 7 / 26 / 11 ☐ CONVERTED (.DAT)

0100?8

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Monday, July 25, 2011 16:49:21
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 1\Daily Performance Check.995
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Priscilla Seiler 7/25/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	4714.9	4714.889	41.621	0.9
	In	114.9	18161.5	18161.524	102.852	0.6
	U	238.1	18666.3	18666.277	47.749	0.3
⌈>	Ce	139.9	17765.7	17765.676	72.221	0.4
⌊	CeO	155.9	1118.5	0.063	0.005	7.4
⌈>	Ba	137.9	158142.6	158142.604	887.100	0.6
⌊	Ba++	69.0	2465.9	0.016	0.000	1.5
	Bkgd	220.0	2.5	2.533	0.570	22.5
	Bkgd	8.5	20.3	20.267	0.990	4.9

Current Optimization File Data

Current Value	Description
1.04	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
9.25	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

✓ 8/2/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.8	352.0
Co	59	45	7.8	7364.0
In	115	45	9.3	17045.0

010079

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Monday, July 25, 2011 16:49:21
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 1\Daily Performance Check.995
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler
7/25/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2782	2023	0.684	
Mg	23.985	23.975	5700	2030	0.716	
Ar2	75.930	75.875	18319	2069	0.711	
In	114.904	114.875	27824	2101	0.694	
Ce	139.905	139.925	33884	2116	0.685	
Pb	207.977	207.975	50482	2156	0.711	
Th	232.038	231.975	56332	2172	0.705	
U	238.050	238.025	57802	2182	0.688	

010030

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Monday, July 25, 2011 17:09:41
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\S-0.998
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	19.682	0.000	
	U	234	27	21.973	0.000	
	U	235	976	2.482	0.000	
	U	238	186	11.095	0.000	
	U 232	232	133	6.805	0.000	
⌈	U-tot	238	1203	2.958	0.000	
|	U-238a	238	186	11.095	0.000	
|	U-235a	235	976	2.482	0.000	
⌊>	U 236	236	8930	1.458	0.000	
	U 236-IS	236	8930	1.458	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.667				ng/L
	U	234	26.667				ng/L
	U	235	975.719				ng/L
	U	238	185.669				ng/L
	U 232	232	133.334				ng/L
⌈	U-tot	238	0.135				ng/L
|	U-238a	238	0.021				ng/L
|	U-235a	235	0.109				ng/L
⌊>	U 236	236	8930.051				ng/L
	U 236-IS	236	8930.051	**100.000**	1.46	1.5	%R

610081

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Monday, July 25, 2011 17:11:59
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\S-1.999
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	43.424	0.000	
	U	234	72	12.108	0.000	
	U	235	6823	1.449	0.000	
	U	238	786635	0.141	0.000	
	U 232	232	101	8.508	0.000	
⌜	U-tot	238	793545	0.136	0.000	
|	U-238a	238	786635	0.141	0.000	
|	U-235a	235	6823	1.449	0.000	
⌞>	U 236	236	8953	1.668	0.000	
	U 236-IS	236	8953	1.668	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	15.333				ng/L
	U	234	72.000				ng/L
	U	235	6822.560				ng/L
	U	238	786635.010				ng/L
	U 232	232	101.334				ng/L
⌜	U-tot	238	88.646	**44984.000**	710.99	1.6	ng/L
|	U-238a	238	87.874	**44572.000**	698.71	1.6	ng/L
|	U-235a	235	0.762	**319.000**	11.26	3.5	ng/L
⌞>	U 236	236	8953.408				ng/L
	U 236-IS	236	8953.408	**100.262**	1.67	1.7	%R

0110082

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Monday, July 25, 2011 17:14:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\icv.1000
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	21	12.599	0.000	
	U	234	34	17.891	0.000	
	U	235	1984	2.277	0.000	
	U	238	139262	0.355	0.000	
	U 232	232	102	12.412	0.000	
⌈	U-tot	238	141301	0.330	0.000	
|	U-238a	238	139262	0.355	0.000	
|	U-235a	235	1984	2.277	0.000	
⌊>	U 236	236	8804	1.365	0.000	
	U 236-IS	236	8804	1.365	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	21.000				ng/L
	U	234	34.000				ng/L
	U	235	1984.217				ng/L
	U	238	139262.236				ng/L
	U 232	232	102.334				ng/L
⌈	U-tot	238	16.052	**8089.735**	100.37	1.2	ng/L
|	U-238a	238	15.821	**8015.946**	100.73	1.3	ng/L
|	U-235a	235	0.225	**56.736**	2.22	3.9	ng/L
⌊>	U 236	236	8803.594				ng/L
	U 236-IS	236	8803.594	**98.584**	1.35	1.4	%R

010083

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Monday, July 25, 2011 17:16:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\icb.1001
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	80.417	0.000	
	U	234	18	12.597	0.000	
	U	235	951	1.098	0.000	
	U	238	174	8.348	0.000	
	U 232	232	75	10.403	0.000	
⌈	U-tot	238	1153	2.120	0.000	
|	U-238a	238	174	8.348	0.000	
⌊	U-235a	235	951	1.098	0.000	
>	U 236	236	8903	0.628	0.000	
	U 236-IS	236	8903	0.628	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	18.333				ng/L
	U	235	951.050				ng/L
	U	238	174.002				ng/L
	U 232	232	74.667				ng/L
⌈	U-tot	238	0.129	**-2.643**	1.14	43.1	ng/L
|	U-238a	238	0.020	**-0.634**	0.77	121.8	ng/L
⌊	U-235a	235	0.107	**-1.185**	0.78	66.1	ng/L
>	U 236	236	8903.024				ng/L
	U 236-IS	236	8903.024	**99.697**	0.63	0.6	%R

010084

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, July 25, 2011 17:18:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\critotU.1002
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	44.607	0.000	
	U	234	18	9.623	0.000	
	U	235	961	6.566	0.000	
	U	238	882	4.153	0.000	
	U 232	232	58	9.600	0.000	
⌈	U-tot	238	1866	2.909	0.000	
|	U-238a	238	882	4.153	0.000	
|	U-235a	235	961	6.566	0.000	
⌊>	U 236	236	8838	1.725	0.000	
	U 236-IS	236	8838	1.725	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	18.000				ng/L
	U	235	961.051				ng/L
	U	238	882.376				ng/L
	U 232	232	58.000				ng/L
⌈	U-tot	238	0.211	**38.852**	1.31	3.4	ng/L
|	U-238a	238	0.100	**40.117**	2.30	5.7	ng/L
|	U-235a	235	0.109	**-0.275**	2.74	995.8	ng/L
⌊>	U 236	236	8837.961				ng/L
	U 236-IS	236	8837.961	**98.969**	1.71	1.7	%R

Quantitative Analysis - Summary Report

010085

Sample ID: cri235

Sample Date/Time: Monday, July 25, 2011 17:21:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\cri235.1003
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	60.093	0.000	
	U	234	19	13.925	0.000	
	U	235	1083	2.547	0.000	
	U	238	12720	1.198	0.000	
	U 232	232	57	10.783	0.000	
⌈	U-tot	238	13828	0.930	0.000	
|	U-238a	238	12720	1.198	0.000	
|	U-235a	235	1083	2.547	0.000	
⌊>	U 236	236	8926	0.325	0.000	
	U 236-IS	236	8926	0.325	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	19.000				ng/L
	U	235	1082.731				ng/L
	U	238	12720.227				ng/L
	U 232	232	56.667				ng/L
⌈	U-tot	238	1.549	**718.888**	6.71	0.9	ng/L
|	U-238a	238	1.425	**712.451**	7.77	1.1	ng/L
|	U-235a	235	0.121	**5.889**	1.69	28.7	ng/L
⌊>	U 236	236	8926.047				ng/L
	U 236-IS	236	8926.047	**99.955**	0.32	0.3	%R

Quantitative Analysis - Summary Report

010086

Sample ID: icsa

Sample Date/Time: Monday, July 25, 2011 17:23:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\icsa.1004
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	14.783	0.000	
	U	234	25	13.856	0.000	
	U	235	891	2.014	0.000	
	U	238	251	6.481	0.000	
	U 232	232	1418	10.271	0.000	
⌜	U-tot	238	1178	0.389	0.000	
|	U-238a	238	251	6.481	0.000	
|	U-235a	235	891	2.014	0.000	
⌞>	U 236	236	7901	1.305	0.000	
	U 236-IS	236	7901	1.305	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.333				ng/L
	U	234	25.000				ng/L
	U	235	891.377				ng/L
	U	238	251.337				ng/L
	U 232	232	1417.778				ng/L
⌜	U-tot	238	0.149	**7.343**	0.84	11.4	ng/L
|	U-238a	238	0.032	**5.595**	1.08	19.4	ng/L
|	U-235a	235	0.113	**1.748**	1.22	69.8	ng/L
⌞>	U 236	236	7900.765				ng/L
	U 236-IS	236	7900.765	**88.474**	1.15	1.3	%R

Quantitative Analysis - Summary Report

010087

Sample ID: icsab

Sample Date/Time: Monday, July 25, 2011 17:25:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\icsab.1005
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	25	12.059	0.000	
	U	234	62	30.179	0.000	
	U	235	3165	0.886	0.000	
	U	238	318969	0.780	0.000	
	U 232	232	762	5.919	0.000	
⌜	U-tot	238	322221	0.785	0.000	
|	U-238a	238	318969	0.780	0.000	
|	U-235a	235	3165	0.886	0.000	
⌞>	U 236	236	7976	0.502	0.000	
	U 236-IS	236	7976	0.502	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	25.333				ng/L
	U	234	61.667				ng/L
	U	235	3165.218				ng/L
	U	238	318969.180				ng/L
	U 232	232	761.699				ng/L
⌜	U-tot	238	40.396	**20461.974**	69.99	0.3	ng/L
|	U-238a	238	39.988	**20277.370**	68.37	0.3	ng/L
|	U-235a	235	0.397	**140.477**	1.01	0.7	ng/L
⌞>	U 236	236	7976.498				ng/L
	U 236-IS	236	7976.498	**89.322**	0.45	0.5	%R

010083

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, July 25, 2011 17:28:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\zzz.1006
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	57.410	0.000	
	U	234	24	19.516	0.000	
	U	235	920	0.166	0.000	
	U	238	200	5.075	0.000	
	U 232	232	32	16.536	0.000	
⌜	U-tot	238	1155	1.869	0.000	
|	U-238a	238	200	5.075	0.000	
|	U-235a	235	920	0.166	0.000	
⌞>	U 236	236	8164	0.548	0.000	
	U 236-IS	236	8164	0.548	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.333				ng/L
	U	234	23.667				ng/L
	U	235	920.380				ng/L
	U	238	200.002				ng/L
	U 232	232	32.000				ng/L
⌜	U-tot	238	0.142	**3.488**	1.73	49.5	ng/L
|	U-238a	238	0.025	**1.884**	0.69	36.6	ng/L
|	U-235a	235	0.113	**1.703**	0.39	22.8	ng/L
⌞>	U 236	236	8163.998				ng/L
	U 236-IS	236	8163.998	**91.422**	0.50	0.5	%R

Quantitative Analysis - Summary Report

010089

Sample ID: ccv

Sample Date/Time: Monday, July 25, 2011 17:30:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccv.1007
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	47.186	0.000	
	U	234	18	17.293	0.000	
	U	235	1867	1.661	0.000	
	U	238	130444	0.999	0.000	
	U 232	232	24	16.609	0.000	
⌜	U-tot	238	132334	0.964	0.000	
|	U-238a	238	130444	0.999	0.000	
|	U-235a	235	1867	1.661	0.000	
⌞>	U 236	236	8191	0.562	0.000	
	U 236-IS	236	8191	0.562	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	17.667				ng/L
	U	235	1867.192				ng/L
	U	238	130443.920				ng/L
	U 232	232	24.333				ng/L
⌜	U-tot	238	16.157	**8142.882**	73.48	0.9	ng/L
|	U-238a	238	15.926	**8069.433**	74.55	0.9	ng/L
|	U-235a	235	0.228	**57.999**	2.29	4.0	ng/L
⌞>	U 236	236	8190.688				ng/L
	U 236-IS	236	8190.688	**91.721**	0.52	0.6	%R

Quantitative Analysis - Summary Report

010090

Sample ID: ccb

Sample Date/Time: Monday, July 25, 2011 17:32:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccb.1008
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	37.749	0.000	
	U	234	21	49.661	0.000	
	U	235	944	4.030	0.000	
	U	238	161	4.237	0.000	
	U 232	232	19	15.802	0.000	
⌜	U-tot	238	1132	3.640	0.000	
|	U-238a	238	161	4.237	0.000	
|	U-235a	235	944	4.030	0.000	
⌞>	U 236	236	8298	0.798	0.000	
	U 236-IS	236	8298	0.798	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	20.667				ng/L
	U	235	943.716				ng/L
	U	238	160.668				ng/L
	U 232	232	19.333				ng/L
⌜	U-tot	238	0.136	**0.877**	2.63	299.5	ng/L
|	U-238a	238	0.019	**-0.725**	0.35	48.5	ng/L
|	U-235a	235	0.114	**2.190**	2.30	104.9	ng/L
⌞>	U 236	236	8297.785				ng/L
	U 236-IS	236	8297.785	**92.920**	0.74	0.8	%R

010091

Quantitative Analysis - Summary Report

Sample ID: Blankd0

Sample Date/Time: Monday, July 25, 2011 17:35:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\Blankd0.1009
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	81.044	0.000	
	U	234	31	12.345	0.000	
	U	235	2617	2.289	0.000	
	U	238	76041	0.194	0.000	
	U 232	232	87	16.368	0.000	
⌜	U-tot	238	78692	0.257	0.000	
|	U-238a	238	76041	0.194	0.000	
|	U-235a	235	2617	2.289	0.000	
⌞>	U 236	236	7942	0.429	0.000	
	U 236-IS	236	7942	0.429	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	30.667				ng/L
	U	235	2616.710				ng/L
	U	238	76040.697				ng/L
	U 232	232	87.334				ng/L
⌜	U-tot	238	9.908	**4967.065**	29.82	0.6	ng/L
|	U-238a	238	9.574	**4846.822**	25.41	0.5	ng/L
|	U-235a	235	0.329	**107.583**	4.25	3.9	ng/L
⌞>	U 236	236	7942.468				ng/L
	U 236-IS	236	7942.468	**88.941**	0.38	0.4	%R

Quantitative Analysis - Summary Report

010092

Sample ID: Blankd1

Sample Date/Time: Monday, July 25, 2011 17:37:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\Blankd1.1010
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	19.924	0.000	
	U	234	29	31.653	0.000	
	U	235	2343	3.152	0.000	
	U	238	66191	0.495	0.000	
	U 232	232	64	6.811	0.000	
⌈	U-tot	238	68570	0.590	0.000	
|	U-238a	238	66191	0.495	0.000	
|	U-235a	235	2343	3.152	0.000	
⌊>	U 236	236	7536	1.097	0.000	
	U 236-IS	236	7536	1.097	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.667				ng/L
	U	234	28.667				ng/L
	U	235	2342.635				ng/L
	U	238	66190.763				ng/L
	U 232	232	64.000				ng/L
⌈	U-tot	238	9.100	**4556.391**	76.75	1.7	ng/L
|	U-238a	238	8.784	**4446.054**	70.09	1.6	ng/L
|	U-235a	235	0.311	**98.528**	6.28	6.4	ng/L
⌊>	U 236	236	7536.123				ng/L
	U 236-IS	236	7536.123	**84.391**	0.93	1.1	%R

0110093

Quantitative Analysis - Summary Report

Sample ID: 469498d1

Sample Date/Time: Monday, July 25, 2011 17:39:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d1.1011
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	34.641	0.000	
	U	234	28	34.163	0.000	
	U	235	2184	1.503	0.000	
	U	238	65858	1.401	0.000	
	U 232	232	128	10.377	0.000	
⌈	U-tot	238	68073	1.356	0.000	
|	U-238a	238	65858	1.401	0.000	
|	U-235a	235	2184	1.503	0.000	
⌊>	U 236	236	7629	2.187	0.000	
	U 236-IS	236	7629	2.187	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	27.667				ng/L
	U	235	2183.596				ng/L
	U	238	65858.054				ng/L
	U 232	232	128.334				ng/L
⌈	U-tot	238	8.925	**4467.361**	53.81	1.2	ng/L
|	U-238a	238	8.634	**4370.061**	52.43	1.2	ng/L
|	U-235a	235	0.286	**86.490**	2.71	3.1	ng/L
⌊>	U 236	236	7628.534				ng/L
	U 236-IS	236	7628.534	**85.425**	1.87	2.2	%R

010094

Quantitative Analysis - Summary Report

Sample ID: 469498d1D

Sample Date/Time: Monday, July 25, 2011 17:42:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d1D.1012
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	87.670	0.000	
	U	234	28	12.395	0.000	
	U	235	2198	1.636	0.000	
	U	238	65091	1.398	0.000	
	U 232	232	235	2.102	0.000	
⌈	U-tot	238	67321	1.392	0.000	
|	U-238a	238	65091	1.398	0.000	
|	U-235a	235	2198	1.636	0.000	
⌊>	U 236	236	7524	0.540	0.000	
	U 236-IS	236	7524	0.540	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	28.333				ng/L
	U	235	2197.599				ng/L
	U	238	65091.227				ng/L
	U 232	232	234.670				ng/L
⌈	U-tot	238	8.948	**4479.045**	77.43	1.7	ng/L
|	U-238a	238	8.651	**4378.696**	74.71	1.7	ng/L
|	U-235a	235	0.292	**89.320**	3.02	3.4	ng/L
⌊>	U 236	236	7524.112				ng/L
	U 236-IS	236	7524.112	**84.256**	0.46	0.5	%R

010095

Quantitative Analysis - Summary Report

Sample ID: 469498d1L df5

Sample Date/Time: Monday, July 25, 2011 17:44:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d1L df5.1013
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	70.501	0.000	
	U	234	26	31.848	0.000	
	U	235	1102	2.043	0.000	
	U	238	13251	0.885	0.000	
	U 232	232	59	7.785	0.000	
⌈	U-tot	238	14384	0.647	0.000	
|	U-238a	238	13251	0.885	0.000	
|	U-235a	235	1102	2.043	0.000	
⌊>	U 236	236	7620	0.072	0.000	
	U 236-IS	236	7620	0.072	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	26.333				ng/L
	U	235	1102.067				ng/L
	U	238	13251.318				ng/L
	U 232	232	59.334				ng/L
⌈	U-tot	238	1.888	**890.987**	6.56	0.7	ng/L
|	U-238a	238	1.739	**871.794**	8.04	0.9	ng/L
|	U-235a	235	0.145	**17.286**	1.47	8.5	ng/L
⌊>	U 236	236	7619.525				ng/L
	U 236-IS	236	7619.525	**85.325**	0.06	0.1	%R

010096

Quantitative Analysis - Summary Report

Sample ID: 469498d1AS

Sample Date/Time: Monday, July 25, 2011 17:46:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d1AS.1014
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20 uL 10 natural Uranium at df 100 (075-Rad-Sol 3, 11-064-06) in 10mL

U tot
TV = 20462 ng/L

U238
TV = 20316 ng/L

U235
TV = 145 ng/L

8/15/11/15

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	29.397	0.000	
	U	234	49	23.536	0.000	
	U	235	4449	1.891	0.000	
	U	238	374762	0.613	0.000	
	U 232	232	130	8.174	0.000	
⌈	U-tot	238	379269	0.602	0.000	
|	U-238a	238	374762	0.613	0.000	
|	U-235a	235	4449	1.891	0.000	
⌊>	U 236	236	7707	0.760	0.000	
	U 236-IS	236	7707	0.760	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	49.000				ng/L
	U	235	4449.089				ng/L
	U	238	374761.729				ng/L
	U 232	232	129.668				ng/L
⌈	U-tot	238	49.213	**24942.832**	184.88	0.7	ng/L
|	U-238a	238	48.628	**24660.609**	187.61	0.8	ng/L
|	U-235a	235	0.577	**228.626**	3.65	1.6	ng/L
⌊>	U 236	236	7706.932				ng/L
	U 236-IS	236	7706.932	**86.303**	0.66	0.8	%R

010097

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, July 25, 2011 17:48:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\zzz.1015
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	22.913	0.000	
	U	234	19	14.931	0.000	
	U	235	867	3.693	0.000	
	U	238	264	6.379	0.000	
	U 232	232	30	8.297	0.000	
⌈	U-tot	238	1157	4.591	0.000	
|	U-238a	238	264	6.379	0.000	
|	U-235a	235	867	3.693	0.000	
⌊>	U 236	236	7652	1.125	0.000	
	U 236-IS	236	7652	1.125	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	19.333				ng/L
	U	235	866.708				ng/L
	U	238	264.337				ng/L
	U 232	232	30.333				ng/L
⌈	U-tot	238	0.151	**8.414**	3.68	43.7	ng/L
|	U-238a	238	0.035	**6.981**	1.14	16.4	ng/L
|	U-235a	235	0.113	**1.966**	2.16	109.7	ng/L
⌊>	U 236	236	7651.886				ng/L
	U 236-IS	236	7651.886	**85.687**	0.96	1.1	%R

010098

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, July 25, 2011 17:51:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\critotU.1016
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	65.465	0.000	
	U	234	11	18.368	0.000	
	U	235	841	4.725	0.000	
	U	238	789	6.667	0.000	
	U 232	232	18	18.196	0.000	
⌈	U-tot	238	1644	2.512	0.000	
|	U-238a	238	789	6.667	0.000	
|	U-235a	235	841	4.725	0.000	
⌊>	U 236	236	7862	0.615	0.000	
	U 236-IS	236	7862	0.615	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.333				ng/L
	U	234	11.333				ng/L
	U	235	841.039				ng/L
	U	238	789.034				ng/L
	U 232	232	17.667				ng/L
⌈	U-tot	238	0.209	**37.831**	3.31	8.7	ng/L
|	U-238a	238	0.100	**40.382**	3.61	8.9	ng/L
|	U-235a	235	0.107	**-1.108**	2.55	230.0	ng/L
⌊>	U 236	236	7861.731				ng/L
	U 236-IS	236	7861.731	**88.037**	0.54	0.6	%R

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, July 25, 2011 17:53:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\cri235.1017
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	56.773	0.000	
	U	234	13	46.259	0.000	
	U	235	967	2.069	0.000	
	U	238	11311	0.656	0.000	
	U 232	232	13	33.530	0.000	
⌜	U-tot	238	12295	0.544	0.000	
|	U-238a	238	11311	0.656	0.000	
|	U-235a	235	967	2.069	0.000	
⌞>	U 236	236	7990	2.637	0.000	
	U 236-IS	236	7990	2.637	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	12.667				ng/L
	U	235	967.385				ng/L
	U	238	11311.032				ng/L
	U 232	232	13.000				ng/L
⌜	U-tot	238	1.539	**713.948**	17.10	2.4	ng/L
|	U-238a	238	1.416	**707.976**	14.61	2.1	ng/L
|	U-235a	235	0.121	**5.820**	2.51	43.2	ng/L
⌞>	U 236	236	7989.511				ng/L
	U 236-IS	236	7989.511	**89.468**	2.36	2.6	%R

010100

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, July 25, 2011 17:56:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccv.1018
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	103.253	0.000	
	U	234	30	14.034	0.000	
	U	235	1824	0.964	0.000	
	U	238	124341	0.128	0.000	
	U 232	232	19	10.526	0.000	
⌜	U-tot	238	126198	0.134	0.000	
|	U-238a	238	124341	0.128	0.000	
|	U-235a	235	1824	0.964	0.000	
⌞>	U 236	236	8074	0.910	0.000	
	U 236-IS	236	8074	0.910	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	29.667				ng/L
	U	235	1824.183				ng/L
	U	238	124340.895				ng/L
	U 232	232	19.000				ng/L
⌜	U-tot	238	15.631	**7875.452**	69.03	0.9	ng/L
|	U-238a	238	15.400	**7802.835**	68.32	0.9	ng/L
|	U-235a	235	0.226	**56.998**	0.89	1.6	ng/L
⌞>	U 236	236	8074.251				ng/L
	U 236-IS	236	8074.251	**90.417**	0.82	0.9	%R

010101

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, July 25, 2011 17:58:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccb.1019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	68.635	0.000	
	U	234	14	38.425	0.000	
	U	235	890	2.160	0.000	
	U	238	156	1.696	0.000	
	U 232	232	13	13.323	0.000	
⌜	U-tot	238	1064	2.124	0.000	
|	U-238a	238	156	1.696	0.000	
|	U-235a	235	890	2.160	0.000	
⌞>	U 236	236	7962	1.067	0.000	
	U 236-IS	236	7962	1.067	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	14.333				ng/L
	U	235	889.710				ng/L
	U	238	156.001				ng/L
	U 232	232	13.000				ng/L
⌜	U-tot	238	0.134	**-0.528**	2.16	409.0	ng/L
|	U-238a	238	0.020	**-0.605**	0.25	41.7	ng/L
|	U-235a	235	0.112	**1.231**	1.75	142.2	ng/L
⌞>	U 236	236	7961.819				ng/L
	U 236-IS	236	7961.819	**89.158**	0.95	1.1	%R

010102

Quantitative Analysis - Summary Report

Sample ID: 469499d1

Sample Date/Time: Monday, July 25, 2011 18:00:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469499d1.1020
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	55	55.888	0.000	
	U	234	82	20.767	0.000	
	U	235	2399	1.047	0.000	
	U	238	66048	1.138	0.000	
	U 232	232	241	21.252	0.000	
⌈	U-tot	238	68585	1.092	0.000	
|	U-238a	238	66048	1.138	0.000	
|	U-235a	235	2399	1.047	0.000	
⌊>	U 236	236	7764	0.948	0.000	
	U 236-IS	236	7764	0.948	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	55.334				ng/L
	U	234	82.334				ng/L
	U	235	2398.983				ng/L
	U	238	66048.417				ng/L
	U 232	232	241.337				ng/L
⌈	U-tot	238	8.834	**4421.315**	56.18	1.3	ng/L
|	U-238a	238	8.507	**4305.616**	51.90	1.2	ng/L
|	U-235a	235	0.309	**97.591**	2.93	3.0	ng/L
⌊>	U 236	236	7763.981				ng/L
	U 236-IS	236	7763.981	**86.942**	0.82	0.9	%R

Quantitative Analysis - Summary Report

010103

Sample ID: 469499d1D

Sample Date/Time: Monday, July 25, 2011 18:02:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469499d1D.1021
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	5.094	0.000	
	U	234	32	8.268	0.000	
	U	235	2311	0.804	0.000	
	U	238	67719	0.937	0.000	
	U 232	232	182	10.440	0.000	
⌈	U-tot	238	70074	0.887	0.000	
|	U-238a	238	67719	0.937	0.000	
|	U-235a	235	2311	0.804	0.000	
⌊>	U 236	236	7762	0.348	0.000	
	U 236-IS	236	7762	0.348	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.333				ng/L
	U	234	32.000				ng/L
	U	235	2310.960				ng/L
	U	238	67719.303				ng/L
	U 232	232	182.002				ng/L
⌈	U-tot	238	9.028	**4520.024**	50.25	1.1	ng/L
|	U-238a	238	8.725	**4416.063**	50.79	1.2	ng/L
|	U-235a	235	0.298	**92.077**	0.74	0.8	ng/L
⌊>	U 236	236	7761.645				ng/L
	U 236-IS	236	7761.645	**86.916**	0.30	0.3	%R

010104

Quantitative Analysis - Summary Report

Sample ID: 469500d1

Sample Date/Time: Monday, July 25, 2011 18:05:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469500d1.1022
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	19	30.462	0.000	
	U	234	42	18.013	0.000	
	U	235	1867	5.466	0.000	
	U	238	53326	0.568	0.000	
	U 232	232	832	13.554	0.000	
⌈	U-tot	238	55253	0.680	0.000	
|	U-238a	238	53326	0.568	0.000	
|	U-235a	235	1867	5.466	0.000	
⌊>	U 236	236	7760	1.301	0.000	
	U 236-IS	236	7760	1.301	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	18.667				ng/L
	U	234	41.667				ng/L
	U	235	1866.859				ng/L
	U	238	53325.947				ng/L
	U 232	232	832.372				ng/L
⌈	U-tot	238	7.121	**3550.484**	24.22	0.7	ng/L
|	U-238a	238	6.872	**3476.138**	29.62	0.9	ng/L
|	U-235a	235	0.241	**64.118**	5.20	8.1	ng/L
⌊>	U 236	236	7759.978				ng/L
	U 236-IS	236	7759.978	**86.897**	1.13	1.3	%R

Quantitative Analysis - Summary Report

Sample ID: 469500d1D

Sample Date/Time: Monday, July 25, 2011 18:07:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469500d1D.1023
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	66.667	0.000	
	U	234	20	35.000	0.000	
	U	235	1942	0.880	0.000	
	U	238	58066	0.409	0.000	
	U 232	232	800	10.722	0.000	
⌜	U-tot	238	60031	0.375	0.000	
|	U-238a	238	58066	0.409	0.000	
|	U-235a	235	1942	0.880	0.000	
⌞>	U 236	236	7938	0.708	0.000	
	U 236-IS	236	7938	0.708	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	20.000				ng/L
	U	235	1942.207				ng/L
	U	238	58065.852				ng/L
	U 232	232	800.035				ng/L
⌜	U-tot	238	7.562	**3775.001**	41.26	1.1	ng/L
|	U-238a	238	7.315	**3700.627**	41.08	1.1	ng/L
|	U-235a	235	0.245	**66.146**	0.48	0.7	ng/L
⌞>	U 236	236	7938.465				ng/L
	U 236-IS	236	7938.465	**88.896**	0.63	0.7	%R

010106

Quantitative Analysis - Summary Report

Sample ID: 469501d1

Sample Date/Time: Monday, July 25, 2011 18:10:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469501d1.1024
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	32.733	0.000	
	U	234	33	20.383	0.000	
	U	235	2371	2.209	0.000	
	U	238	70729	0.361	0.000	
	U 232	232	143	14.042	0.000	
⌈	U-tot	238	73137	0.300	0.000	
|	U-238a	238	70729	0.361	0.000	
|	U-235a	235	2371	2.209	0.000	
⌊>	U 236	236	8013	0.412	0.000	
	U 236-IS	236	8013	0.412	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	32.667				ng/L
	U	235	2370.976				ng/L
	U	238	70728.743				ng/L
	U 232	232	142.668				ng/L
⌈	U-tot	238	9.127	**4570.263**	26.87	0.6	ng/L
|	U-238a	238	8.827	**4467.633**	29.68	0.7	ng/L
|	U-235a	235	0.296	**91.165**	2.67	2.9	ng/L
⌊>	U 236	236	8013.197				ng/L
	U 236-IS	236	8013.197	**89.733**	0.37	0.4	%R

010107

Quantitative Analysis - Summary Report

Sample ID: 469501d1D

Sample Date/Time: Monday, July 25, 2011 18:12:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469501d1D.1025
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	75.000	0.000	
	U	234	25	16.000	0.000	
	U	235	2435	0.616	0.000	
	U	238	70644	0.188	0.000	
	U 232	232	192	19.691	0.000	
⌈	U-tot	238	73109	0.184	0.000	
|	U-238a	238	70644	0.188	0.000	
|	U-235a	235	2435	0.616	0.000	
⌊>	U 236	236	8111	1.144	0.000	
	U 236-IS	236	8111	1.144	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.000				ng/L
	U	234	25.000				ng/L
	U	235	2435.326				ng/L
	U	238	70644.423				ng/L
	U 232	232	192.335				ng/L
⌈	U-tot	238	9.015	**4513.171**	60.70	1.3	ng/L
|	U-238a	238	8.711	**4408.948**	58.98	1.3	ng/L
|	U-235a	235	0.300	**93.324**	1.93	2.1	ng/L
⌊>	U 236	236	8110.617				ng/L
	U 236-IS	236	8110.617	**90.824**	1.04	1.1	%R

Quantitative Analysis - Summary Report

010108

Sample ID: 469506d1

Sample Date/Time: Monday, July 25, 2011 18:14:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469506d1.1026
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	94.373	0.000	
	U	234	29	20.690	0.000	
	U	235	2437	1.828	0.000	
	U	238	71635	0.332	0.000	
	U 232	232	201	6.729	0.000	
⌈	U-tot	238	74104	0.256	0.000	
|	U-238a	238	71635	0.332	0.000	
|	U-235a	235	2437	1.828	0.000	
⌊>	U 236	236	8252	1.202	0.000	
	U 236-IS	236	8252	1.202	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	29.000				ng/L
	U	235	2437.327				ng/L
	U	238	71634.796				ng/L
	U 232	232	200.669				ng/L
⌈	U-tot	238	8.981	**4495.793**	65.10	1.4	ng/L
|	U-238a	238	8.681	**4393.978**	65.72	1.5	ng/L
|	U-235a	235	0.295	**90.906**	1.64	1.8	ng/L
⌊>	U 236	236	8252.411				ng/L
	U 236-IS	236	8252.411	**92.412**	1.11	1.2	%R

Quantitative Analysis - Summary Report

010109

Sample ID: zzz

Sample Date/Time: Monday, July 25, 2011 18:17:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\zzz.1027
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	57.735	0.000	
	U	234	20	52.678	0.000	
	U	235	941	3.723	0.000	
	U	238	219	2.056	0.000	
	U 232	232	22	27.820	0.000	
⌜	U-tot	238	1183	2.124	0.000	
|	U-238a	238	219	2.056	0.000	
|	U-235a	235	941	3.723	0.000	
⌞>	U 236	236	8393	0.667	0.000	
	U 236-IS	236	8393	0.667	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	20.000				ng/L
	U	235	940.715				ng/L
	U	238	219.336				ng/L
	U 232	232	21.667				ng/L
⌜	U-tot	238	0.141	**3.200**	1.87	58.5	ng/L
|	U-238a	238	0.026	**2.710**	0.21	7.7	ng/L
|	U-235a	235	0.112	**1.388**	2.28	163.9	ng/L
⌞>	U 236	236	8393.206				ng/L
	U 236-IS	236	8393.206	**93.988**	0.63	0.7	%R

010110

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, July 25, 2011 18:19:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\critotU.1028
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	45.826	0.000	
	U	234	20	30.414	0.000	
	U	235	954	2.870	0.000	
	U	238	866	0.593	0.000	
	U 232	232	17	27.056	0.000	
⌈	U-tot	238	1843	1.411	0.000	
|	U-238a	238	866	0.593	0.000	
|	U-235a	235	954	2.870	0.000	
⌊>	U 236	236	8499	0.604	0.000	
	U 236-IS	236	8499	0.604	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	20.000				ng/L
	U	235	954.383				ng/L
	U	238	865.708				ng/L
	U 232	232	16.667				ng/L
⌈	U-tot	238	0.217	**41.805**	2.21	5.3	ng/L
|	U-238a	238	0.102	**41.135**	0.61	1.5	ng/L
|	U-235a	235	0.112	**1.495**	1.91	127.7	ng/L
⌊>	U 236	236	8498.637				ng/L
	U 236-IS	236	8498.637	**95.169**	0.57	0.6	%R

010111

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, July 25, 2011 18:21:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\cri235.1029
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	12.372	0.000	
	U	234	17	30.566	0.000	
	U	235	1049	1.984	0.000	
	U	238	12455	2.484	0.000	
	U 232	232	20	17.272	0.000	
⌈	U-tot	238	13526	2.277	0.000	
|	U-238a	238	12455	2.484	0.000	
|	U-235a	235	1049	1.984	0.000	
⌊>	U 236	236	8695	1.888	0.000	
	U 236-IS	236	8695	1.888	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	17.000				ng/L
	U	235	1049.394				ng/L
	U	238	12454.863				ng/L
	U 232	232	20.333				ng/L
⌈	U-tot	238	1.556	**722.309**	23.73	3.3	ng/L
|	U-238a	238	1.433	**716.339**	23.62	3.3	ng/L
|	U-235a	235	0.121	**5.583**	0.27	4.8	ng/L
⌊>	U 236	236	8695.491				ng/L
	U 236-IS	236	8695.491	**97.373**	1.84	1.9	%R

010112

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, July 25, 2011 18:24:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccv.1030
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	53.927	0.000	
	U	234	26	16.765	0.000	
	U	235	1914	1.723	0.000	
	U	238	136195	0.335	0.000	
	U 232	232	15	11.547	0.000	
⌈	U-tot	238	138139	0.351	0.000	
|	U-238a	238	136195	0.335	0.000	
|	U-235a	235	1914	1.723	0.000	
⌊>	U 236	236	8597	1.011	0.000	
	U 236-IS	236	8597	1.011	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	26.000				ng/L
	U	235	1914.202				ng/L
	U	238	136194.616				ng/L
	U 232	232	15.000				ng/L
⌈	U-tot	238	16.070	**8098.623**	109.66	1.4	ng/L
|	U-238a	238	15.843	**8027.548**	106.95	1.3	ng/L
|	U-235a	235	0.223	**55.414**	2.69	4.8	ng/L
⌊>	U 236	236	8597.063				ng/L
	U 236-IS	236	8597.063	**96.271**	0.97	1.0	%R

010113

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, July 25, 2011 18:26:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccb.1031
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	68.635	0.000	
	U	234	12	26.064	0.000	
	U	235	945	2.335	0.000	
	U	238	170	1.222	0.000	
	U 232	232	20	7.767	0.000	
⌈	U-tot	238	1131	2.209	0.000	
|	U-238a	238	170	1.222	0.000	
|	U-235a	235	945	2.335	0.000	
⌊>	U 236	236	8613	0.809	0.000	
	U 236-IS	236	8613	0.809	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	12.333				ng/L
	U	235	945.049				ng/L
	U	238	170.335				ng/L
	U 232	232	19.667				ng/L
⌈	U-tot	238	0.131	**-1.678**	1.88	112.2	ng/L
|	U-238a	238	0.020	**-0.513**	0.20	39.4	ng/L
|	U-235a	235	0.110	**0.233**	1.50	644.9	ng/L
⌊>	U 236	236	8613.412				ng/L
	U 236-IS	236	8613.412	**96.454**	0.78	0.8	%R

010114

Quantitative Analysis - Summary Report

Sample ID: 469506d1D

Sample Date/Time: Monday, July 25, 2011 18:28:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469506d1D.1032
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	45.826	0.000	
	U	234	35	38.439	0.000	
	U	235	2457	0.916	0.000	
	U	238	71380	0.419	0.000	
	U 232	232	114	4.845	0.000	
⌜	U-tot	238	73875	0.415	0.000	
|	U-238a	238	71380	0.419	0.000	
|	U-235a	235	2457	0.916	0.000	
⌞>	U 236	236	8409	1.715	0.000	
	U 236-IS	236	8409	1.715	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	35.000				ng/L
	U	235	2456.999				ng/L
	U	238	71379.803				ng/L
	U 232	232	113.667				ng/L
⌜	U-tot	238	8.786	**4397.026**	58.90	1.3	ng/L
|	U-238a	238	8.490	**4296.596**	56.81	1.3	ng/L
|	U-235a	235	0.292	**89.375**	1.15	1.3	ng/L
⌞>	U 236	236	8409.222				ng/L
	U 236-IS	236	8409.222	**94.168**	1.61	1.7	%R

010115

Quantitative Analysis - Summary Report

Sample ID: Blankd2

Sample Date/Time: Monday, July 25, 2011 18:31:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\Blankd2.1033
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	78.062	0.000	
	U	234	30	21.951	0.000	
	U	235	2690	2.651	0.000	
	U	238	74552	0.576	0.000	
	U 232	232	50	16.059	0.000	
⌈	U-tot	238	77276	0.627	0.000	
|	U-238a	238	74552	0.576	0.000	
|	U-235a	235	2690	2.651	0.000	
⌊>	U 236	236	8391	1.025	0.000	
	U 236-IS	236	8391	1.025	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	30.333				ng/L
	U	235	2690.065				ng/L
	U	238	74552.452				ng/L
	U 232	232	50.333				ng/L
⌈	U-tot	238	9.210	**4612.216**	56.04	1.2	ng/L
|	U-238a	238	8.885	**4497.318**	50.95	1.1	ng/L
|	U-235a	235	0.321	**103.262**	5.18	5.0	ng/L
⌊>	U 236	236	8391.204				ng/L
	U 236-IS	236	8391.204	**93.966**	0.96	1.0	%R

Quantitative Analysis - Summary Report

Sample ID: 469498d2

Sample Date/Time: Monday, July 25, 2011 18:33:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d2.1034
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	75.498	0.000	
	U	234	30	17.638	0.000	
	U	235	2500	2.737	0.000	
	U	238	74796	0.421	0.000	
	U 232	232	156	6.115	0.000	
⌜	U-tot	238	77329	0.495	0.000	
|	U-238a	238	74796	0.421	0.000	
|	U-235a	235	2500	2.737	0.000	
⌞>	U 236	236	8466	0.215	0.000	
	U 236-IS	236	8466	0.215	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	30.000				ng/L
	U	235	2500.011				ng/L
	U	238	74796.105				ng/L
	U 232	232	156.001				ng/L
⌜	U-tot	238	9.134	**4573.612**	14.18	0.3	ng/L
|	U-238a	238	8.835	**4471.641**	10.56	0.2	ng/L
|	U-235a	235	0.295	**90.877**	3.67	4.0	ng/L
⌞>	U 236	236	8466.274				ng/L
	U 236-IS	236	8466.274	**94.807**	0.20	0.2	%R

010117

Quantitative Analysis - Summary Report

Sample ID: 469498d2D

Sample Date/Time: Monday, July 25, 2011 18:35:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d2D.1035
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	21.651	0.000	
	U	234	31	24.036	0.000	
	U	235	2452	1.157	0.000	
	U	238	76413	0.869	0.000	
	U 232	232	133	8.671	0.000	
⌜	U-tot	238	78898	0.861	0.000	
|	U-238a	238	76413	0.869	0.000	
|	U-235a	235	2452	1.157	0.000	
⌞>	U 236	236	8451	0.554	0.000	
	U 236-IS	236	8451	0.554	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	30.667				ng/L
	U	235	2451.664				ng/L
	U	238	76413.485				ng/L
	U 232	232	133.001				ng/L
⌜	U-tot	238	9.336	**4676.366**	15.10	0.3	ng/L
|	U-238a	238	9.042	**4576.838**	14.64	0.3	ng/L
|	U-235a	235	0.290	**88.348**	1.32	1.5	ng/L
⌞>	U 236	236	8450.926				ng/L
	U 236-IS	236	8450.926	**94.635**	0.52	0.6	%R

0-017A
M 8.31.11

Quantitative Analysis - Summary Report

Sample ID: 469498d2L df5

Sample Date/Time: Monday, July 25, 2011 18:38:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d2L df5.1036
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	88.192	0.000	
	U	234	28	36.051	0.000	
	U	235	1282	1.745	0.000	
	U	238	15174	1.063	0.000	
	U 232	232	59	19.547	0.000	
⌜	U-tot	238	16490	0.836	0.000	
|	U-238a	238	15174	1.063	0.000	
|	U-235a	235	1282	1.745	0.000	
⌞>	U 236	236	8606	1.061	0.000	
	U 236-IS	236	8606	1.061	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	28.333				ng/L
	U	235	1281.757				ng/L
	U	238	15173.654				ng/L
	U 232	232	59.000				ng/L
⌜	U-tot	238	1.916	**905.521**	18.48	2.0	ng/L
|	U-238a	238	1.763	**884.141**	19.06	2.2	ng/L
|	U-235a	235	0.149	**19.385**	0.56	2.9	ng/L
⌞>	U 236	236	8605.738				ng/L
	U 236-IS	236	8605.738	**96.368**	1.02	1.1	%R

010113

Quantitative Analysis - Summary Report

Sample ID: 469498d2AS

Sample Date/Time: Monday, July 25, 2011 18:40:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\469498d2AS.1037
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20.4L of 1° Natural Uranium at dfg 100 in 10mL (075-Rad-sol, 11-064-06)

U_{tot} TV = 20462 ng/L

U_{238} TV = 20316 ng/L

8/15/11 LS

U_{235} TV = 145 ng/L

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	62.450	0.000	
	U	234	43	12.306	0.000	
	U	235	4974	0.912	0.000	
	U	238	419403	0.151	0.000	
	U 232	232	161	5.521	0.000	
⌈	U-tot	238	424423	0.141	0.000	
|	U-238a	238	419403	0.151	0.000	
|	U-235a	235	4974	0.912	0.000	
⌊>	U 236	236	8677	1.729	0.000	
	U 236-IS	236	8677	1.729	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	43.000				ng/L
	U	235	4973.694				ng/L
	U	238	419403.337				ng/L
	U 232	232	161.001				ng/L
⌈	U-tot	238	48.923	**24795.752**	459.73	1.9	ng/L
|	U-238a	238	48.345	**24516.933**	456.68	1.9	ng/L
|	U-235a	235	0.573	**226.668**	2.35	1.0	ng/L
⌊>	U 236	236	8677.140				ng/L
	U 236-IS	236	8677.140	**97.168**	1.68	1.7	%R

Quantitative Analysis - Summary Report

010119

Sample ID: zzz

Sample Date/Time: Monday, July 25, 2011 18:42:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\zzz.1038
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	53.927	0.000	
	U	234	16	25.797	0.000	
	U	235	919	1.146	0.000	
	U	238	314	2.893	0.000	
	U 232	232	20	17.857	0.000	
⌜	U-tot	238	1253	1.208	0.000	
|	U-238a	238	314	2.893	0.000	
|	U-235a	235	919	1.146	0.000	
⌞>	U 236	236	8573	0.369	0.000	
	U 236-IS	236	8573	0.369	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	15.667				ng/L
	U	235	919.046				ng/L
	U	238	313.672				ng/L
	U 232	232	19.667				ng/L
⌜	U-tot	238	0.146	**5.842**	0.63	10.9	ng/L
|	U-238a	238	0.037	**8.016**	0.50	6.2	ng/L
|	U-235a	235	0.107	**-1.001**	0.41	41.0	ng/L
⌞>	U 236	236	8572.707				ng/L
	U 236-IS	236	8572.707	**95.998**	0.35	0.4	%R

Quantitative Analysis - Summary Report

010120

Sample ID: critotU

Sample Date/Time: Monday, July 25, 2011 18:45:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\critotU.1039
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	28.395	0.000	
	U	234	32	10.151	0.000	
	U	235	946	5.672	0.000	
	U	238	871	2.244	0.000	
	U 232	232	24	49.124	0.000	
⌈	U-tot	238	1862	2.614	0.000	
|	U-238a	238	871	2.244	0.000	
|	U-235a	235	946	5.672	0.000	
⌊>	U 236	236	8603	0.777	0.000	
	U 236-IS	236	8603	0.777	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.333				ng/L
	U	234	31.667				ng/L
	U	235	945.716				ng/L
	U	238	871.375				ng/L
	U 232	232	24.000				ng/L
⌈	U-tot	238	0.216	**41.568**	3.40	8.2	ng/L
|	U-238a	238	0.101	**40.845**	1.50	3.7	ng/L
|	U-235a	235	0.110	**0.330**	3.10	939.5	ng/L
⌊>	U 236	236	8603.403				ng/L
	U 236-IS	236	8603.403	**96.342**	0.75	0.8	%R

010121

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, July 25, 2011 18:47:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\cri235.1040
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	10.825	0.000	
	U	234	17	22.716	0.000	
	U	235	1058	2.488	0.000	
	U	238	12667	0.869	0.000	
	U 232	232	9	16.366	0.000	
⌜	U-tot	238	13747	0.886	0.000	
|	U-238a	238	12667	0.869	0.000	
|	U-235a	235	1058	2.488	0.000	
⌞>	U 236	236	8710	1.088	0.000	
	U 236-IS	236	8710	1.088	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	16.667				ng/L
	U	235	1057.728				ng/L
	U	238	12667.153				ng/L
	U 232	232	9.333				ng/L
⌜	U-tot	238	1.578	**733.704**	7.26	1.0	ng/L
|	U-238a	238	1.454	**727.307**	5.40	0.7	ng/L
|	U-235a	235	0.121	**5.962**	1.89	31.7	ng/L
⌞>	U 236	236	8710.171				ng/L
	U 236-IS	236	8710.171	**97.538**	1.06	1.1	%R

Quantitative Analysis - Summary Report

010122

Sample ID: ccv

Sample Date/Time: Monday, July 25, 2011 18:49:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccv.1041
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	91.124	0.000	
	U	234	29	33.520	0.000	
	U	235	1984	1.792	0.000	
	U	238	139803	0.658	0.000	
	U 232	232	19	56.930	0.000	
⌈	U-tot	238	141825	0.659	0.000	
|	U-238a	238	139803	0.658	0.000	
|	U-235a	235	1984	1.792	0.000	
⌊>	U 236	236	8892	0.993	0.000	
	U 236-IS	236	8892	0.993	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	28.667				ng/L
	U	235	1984.217				ng/L
	U	238	139803.131				ng/L
	U 232	232	19.000				ng/L
⌈	U-tot	238	15.951	**8038.236**	50.96	0.6	ng/L
|	U-238a	238	15.723	**7966.676**	51.79	0.7	ng/L
|	U-235a	235	0.223	**55.641**	1.55	2.8	ng/L
⌊>	U 236	236	8891.680				ng/L
	U 236-IS	236	8891.680	**99.570**	0.99	1.0	%R

Quantitative Analysis - Summary Report

010123

Sample ID: ccb

Sample Date/Time: Monday, July 25, 2011 18:52:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 1\ccb.1042
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	26	19.487	0.000	
	U	234	37	5.576	0.000	
	U	235	995	4.672	0.000	
	U	238	208	6.934	0.000	
	U 232	232	29	3.936	0.000	
⌜	U-tot	238	1267	4.795	0.000	
|	U-238a	238	208	6.934	0.000	
|	U-235a	235	995	4.672	0.000	
⌞>	U 236	236	8893	1.395	0.000	
	U 236-IS	236	8893	1.395	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	26.333				ng/L
	U	234	37.333				ng/L
	U	235	995.388				ng/L
	U	238	208.002				ng/L
	U 232	232	29.333				ng/L
⌜	U-tot	238	0.143	**4.005**	4.31	107.7	ng/L
|	U-238a	238	0.023	**1.328**	0.98	73.9	ng/L
|	U-235a	235	0.112	**1.335**	3.20	239.9	ng/L
⌞>	U 236	236	8892.681				ng/L
	U 236-IS	236	8892.681	**99.582**	1.39	1.4	%R

SOUTHWEST RESEARCH INSTITUTE

010124

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS

Utot, U238, U235 (NN) 8/23/11

IDL Date: 5/10/2011

ICP-MS CALIB. STD. ID's — **TVs**

tot U / U238 / U235

S0	11-081-05	
STD. 1	11-064-02	44984 / 44572 / 319 ppt
I. STD	11-064-09	0.5 ppb
I. STD		

QC STD. ID's

ICV/CCV	11-080-08	7666 / 7612 / 54.5 ppt
UCL		
CRI	11-080-04/05	40 / 39.7 / 4.95 ppt
ICSA	11-064-04	
ICSAB	11-078-01	20444 / 20398 / 145 ppt

STD's IV, CCS 1-6 Expires	10-1-11
STD's Spex, ME 1-4 Expires	9-15-11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.00	Fluor	110614-8	7/26/11	SO	WC 15 0082 - 15 0086

INSTRUMENT: DRC II FILENAME: 110726.:ep

Analyst: Michelle Seiler Date: 7/26/11 ☐ CONVERTED (.DAT)

Daily Performance Report

010125

Sample ID: Daily Performance Check
Sample Date/Time: Tuesday, July 26, 2011 10:18:26
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler 7/26/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5925.1	5925.130	68.600	1.2
	In	114.9	19187.4	19187.363	228.670	1.2
	U	238.1	14618.1	14618.144	145.523	1.0
⌈>	Ce	139.9	21118.2	21118.237	258.841	1.2
⌊	CeO	155.9	963.6	0.046	0.001	2.5
⌈>	Ba	137.9	176939.6	176939.560	1931.322	1.1
⌊	Ba++	69.0	4700.1	0.027	0.000	1.0
	Bkgd	220.0	3.6	3.633	1.063	29.3
	Bkgd	8.5	1.2	1.233	0.641	52.0

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
8.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

8/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.3	563.0
Co	59	45	7.3	10734.3
In	115	45	8.5	21071.4

010126

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Tuesday, July 26, 2011 10:18:26
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler
7/26/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2750	2062	0.699	
Mg	23.985	23.975	5673	2074	0.683	
Ar2	75.930	75.925	18309	2097	0.710	
In	114.904	114.925	27798	2129	0.694	
Ce	139.905	139.925	33881	2145	0.686	
Pb	207.977	207.975	50477	2185	0.708	
Th	232.038	232.025	56336	2208	0.683	
U	238.050	238.075	57806	2221	0.693	

Quantitative Analysis - Summary Report

010127

Sample ID: S-0

Sample Date/Time: Tuesday, July 26, 2011 10:26:27
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-0.020
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	21	35.493	0.000	
	U	234	35	24.019	0.000	
	U	235	804	3.455	0.000	
	U	238	145	6.207	0.000	
	U 232	232	295	2.255	0.000	
⌈	U-tot	238	1005	2.786	0.000	
|	U-238a	238	145	6.207	0.000	
|	U-235a	235	804	3.455	0.000	
⌊>	U 236	236	7513	0.385	0.000	
	U 236-IS	236	7513	0.385	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	21.333				ng/L
	U	234	34.667				ng/L
	U	235	804.369				ng/L
	U	238	145.001				ng/L
	U 232	232	295.338				ng/L
⌈	U-tot	238	0.134				ng/L
|	U-238a	238	0.019				ng/L
|	U-235a	235	0.107				ng/L
⌊>	U 236	236	7512.770				ng/L
	U 236-IS	236	7512.770	**100.000**	0.39	0.4	%R

Quantitative Analysis - Summary Report

010128

Sample ID: S-1

Sample Date/Time: Tuesday, July 26, 2011 10:28:45
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-1.021
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	62.780	0.000	
	U	234	56	19.788	0.000	
	U	235	5664	1.740	0.000	
	U	238	626615	0.165	0.000	
	U 232	232	204	4.828	0.000	
⌈	U-tot	238	632344	0.150	0.000	
|	U-238a	238	626615	0.165	0.000	
|	U-235a	235	5664	1.740	0.000	
⌊>	U 236	236	7828	1.170	0.000	
	U 236-IS	236	7828	1.170	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	55.667				ng/L
	U	235	5664.098				ng/L
	U	238	626614.767				ng/L
	U 232	232	204.336				ng/L
⌈	U-tot	238	80.789	**44984.000**	474.58	1.1	ng/L
|	U-238a	238	80.057	**44572.000**	465.61	1.0	ng/L
|	U-235a	235	0.724	**319.000**	10.04	3.1	ng/L
⌊>	U 236	236	7827.702				ng/L
	U 236-IS	236	7827.702	**104.192**	1.22	1.2	%R

Quantitative Analysis - Summary Report

010129

Sample ID: icv

Sample Date/Time: Tuesday, July 26, 2011 10:31:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icv.022
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	28.571	0.000	
	U	234	27	9.799	0.000	
	U	235	1608	4.077	0.000	
	U	238	109170	0.470	0.000	
	U 232	232	163	9.726	0.000	
⌈	U-tot	238	110812	0.454	0.000	
|	U-238a	238	109170	0.470	0.000	
|	U-235a	235	1608	4.077	0.000	
⌊>	U 236	236	7685	0.293	0.000	
	U 236-IS	236	7685	0.293	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	27.000				ng/L
	U	235	1608.142				ng/L
	U	238	109169.924				ng/L
	U 232	232	163.335				ng/L
⌈	U-tot	238	14.420	**7967.953**	56.40	0.7	ng/L
|	U-238a	238	14.207	**7900.653**	55.42	0.7	ng/L
|	U-235a	235	0.209	**52.872**	4.59	8.7	ng/L
⌊>	U 236	236	7684.580				ng/L
	U 236-IS	236	7684.580	**102.287**	0.30	0.3	%R

Quantitative Analysis - Summary Report

010130

Sample ID: icb

Sample Date/Time: Tuesday, July 26, 2011 10:33:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icb.023
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	59.539	0.000	
	U	234	18	14.699	0.000	
	U	235	839	3.677	0.000	
	U	238	136	7.950	0.000	
	U 232	232	130	8.204	0.000	
⌈	U-tot	238	1004	2.229	0.000	
|	U-238a	238	136	7.950	0.000	
|	U-235a	235	839	3.677	0.000	
⌊>	U 236	236	7545	1.225	0.000	
	U 236-IS	236	7545	1.225	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.667				ng/L
	U	234	18.000				ng/L
	U	235	839.372				ng/L
	U	238	135.668				ng/L
	U 232	232	130.334				ng/L
⌈	U-tot	238	0.133	**-0.424**	2.54	599.4	ng/L
|	U-238a	238	0.018	**-0.739**	0.67	90.7	ng/L
|	U-235a	235	0.111	**2.180**	2.80	128.4	ng/L
⌊>	U 236	236	7545.464				ng/L
	U 236-IS	236	7545.464	**100.435**	1.23	1.2	%R

Quantitative Analysis - Summary Report

010131

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 10:35:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.024
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	49.487	0.000	
	U	234	20	17.272	0.000	
	U	235	825	4.325	0.000	
	U	238	685	3.072	0.000	
	U 232	232	103	7.873	0.000	
⌈	U-tot	238	1535	2.780	0.000	
|	U-238a	238	685	3.072	0.000	
|	U-235a	235	825	4.325	0.000	
⌊>	U 236	236	7560	1.213	0.000	
	U 236-IS	236	7560	1.213	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	20.333				ng/L
	U	235	825.037				ng/L
	U	238	684.692				ng/L
	U 232	232	102.667				ng/L
⌈	U-tot	238	0.203	**38.622**	4.47	11.6	ng/L
|	U-238a	238	0.091	**39.703**	2.06	5.2	ng/L
|	U-235a	235	0.109	**1.084**	2.98	274.7	ng/L
⌊>	U 236	236	7560.143				ng/L
	U 236-IS	236	7560.143	**100.631**	1.22	1.2	%R

Quantitative Analysis - Summary Report

010132

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 10:38:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.025
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	61.974	0.000	
	U	234	17	41.176	0.000	
	U	235	896	2.967	0.000	
	U	238	9918	1.026	0.000	
	U 232	232	90	10.058	0.000	
⌈	U-tot	238	10837	0.748	0.000	
|	U-238a	238	9918	1.026	0.000	
|	U-235a	235	896	2.967	0.000	
⌊>	U 236	236	7574	0.371	0.000	
	U 236-IS	236	7574	0.371	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	17.000				ng/L
	U	235	895.711				ng/L
	U	238	9918.408				ng/L
	U 232	232	89.667				ng/L
⌈	U-tot	238	1.431	**723.362**	8.74	1.2	ng/L
|	U-238a	238	1.310	**718.519**	9.74	1.4	ng/L
|	U-235a	235	0.118	**5.787**	1.81	31.2	ng/L
⌊>	U 236	236	7574.154				ng/L
	U 236-IS	236	7574.154	**100.817**	0.37	0.4	%R

Quantitative Analysis - Summary Report

010133

Sample ID: icsa

Sample Date/Time: Tuesday, July 26, 2011 10:40:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsa.026
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	16.667	0.000	
	U	234	17	41.177	0.000	
	U	235	728	5.564	0.000	
	U	238	168	13.722	0.000	
	U 232	232	1424	13.834	0.000	
⌜	U-tot	238	919	2.493	0.000	
|	U-238a	238	168	13.722	0.000	
|	U-235a	235	728	5.564	0.000	
⌞>	U 236	236	6443	1.453	0.000	
	U 236-IS	236	6443	1.453	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	17.000				ng/L
	U	235	728.363				ng/L
	U	238	167.668				ng/L
	U 232	232	1423.780				ng/L
⌜	U-tot	238	0.143	**4.945**	3.07	62.1	ng/L
|	U-238a	238	0.026	**3.747**	2.03	54.1	ng/L
|	U-235a	235	0.113	**3.110**	3.70	118.9	ng/L
⌞>	U 236	236	6443.283				ng/L
	U 236-IS	236	6443.283	**85.764**	1.25	1.5	%R

010134

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Tuesday, July 26, 2011 10:42:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsab.027
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	29.397	0.000	
	U	234	35	20.862	0.000	
	U	235	2600	1.540	0.000	
	U	238	247367	1.069	0.000	
	U 232	232	625	8.658	0.000	
⌈	U-tot	238	250011	1.047	0.000	
|	U-238a	238	247367	1.069	0.000	
|	U-235a	235	2600	1.540	0.000	
⌊>	U 236	236	6774	1.687	0.000	
	U 236-IS	236	6774	1.687	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	35.333				ng/L
	U	235	2599.705				ng/L
	U	238	247366.534				ng/L
	U 232	232	625.022				ng/L
⌈	U-tot	238	36.909	**20510.596**	131.84	0.6	ng/L
|	U-238a	238	36.519	**20325.886**	125.87	0.6	ng/L
|	U-235a	235	0.384	**143.193**	5.73	4.0	ng/L
⌊>	U 236	236	6774.190				ng/L
	U 236-IS	236	6774.190	**90.169**	1.52	1.7	%R

Quantitative Analysis - Summary Report

010135

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 10:45:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.028
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	37.796	0.000	
	U	234	21	11.175	0.000	
	U	235	874	1.714	0.000	
	U	238	169	14.780	0.000	
	U 232	232	38	11.763	0.000	
⌈	U-tot	238	1071	2.461	0.000	
|	U-238a	238	169	14.780	0.000	
|	U-235a	235	874	1.714	0.000	
⌊>	U 236	236	8034	0.872	0.000	
	U 236-IS	236	8034	0.872	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	20.667				ng/L
	U	235	873.709				ng/L
	U	238	169.335				ng/L
	U 232	232	38.333				ng/L
⌈	U-tot	238	0.133	**-0.290**	2.27	783.0	ng/L
|	U-238a	238	0.021	**0.991**	1.74	175.2	ng/L
|	U-235a	235	0.109	**0.880**	1.45	164.3	ng/L
⌊>	U 236	236	8033.548				ng/L
	U 236-IS	236	8033.548	**106.932**	0.93	0.9	%R

Quantitative Analysis - Summary Report

010136

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 10:47:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.029
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	33.333	0.000	
	U	234	25	40.608	0.000	
	U	235	1729	4.567	0.000	
	U	238	116805	0.582	0.000	
	U 232	232	30	23.914	0.000	
⌈	U-tot	238	118568	0.594	0.000	
|	U-238a	238	116805	0.582	0.000	
|	U-235a	235	1729	4.567	0.000	
⌊>	U 236	236	8157	0.763	0.000	
	U 236-IS	236	8157	0.763	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	24.667				ng/L
	U	235	1728.831				ng/L
	U	238	116805.284				ng/L
	U 232	232	29.667				ng/L
⌈	U-tot	238	14.537	**8032.835**	99.74	1.2	ng/L
|	U-238a	238	14.320	**7964.086**	94.56	1.2	ng/L
|	U-235a	235	0.212	**54.281**	5.86	10.8	ng/L
⌊>	U 236	236	8156.991				ng/L
	U 236-IS	236	8156.991	**108.575**	0.83	0.8	%R

Quantitative Analysis - Summary Report

010137

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 10:49:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.030
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	17	32.805	0.000	
	U	234	27	4.225	0.000	
	U	235	828	3.408	0.000	
	U	238	155	5.226	0.000	
	U 232	232	36	10.615	0.000	
⌈	U-tot	238	1027	4.042	0.000	
|	U-238a	238	155	5.226	0.000	
|	U-235a	235	828	3.408	0.000	
⌊>	U 236	236	8020	0.526	0.000	
	U 236-IS	236	8020	0.526	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	17.333				ng/L
	U	234	27.333				ng/L
	U	235	828.038				ng/L
	U	238	154.668				ng/L
	U 232	232	35.667				ng/L
⌈	U-tot	238	0.128	**-3.187**	2.90	91.0	ng/L
|	U-238a	238	0.019	**-0.006**	0.59	10192.0	ng/L
|	U-235a	235	0.103	**-1.978**	1.81	91.3	ng/L
⌊>	U 236	236	8019.869				ng/L
	U 236-IS	236	8019.869	**106.750**	0.56	0.5	%R

010138

Quantitative Analysis - Summary Report

Sample ID: 469499d2

Sample Date/Time: Tuesday, July 26, 2011 10:52:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d2.031
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	19	18.977	0.000	
	U	234	47	1.237	0.000	
	U	235	2162	3.219	0.000	
	U	238	58707	0.798	0.000	
	U 232	232	147	16.084	0.000	
⌈	U-tot	238	60935	0.665	0.000	
|	U-238a	238	58707	0.798	0.000	
|	U-235a	235	2162	3.219	0.000	
⌊>	U 236	236	7434	0.670	0.000	
	U 236-IS	236	7434	0.670	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	19.000				ng/L
	U	234	46.667				ng/L
	U	235	2161.924				ng/L
	U	238	58707.291				ng/L
	U 232	232	147.001				ng/L
⌈	U-tot	238	8.197	**4497.198**	60.73	1.4	ng/L
|	U-238a	238	7.898	**4387.311**	64.32	1.5	ng/L
|	U-235a	235	0.291	**95.035**	3.90	4.1	ng/L
⌊>	U 236	236	7434.038				ng/L
	U 236-IS	236	7434.038	**98.952**	0.66	0.7	%R

Quantitative Analysis - Summary Report

Sample ID: 469499d2D

Sample Date/Time: Tuesday, July 26, 2011 10:54:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d2D.032
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	16	22.535	0.000	
	U	234	41	24.875	0.000	
	U	235	2071	4.636	0.000	
	U	238	57171	0.209	0.000	
	U 232	232	177	5.240	0.000	
⌈	U-tot	238	59298	0.084	0.000	
|	U-238a	238	57171	0.209	0.000	
|	U-235a	235	2071	4.636	0.000	
⌊>	U 236	236	7152	1.097	0.000	
	U 236-IS	236	7152	1.097	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	16.000				ng/L
	U	234	40.667				ng/L
	U	235	2071.236				ng/L
	U	238	57170.536				ng/L
	U 232	232	177.335				ng/L
⌈	U-tot	238	8.292	**4549.842**	46.99	1.0	ng/L
|	U-238a	238	7.994	**4441.004**	42.00	0.9	ng/L
|	U-235a	235	0.290	**94.455**	7.76	8.2	ng/L
⌊>	U 236	236	7152.146				ng/L
	U 236-IS	236	7152.146	**95.200**	1.04	1.1	%R

010140

Quantitative Analysis - Summary Report

Sample ID: 469500d2

Sample Date/Time: Tuesday, July 26, 2011 10:56:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d2.033
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	22	21.160	0.000	
	U	234	39	18.490	0.000	
	U	235	1372	2.863	0.000	
	U	238	35488	0.456	0.000	
	U 232	232	541	7.321	0.000	
⌈	U-tot	238	36922	0.553	0.000	
|	U-238a	238	35488	0.456	0.000	
|	U-235a	235	1372	2.863	0.000	
⌊>	U 236	236	6689	0.855	0.000	
	U 236-IS	236	6689	0.855	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	22.333				ng/L
	U	234	39.000				ng/L
	U	235	1372.104				ng/L
	U	238	35488.133				ng/L
	U 232	232	541.350				ng/L
⌈	U-tot	238	5.520	**3003.956**	27.60	0.9	ng/L
|	U-238a	238	5.306	**2943.841**	25.02	0.8	ng/L
|	U-235a	235	0.205	**50.726**	3.06	6.0	ng/L
⌊>	U 236	236	6689.127				ng/L
	U 236-IS	236	6689.127	**89.037**	0.76	0.9	%R

010141

Quantitative Analysis - Summary Report

Sample ID: 469500d2D

Sample Date/Time: Tuesday, July 26, 2011 10:59:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d2D.034
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	14	29.572	0.000	
	U	234	37	4.166	0.000	
	U	235	1432	3.248	0.000	
	U	238	37122	0.126	0.000	
	U 232	232	735	7.351	0.000	
⌈	U-tot	238	38604	0.198	0.000	
|	U-238a	238	37122	0.126	0.000	
|	U-235a	235	1432	3.248	0.000	
⌊>	U 236	236	6921	0.184	0.000	
	U 236-IS	236	6921	0.184	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.667				ng/L
	U	234	36.667				ng/L
	U	235	1431.779				ng/L
	U	238	37121.637				ng/L
	U 232	232	735.030				ng/L
⌈	U-tot	238	5.578	**3036.131**	11.82	0.4	ng/L
|	U-238a	238	5.363	**2976.054**	8.97	0.3	ng/L
|	U-235a	235	0.207	**51.627**	3.61	7.0	ng/L
⌊>	U 236	236	6921.300				ng/L
	U 236-IS	236	6921.300	**92.127**	0.17	0.2	%R

Quantitative Analysis - Summary Report

010142

Sample ID: 469501d2

Sample Date/Time: Tuesday, July 26, 2011 11:01:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d2.035
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	23	13.777	0.000	
	U	234	41	17.073	0.000	
	U	235	1997	1.403	0.000	
	U	238	55091	0.224	0.000	
	U 232	232	222	12.245	0.000	
⌈	U-tot	238	57152	0.157	0.000	
|	U-238a	238	55091	0.224	0.000	
|	U-235a	235	1997	1.403	0.000	
⌊>	U 236	236	7042	1.434	0.000	
	U 236-IS	236	7042	1.434	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	23.333				ng/L
	U	234	41.000				ng/L
	U	235	1996.553				ng/L
	U	238	55091.090				ng/L
	U 232	232	222.003				ng/L
⌈	U-tot	238	8.117	**4452.402**	64.73	1.5	ng/L
|	U-238a	238	7.824	**4346.446**	63.57	1.5	ng/L
|	U-235a	235	0.284	**91.294**	2.69	2.9	ng/L
⌊>	U 236	236	7042.060				ng/L
	U 236-IS	236	7042.060	**93.735**	1.34	1.4	%R

Quantitative Analysis - Summary Report

010143

Sample ID: 469501d2D

Sample Date/Time: Tuesday, July 26, 2011 11:03:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d2D.036
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	12	68.959	0.000	
	U	234	29	34.942	0.000	
	U	235	1905	3.488	0.000	
	U	238	54921	0.259	0.000	
	U 232	232	216	8.299	0.000	
⌈	U-tot	238	56867	0.154	0.000	
|	U-238a	238	54921	0.259	0.000	
|	U-235a	235	1905	3.488	0.000	
⌊>	U 236	236	6887	1.234	0.000	
	U 236-IS	236	6887	1.234	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.333				ng/L
	U	234	28.667				ng/L
	U	235	1904.533				ng/L
	U	238	54921.401				ng/L
	U 232	232	216.336				ng/L
⌈	U-tot	238	8.258	**4531.102**	54.81	1.2	ng/L
|	U-238a	238	7.975	**4430.646**	48.85	1.1	ng/L
|	U-235a	235	0.277	**87.723**	6.76	7.7	ng/L
⌊>	U 236	236	6886.941				ng/L
	U 236-IS	236	6886.941	**91.670**	1.13	1.2	%R

Quantitative Analysis - Summary Report

010144

Sample ID: 469506d2

Sample Date/Time: Tuesday, July 26, 2011 11:06:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d2.037
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	69.282	0.000	
	U	234	22		0.000	
	U	235	1907	0.476	0.000	
	U	238	53655	0.830	0.000	
	U 232	232	162	19.801	0.000	
⌜	U-tot	238	55588	0.784	0.000	
|	U-238a	238	53655	0.830	0.000	
|	U-235a	235	1907	0.476	0.000	
⌞>	U 236	236	6735	0.905	0.000	
	U 236-IS	236	6735	0.905	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.000				ng/L
	U	234	22.000				ng/L
	U	235	1906.867				ng/L
	U	238	53654.543				ng/L
	U 232	232	162.001				ng/L
⌜	U-tot	238	8.253	**4528.572**	53.15	1.2	ng/L
|	U-238a	238	7.966	**4425.586**	52.04	1.2	ng/L
|	U-235a	235	0.283	**91.075**	1.86	2.0	ng/L
⌞>	U 236	236	6735.494				ng/L
	U 236-IS	236	6735.494	**89.654**	0.81	0.9	%R

010145

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 11:08:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.038
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	22.913	0.000	
	U	234	21	11.175	0.000	
	U	235	730	2.931	0.000	
	U	238	187	7.365	0.000	
	U 232	232	29	25.587	0.000	
⌜	U-tot	238	944	0.583	0.000	
|	U-238a	238	187	7.365	0.000	
|	U-235a	235	730	2.931	0.000	
⌞>	U 236	236	6894	1.161	0.000	
	U 236-IS	236	6894	1.161	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	20.667				ng/L
	U	235	729.696				ng/L
	U	238	187.335				ng/L
	U 232	232	29.333				ng/L
⌜	U-tot	238	0.137	**1.766**	0.52	29.3	ng/L
|	U-238a	238	0.027	**4.393**	1.26	28.7	ng/L
|	U-235a	235	0.106	**-0.642**	1.13	176.6	ng/L
⌞>	U 236	236	6894.280				ng/L
	U 236-IS	236	6894.280	**91.767**	1.07	1.2	%R

010146

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 11:10:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.039
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	26.964	0.000	
	U	234	21	23.810	0.000	
	U	235	731	4.063	0.000	
	U	238	629	5.169	0.000	
	U 232	232	22	16.209	0.000	
⌈	U-tot	238	1390	3.778	0.000	
|	U-238a	238	629	5.169	0.000	
|	U-235a	235	731	4.063	0.000	
⌊>	U 236	236	6707	1.616	0.000	
	U 236-IS	236	6707	1.616	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	21.000				ng/L
	U	235	730.696				ng/L
	U	238	629.022				ng/L
	U 232	232	21.667				ng/L
⌈	U-tot	238	0.207	**40.931**	2.72	6.6	ng/L
|	U-238a	238	0.094	**41.462**	1.91	4.6	ng/L
|	U-235a	235	0.109	**0.968**	2.14	221.2	ng/L
⌊>	U 236	236	6707.140				ng/L
	U 236-IS	236	6707.140	**89.277**	1.44	1.6	%R

010147

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 11:13:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.040
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	70.501	0.000	
	U	234	21	25.198	0.000	
	U	235	787	4.591	0.000	
	U	238	9016	0.722	0.000	
	U 232	232	15	17.638	0.000	
⌈	U-tot	238	9828	0.988	0.000	
|	U-238a	238	9016	0.722	0.000	
|	U-235a	235	787	4.591	0.000	
⌊>	U 236	236	6728	1.543	0.000	
	U 236-IS	236	6728	1.543	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	21.000				ng/L
	U	235	786.701				ng/L
	U	238	9016.136				ng/L
	U 232	232	15.000				ng/L
⌈	U-tot	238	1.461	**740.191**	10.17	1.4	ng/L
|	U-238a	238	1.340	**735.643**	10.27	1.4	ng/L
|	U-235a	235	0.117	**5.089**	2.17	42.6	ng/L
⌊>	U 236	236	6727.822				ng/L
	U 236-IS	236	6727.822	**89.552**	1.38	1.5	%R

010148

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 11:15:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.041
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	32.733	0.000	
	U	234	17	23.316	0.000	
	U	235	1502	0.684	0.000	
	U	238	98183	0.172	0.000	
	U 232	232	19	28.487	0.000	
⌈	U-tot	238	99707	0.160	0.000	
|	U-238a	238	98183	0.172	0.000	
|	U-235a	235	1502	0.684	0.000	
⌊>	U 236	236	6747	1.188	0.000	
	U 236-IS	236	6747	1.188	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	17.333				ng/L
	U	235	1501.791				ng/L
	U	238	98183.015				ng/L
	U 232	232	19.333				ng/L
⌈	U-tot	238	14.780	**8168.746**	86.06	1.1	ng/L
|	U-238a	238	14.554	**8094.353**	83.83	1.0	ng/L
|	U-235a	235	0.223	**59.780**	1.96	3.3	ng/L
⌊>	U 236	236	6746.503				ng/L
	U 236-IS	236	6746.503	**89.800**	1.07	1.2	%R

Quantitative Analysis - Summary Report

010149

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 11:17:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.042
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	14	56.695	0.000	
	U	234	20	27.839	0.000	
	U	235	718	5.926	0.000	
	U	238	134	12.330	0.000	
	U 232	232	18	13.727	0.000	
⌜	U-tot	238	886	1.989	0.000	
|	U-238a	238	134	12.330	0.000	
|	U-235a	235	718	5.926	0.000	
⌞>	U 236	236	6693	0.980	0.000	
	U 236-IS	236	6693	0.980	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.000				ng/L
	U	234	20.000				ng/L
	U	235	717.695				ng/L
	U	238	134.001				ng/L
	U 232	232	18.333				ng/L
⌜	U-tot	238	0.132	**-0.832**	1.16	139.0	ng/L
|	U-238a	238	0.020	**0.412**	1.48	358.2	ng/L
|	U-235a	235	0.107	**0.064**	2.75	4299.6	ng/L
⌞>	U 236	236	6693.130				ng/L
	U 236-IS	236	6693.130	**89.090**	0.87	1.0	%R

469150

Quantitative Analysis - Summary Report

Sample ID: 469506d2D

Sample Date/Time: Tuesday, July 26, 2011 11:20:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d2D.043
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	18.330	0.000	
	U	234	31	11.452	0.000	
	U	235	1829	3.707	0.000	
	U	238	50748	0.327	0.000	
	U 232	232	138	35.195	0.000	
⌈	U-tot	238	52616	0.244	0.000	
|	U-238a	238	50748	0.327	0.000	
|	U-235a	235	1829	3.707	0.000	
⌊>	U 236	236	6499	2.174	0.000	
	U 236-IS	236	6499	2.174	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.333				ng/L
	U	234	30.667				ng/L
	U	235	1829.184				ng/L
	U	238	50747.918				ng/L
	U 232	232	138.334				ng/L
⌈	U-tot	238	8.099	**4442.542**	106.70	2.4	ng/L
|	U-238a	238	7.812	**4339.435**	102.47	2.4	ng/L
|	U-235a	235	0.282	**90.274**	6.67	7.4	ng/L
⌊>	U 236	236	6498.656				ng/L
	U 236-IS	236	6498.656	**86.501**	1.88	2.2	%R

010151

Quantitative Analysis - Summary Report

Sample ID: Blankd4

Sample Date/Time: Tuesday, July 26, 2011 11:22:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Blankd4.044
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	59.010	0.000	
	U	234	29	36.001	0.000	
	U	235	1991	2.965	0.000	
	U	238	52442	0.402	0.000	
	U 232	232	43	22.276	0.000	
⌈	U-tot	238	54471	0.451	0.000	
|	U-238a	238	52442	0.402	0.000	
|	U-235a	235	1991	2.965	0.000	
⌊>	U 236	236	6421	0.518	0.000	
	U 236-IS	236	6421	0.518	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	29.000				ng/L
	U	235	1990.885				ng/L
	U	238	52441.825				ng/L
	U 232	232	42.667				ng/L
⌈	U-tot	238	8.484	**4657.042**	9.48	0.2	ng/L
|	U-238a	238	8.168	**4537.772**	11.99	0.3	ng/L
|	U-235a	235	0.310	**105.004**	4.00	3.8	ng/L
⌊>	U 236	236	6420.600				ng/L
	U 236-IS	236	6420.600	**85.462**	0.44	0.5	%R

Quantitative Analysis - Summary Report

010152

Sample ID: 469498d4

Sample Date/Time: Tuesday, July 26, 2011 11:24:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d4.045
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	12.372	0.000	
	U	234	24	11.024	0.000	
	U	235	1814	3.405	0.000	
	U	238	51742	0.194	0.000	
	U 232	232	525	5.638	0.000	
⌈	U-tot	238	53585	0.298	0.000	
|	U-238a	238	51742	0.194	0.000	
|	U-235a	235	1814	3.405	0.000	
⌊>	U 236	236	6433	0.935	0.000	
	U 236-IS	236	6433	0.935	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	24.000				ng/L
	U	235	1813.848				ng/L
	U	238	51742.500				ng/L
	U 232	232	525.015				ng/L
⌈	U-tot	238	8.330	**4571.148**	43.82	1.0	ng/L
|	U-238a	238	8.043	**4468.497**	40.94	0.9	ng/L
|	U-235a	235	0.282	**90.473**	5.20	5.8	ng/L
⌊>	U 236	236	6433.276				ng/L
	U 236-IS	236	6433.276	**85.631**	0.80	0.9	%R

010153

Quantitative Analysis - Summary Report

Sample ID: 469498d4D

Sample Date/Time: Tuesday, July 26, 2011 11:27:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d4D.046
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	16.667	0.000	
	U	234	22	18.653	0.000	
	U	235	1833	1.947	0.000	
	U	238	52620	0.172	0.000	
	U 232	232	88	4.749	0.000	
⌈	U-tot	238	54481	0.097	0.000	
|	U-238a	238	52620	0.172	0.000	
|	U-235a	235	1833	1.947	0.000	
⌊>	U 236	236	6318	0.527	0.000	
	U 236-IS	236	6318	0.527	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	21.667				ng/L
	U	235	1833.185				ng/L
	U	238	52619.847				ng/L
	U 232	232	87.667				ng/L
⌈	U-tot	238	8.624	**4735.177**	28.77	0.6	ng/L
|	U-238a	238	8.329	**4627.748**	29.35	0.6	ng/L
|	U-235a	235	0.290	**94.720**	2.86	3.0	ng/L
⌊>	U 236	236	6317.528				ng/L
	U 236-IS	236	6317.528	**84.091**	0.44	0.5	%R

010154

Quantitative Analysis - Summary Report

Sample ID: 469498d4L df5

Sample Date/Time: Tuesday, July 26, 2011 11:29:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d4L df5.047
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	88.192	0.000	
	U	234	17	29.605	0.000	
	U	235	969	1.601	0.000	
	U	238	11131	1.206	0.000	
	U 232	232	128	5.123	0.000	
⌈	U-tot	238	12121	1.013	0.000	
|	U-238a	238	11131	1.206	0.000	
|	U-235a	235	969	1.601	0.000	
⌊>	U 236	236	6922	1.691	0.000	
	U 236-IS	236	6922	1.691	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	17.333				ng/L
	U	235	968.718				ng/L
	U	238	11131.478				ng/L
	U 232	232	128.001				ng/L
⌈	U-tot	238	1.751	**902.153**	15.67	1.7	ng/L
|	U-238a	238	1.608	**884.983**	16.15	1.8	ng/L
|	U-235a	235	0.140	**17.015**	0.87	5.1	ng/L
⌊>	U 236	236	6921.634				ng/L
	U 236-IS	236	6921.634	**92.132**	1.56	1.7	%R

010155

Quantitative Analysis - Summary Report

Sample ID: 469498d4AS

Sample Date/Time: Tuesday, July 26, 2011 11:32:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d4AS.048
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20uL 1° natural uranium at df 100 (075-Rad-5012, 11-064-06) in 10mL

U-tot
TV= 20462 ng/L

U-238
TV= 20316 ng/L

U-235
TV= 145 ng/L

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	40.754	0.000	
	U	234	38	18.977	0.000	
	U	235	3662	2.089	0.000	
	U	238	294652	0.398	0.000	
	U 232	232	539	1.033	0.000	
⌈	U-tot	238	298358	0.366	0.000	
|	U-238a	238	294652	0.398	0.000	
|	U-235a	235	3662	2.089	0.000	
⌊>	U 236	236	6504	1.250	0.000	
	U 236-IS	236	6504	1.250	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	38.000				ng/L
	U	235	3662.071				ng/L
	U	238	294651.986				ng/L
	U 232	232	539.016				ng/L
⌈	U-tot	238	45.878	**25513.082**	369.54	1.4	ng/L
|	U-238a	238	45.309	**25220.911**	368.62	1.5	ng/L
|	U-235a	235	0.563	**235.899**	6.32	2.7	ng/L
⌊>	U 236	236	6503.993				ng/L
	U 236-IS	236	6503.993	**86.573**	1.08	1.3	%R

0010156

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 11:34:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.049
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	13.323	0.000	
	U	234	17	32.805	0.000	
	U	235	712	4.102	0.000	
	U	238	219	5.532	0.000	
	U 232	232	23	15.676	0.000	
⌈	U-tot	238	957	4.885	0.000	
|	U-238a	238	219	5.532	0.000	
|	U-235a	235	712	4.102	0.000	
⌊>	U 236	236	6687	0.571	0.000	
	U 236-IS	236	6687	0.571	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	17.333				ng/L
	U	235	712.028				ng/L
	U	238	218.669				ng/L
	U 232	232	23.000				ng/L
⌈	U-tot	238	0.143	**5.146**	3.53	68.5	ng/L
|	U-238a	238	0.033	**7.461**	0.93	12.4	ng/L
|	U-235a	235	0.106	**-0.314**	1.98	631.3	ng/L
⌊>	U 236	236	6687.125				ng/L
	U 236-IS	236	6687.125	**89.010**	0.51	0.6	%R

Quantitative Analysis - Summary Report

010157

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 11:36:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.050
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	32	38.670	0.000	
	U	234	43	26.208	0.000	
	U	235	768	4.634	0.000	
	U	238	664	1.677	0.000	
	U 232	232	36	11.673	0.000	
⌈	U-tot	238	1507	3.965	0.000	
|	U-238a	238	664	1.677	0.000	
|	U-235a	235	768	4.634	0.000	
⌊>	U 236	236	6669	1.272	0.000	
	U 236-IS	236	6669	1.272	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	32.333				ng/L
	U	234	43.000				ng/L
	U	235	767.699				ng/L
	U	238	664.024				ng/L
	U 232	232	35.667				ng/L
⌈	U-tot	238	0.226	**51.453**	6.35	12.3	ng/L
|	U-238a	238	0.100	**44.717**	1.62	3.6	ng/L
|	U-235a	235	0.115	**4.192**	3.49	83.3	ng/L
⌊>	U 236	236	6668.779				ng/L
	U 236-IS	236	6668.779	**88.766**	1.13	1.3	%R

010158

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 11:39:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.051
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	16	39.031	0.000	
	U	234	30	31.798	0.000	
	U	235	778	5.772	0.000	
	U	238	8807	1.489	0.000	
	U 232	232	19	6.186	0.000	
⌈	U-tot	238	9631	1.136	0.000	
|	U-238a	238	8807	1.489	0.000	
|	U-235a	235	778	5.772	0.000	
⌊>	U 236	236	6538	0.876	0.000	
	U 236-IS	236	6538	0.876	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	16.000				ng/L
	U	234	30.000				ng/L
	U	235	777.700				ng/L
	U	238	8807.265				ng/L
	U 232	232	18.667				ng/L
⌈	U-tot	238	1.473	**746.999**	13.49	1.8	ng/L
|	U-238a	238	1.347	**739.496**	15.63	2.1	ng/L
|	U-235a	235	0.119	**6.129**	3.09	50.4	ng/L
⌊>	U 236	236	6538.017				ng/L
	U 236-IS	236	6538.017	**87.025**	0.76	0.9	%R

010159

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 11:41:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.052
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	17.321	0.000	
	U	234	31	14.783	0.000	
	U	235	1431	3.049	0.000	
	U	238	95798	0.281	0.000	
	U 232	232	24	16.667	0.000	
⌈	U-tot	238	97270	0.303	0.000	
|	U-238a	238	95798	0.281	0.000	
|	U-235a	235	1431	3.049	0.000	
⌊>	U 236	236	6507	0.906	0.000	
	U 236-IS	236	6507	0.906	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	31.000				ng/L
	U	235	1430.779				ng/L
	U	238	95798.444				ng/L
	U 232	232	24.000				ng/L
⌈	U-tot	238	14.948	**8262.502**	52.23	0.6	ng/L
|	U-238a	238	14.722	**8187.814**	52.04	0.6	ng/L
|	U-235a	235	0.220	**58.348**	3.05	5.2	ng/L
⌊>	U 236	236	6507.328				ng/L
	U 236-IS	236	6507.328	**86.617**	0.78	0.9	%R

010160

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 11:43:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.053
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	15.746	0.000	
	U	234	21	21.822	0.000	
	U	235	721	4.536	0.000	
	U	238	121	14.519	0.000	
	U 232	232	18	8.332	0.000	
⌈	U-tot	238	875	5.566	0.000	
|	U-238a	238	121	14.519	0.000	
|	U-235a	235	721	4.536	0.000	
⌊>	U 236	236	6485	0.735	0.000	
	U 236-IS	236	6485	0.735	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.000				ng/L
	U	234	21.000				ng/L
	U	235	721.362				ng/L
	U	238	121.334				ng/L
	U 232	232	18.333				ng/L
⌈	U-tot	238	0.135	**0.570**	3.65	639.7	ng/L
|	U-238a	238	0.019	**-0.335**	1.44	431.3	ng/L
|	U-235a	235	0.111	**2.142**	2.24	104.4	ng/L
⌊>	U 236	236	6485.313				ng/L
	U 236-IS	236	6485.313	**86.324**	0.63	0.7	%R

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010161

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS

Tot U

IDL Date: 5/10/2011

ICP-MS CALIB. STD. ID's | **TVs**

		Tot U / U238 / U235
S0	11-081-05	
STD. 1	11-064-02	44984 / 44572 / 3.19 ppt
I. STD	11-064-09	0.5 ppb
I. STD		

QC STD. ID's

ICV/CCV	11-080-08	7666 / 7612 / 54.5 ppt
UCL		
CRI	11-080-04/05	40 / 39.7 / 4.95 ppt
ICSA	11-064-04	
ICSAB	11-078-01	30444 / 30298 / 145 ppt

STD's IV, CCS 1-6 Expires 10-1-11
STD's Spex, ME 1-4 Expires 9-15-11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
160526.05.00	Fluor	110614-8	7/26/11	SO	WC 15 0082 - 15 0086

INSTRUMENT: DRC II FILENAME: 110726a.rep

Analyst: M. Seiler Date: 7/26/11 ☐ CONVERTED (.DAT)

010162

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Tuesday, July 26, 2011 10:18:26
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler 7/26/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5925.1	5925.130	68.600	1.2
	In	114.9	19187.4	19187.363	228.670	1.2
	U	238.1	14618.1	14618.144	145.523	1.0
⌈>	Ce	139.9	21118.2	21118.237	258.841	1.2
⌊	CeO	155.9	963.6	0.046	0.001	2.5
⌈>	Ba	137.9	176939.6	176939.560	1931.322	1.1
⌊	Ba++	69.0	4700.1	0.027	0.000	1.0
	Bkgd	220.0	3.6	3.633	1.063	29.3
	Bkgd	8.5	1.2	1.233	0.641	52.0

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
8.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

8/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.3	563.0
Co	59	45	7.3	10734.3
In	115	45	8.5	21071.4

010163

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Tuesday, July 26, 2011 10:18:26
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler
7/26/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2750	2062	0.699	
Mg	23.985	23.975	5673	2074	0.683	
Ar2	75.930	75.925	18309	2097	0.710	
In	114.904	114.925	27798	2129	0.694	
Ce	139.905	139.925	33881	2145	0.686	
Pb	207.977	207.975	50477	2185	0.708	
Th	232.038	232.025	56336	2208	0.683	
U	238.050	238.075	57806	2221	0.693	

010164

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Tuesday, July 26, 2011 14:39:44
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-0.109
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	86.848	0.000	
	U	234	14	14.286	0.000	
	U	235	687	2.511	0.000	
	U	238	115	5.936	0.000	
	U 232	232	10	11.945	0.000	
⌜	U-tot	238	823	2.277	0.000	
|	U-238a	238	115	5.936	0.000	
|	U-235a	235	687	2.511	0.000	
⌞>	U 236	236	6035	1.007	0.000	
	U 236-IS	236	6035	1.007	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.667				ng/L
	U	234	14.000				ng/L
	U	235	686.693				ng/L
	U	238	114.667				ng/L
	U 232	232	9.667				ng/L
⌜	U-tot	238	0.136				ng/L
|	U-238a	238	0.019				ng/L
|	U-235a	235	0.114				ng/L
⌞>	U 236	236	6035.336				ng/L
	U 236-IS	236	6035.336	**100.000**	1.01	1.0	%R

0110165

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Tuesday, July 26, 2011 14:42:02
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-1.110
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	48.888	0.000	
	U	234	49	12.745	0.000	
	U	235	4602	0.661	0.000	
	U	238	512343	0.721	0.000	
	U 232	232	10	11.945	0.000	
⌈	U-tot	238	517004	0.708	0.000	
|	U-238a	238	512343	0.721	0.000	
|	U-235a	235	4602	0.661	0.000	
⌊>	U 236	236	6134	0.897	0.000	
	U 236-IS	236	6134	0.897	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	49.000				ng/L
	U	235	4602.165				ng/L
	U	238	512343.383				ng/L
	U 232	232	9.667				ng/L
⌈	U-tot	238	84.287	**44984.000**	420.31	0.9	ng/L
|	U-238a	238	83.527	**44572.000**	419.71	0.9	ng/L
|	U-235a	235	0.750	**319.000**	3.98	1.2	ng/L
⌊>	U 236	236	6134.069				ng/L
	U 236-IS	236	6134.069	**101.636**	0.91	0.9	%R

Quantitative Analysis - Summary Report

010166

Sample ID: icv

Sample Date/Time: Tuesday, July 26, 2011 14:44:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icv.111
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	50.918	0.000	
	U	234	23	13.043	0.000	
	U	235	1345	3.762	0.000	
	U	238	89168	0.006	0.000	
	U 232	232	9	26.964	0.000	
⌈	U-tot	238	90545	0.049	0.000	
|	U-238a	238	89168	0.006	0.000	
|	U-235a	235	1345	3.762	0.000	
⌊>	U 236	236	5981	2.409	0.000	
	U 236-IS	236	5981	2.409	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	23.000				ng/L
	U	235	1344.766				ng/L
	U	238	89168.169				ng/L
	U 232	232	9.333				ng/L
⌈	U-tot	238	15.146	**8023.349**	195.47	2.4	ng/L
|	U-238a	238	14.915	**7950.783**	193.46	2.4	ng/L
|	U-235a	235	0.225	**55.686**	4.46	8.0	ng/L
⌊>	U 236	236	5980.634				ng/L
	U 236-IS	236	5980.634	**99.094**	2.39	2.4	%R

010167

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Tuesday, July 26, 2011 14:46:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icb.112
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	17.321	0.000	
	U	234	18	24.596	0.000	
	U	235	666	3.220	0.000	
	U	238	126	1.838	0.000	
	U 232	232	9	13.323	0.000	
⌈	U-tot	238	817	1.924	0.000	
⌋	U-238a	238	126	1.838	0.000	
⌋	U-235a	235	666	3.220	0.000	
⌊>	U 236	236	5977	1.777	0.000	
	U 236-IS	236	5977	1.777	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	18.333				ng/L
	U	235	666.358				ng/L
	U	238	125.668				ng/L
	U 232	232	8.667				ng/L
⌈	U-tot	238	0.137	**0.181**	1.81	997.8	ng/L
⌋	U-238a	238	0.021	**1.081**	0.25	23.1	ng/L
⌋	U-235a	235	0.112	**-1.140**	2.19	191.7	ng/L
⌊>	U 236	236	5976.631				ng/L
	U 236-IS	236	5976.631	**99.027**	1.76	1.8	%R

Quantitative Analysis - Summary Report

010168

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 14:48:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.113
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	48.596	0.000	
	U	234	18	13.072	0.000	
	U	235	685	1.258	0.000	
	U	238	559	3.399	0.000	
	U 232	232	7	31.225	0.000	
⌈	U-tot	238	1273	2.048	0.000	
|	U-238a	238	559	3.399	0.000	
|	U-235a	235	685	1.258	0.000	
⌊>	U 236	236	5886	0.601	0.000	
	U 236-IS	236	5886	0.601	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.333				ng/L
	U	234	17.667				ng/L
	U	235	685.359				ng/L
	U	238	559.017				ng/L
	U 232	232	6.667				ng/L
⌈	U-tot	238	0.216	**42.742**	2.82	6.6	ng/L
|	U-238a	238	0.095	**40.552**	1.94	4.8	ng/L
|	U-235a	235	0.116	**1.321**	0.73	55.4	ng/L
⌊>	U 236	236	5886.238				ng/L
	U 236-IS	236	5886.238	**97.530**	0.59	0.6	%R

010169

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 14:51:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.114
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	20.830	0.000	
	U	234	20	38.201	0.000	
	U	235	737	6.111	0.000	
	U	238	8048	0.168	0.000	
	U 232	232	9	34.442	0.000	
⌈	U-tot	238	8820	0.644	0.000	
|	U-238a	238	8048	0.168	0.000	
|	U-235a	235	737	6.111	0.000	
⌊>	U 236	236	5894	1.179	0.000	
	U 236-IS	236	5894	1.179	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.667				ng/L
	U	234	20.333				ng/L
	U	235	737.363				ng/L
	U	238	8047.560				ng/L
	U 232	232	9.333				ng/L
⌈	U-tot	238	1.497	**727.195**	14.45	2.0	ng/L
|	U-238a	238	1.366	**718.745**	9.48	1.3	ng/L
|	U-235a	235	0.125	**5.704**	4.52	79.3	ng/L
⌊>	U 236	236	5893.577				ng/L
	U 236-IS	236	5893.577	**97.651**	1.15	1.2	%R

0010170

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Tuesday, July 26, 2011 14:53:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsa.115
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	35.599	0.000	
	U	234	20	13.229	0.000	
	U	235	574	6.014	0.000	
	U	238	152	5.138	0.000	
	U 232	232	173	3.516	0.000	
⌈	U-tot	238	758	5.179	0.000	
|	U-238a	238	152	5.138	0.000	
|	U-235a	235	574	6.014	0.000	
⌊>	U 236	236	4883	1.134	0.000	
	U 236-IS	236	4883	1.134	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.667				ng/L
	U	234	20.000				ng/L
	U	235	573.685				ng/L
	U	238	152.001				ng/L
	U 232	232	173.002				ng/L
⌈	U-tot	238	0.155	**10.087**	3.39	33.6	ng/L
|	U-238a	238	0.031	**6.467**	0.70	10.8	ng/L
|	U-235a	235	0.117	**1.826**	2.88	157.7	ng/L
⌊>	U 236	236	4882.978				ng/L
	U 236-IS	236	4882.978	**80.906**	0.92	1.1	%R

010171

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Tuesday, July 26, 2011 14:55:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsab.116
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	23.890	0.000	
	U	234	29	20.440	0.000	
	U	235	2048	1.811	0.000	
	U	238	194727	0.862	0.000	
	U 232	232	150	3.528	0.000	
⌈	U-tot	238	196813	0.869	0.000	
|	U-238a	238	194727	0.862	0.000	
|	U-235a	235	2048	1.811	0.000	
⌊>	U 236	236	5041	0.998	0.000	
	U 236-IS	236	5041	0.998	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	28.667				ng/L
	U	235	2047.897				ng/L
	U	238	194726.854				ng/L
	U 232	232	150.001				ng/L
⌈	U-tot	238	39.040	**20796.306**	43.43	0.2	ng/L
|	U-238a	238	38.626	**20606.155**	43.16	0.2	ng/L
|	U-235a	235	0.406	**146.542**	1.74	1.2	ng/L
⌊>	U 236	236	5041.398				ng/L
	U 236-IS	236	5041.398	**83.531**	0.83	1.0	%R

010172

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 14:58:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.117
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	26.956	0.000	
	U	234	20	27.086	0.000	
	U	235	671	1.867	0.000	
	U	238	141	4.285	0.000	
	U 232	232	9	29.397	0.000	
⌈	U-tot	238	843	1.511	0.000	
|	U-238a	238	141	4.285	0.000	
|	U-235a	235	671	1.867	0.000	
⌊>	U 236	236	6189	1.741	0.000	
	U 236-IS	236	6189	1.741	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.333				ng/L
	U	234	20.333				ng/L
	U	235	671.025				ng/L
	U	238	140.668				ng/L
	U 232	232	9.000				ng/L
⌈	U-tot	238	0.136	**-0.049**	1.61	3296.2	ng/L
|	U-238a	238	0.023	**1.985**	0.32	16.0	ng/L
|	U-235a	235	0.108	**-2.678**	1.57	58.6	ng/L
⌊>	U 236	236	6188.773				ng/L
	U 236-IS	236	6188.773	**102.542**	1.79	1.7	%R

010173

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 15:00:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.118
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	22.304	0.000	
	U	234	21	35.667	0.000	
	U	235	1378	0.716	0.000	
	U	238	93633	0.216	0.000	
	U 232	232	10	33.254	0.000	
⌈	U-tot	238	95041	0.215	0.000	
|	U-238a	238	93633	0.216	0.000	
|	U-235a	235	1378	0.716	0.000	
⌊>	U 236	236	6164	1.126	0.000	
	U 236-IS	236	6164	1.126	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	20.667				ng/L
	U	235	1377.771				ng/L
	U	238	93633.058				ng/L
	U 232	232	9.667				ng/L
⌈	U-tot	238	15.420	**8169.882**	87.44	1.1	ng/L
|	U-238a	238	15.191	**8098.079**	85.63	1.1	ng/L
|	U-235a	235	0.224	**55.003**	2.07	3.8	ng/L
⌊>	U 236	236	6164.089				ng/L
	U 236-IS	236	6164.089	**102.133**	1.15	1.1	%R

0110174

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 15:02:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.119
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	24.037	0.000	
	U	234	27	34.027	0.000	
	U	235	703	1.642	0.000	
	U	238	129	13.449	0.000	
	U 232	232	17	21.842	0.000	
⌈	U-tot	238	874	2.724	0.000	
|	U-238a	238	129	13.449	0.000	
|	U-235a	235	703	1.642	0.000	
⌊>	U 236	236	6181	0.959	0.000	
	U 236-IS	236	6181	0.959	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	15.000				ng/L
	U	234	26.667				ng/L
	U	235	703.361				ng/L
	U	238	129.001				ng/L
	U 232	232	17.333				ng/L
⌈	U-tot	238	0.141	**2.673**	1.44	53.7	ng/L
|	U-238a	238	0.021	**0.989**	1.42	143.9	ng/L
|	U-235a	235	0.114	**-0.001**	1.05	173323.6	ng/L
⌊>	U 236	236	6181.101				ng/L
	U 236-IS	236	6181.101	**102.415**	0.98	1.0	%R

010175

Quantitative Analysis - Summary Report

Sample ID: 469499d4

Sample Date/Time: Tuesday, July 26, 2011 15:05:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d4.120
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	41.660	0.000	
	U	234	20		0.000	
	U	235	1629	2.643	0.000	
	U	238	46979	0.631	0.000	
	U 232	232	74	57.476	0.000	
⌈	U-tot	238	48631	0.630	0.000	
|	U-238a	238	46979	0.631	0.000	
|	U-235a	235	1629	2.643	0.000	
⌊>	U 236	236	5547	1.592	0.000	
	U 236-IS	236	5547	1.592	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	20.000				ng/L
	U	235	1628.813				ng/L
	U	238	46978.742				ng/L
	U 232	232	74.000				ng/L
⌈	U-tot	238	8.767	**4613.845**	45.05	1.0	ng/L
|	U-238a	238	8.470	**4510.409**	44.55	1.0	ng/L
|	U-235a	235	0.294	**90.131**	3.75	4.2	ng/L
⌊>	U 236	236	5547.359				ng/L
	U 236-IS	236	5547.359	**91.915**	1.46	1.6	%R

010176

Quantitative Analysis - Summary Report

Sample ID: 469499d4D

Sample Date/Time: Tuesday, July 26, 2011 15:07:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d4D.121
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	53.294	0.000	
	U	234	21	17.169	0.000	
	U	235	1650	2.845	0.000	
	U	238	46300	0.174	0.000	
	U 232	232	84	11.937	0.000	
⌈	U-tot	238	47975	0.259	0.000	
|	U-238a	238	46300	0.174	0.000	
|	U-235a	235	1650	2.845	0.000	
⌊>	U 236	236	5534	1.144	0.000	
	U 236-IS	236	5534	1.144	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	21.000				ng/L
	U	235	1649.816				ng/L
	U	238	46299.937				ng/L
	U 232	232	84.334				ng/L
⌈	U-tot	238	8.670	**4561.694**	54.94	1.2	ng/L
|	U-238a	238	8.367	**4455.777**	53.96	1.2	ng/L
|	U-235a	235	0.298	**92.379**	3.92	4.2	ng/L
⌊>	U 236	236	5534.017				ng/L
	U 236-IS	236	5534.017	**91.694**	1.05	1.1	%R

Quantitative Analysis - Summary Report

010177

Sample ID: 469500d4

Sample Date/Time: Tuesday, July 26, 2011 15:09:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d4.122
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	47.186	0.000	
	U	234	14	34.579	0.000	
	U	235	999	5.167	0.000	
	U	238	22337	1.375	0.000	
	U 232	232	319	28.325	0.000	
⌈	U-tot	238	23356	1.486	0.000	
|	U-238a	238	22337	1.375	0.000	
|	U-235a	235	999	5.167	0.000	
⌊>	U 236	236	5489	1.892	0.000	
	U 236-IS	236	5489	1.892	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	13.667				ng/L
	U	235	999.388				ng/L
	U	238	22337.413				ng/L
	U 232	232	319.006				ng/L
⌈	U-tot	238	4.256	**2202.455**	74.80	3.4	ng/L
|	U-238a	238	4.071	**2162.650**	69.64	3.2	ng/L
|	U-235a	235	0.182	**34.265**	5.88	17.1	ng/L
⌊>	U 236	236	5489.324				ng/L
	U 236-IS	236	5489.324	**90.953**	1.72	1.9	%R

010178

Quantitative Analysis - Summary Report

Sample ID: 469500d4D

Sample Date/Time: Tuesday, July 26, 2011 15:12:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d4D.123
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	82.614	0.000	
	U	234	19	13.925	0.000	
	U	235	985	2.590	0.000	
	U	238	21466	0.869	0.000	
	U 232	232	320	11.035	0.000	
⌈	U-tot	238	22477	0.965	0.000	
|	U-238a	238	21466	0.869	0.000	
|	U-235a	235	985	2.590	0.000	
⌊>	U 236	236	5335	2.106	0.000	
	U 236-IS	236	5335	2.106	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	19.000				ng/L
	U	235	985.053				ng/L
	U	238	21465.981				ng/L
	U 232	232	319.672				ng/L
⌈	U-tot	238	4.215	**2180.180**	65.53	3.0	ng/L
|	U-238a	238	4.025	**2138.291**	60.03	2.8	ng/L
|	U-235a	235	0.185	**35.564**	4.29	12.1	ng/L
⌊>	U 236	236	5334.899				ng/L
	U 236-IS	236	5334.899	**88.394**	1.86	2.1	%R

010179

Quantitative Analysis - Summary Report

Sample ID: 469501d4

Sample Date/Time: Tuesday, July 26, 2011 15:14:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d4.124
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	21.651	0.000	
	U	234	22	9.608	0.000	
	U	235	1580	1.023	0.000	
	U	238	44509	0.446	0.000	
	U 232	232	206	8.702	0.000	
⌈	U-tot	238	46117	0.457	0.000	
|	U-238a	238	44509	0.446	0.000	
|	U-235a	235	1580	1.023	0.000	
⌊>	U 236	236	5408	1.828	0.000	
	U 236-IS	236	5408	1.828	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	21.667				ng/L
	U	235	1580.471				ng/L
	U	238	44509.362				ng/L
	U 232	232	205.669				ng/L
⌈	U-tot	238	8.530	**4486.899**	103.47	2.3	ng/L
|	U-238a	238	8.233	**4383.959**	99.15	2.3	ng/L
|	U-235a	235	0.292	**89.482**	3.91	4.4	ng/L
⌊>	U 236	236	5407.942				ng/L
	U 236-IS	236	5407.942	**89.605**	1.64	1.8	%R

Quantitative Analysis - Summary Report

010180

Sample ID: 469501d4D

Sample Date/Time: Tuesday, July 26, 2011 15:16:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d4D.125
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	66.144	0.000	
	U	234	18	14.245	0.000	
	U	235	1551	2.482	0.000	
	U	238	43510	0.498	0.000	
	U 232	232	200	3.759	0.000	
⌈	U-tot	238	45083	0.410	0.000	
|	U-238a	238	43510	0.498	0.000	
|	U-235a	235	1551	2.482	0.000	
⌊>	U 236	236	5263	1.255	0.000	
	U 236-IS	236	5263	1.255	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.000				ng/L
	U	234	17.667				ng/L
	U	235	1551.466				ng/L
	U	238	43510.209				ng/L
	U 232	232	199.669				ng/L
⌈	U-tot	238	8.568	**4507.040**	52.68	1.2	ng/L
|	U-238a	238	8.269	**4403.174**	48.16	1.1	ng/L
|	U-235a	235	0.295	**90.764**	5.43	6.0	ng/L
⌊>	U 236	236	5262.523				ng/L
	U 236-IS	236	5262.523	**87.195**	1.09	1.3	%R

010181

Quantitative Analysis - Summary Report

Sample ID: 469506d4

Sample Date/Time: Tuesday, July 26, 2011 15:19:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d4.126
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	140.868	0.000	
	U	234	26	25.849	0.000	
	U	235	1578	2.152	0.000	
	U	238	45072	0.522	0.000	
	U 232	232	144	3.487	0.000	
⌈	U-tot	238	46684	0.428	0.000	
|	U-238a	238	45072	0.522	0.000	
|	U-235a	235	1578	2.152	0.000	
⌊>	U 236	236	5370	1.905	0.000	
	U 236-IS	236	5370	1.905	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.000				ng/L
	U	234	26.333				ng/L
	U	235	1577.804				ng/L
	U	238	45072.125				ng/L
	U 232	232	144.334				ng/L
⌈	U-tot	238	8.696	**4575.651**	99.69	2.2	ng/L
|	U-238a	238	8.396	**4470.993**	96.81	2.2	ng/L
|	U-235a	235	0.294	**90.281**	5.27	5.8	ng/L
⌊>	U 236	236	5369.919				ng/L
	U 236-IS	236	5369.919	**88.975**	1.69	1.9	%R

010182

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 15:21:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.127
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	33.333	0.000	
	U	234	9	11.111	0.000	
	U	235	629	5.016	0.000	
	U	238	125	5.067	0.000	
	U 232	232	6	26.956	0.000	
⌜	U-tot	238	767	4.451	0.000	
|	U-238a	238	125	5.067	0.000	
|	U-235a	235	629	5.016	0.000	
⌞>	U 236	236	5512	1.866	0.000	
	U 236-IS	236	5512	1.866	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	9.000				ng/L
	U	235	629.355				ng/L
	U	238	125.334				ng/L
	U 232	232	5.667				ng/L
⌜	U-tot	238	0.139	**1.432**	2.59	181.1	ng/L
|	U-238a	238	0.023	**1.998**	0.73	36.7	ng/L
|	U-235a	235	0.114	**0.173**	2.16	1246.1	ng/L
⌞>	U 236	236	5512.338				ng/L
	U 236-IS	236	5512.338	**91.334**	1.70	1.9	%R

Quantitative Analysis - Summary Report

010183

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 15:23:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.128
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	103.253	0.000	
	U	234	16	16.063	0.000	
	U	235	600	4.504	0.000	
	U	238	514	6.069	0.000	
	U 232	232	5	20.000	0.000	
⌈	U-tot	238	1133	1.952	0.000	
|	U-238a	238	514	6.069	0.000	
|	U-235a	235	600	4.504	0.000	
⌊>	U 236	236	5494	0.776	0.000	
	U 236-IS	236	5494	0.776	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	15.667				ng/L
	U	235	599.686				ng/L
	U	238	514.015				ng/L
	U 232	232	5.000				ng/L
⌈	U-tot	238	0.206	**37.338**	1.67	4.5	ng/L
|	U-238a	238	0.094	**39.784**	2.67	6.7	ng/L
|	U-235a	235	0.109	**-2.316**	2.70	116.7	ng/L
⌊>	U 236	236	5493.659				ng/L
	U 236-IS	236	5493.659	**91.025**	0.71	0.8	%R

Quantitative Analysis - Summary Report

010184

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 15:26:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.129
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	98.974	0.000	
	U	234	11	35.493	0.000	
	U	235	671	2.314	0.000	
	U	238	7574	2.366	0.000	
	U 232	232	8	37.653	0.000	
⌈	U-tot	238	8261	2.315	0.000	
|	U-238a	238	7574	2.366	0.000	
|	U-235a	235	671	2.314	0.000	
⌊>	U 236	236	5502	2.540	0.000	
	U 236-IS	236	5502	2.540	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	10.667				ng/L
	U	235	671.025				ng/L
	U	238	7574.155				ng/L
	U 232	232	7.667				ng/L
⌈	U-tot	238	1.502	**729.770**	13.42	1.8	ng/L
|	U-238a	238	1.377	**724.702**	12.03	1.7	ng/L
|	U-235a	235	0.122	**4.100**	1.17	28.6	ng/L
⌊>	U 236	236	5501.999				ng/L
	U 236-IS	236	5501.999	**91.163**	2.32	2.5	%R

010185

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 15:28:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.130
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	32.733	0.000	
	U	234	20	5.679	0.000	
	U	235	1234	1.947	0.000	
	U	238	81747	0.145	0.000	
	U 232	232	10	26.458	0.000	
⌈	U-tot	238	83006	0.164	0.000	
|	U-238a	238	81747	0.145	0.000	
|	U-235a	235	1234	1.947	0.000	
⌊>	U 236	236	5380	2.587	0.000	
	U 236-IS	236	5380	2.587	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	20.333				ng/L
	U	235	1234.417				ng/L
	U	238	81746.896				ng/L
	U 232	232	10.000				ng/L
⌈	U-tot	238	15.437	**8178.958**	211.44	2.6	ng/L
|	U-238a	238	15.202	**8104.016**	206.37	2.5	ng/L
|	U-235a	235	0.230	**58.037**	4.51	7.8	ng/L
⌊>	U 236	236	5379.592				ng/L
	U 236-IS	236	5379.592	**89.135**	2.31	2.6	%R

010186

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 15:30:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.131
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	52.852	0.000	
	U	234	19	24.744	0.000	
	U	235	617	3.220	0.000	
	U	238	104	22.648	0.000	
	U 232	232	7	14.286	0.000	
⌜	U-tot	238	749	1.602	0.000	
|	U-238a	238	104	22.648	0.000	
|	U-235a	235	617	3.220	0.000	
⌞>	U 236	236	5467	1.958	0.000	
	U 236-IS	236	5467	1.958	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	18.667				ng/L
	U	235	616.688				ng/L
	U	238	104.334				ng/L
	U 232	232	7.000				ng/L
⌜	U-tot	238	0.137	**0.344**	1.80	521.8	ng/L
|	U-238a	238	0.019	**0.015**	2.09	13985.6	ng/L
|	U-235a	235	0.113	**-0.467**	2.85	609.1	ng/L
⌞>	U 236	236	5467.311				ng/L
	U 236-IS	236	5467.311	**90.588**	1.77	2.0	%R

010187

Quantitative Analysis - Summary Report

Sample ID: 469506d4D

Sample Date/Time: Tuesday, July 26, 2011 15:33:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d4D.132
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	36.735	0.000	
	U	234	20	30.414	0.000	
	U	235	1594	3.628	0.000	
	U	238	43224	1.467	0.000	
	U 232	232	105	21.780	0.000	
⌈	U-tot	238	44844	1.465	0.000	
|	U-238a	238	43224	1.467	0.000	
|	U-235a	235	1594	3.628	0.000	
⌊>	U 236	236	5169	2.391	0.000	
	U 236-IS	236	5169	2.391	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	20.000				ng/L
	U	235	1593.806				ng/L
	U	238	43224.196				ng/L
	U 232	232	105.334				ng/L
⌈	U-tot	238	8.677	**4565.635**	53.82	1.2	ng/L
|	U-238a	238	8.364	**4453.993**	48.53	1.1	ng/L
|	U-235a	235	0.308	**97.555**	6.35	6.5	ng/L
⌊>	U 236	236	5168.803				ng/L
	U 236-IS	236	5168.803	**85.642**	2.05	2.4	%R

010183

Quantitative Analysis - Summary Report

Sample ID: Blankd7

Sample Date/Time: Tuesday, July 26, 2011 15:35:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Blankd7.133
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	41.929	0.000	
	U	234	27	33.197	0.000	
	U	235	1670	2.483	0.000	
	U	238	45049	0.378	0.000	
	U 232	232	168	5.379	0.000	
⌜	U-tot	238	46762	0.393	0.000	
|	U-238a	238	45049	0.378	0.000	
|	U-235a	235	1670	2.483	0.000	
⌞>	U 236	236	5207	0.517	0.000	
	U 236-IS	236	5207	0.517	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	15.333				ng/L
	U	234	27.333				ng/L
	U	235	1670.487				ng/L
	U	238	45049.010				ng/L
	U 232	232	167.668				ng/L
⌜	U-tot	238	8.980	**4727.495**	42.06	0.9	ng/L
|	U-238a	238	8.651	**4607.279**	37.58	0.8	ng/L
|	U-235a	235	0.321	**103.752**	4.73	4.6	ng/L
⌞>	U 236	236	5207.491				ng/L
	U 236-IS	236	5207.491	**86.283**	0.45	0.5	%R

010189

Quantitative Analysis - Summary Report

Sample ID: 469498d7

Sample Date/Time: Tuesday, July 26, 2011 15:37:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d7.134
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	69.282	0.000	
	U	234	19	16.366	0.000	
	U	235	1578	4.025	0.000	
	U	238	44711	0.843	0.000	
	U 232	232	78	24.633	0.000	
⌈	U-tot	238	46310	0.760	0.000	
|	U-238a	238	44711	0.843	0.000	
|	U-235a	235	1578	4.025	0.000	
⌊>	U 236	236	5256	1.552	0.000	
	U 236-IS	236	5256	1.552	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	1.667				ng/L
	U	234	18.667				ng/L
	U	235	1578.471				ng/L
	U	238	44711.353				ng/L
	U 232	232	78.334				ng/L
⌈	U-tot	238	8.814	**4638.614**	107.47	2.3	ng/L
|	U-238a	238	8.510	**4531.788**	108.35	2.4	ng/L
|	U-235a	235	0.300	**93.479**	4.95	5.3	ng/L
⌊>	U 236	236	5255.519				ng/L
	U 236-IS	236	5255.519	**87.079**	1.35	1.6	%R

610190

Quantitative Analysis - Summary Report

Sample ID: 469498d7D

Sample Date/Time: Tuesday, July 26, 2011 15:40:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d7D.135
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	21.651	0.000	
	U	234	23	47.013	0.000	
	U	235	1560	1.006	0.000	
	U	238	45006	0.496	0.000	
	U 232	232	90	11.362	0.000	
⌈	U-tot	238	46592	0.491	0.000	
|	U-238a	238	45006	0.496	0.000	
|	U-235a	235	1560	1.006	0.000	
⌊>	U 236	236	5180	0.245	0.000	
	U 236-IS	236	5180	0.245	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	23.333				ng/L
	U	235	1559.800				ng/L
	U	238	45005.797				ng/L
	U 232	232	90.334				ng/L
⌈	U-tot	238	8.995	**4735.423**	25.87	0.5	ng/L
|	U-238a	238	8.689	**4627.398**	25.15	0.5	ng/L
|	U-235a	235	0.301	**93.888**	1.72	1.8	ng/L
⌊>	U 236	236	5179.809				ng/L
	U 236-IS	236	5179.809	**85.825**	0.21	0.2	%R

010191

Quantitative Analysis - Summary Report

Sample ID: 469498d7L df5

Sample Date/Time: Tuesday, July 26, 2011 15:42:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d7L df5.136
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	44.096	0.000	
	U	234	18	19.245	0.000	
	U	235	820	4.565	0.000	
	U	238	9353	1.377	0.000	
	U 232	232	30	12.019	0.000	
⌈	U-tot	238	10198	1.622	0.000	
|	U-238a	238	9353	1.377	0.000	
|	U-235a	235	820	4.565	0.000	
⌊>	U 236	236	5509	0.319	0.000	
	U 236-IS	236	5509	0.319	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	18.000				ng/L
	U	235	820.370				ng/L
	U	238	9353.477				ng/L
	U 232	232	30.000				ng/L
⌈	U-tot	238	1.851	**916.569**	15.25	1.7	ng/L
|	U-238a	238	1.698	**896.014**	11.76	1.3	ng/L
|	U-235a	235	0.149	**17.592**	3.31	18.8	ng/L
⌊>	U 236	236	5509.336				ng/L
	U 236-IS	236	5509.336	**91.285**	0.29	0.3	%R

010192

Quantitative Analysis - Summary Report

Sample ID: 469498d7AS

Sample Date/Time: Tuesday, July 26, 2011 15:44:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

spiked 20uL 1° natural Uranium at dil 100 (1075-Rad-Sol 2) (11-064-006) in 10mL

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d7AS.137
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Utot
TV = 20462 ng/L

U238
TV = 20316 ng/L

U235
TV = 145 ng/L

8/15/11/15

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	52.915	0.000	
	U	234	30	15.930	0.000	
	U	235	3081	3.633	0.000	
	U	238	249056	0.701	0.000	
	U 232	232	80	16.346	0.000	
⌈	U-tot	238	252171	0.649	0.000	
|	U-238a	238	249056	0.701	0.000	
|	U-235a	235	3081	3.633	0.000	
⌊>	U 236	236	5209	0.174	0.000	
	U 236-IS	236	5209	0.174	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.000				ng/L
	U	234	29.667				ng/L
	U	235	3080.856				ng/L
	U	238	249055.584				ng/L
	U 232	232	80.000				ng/L
⌈	U-tot	238	48.412	**25806.457**	148.35	0.6	ng/L
|	U-238a	238	47.814	**25510.227**	159.23	0.6	ng/L
|	U-235a	235	0.591	**239.404**	11.04	4.6	ng/L
⌊>	U 236	236	5208.825				ng/L
	U 236-IS	236	5208.825	**86.305**	0.15	0.2	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 15:47:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.138
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	88.192	0.000	
	U	234	13	27.735	0.000	
	U	235	643	0.647	0.000	
	U	238	214	0.935	0.000	
	U 232	232	5	84.548	0.000	
⌈	U-tot	238	873	1.385	0.000	
|	U-238a	238	214	0.935	0.000	
|	U-235a	235	643	0.647	0.000	
⌊>	U 236	236	5469	2.192	0.000	
	U 236-IS	236	5469	2.192	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	13.000				ng/L
	U	235	643.356				ng/L
	U	238	214.003				ng/L
	U 232	232	5.333				ng/L
⌈	U-tot	238	0.160	**12.473**	0.80	6.4	ng/L
|	U-238a	238	0.039	**10.747**	0.31	2.9	ng/L
|	U-235a	235	0.118	**1.941**	0.93	47.7	ng/L
⌊>	U 236	236	5468.645				ng/L
	U 236-IS	236	5468.645	**90.610**	1.99	2.2	%R

010194

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 15:49:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.139
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	45.826	0.000	
	U	234	12	16.878	0.000	
	U	235	657	4.888	0.000	
	U	238	525	5.472	0.000	
	U 232	232	5	81.127	0.000	
⌈	U-tot	238	1198	4.799	0.000	
|	U-238a	238	525	5.472	0.000	
|	U-235a	235	657	4.888	0.000	
⌊>	U 236	236	5591	0.905	0.000	
	U 236-IS	236	5591	0.905	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	12.333				ng/L
	U	235	657.357				ng/L
	U	238	525.349				ng/L
	U 232	232	4.667				ng/L
⌈	U-tot	238	0.214	**41.651**	5.08	12.2	ng/L
|	U-238a	238	0.094	**39.997**	2.48	6.2	ng/L
|	U-235a	235	0.118	**1.886**	2.80	148.4	ng/L
⌊>	U 236	236	5591.386				ng/L
	U 236-IS	236	5591.386	**92.644**	0.84	0.9	%R

0110195

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 15:51:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.140
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

re-ran with fresh cri235
7/26/11 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	53.294	0.000	
	U	234	12	4.681	0.000	
	U	235	642	1.947	0.000	
	U	238	7466	1.188	0.000	
	U 232	232	3	91.652	0.000	
⌈	U-tot	238	8125	1.133	0.000	
|	U-238a	238	7466	1.188	0.000	
|	U-235a	235	642	1.947	0.000	
⌊>	U 236	236	5465	1.804	0.000	
	U 236-IS	236	5465	1.804	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	12.333				ng/L
	U	235	642.356				ng/L
	U	238	7466.065				ng/L
	U 232	232	3.333				ng/L
⌈	U-tot	238	1.487	**722.009**	11.05	1.5	ng/L
|	U-238a	238	1.366	**719.163**	8.97	1.2	ng/L
|	U-235a	235	0.118	**1.896**	1.78	94.0	ng/L
⌊>	U 236	236	5464.642				ng/L
	U 236-IS	236	5464.642	**90.544**	1.63	1.8	%R

010196

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 15:57:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.141
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	108.253	0.000	
	U	234	14	38.425	0.000	
	U	235	691	6.426	0.000	
	U	238	7638	1.274	0.000	
	U 232	232	9	115.470	0.000	
⌜	U-tot	238	8351	1.482	0.000	
|	U-238a	238	7638	1.274	0.000	
|	U-235a	235	691	6.426	0.000	
⌞>	U 236	236	5441	3.212	0.000	
	U 236-IS	236	5441	3.212	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.000				ng/L
	U	234	14.333				ng/L
	U	235	690.693				ng/L
	U	238	7637.541				ng/L
	U 232	232	9.000				ng/L
⌜	U-tot	238	1.536	**748.262**	35.65	4.8	ng/L
|	U-238a	238	1.405	**739.757**	32.12	4.3	ng/L
|	U-235a	235	0.127	**6.668**	5.25	78.7	ng/L
⌞>	U 236	236	5440.962				ng/L
	U 236-IS	236	5440.962	**90.152**	2.90	3.2	%R

0010197

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 15:59:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.142
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	13.323	0.000	
	U	234	16	3.685	0.000	
	U	235	1216	0.628	0.000	
	U	238	82012	0.466	0.000	
	U 232	232	5	47.186	0.000	
⌜	U-tot	238	83248	0.459	0.000	
|	U-238a	238	82012	0.466	0.000	
|	U-235a	235	1216	0.628	0.000	
⌞>	U 236	236	5353	0.350	0.000	
	U 236-IS	236	5353	0.350	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	15.667				ng/L
	U	235	1216.415				ng/L
	U	238	82011.602				ng/L
	U 232	232	5.333				ng/L
⌜	U-tot	238	15.553	**8241.072**	9.13	0.1	ng/L
|	U-238a	238	15.322	**8167.776**	9.48	0.1	ng/L
|	U-235a	235	0.227	**56.864**	0.80	1.4	ng/L
⌞>	U 236	236	5352.575				ng/L
	U 236-IS	236	5352.575	**88.687**	0.31	0.4	%R

010198

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 16:01:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.143
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	121.244	0.000	
	U	234	10	40.290	0.000	
	U	235	604	6.730	0.000	
	U	238	99	7.471	0.000	
	U 232	232	6	40.754	0.000	
⌈	U-tot	238	716	6.775	0.000	
|	U-238a	238	99	7.471	0.000	
|	U-235a	235	604	6.730	0.000	
⌊>	U 236	236	5464	1.022	0.000	
	U 236-IS	236	5464	1.022	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	10.333				ng/L
	U	235	603.687				ng/L
	U	238	98.667				ng/L
	U 232	232	5.667				ng/L
⌈	U-tot	238	0.131	**-2.860**	4.67	163.2	ng/L
|	U-238a	238	0.018	**-0.510**	0.62	121.4	ng/L
|	U-235a	235	0.110	**-1.661**	3.70	222.6	ng/L
⌊>	U 236	236	5463.975				ng/L
	U 236-IS	236	5463.975	**90.533**	0.93	1.0	%R

SOUTHWEST RESEARCH INSTITUTE

010199

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS tot U

IDL Date: 5/10/2011

ICP-MS CALIB. STD. ID's | **TVs**

tot U / U235 / U235

S0	11-081-05	
STD. 1	11-064-02	44464 / 44513 / 319ppt
I. STD	11-064-09	0.5ppb
I. STD		

QC STD. ID's

ICV/CCV	11-080-08	1666 / 7612 / 54.5ppt
UCL		
CRI	11-080-04/05	40 / 34.7 / 4.95ppt
ICSA	11-081-06	
ICSAB	11-076-01	20444 / 20398 / 145ppt

STD's IV, CCS 1-6 Expires 10-1-11
STD's Spex, ME 1-4 Expires 9-15-11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.00	Rem	110614-8	7/26/11	S0	WC 15 0082 - 15 0086

INSTRUMENT: DRC II FILENAME: 110726b.rep

Analyst: A. Seales Date: 7/26/11 ☐ CONVERTED (.DAT)

010200

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Tuesday, July 26, 2011 10:18:26
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler 7/26/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5925.1	5925.130	68.600	1.2
	In	114.9	19187.4	19187.363	228.670	1.2
	U	238.1	14618.1	14618.144	145.523	1.0
⌈>	Ce	139.9	21118.2	21118.237	258.841	1.2
⌊	CeO	155.9	963.6	0.046	0.001	2.5
⌈>	Ba	137.9	176939.6	176939.560	1931.322	1.1
⌊	Ba++	69.0	4700.1	0.027	0.000	1.0
	Bkgd	220.0	3.6	3.633	1.063	29.3
	Bkgd	8.5	1.2	1.233	0.641	52.0

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
8.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

8/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.3	563.0
Co	59	45	7.3	10734.3
In	115	45	8.5	21071.4

010201

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Tuesday, July 26, 2011 10:18:26
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler
7/26/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2750	2062	0.699	
Mg	23.985	23.975	5673	2074	0.683	
Ar2	75.930	75.925	18309	2097	0.710	
In	114.904	114.925	27798	2129	0.694	
Ce	139.905	139.925	33881	2145	0.686	
Pb	207.977	207.975	50477	2185	0.708	
Th	232.038	232.025	56336	2208	0.683	
U	238.050	238.075	57806	2221	0.693	

010202

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Tuesday, July 26, 2011 16:44:27
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-0.156
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	21	16.496	0.000	
	U	234	24	25.469	0.000	
	U	235	607	2.662	0.000	
	U	238	94	13.582	0.000	
	U 232	232	13	7.692	0.000	
⌈	U-tot	238	746	3.574	0.000	
|	U-238a	238	94	13.582	0.000	
|	U-235a	235	607	2.662	0.000	
⌊>	U 236	236	4963	2.532	0.000	
	U 236-IS	236	4963	2.532	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	21.000				ng/L
	U	234	23.667				ng/L
	U	235	607.354				ng/L
	U	238	94.000				ng/L
	U 232	232	13.000				ng/L
⌈	U-tot	238	0.150				ng/L
|	U-238a	238	0.019				ng/L
|	U-235a	235	0.122				ng/L
⌊>	U 236	236	4962.688				ng/L
	U 236-IS	236	4962.688	**100.000**	2.53	2.5	%R

010203

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Tuesday, July 26, 2011 16:46:46
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-1.157
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	18	33.793	0.000	
	U	234	48	11.765	0.000	
	U	235	3937	1.847	0.000	
	U	238	437457	0.263	0.000	
	U 232	232	18	16.667	0.000	
⌈	U-tot	238	441460	0.272	0.000	
|	U-238a	238	437457	0.263	0.000	
|	U-235a	235	3937	1.847	0.000	
⌊>	U 236	236	5043	1.803	0.000	
	U 236-IS	236	5043	1.803	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	18.000				ng/L
	U	234	48.333				ng/L
	U	235	3936.519				ng/L
	U	238	437457.381				ng/L
	U 232	232	18.000				ng/L
⌈	U-tot	238	87.560	**44984.000**	939.20	2.1	ng/L
|	U-238a	238	86.766	**44572.000**	925.72	2.1	ng/L
|	U-235a	235	0.781	**319.000**	11.84	3.7	ng/L
⌊>	U 236	236	5043.065				ng/L
	U 236-IS	236	5043.065	**101.620**	1.83	1.8	%R

010204

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Tuesday, July 26, 2011 16:49:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icv.158
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	17	25.641	0.000	
	U	234	32	21.875	0.000	
	U	235	1167	0.870	0.000	
	U	238	76486	0.450	0.000	
	U 232	232	22	14.836	0.000	
⌈	U-tot	238	77702	0.436	0.000	
|	U-238a	238	76486	0.450	0.000	
|	U-235a	235	1167	0.870	0.000	
⌊>	U 236	236	4919	1.005	0.000	
	U 236-IS	236	4919	1.005	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	17.000				ng/L
	U	234	32.000				ng/L
	U	235	1167.075				ng/L
	U	238	76485.744				ng/L
	U 232	232	21.667				ng/L
⌈	U-tot	238	15.797	**8052.083**	114.54	1.4	ng/L
|	U-238a	238	15.549	**7979.808**	113.31	1.4	ng/L
|	U-235a	235	0.237	**55.616**	1.87	3.4	ng/L
⌊>	U 236	236	4919.331				ng/L
	U 236-IS	236	4919.331	**99.126**	1.00	1.0	%R

010205

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Tuesday, July 26, 2011 16:51:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icb.159
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	20	35.578	0.000	
	U	234	29	27.370	0.000	
	U	235	587	5.271	0.000	
	U	238	120	10.104	0.000	
	U 232	232	18	48.432	0.000	
⌜	U-tot	238	756	3.307	0.000	
|	U-238a	238	120	10.104	0.000	
|	U-235a	235	587	5.271	0.000	
⌞>	U 236	236	4814	1.512	0.000	
	U 236-IS	236	4814	1.512	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	20.333				ng/L
	U	234	29.000				ng/L
	U	235	586.686				ng/L
	U	238	120.001				ng/L
	U 232	232	18.000				ng/L
⌜	U-tot	238	0.157	**3.392**	2.81	82.9	ng/L
|	U-238a	238	0.025	**3.047**	1.13	37.2	ng/L
|	U-235a	235	0.122	**-0.285**	3.35	1174.4	ng/L
⌞>	U 236	236	4813.941				ng/L
	U 236-IS	236	4813.941	**97.003**	1.47	1.5	%R

010206

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 16:53:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.160
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	50.000	0.000	
	U	234	15	11.547	0.000	
	U	235	587	3.183	0.000	
	U	238	482	7.300	0.000	
	U 232	232	9	38.490	0.000	
⌜	U-tot	238	1092	4.788	0.000	
|	U-238a	238	482	7.300	0.000	
|	U-235a	235	587	3.183	0.000	
⌞>	U 236	236	4823	0.490	0.000	
	U 236-IS	236	4823	0.490	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.000				ng/L
	U	234	15.000				ng/L
	U	235	587.019				ng/L
	U	238	481.679				ng/L
	U 232	232	9.000				ng/L
⌜	U-tot	238	0.226	**39.069**	6.09	15.6	ng/L
|	U-238a	238	0.100	**41.575**	3.95	9.5	ng/L
|	U-235a	235	0.122	**-0.368**	2.14	581.5	ng/L
⌞>	U 236	236	4822.946				ng/L
	U 236-IS	236	4822.946	**97.184**	0.48	0.5	%R

010207

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 16:56:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.161
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	68.635	0.000	
	U	234	10	21.534	0.000	
	U	235	636	4.218	0.000	
	U	238	6848	0.073	0.000	
	U 232	232	4	0.000	0.000	
⌈	U-tot	238	7497	0.340	0.000	
|	U-238a	238	6848	0.073	0.000	
|	U-235a	235	636	4.218	0.000	
⌊>	U 236	236	4859	0.709	0.000	
	U 236-IS	236	4859	0.709	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	9.667				ng/L
	U	235	636.356				ng/L
	U	238	6847.578				ng/L
	U 232	232	4.000				ng/L
⌈	U-tot	238	1.543	**716.647**	4.08	0.6	ng/L
|	U-238a	238	1.409	**714.377**	5.30	0.7	ng/L
|	U-235a	235	0.131	**4.099**	2.29	55.8	ng/L
⌊>	U 236	236	4858.965				ng/L
	U 236-IS	236	4858.965	**97.910**	0.69	0.7	%R

010208

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Tuesday, July 26, 2011 16:58:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsa.162
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	17	75.498	0.000	
	U	234	22	47.033	0.000	
	U	235	512	8.317	0.000	
	U	238	125	8.653	0.000	
	U 232	232	154	9.206	0.000	
⌈	U-tot	238	676	11.201	0.000	
|	U-238a	238	125	8.653	0.000	
|	U-235a	235	512	8.317	0.000	
⌊>	U 236	236	4160	1.936	0.000	
	U 236-IS	236	4160	1.936	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	16.667				ng/L
	U	234	22.333				ng/L
	U	235	512.014				ng/L
	U	238	125.001				ng/L
	U 232	232	154.001				ng/L
⌈	U-tot	238	0.163	**6.287**	10.58	168.3	ng/L
|	U-238a	238	0.030	**5.700**	1.54	27.0	ng/L
|	U-235a	235	0.123	**0.337**	5.76	1708.6	ng/L
⌊>	U 236	236	4160.285				ng/L
	U 236-IS	236	4160.285	**83.831**	1.62	1.9	%R

010209

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Tuesday, July 26, 2011 17:00:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsab.163
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	53.927	0.000	
	U	234	24	12.909	0.000	
	U	235	1818	2.496	0.000	
	U	238	171178	0.407	0.000	
	U 232	232	126	9.357	0.000	
⌈	U-tot	238	173024	0.423	0.000	
|	U-238a	238	171178	0.407	0.000	
|	U-235a	235	1818	2.496	0.000	
⌊>	U 236	236	4386	1.138	0.000	
	U 236-IS	236	4386	1.138	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	23.667				ng/L
	U	235	1817.848				ng/L
	U	238	171177.583				ng/L
	U 232	232	126.001				ng/L
⌈	U-tot	238	39.454	**20227.084**	192.14	0.9	ng/L
|	U-238a	238	39.033	**20046.151**	188.35	0.9	ng/L
|	U-235a	235	0.415	**141.505**	5.34	3.8	ng/L
⌊>	U 236	236	4385.724				ng/L
	U 236-IS	236	4385.724	**88.374**	1.01	1.1	%R

010210

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 17:03:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.164
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	0.000	0.000	
	U	234	12	13.093	0.000	
	U	235	608	1.480	0.000	
	U	238	130	7.802	0.000	
	U 232	232	3	33.333	0.000	
⌈	U-tot	238	753	1.943	0.000	
|	U-238a	238	130	7.802	0.000	
|	U-235a	235	608	1.480	0.000	
⌊>	U 236	236	5358	0.694	0.000	
	U 236-IS	236	5358	0.694	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.000				ng/L
	U	234	11.667				ng/L
	U	235	608.020				ng/L
	U	238	129.668				ng/L
	U 232	232	3.000				ng/L
⌈	U-tot	238	0.141	**-5.076**	1.51	29.8	ng/L
|	U-238a	238	0.024	**2.681**	0.93	34.6	ng/L
|	U-235a	235	0.113	**-4.359**	1.14	26.2	ng/L
⌊>	U 236	236	5357.912				ng/L
	U 236-IS	236	5357.912	**107.964**	0.75	0.7	%R

010211

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 17:05:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.165
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	26.956	0.000	
	U	234	18	8.332	0.000	
	U	235	1209	4.720	0.000	
	U	238	82376	0.459	0.000	
	U 232	232	4	13.323	0.000	
⌈	U-tot	238	83609	0.516	0.000	
|	U-238a	238	82376	0.459	0.000	
|	U-235a	235	1209	4.720	0.000	
⌊>	U 236	236	5293	1.125	0.000	
	U 236-IS	236	5293	1.125	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	18.333				ng/L
	U	235	1209.414				ng/L
	U	238	82375.537				ng/L
	U 232	232	4.333				ng/L
⌈	U-tot	238	15.797	**8052.411**	58.62	0.7	ng/L
|	U-238a	238	15.564	**7987.446**	60.25	0.8	ng/L
|	U-235a	235	0.228	**51.346**	4.28	8.3	ng/L
⌊>	U 236	236	5292.874				ng/L
	U 236-IS	236	5292.874	**106.653**	1.20	1.1	%R

010212

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 17:07:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.166
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	26.956	0.000	
	U	234	12	4.949	0.000	
	U	235	606	4.560	0.000	
	U	238	97	4.152	0.000	
	U 232	232	7	15.746	0.000	
⌜	U-tot	238	721	4.331	0.000	
|	U-238a	238	97	4.152	0.000	
|	U-235a	235	606	4.560	0.000	
⌞>	U 236	236	5238	1.286	0.000	
	U 236-IS	236	5238	1.286	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	11.667				ng/L
	U	235	606.354				ng/L
	U	238	97.334				ng/L
	U 232	232	7.333				ng/L
⌜	U-tot	238	0.138	**-6.605**	2.80	42.3	ng/L
|	U-238a	238	0.019	**-0.206**	0.31	152.9	ng/L
|	U-235a	235	0.116	**-3.262**	2.42	74.1	ng/L
⌞>	U 236	236	5238.176				ng/L
	U 236-IS	236	5238.176	**105.551**	1.36	1.3	%R

Quantitative Analysis - Summary Report

Sample ID: 469499d7

Sample Date/Time: Tuesday, July 26, 2011 17:13:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d7.167
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	75.593	0.000	
	U	234	28	31.744	0.000	
	U	235	1478	3.628	0.000	
	U	238	41758	0.938	0.000	
	U 232	232	146	15.422	0.000	
⌈	U-tot	238	43272	0.858	0.000	
|	U-238a	238	41758	0.938	0.000	
|	U-235a	235	1478	3.628	0.000	
⌊>	U 236	236	4805	1.072	0.000	
	U 236-IS	236	4805	1.072	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	28.000				ng/L
	U	235	1478.454				ng/L
	U	238	41758.359				ng/L
	U 232	232	146.001				ng/L
⌈	U-tot	238	9.007	**4557.765**	82.92	1.8	ng/L
|	U-238a	238	8.692	**4456.202**	80.63	1.8	ng/L
|	U-235a	235	0.308	**89.777**	6.47	7.2	ng/L
⌊>	U 236	236	4804.936				ng/L
	U 236-IS	236	4804.936	**96.821**	1.04	1.1	%R

0010214

Quantitative Analysis - Summary Report

Sample ID: 469499d7D

Sample Date/Time: Tuesday, July 26, 2011 17:15:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d7D.168
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	7.692	0.000	
	U	234	27	21.651	0.000	
	U	235	1459	3.901	0.000	
	U	238	41690	0.794	0.000	
	U 232	232	147	19.095	0.000	
⌈	U-tot	238	43189	0.681	0.000	
|	U-238a	238	41690	0.794	0.000	
|	U-235a	235	1459	3.901	0.000	
⌊>	U 236	236	4889	2.745	0.000	
	U 236-IS	236	4889	2.745	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.000				ng/L
	U	234	26.667				ng/L
	U	235	1459.451				ng/L
	U	238	41690.045				ng/L
	U 232	232	146.668				ng/L
⌈	U-tot	238	8.839	**4471.268**	136.00	3.0	ng/L
|	U-238a	238	8.532	**4374.195**	137.76	3.1	ng/L
|	U-235a	235	0.298	**85.268**	1.87	2.2	ng/L
⌊>	U 236	236	4888.982				ng/L
	U 236-IS	236	4888.982	**98.515**	2.70	2.7	%R

010215

Quantitative Analysis - Summary Report

Sample ID: 469500d7

Sample Date/Time: Tuesday, July 26, 2011 17:17:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d7.169
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	17.159	0.000	
	U	234	27	20.653	0.000	
	U	235	859	1.762	0.000	
	U	238	18532	0.460	0.000	
	U 232	232	275	15.988	0.000	
⌈	U-tot	238	19433	0.371	0.000	
|	U-238a	238	18532	0.460	0.000	
|	U-235a	235	859	1.762	0.000	
⌊>	U 236	236	4715	1.597	0.000	
	U 236-IS	236	4715	1.597	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.667				ng/L
	U	234	26.667				ng/L
	U	235	859.374				ng/L
	U	238	18532.204				ng/L
	U 232	232	275.004				ng/L
⌈	U-tot	238	4.123	**2044.226**	37.69	1.8	ng/L
|	U-238a	238	3.932	**2010.379**	38.28	1.9	ng/L
|	U-235a	235	0.182	**28.974**	0.80	2.7	ng/L
⌊>	U 236	236	4714.556				ng/L
	U 236-IS	236	4714.556	**95.000**	1.52	1.6	%R

010216

Quantitative Analysis - Summary Report

Sample ID: 469500d7D

Sample Date/Time: Tuesday, July 26, 2011 17:20:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d7D.170
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	20.352	0.000	
	U	234	23	22.592	0.000	
	U	235	866	2.946	0.000	
	U	238	16556	0.349	0.000	
	U 232	232	237	15.405	0.000	
⌈	U-tot	238	17458	0.479	0.000	
|	U-238a	238	16556	0.349	0.000	
|	U-235a	235	866	2.946	0.000	
⌊>	U 236	236	4638	1.028	0.000	
	U 236-IS	236	4638	1.028	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.000				ng/L
	U	234	23.000				ng/L
	U	235	866.041				ng/L
	U	238	16556.396				ng/L
	U 232	232	237.003				ng/L
⌈	U-tot	238	3.765	**1860.041**	12.54	0.7	ng/L
|	U-238a	238	3.570	**1824.717**	14.35	0.8	ng/L
|	U-235a	235	0.187	**31.126**	1.84	5.9	ng/L
⌊>	U 236	236	4637.516				ng/L
	U 236-IS	236	4637.516	**93.448**	0.96	1.0	%R

010217

Quantitative Analysis - Summary Report

Sample ID: 469501d7

Sample Date/Time: Tuesday, July 26, 2011 17:22:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d7.171
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	12.059	0.000	
	U	234	27	12.830	0.000	
	U	235	1402	3.954	0.000	
	U	238	38157	0.309	0.000	
	U 232	232	104	4.918	0.000	
⌈	U-tot	238	39599	0.196	0.000	
|	U-238a	238	38157	0.309	0.000	
|	U-235a	235	1402	3.954	0.000	
⌊>	U 236	236	4528	1.159	0.000	
	U 236-IS	236	4528	1.159	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.667				ng/L
	U	234	27.000				ng/L
	U	235	1402.108				ng/L
	U	238	38156.910				ng/L
	U 232	232	104.334				ng/L
⌈	U-tot	238	8.747	**4423.837**	57.34	1.3	ng/L
|	U-238a	238	8.428	**4320.777**	61.14	1.4	ng/L
|	U-235a	235	0.310	**90.667**	4.30	4.7	ng/L
⌊>	U 236	236	4527.794				ng/L
	U 236-IS	236	4527.794	**91.237**	1.06	1.2	%R

010218

Quantitative Analysis - Summary Report

Sample ID: 469501d7D

Sample Date/Time: Tuesday, July 26, 2011 17:24:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d7D.172
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	61.641	0.000	
	U	234	20	29.794	0.000	
	U	235	1372	2.930	0.000	
	U	238	38364	0.142	0.000	
	U 232	232	184	20.545	0.000	
⌜	U-tot	238	39764	0.118	0.000	
|	U-238a	238	38364	0.142	0.000	
|	U-235a	235	1372	2.930	0.000	
⌞>	U 236	236	4652	0.596	0.000	
	U 236-IS	236	4652	0.596	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.667				ng/L
	U	234	19.667				ng/L
	U	235	1372.437				ng/L
	U	238	38364.112				ng/L
	U 232	232	184.002				ng/L
⌜	U-tot	238	8.548	**4321.408**	21.36	0.5	ng/L
|	U-238a	238	8.247	**4227.492**	20.17	0.5	ng/L
|	U-235a	235	0.295	**83.597**	4.17	5.0	ng/L
⌞>	U 236	236	4652.190				ng/L
	U 236-IS	236	4652.190	**93.743**	0.56	0.6	%R

Quantitative Analysis - Summary Report

010219

Sample ID: 469506d7

Sample Date/Time: Tuesday, July 26, 2011 17:26:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d7.173
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	52.915	0.000	
	U	234	19	15.789	0.000	
	U	235	1427	1.779	0.000	
	U	238	40283	0.344	0.000	
	U 232	232	88	17.751	0.000	
⌈	U-tot	238	41739	0.358	0.000	
|	U-238a	238	40283	0.344	0.000	
|	U-235a	235	1427	1.779	0.000	
⌊>	U 236	236	4610	1.454	0.000	
	U 236-IS	236	4610	1.454	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	19.000				ng/L
	U	235	1427.445				ng/L
	U	238	40282.718				ng/L
	U 232	232	88.000				ng/L
⌈	U-tot	238	9.056	**4583.107**	53.65	1.2	ng/L
|	U-238a	238	8.740	**4481.035**	54.38	1.2	ng/L
|	U-235a	235	0.310	**90.702**	1.64	1.8	ng/L
⌊>	U 236	236	4609.502				ng/L
	U 236-IS	236	4609.502	**92.883**	1.35	1.5	%R

010220

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 17:29:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.174
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	26.956	0.000	
	U	234	19	38.822	0.000	
	U	235	572	1.770	0.000	
	U	238	136	5.697	0.000	
	U 232	232	12	8.333	0.000	
⌈	U-tot	238	739	1.569	0.000	
|	U-238a	238	136	5.697	0.000	
|	U-235a	235	572	1.770	0.000	
⌊>	U 236	236	4794	2.183	0.000	
	U 236-IS	236	4794	2.183	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.333				ng/L
	U	234	19.333				ng/L
	U	235	571.685				ng/L
	U	238	136.334				ng/L
	U 232	232	12.000				ng/L
⌈	U-tot	238	0.154	**1.896**	2.46	129.7	ng/L
|	U-238a	238	0.028	**4.872**	1.03	21.1	ng/L
|	U-235a	235	0.119	**-1.551**	1.34	86.3	ng/L
⌊>	U 236	236	4793.597				ng/L
	U 236-IS	236	4793.597	**96.593**	2.11	2.2	%R

010221

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 17:31:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.175
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	13	16.434	0.000	
	U	234	16	12.745	0.000	
	U	235	607	2.742	0.000	
	U	238	505	4.077	0.000	
	U 232	232	8	21.651	0.000	
⌜	U-tot	238	1141	3.576	0.000	
|	U-238a	238	505	4.077	0.000	
|	U-235a	235	607	2.742	0.000	
⌞>	U 236	236	4853	1.866	0.000	
	U 236-IS	236	4853	1.866	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.667				ng/L
	U	234	16.333				ng/L
	U	235	607.020				ng/L
	U	238	505.347				ng/L
	U 232	232	8.000				ng/L
⌜	U-tot	238	0.235	**43.633**	5.41	12.4	ng/L
|	U-238a	238	0.104	**43.772**	2.71	6.2	ng/L
|	U-235a	235	0.125	**1.270**	2.12	166.5	ng/L
⌞>	U 236	236	4853.295				ng/L
	U 236-IS	236	4853.295	**97.796**	1.82	1.9	%R

010222

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 17:33:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.176
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	19	54.331	0.000	
	U	234	27	31.644	0.000	
	U	235	630	1.563	0.000	
	U	238	7133	1.003	0.000	
	U 232	232	18	61.111	0.000	
⌈	U-tot	238	7809	0.922	0.000	
|	U-238a	238	7133	1.003	0.000	
|	U-235a	235	630	1.563	0.000	
⌊>	U 236	236	4829	1.568	0.000	
	U 236-IS	236	4829	1.568	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	19.333				ng/L
	U	234	27.000				ng/L
	U	235	630.022				ng/L
	U	238	7133.131				ng/L
	U 232	232	18.000				ng/L
⌈	U-tot	238	1.618	**755.044**	19.88	2.6	ng/L
|	U-238a	238	1.478	**749.422**	18.31	2.4	ng/L
|	U-235a	235	0.130	**3.875**	1.25	32.2	ng/L
⌊>	U 236	236	4828.949				ng/L
	U 236-IS	236	4828.949	**97.305**	1.53	1.6	%R

010223

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 17:36:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.177
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	14	34.579	0.000	
	U	234	30	15.200	0.000	
	U	235	1133	2.101	0.000	
	U	238	75230	0.476	0.000	
	U 232	232	17	40.754	0.000	
⌈	U-tot	238	76406	0.493	0.000	
|	U-238a	238	75230	0.476	0.000	
|	U-235a	235	1133	2.101	0.000	
⌊>	U 236	236	4901	2.918	0.000	
	U 236-IS	236	4901	2.918	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.667				ng/L
	U	234	29.667				ng/L
	U	235	1132.737				ng/L
	U	238	75230.333				ng/L
	U 232	232	17.000				ng/L
⌈	U-tot	238	15.597	**7949.465**	192.76	2.4	ng/L
|	U-238a	238	15.357	**7881.043**	190.46	2.4	ng/L
|	U-235a	235	0.231	**52.671**	2.30	4.4	ng/L
⌊>	U 236	236	4900.988				ng/L
	U 236-IS	236	4900.988	**98.757**	2.88	2.9	%R

010224

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 17:38:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.178
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	28.386	0.000	
	U	234	24	14.839	0.000	
	U	235	559	4.471	0.000	
	U	238	101	14.585	0.000	
	U 232	232	13	63.787	0.000	
⌈	U-tot	238	699	3.058	0.000	
|	U-238a	238	101	14.585	0.000	
|	U-235a	235	559	4.471	0.000	
⌊>	U 236	236	4796	1.017	0.000	
	U 236-IS	236	4796	1.017	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.667				ng/L
	U	234	23.667				ng/L
	U	235	559.351				ng/L
	U	238	101.001				ng/L
	U 232	232	13.333				ng/L
⌈	U-tot	238	0.146	**-2.451**	3.02	123.4	ng/L
|	U-238a	238	0.021	**1.072**	1.62	151.0	ng/L
|	U-235a	235	0.117	**-2.825**	2.99	105.9	ng/L
⌊>	U 236	236	4796.265				ng/L
	U 236-IS	236	4796.265	**96.647**	0.98	1.0	%R

010225

Quantitative Analysis - Summary Report

Sample ID: 469506d7D

Sample Date/Time: Tuesday, July 26, 2011 17:40:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d7D.179
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	65.465	0.000	
	U	234	21	40.580	0.000	
	U	235	1433	1.249	0.000	
	U	238	38719	0.566	0.000	
	U 232	232	165	10.356	0.000	
⌜	U-tot	238	40175	0.582	0.000	
|	U-238a	238	38719	0.566	0.000	
|	U-235a	235	1433	1.249	0.000	
⌞>	U 236	236	4534	0.887	0.000	
	U 236-IS	236	4534	0.887	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.333				ng/L
	U	234	20.667				ng/L
	U	235	1432.780				ng/L
	U	238	38718.947				ng/L
	U 232	232	165.002				ng/L
⌜	U-tot	238	8.862	**4483.191**	63.72	1.4	ng/L
|	U-238a	238	8.541	**4378.615**	60.05	1.4	ng/L
|	U-235a	235	0.316	**93.796**	3.19	3.4	ng/L
⌞>	U 236	236	4533.797				ng/L
	U 236-IS	236	4533.797	**91.358**	0.81	0.9	%R

010226

Quantitative Analysis - Summary Report

Sample ID: Blankd10

Sample Date/Time: Tuesday, July 26, 2011 17:43:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Blankd10.180
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	1	114.564	0.000	
	U	234	21	2.794	0.000	
	U	235	1511	3.503	0.000	
	U	238	39670	0.445	0.000	
	U 232	232	78	13.287	0.000	
⌈	U-tot	238	41203	0.324	0.000	
|	U-238a	238	39670	0.445	0.000	
|	U-235a	235	1511	3.503	0.000	
⌊>	U 236	236	4477	1.768	0.000	
	U 236-IS	236	4477	1.768	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	1.333				ng/L
	U	234	20.667				ng/L
	U	235	1511.459				ng/L
	U	238	39669.699				ng/L
	U 232	232	78.334				ng/L
⌈	U-tot	238	9.206	**4660.295**	97.97	2.1	ng/L
|	U-238a	238	8.864	**4544.474**	100.44	2.2	ng/L
|	U-235a	235	0.338	**104.211**	2.94	2.8	ng/L
⌊>	U 236	236	4476.769				ng/L
	U 236-IS	236	4476.769	**90.209**	1.59	1.8	%R

0110227

Quantitative Analysis - Summary Report

Sample ID: 469498d10

Sample Date/Time: Tuesday, July 26, 2011 17:45:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d10.181
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	1	43.301	0.000	
	U	234	18	22.044	0.000	
	U	235	1374	3.822	0.000	
	U	238	41386	0.571	0.000	
	U 232	232	98	9.734	0.000	
⌈	U-tot	238	42780	0.640	0.000	
|	U-238a	238	41386	0.571	0.000	
|	U-235a	235	1374	3.822	0.000	
⌊>	U 236	236	4584	0.809	0.000	
	U 236-IS	236	4584	0.809	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	1.333				ng/L
	U	234	18.333				ng/L
	U	235	1374.104				ng/L
	U	238	41386.327				ng/L
	U 232	232	98.001				ng/L
⌈	U-tot	238	9.332	**4724.936**	20.06	0.4	ng/L
|	U-238a	238	9.028	**4628.775**	16.43	0.4	ng/L
|	U-235a	235	0.300	**85.882**	5.40	6.3	ng/L
⌊>	U 236	236	4584.489				ng/L
	U 236-IS	236	4584.489	**92.379**	0.75	0.8	%R

010228

Quantitative Analysis - Summary Report

Sample ID: 469498d10D

Sample Date/Time: Tuesday, July 26, 2011 17:47:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d10D.182
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	49.487	0.000	
	U	234	18	11.783	0.000	
	U	235	1397	4.938	0.000	
	U	238	41026	0.360	0.000	
	U 232	232	171	8.103	0.000	
⌜	U-tot	238	42443	0.497	0.000	
|	U-238a	238	41026	0.360	0.000	
|	U-235a	235	1397	4.938	0.000	
⌞>	U 236	236	4620	0.695	0.000	
	U 236-IS	236	4620	0.695	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.333				ng/L
	U	234	17.667				ng/L
	U	235	1397.108				ng/L
	U	238	41026.366				ng/L
	U 232	232	171.002				ng/L
⌜	U-tot	238	9.187	**4650.519**	53.16	1.1	ng/L
|	U-238a	238	8.880	**4553.043**	44.06	1.0	ng/L
|	U-235a	235	0.302	**87.210**	8.19	9.4	ng/L
⌞>	U 236	236	4620.174				ng/L
	U 236-IS	236	4620.174	**93.098**	0.65	0.7	%R

010229

Quantitative Analysis - Summary Report

Sample ID: 469498d10L df5

Sample Date/Time: Tuesday, July 26, 2011 17:50:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d10L df5.183
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	37.796	0.000	
	U	234	16	45.952	0.000	
	U	235	790	1.973	0.000	
	U	238	8981	0.734	0.000	
	U 232	232	38	11.471	0.000	
⌈	U-tot	238	9795	0.570	0.000	
|	U-238a	238	8981	0.734	0.000	
|	U-235a	235	790	1.973	0.000	
⌊>	U 236	236	4890	0.333	0.000	
	U 236-IS	236	4890	0.333	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	16.333				ng/L
	U	235	790.034				ng/L
	U	238	8981.435				ng/L
	U 232	232	38.000				ng/L
⌈	U-tot	238	2.003	**953.481**	9.02	0.9	ng/L
|	U-238a	238	1.837	**934.059**	9.68	1.0	ng/L
|	U-235a	235	0.162	**18.937**	1.38	7.3	ng/L
⌊>	U 236	236	4889.648				ng/L
	U 236-IS	236	4889.648	**98.528**	0.33	0.3	%R

Quantitative Analysis - Summary Report

010230

Sample ID: 469498d10AS

Sample Date/Time: Tuesday, July 26, 2011 17:52:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469498d10AS.184
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Re-rem 8/15/11 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	56.773	0.000	
	U	234	34	38.457	0.000	
	U	235	3271	0.556	0.000	
	U	238	283121	0.369	0.000	
	U 232	232	111	8.150	0.000	
⌜	U-tot	238	286430	0.367	0.000	
|	U-238a	238	283121	0.369	0.000	
|	U-235a	235	3271	0.556	0.000	
⌞>	U 236	236	4638	3.883	0.000	
	U 236-IS	236	4638	3.883	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	34.333				ng/L
	U	235	3270.922				ng/L
	U	238	283121.106				ng/L
	U 232	232	111.334				ng/L
⌜	U-tot	238	61.821	**31737.901**	1143.77	3.6	ng/L
|	U-238a	238	61.107	**31387.981**	1127.97	3.6	ng/L
|	U-235a	235	0.706	**282.712**	11.65	4.1	ng/L
⌞>	U 236	236	4637.517				ng/L
	U 236-IS	236	4637.517	**93.448**	3.63	3.9	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 17:54:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.185
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	13.323	0.000	
	U	234	11	31.492	0.000	
	U	235	571	3.382	0.000	
	U	238	190	3.814	0.000	
	U 232	232	9	44.444	0.000	
⌈	U-tot	238	776	3.149	0.000	
|	U-238a	238	190	3.814	0.000	
|	U-235a	235	571	3.382	0.000	
⌊>	U 236	236	4841	1.083	0.000	
	U 236-IS	236	4841	1.083	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	11.000				ng/L
	U	235	571.018				ng/L
	U	238	189.669				ng/L
	U 232	232	9.000				ng/L
⌈	U-tot	238	0.160	**5.052**	2.44	48.4	ng/L
|	U-238a	238	0.039	**10.383**	0.93	9.0	ng/L
|	U-235a	235	0.118	**-2.203**	1.68	76.3	ng/L
⌊>	U 236	236	4841.289				ng/L
	U 236-IS	236	4841.289	**97.554**	1.06	1.1	%R

010232

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 17:57:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.186
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	62.450	0.000	
	U	234	10	31.604	0.000	
	U	235	544	0.591	0.000	
	U	238	484	3.957	0.000	
	U 232	232	3	33.333	0.000	
⌜	U-tot	238	1040	1.255	0.000	
|	U-238a	238	484	3.957	0.000	
|	U-235a	235	544	0.591	0.000	
⌞>	U 236	236	4758	1.042	0.000	
	U 236-IS	236	4758	1.042	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	9.667				ng/L
	U	235	543.683				ng/L
	U	238	483.680				ng/L
	U 232	232	3.000				ng/L
⌜	U-tot	238	0.219	**35.108**	2.60	7.4	ng/L
|	U-238a	238	0.102	**42.499**	2.61	6.1	ng/L
|	U-235a	235	0.114	**-3.980**	0.25	6.3	ng/L
⌞>	U 236	236	4757.912				ng/L
	U 236-IS	236	4757.912	**95.874**	1.00	1.0	%R

010233

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 17:59:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.187
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	128.886	0.000	
	U	234	12	60.204	0.000	
	U	235	625	4.909	0.000	
	U	238	6824	1.183	0.000	
	U 232	232	9	83.471	0.000	
⌜	U-tot	238	7464	1.169	0.000	
|	U-238a	238	6824	1.183	0.000	
|	U-235a	235	625	4.909	0.000	
⌞>	U 236	236	4845	0.717	0.000	
	U 236-IS	236	4845	0.717	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	11.667				ng/L
	U	235	624.688				ng/L
	U	238	6823.894				ng/L
	U 232	232	8.667				ng/L
⌜	U-tot	238	1.540	**715.343**	9.44	1.3	ng/L
|	U-238a	238	1.408	**713.888**	7.49	1.0	ng/L
|	U-235a	235	0.129	**3.135**	3.47	110.8	ng/L
⌞>	U 236	236	4845.291				ng/L
	U 236-IS	236	4845.291	**97.634**	0.70	0.7	%R

010234

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 18:01:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.188
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	21	32.924	0.000	
	U	234	37	13.745	0.000	
	U	235	1098	0.913	0.000	
	U	238	73329	1.005	0.000	
	U 232	232	20	22.913	0.000	
⌜	U-tot	238	74485	0.982	0.000	
|	U-238a	238	73329	1.005	0.000	
|	U-235a	235	1098	0.913	0.000	
⌞>	U 236	236	4693	2.079	0.000	
	U 236-IS	236	4693	2.079	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	21.333				ng/L
	U	234	37.333				ng/L
	U	235	1097.733				ng/L
	U	238	73328.571				ng/L
	U 232	232	20.000				ng/L
⌜	U-tot	238	15.877	**8093.476**	170.74	2.1	ng/L
|	U-238a	238	15.631	**8021.509**	168.99	2.1	ng/L
|	U-235a	235	0.234	**54.031**	2.45	4.5	ng/L
⌞>	U 236	236	4692.544				ng/L
	U 236-IS	236	4692.544	**94.557**	1.97	2.1	%R

0410235

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 18:04:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.189
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	27	19.245	0.000	
	U	234	28	23.419	0.000	
	U	235	570	1.774	0.000	
	U	238	119	6.345	0.000	
	U 232	232	25	14.237	0.000	
⌜	U-tot	238	745	0.809	0.000	
|	U-238a	238	119	6.345	0.000	
|	U-235a	235	570	1.774	0.000	
⌞>	U 236	236	4579	3.672	0.000	
	U 236-IS	236	4579	3.672	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	27.000				ng/L
	U	234	28.000				ng/L
	U	235	570.351				ng/L
	U	238	119.334				ng/L
	U 232	232	24.667				ng/L
⌜	U-tot	238	0.163	**6.335**	3.63	57.4	ng/L
|	U-238a	238	0.026	**3.664**	1.25	34.2	ng/L
|	U-235a	235	0.125	**1.058**	2.69	254.4	ng/L
⌞>	U 236	236	4579.488				ng/L
	U 236-IS	236	4579.488	**92.278**	3.39	3.7	%R

C10236

SOUTHWEST RESEARCH INSTITUTE

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS

Utot, ~~Ua238, Ua235~~ (NN) SP 8/23/11

IDL Date: 5/10/2011

ICP-MS CALIB. STD. ID's | **TVs**

tot U / U234/U235

S0	11-081-05	
STD. 1	1123 64-02	44984/44572/319 ng/L
I. STD	11-064-09	0.5 ppb
I. STD		

QC STD. ID's

ICV/CCV	11-080-08	7666/7612/54.5 ng/L
UCL		
CRI	11-080-04/05	40/39.7/4.95 ng/L
ICSA	11-064-04	—
ICSAB	11-078-01	20,444/20298/145 ng/L

STD's IV, CCS 1-6 Expires 10-1-11
STD's Spex, ME I-4 Expires 9-15-11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
165826.05.006	Fluor	110648	7/26/11	SO	LJC 15 0082 - 15 0086

INSTRUMENT: DRC II FILENAME: 110726C.rep

Analyst: N Seiler Date: 7 / 27 / 11 ☐ CONVERTED (.DAT)

010237

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Tuesday, July 26, 2011 10:16:26
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler 7/26/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5925.1	5925.130	68.600	1.2
	In	114.9	19187.4	19187.363	228.670	1.2
	U	238.1	14618.1	14618.144	145.523	1.0
⌈>	Ce	139.9	21118.2	21118.237	258.841	1.2
⌊	CeO	155.9	963.6	0.046	0.001	2.5
⌈>	Ba	137.9	176939.6	176939.560	1931.322	1.1
⌊	Ba++	69.0	4700.1	0.027	0.000	1.0
	Bkgd	220.0	3.6	3.633	1.063	29.3
	Bkgd	8.5	1.2	1.233	0.641	52.0

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
8.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

8/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.3	563.0
Co	59	45	7.3	10734.3
In	115	45	8.5	21071.4

010238

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Tuesday, July 26, 2011 10:18:26
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 July 2\Daily Performance Check.019
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Nicholle Seiler
7/26/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2750	2062	0.699	
Mg	23.985	23.975	5673	2074	0.683	
Ar2	75.930	75.925	18309	2097	0.710	
In	114.904	114.925	27798	2129	0.694	
Ce	139.905	139.925	33881	2145	0.686	
Pb	207.977	207.975	50477	2185	0.708	
Th	232.038	232.025	56336	2208	0.683	
U	238.050	238.075	57806	2221	0.693	

010239

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Tuesday, July 26, 2011 18:12:21
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-0.190
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	14	21.123	0.000	
	U	234	16	10.825	0.000	
	U	235	538	1.756	0.000	
	U	238	88	14.193	0.000	
	U 232	232	11	28.364	0.000	
⌈	U-tot	238	656	0.528	0.000	
|	U-238a	238	88	14.193	0.000	
|	U-235a	235	538	1.756	0.000	
⌊>	U 236	236	4539	0.147	0.000	
	U 236-IS	236	4539	0.147	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	13.667				ng/L
	U	234	16.000				ng/L
	U	235	538.349				ng/L
	U	238	88.000				ng/L
	U 232	232	11.333				ng/L
⌈	U-tot	238	0.145				ng/L
|	U-238a	238	0.019				ng/L
|	U-235a	235	0.119				ng/L
⌊>	U 236	236	4539.466				ng/L
	U 236-IS	236	4539.466	**100.000**	0.15	0.1	%R

010240

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Tuesday, July 26, 2011 18:14:40
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\S-1.191
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	45.069	0.000	
	U	234	42	3.608	0.000	
	U	235	3604	2.302	0.000	
	U	238	401720	0.773	0.000	
	U 232	232	11	24.052	0.000	
⌈	U-tot	238	405374	0.751	0.000	
|	U-238a	238	401720	0.773	0.000	
|	U-235a	235	3604	2.302	0.000	
⌊>	U 236	236	4515	0.511	0.000	
	U 236-IS	236	4515	0.511	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.000				ng/L
	U	234	42.333				ng/L
	U	235	3604.048				ng/L
	U	238	401719.622				ng/L
	U 232	232	11.000				ng/L
⌈	U-tot	238	89.781	**44984.000**	109.41	0.2	ng/L
|	U-238a	238	88.971	**44572.000**	117.36	0.3	ng/L
|	U-235a	235	0.798	**319.000**	10.15	3.2	ng/L
⌊>	U 236	236	4515.121				ng/L
	U 236-IS	236	4515.121	**99.464**	0.51	0.5	%R

010241

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Tuesday, July 26, 2011 18:16:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icv.192
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	14	21.429	0.000	
	U	234	22	34.021	0.000	
	U	235	1051	1.761	0.000	
	U	238	70470	0.280	0.000	
	U 232	232	14	22.354	0.000	
⌈	U-tot	238	71557	0.257	0.000	
|	U-238a	238	70470	0.280	0.000	
|	U-235a	235	1051	1.761	0.000	
⌊>	U 236	236	4471	1.507	0.000	
	U 236-IS	236	4471	1.507	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	14.000				ng/L
	U	234	21.667				ng/L
	U	235	1050.727				ng/L
	U	238	70470.415				ng/L
	U 232	232	13.667				ng/L
⌈	U-tot	238	16.006	**7960.304**	106.12	1.3	ng/L
|	U-238a	238	15.763	**7889.009**	105.36	1.3	ng/L
|	U-235a	235	0.235	**54.644**	1.94	3.6	ng/L
⌊>	U 236	236	4471.099				ng/L
	U 236-IS	236	4471.099	**98.494**	1.48	1.5	%R

010242

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Tuesday, July 26, 2011 18:19:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icb.193
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	12	36.324	0.000	
	U	234	24	20.843	0.000	
	U	235	534	6.326	0.000	
	U	238	108	19.805	0.000	
	U 232	232	11	32.778	0.000	
⌈	U-tot	238	678	8.067	0.000	
|	U-238a	238	108	19.805	0.000	
|	U-235a	235	534	6.326	0.000	
⌊>	U 236	236	4512	0.437	0.000	
	U 236-IS	236	4512	0.437	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.000				ng/L
	U	234	23.667				ng/L
	U	235	534.016				ng/L
	U	238	108.334				ng/L
	U 232	232	11.000				ng/L
⌈	U-tot	238	0.150	**2.877**	5.90	205.1	ng/L
|	U-238a	238	0.024	**2.314**	2.36	102.2	ng/L
|	U-235a	235	0.118	**-0.119**	3.37	2841.9	ng/L
⌊>	U 236	236	4512.119				ng/L
	U 236-IS	236	4512.119	**99.398**	0.43	0.4	%R

Quantitative Analysis - Summary Report

010243

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 18:21:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.194
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	12	52.128	0.000	
	U	234	16	46.358	0.000	
	U	235	515	9.182	0.000	
	U	238	457	1.281	0.000	
	U 232	232	12	22.048	0.000	
⌈	U-tot	238	1001	4.798	0.000	
|	U-238a	238	457	1.281	0.000	
|	U-235a	235	515	9.182	0.000	
⌊>	U 236	236	4511	2.020	0.000	
	U 236-IS	236	4511	2.020	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.333				ng/L
	U	234	16.333				ng/L
	U	235	515.015				ng/L
	U	238	457.345				ng/L
	U 232	232	12.000				ng/L
⌈	U-tot	238	0.222	**38.932**	7.46	19.2	ng/L
|	U-238a	238	0.101	**41.097**	1.05	2.5	ng/L
|	U-235a	235	0.114	**-2.000**	6.00	300.0	ng/L
⌊>	U 236	236	4511.119				ng/L
	U 236-IS	236	4511.119	**99.376**	2.01	2.0	%R

Quantitative Analysis - Summary Report

010244

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 18:23:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.195
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	48.432	0.000	
	U	234	21	40.686	0.000	
	U	235	592	4.643	0.000	
	U	238	6410	1.211	0.000	
	U 232	232	8	104.843	0.000	
⌜	U-tot	238	7033	0.583	0.000	
|	U-238a	238	6410	1.211	0.000	
|	U-235a	235	592	4.643	0.000	
⌞>	U 236	236	4409	1.082	0.000	
	U 236-IS	236	4409	1.082	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	21.000				ng/L
	U	235	592.353				ng/L
	U	238	6410.259				ng/L
	U 232	232	8.333				ng/L
⌜	U-tot	238	1.595	**728.013**	10.62	1.5	ng/L
|	U-238a	238	1.454	**718.862**	12.67	1.8	ng/L
|	U-235a	235	0.134	**7.401**	3.07	41.4	ng/L
⌞>	U 236	236	4409.069				ng/L
	U 236-IS	236	4409.069	**97.127**	1.05	1.1	%R

010245

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Tuesday, July 26, 2011 18:26:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsa.196
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	48.038	0.000	
	U	234	9	6.662	0.000	
	U	235	488	2.847	0.000	
	U	238	113	7.955	0.000	
	U 232	232	127	4.325	0.000	
⌈	U-tot	238	614	3.912	0.000	
|	U-238a	238	113	7.955	0.000	
|	U-235a	235	488	2.847	0.000	
⌊>	U 236	236	3914	0.595	0.000	
	U 236-IS	236	3914	0.595	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	8.667				ng/L
	U	235	488.013				ng/L
	U	238	112.667				ng/L
	U 232	232	127.334				ng/L
⌈	U-tot	238	0.157	**6.178**	3.55	57.4	ng/L
|	U-238a	238	0.029	**4.715**	1.23	26.2	ng/L
|	U-235a	235	0.125	**2.869**	2.01	69.9	ng/L
⌊>	U 236	236	3913.842				ng/L
	U 236-IS	236	3913.842	**86.218**	0.51	0.6	%R

010246

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Tuesday, July 26, 2011 18:28:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\icsab.197
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	24.019	0.000	
	U	234	26	5.801	0.000	
	U	235	1713	2.047	0.000	
	U	238	162327	0.402	0.000	
	U 232	232	119	9.090	0.000	
⌈	U-tot	238	164075	0.420	0.000	
|	U-238a	238	162327	0.402	0.000	
|	U-235a	235	1713	2.047	0.000	
⌊>	U 236	236	4011	0.622	0.000	
	U 236-IS	236	4011	0.622	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	26.333				ng/L
	U	235	1713.495				ng/L
	U	238	162326.773				ng/L
	U 232	232	119.001				ng/L
⌈	U-tot	238	40.912	**20459.340**	183.50	0.9	ng/L
|	U-238a	238	40.476	**20272.139**	179.32	0.9	ng/L
|	U-235a	235	0.427	**144.869**	4.44	3.1	ng/L
⌊>	U 236	236	4010.551				ng/L
	U 236-IS	236	4010.551	**88.349**	0.55	0.6	%R

0010247

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 18:30:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.198
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	62.984	0.000	
	U	234	10	36.638	0.000	
	U	235	540	3.585	0.000	
	U	238	114	10.361	0.000	
	U 232	232	6	79.575	0.000	
⌈	U-tot	238	668	1.821	0.000	
|	U-238a	238	114	10.361	0.000	
|	U-235a	235	540	3.585	0.000	
⌊>	U 236	236	4915	1.182	0.000	
	U 236-IS	236	4915	1.182	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	10.333				ng/L
	U	235	539.683				ng/L
	U	238	114.334				ng/L
	U 232	232	5.667				ng/L
⌈	U-tot	238	0.136	**-4.315**	1.05	24.2	ng/L
|	U-238a	238	0.023	**1.934**	1.07	55.1	ng/L
|	U-235a	235	0.110	**-4.115**	2.16	52.4	ng/L
⌊>	U 236	236	4914.995				ng/L
	U 236-IS	236	4914.995	**108.273**	1.28	1.2	%R

010248

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 18:33:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.199
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	45.826	0.000	
	U	234	13	40.704	0.000	
	U	235	1154	4.143	0.000	
	U	238	77155	1.031	0.000	
	U 232	232	4	66.144	0.000	
⌈	U-tot	238	78326	0.969	0.000	
|	U-238a	238	77155	1.031	0.000	
|	U-235a	235	1154	4.143	0.000	
⌊>	U 236	236	4918	0.687	0.000	
	U 236-IS	236	4918	0.687	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.333				ng/L
	U	234	13.000				ng/L
	U	235	1154.407				ng/L
	U	238	77155.049				ng/L
	U 232	232	4.000				ng/L
⌈	U-tot	238	15.926	**7919.997**	112.35	1.4	ng/L
|	U-238a	238	15.688	**7851.244**	113.56	1.4	ng/L
|	U-235a	235	0.235	**54.510**	4.86	8.9	ng/L
⌊>	U 236	236	4918.330				ng/L
	U 236-IS	236	4918.330	**108.346**	0.74	0.7	%R

010249

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 18:35:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.200
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	57.282	0.000	
	U	234	9	26.964	0.000	
	U	235	567	5.030	0.000	
	U	238	88	14.239	0.000	
	U 232	232	2	50.000	0.000	
⌈	U-tot	238	667	3.222	0.000	
|	U-238a	238	88	14.239	0.000	
|	U-235a	235	567	5.030	0.000	
⌊>	U 236	236	4959	0.845	0.000	
	U 236-IS	236	4959	0.845	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	9.333				ng/L
	U	235	567.351				ng/L
	U	238	88.000				ng/L
	U 232	232	2.000				ng/L
⌈	U-tot	238	0.135	**-4.992**	2.17	43.4	ng/L
|	U-238a	238	0.018	**-0.828**	1.21	146.5	ng/L
|	U-235a	235	0.114	**-1.962**	2.82	144.0	ng/L
⌊>	U 236	236	4959.352				ng/L
	U 236-IS	236	4959.352	**109.250**	0.92	0.8	%R

010250

Quantitative Analysis - Summary Report

Sample ID: 469499d10

Sample Date/Time: Tuesday, July 26, 2011 18:37:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d10.201
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	50.000	0.000	
	U	234	15	26.667	0.000	
	U	235	1419	3.324	0.000	
	U	238	39977	0.603	0.000	
	U 232	232	161	14.567	0.000	
⌈	U-tot	238	41413	0.493	0.000	
|	U-238a	238	39977	0.603	0.000	
|	U-235a	235	1419	3.324	0.000	
⌊>	U 236	236	4531	0.587	0.000	
	U 236-IS	236	4531	0.587	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.000				ng/L
	U	234	15.000				ng/L
	U	235	1419.444				ng/L
	U	238	39976.707				ng/L
	U 232	232	161.335				ng/L
⌈	U-tot	238	9.139	**4514.096**	49.32	1.1	ng/L
|	U-238a	238	8.822	**4411.028**	51.78	1.2	ng/L
|	U-235a	235	0.313	**91.350**	4.52	4.9	ng/L
⌊>	U 236	236	4531.462				ng/L
	U 236-IS	236	4531.462	**99.824**	0.59	0.6	%R

010251

Quantitative Analysis - Summary Report

Sample ID: 469499d10D

Sample Date/Time: Tuesday, July 26, 2011 18:40:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469499d10D.202
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	57.282	0.000	
	U	234	19	34.513	0.000	
	U	235	1433	2.520	0.000	
	U	238	40662	1.171	0.000	
	U 232	232	99	30.421	0.000	
⌈	U-tot	238	42118	1.229	0.000	
|	U-238a	238	40662	1.171	0.000	
|	U-235a	235	1433	2.520	0.000	
⌊>	U 236	236	4560	2.023	0.000	
	U 236-IS	236	4560	2.023	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	19.000				ng/L
	U	235	1433.446				ng/L
	U	238	40662.411				ng/L
	U 232	232	99.001				ng/L
⌈	U-tot	238	9.237	**4563.011**	72.84	1.6	ng/L
|	U-238a	238	8.918	**4458.813**	70.14	1.6	ng/L
|	U-235a	235	0.314	**91.866**	2.64	2.9	ng/L
⌊>	U 236	236	4560.477				ng/L
	U 236-IS	236	4560.477	**100.463**	2.03	2.0	%R

010252

Quantitative Analysis - Summary Report

Sample ID: 469500d10

Sample Date/Time: Tuesday, July 26, 2011 18:42:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d10.203
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	30.551	0.000	
	U	234	26	2.192	0.000	
	U	235	779	3.019	0.000	
	U	238	16059	0.235	0.000	
	U 232	232	298	4.511	0.000	
⌈	U-tot	238	16880	0.331	0.000	
|	U-238a	238	16059	0.235	0.000	
|	U-235a	235	779	3.019	0.000	
⌊>	U 236	236	4489	0.624	0.000	
	U 236-IS	236	4489	0.624	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	15.000				ng/L
	U	234	26.333				ng/L
	U	235	779.033				ng/L
	U	238	16059.172				ng/L
	U 232	232	297.672				ng/L
⌈	U-tot	238	3.760	**1814.677**	12.90	0.7	ng/L
|	U-238a	238	3.578	**1783.005**	10.80	0.6	ng/L
|	U-235a	235	0.174	**25.801**	2.74	10.6	ng/L
⌊>	U 236	236	4488.775				ng/L
	U 236-IS	236	4488.775	**98.883**	0.62	0.6	%R

010253

Quantitative Analysis - Summary Report

Sample ID: 469500d10D

Sample Date/Time: Tuesday, July 26, 2011 18:44:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469500d10D.204
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	21.534	0.000	
	U	234	21	12.599	0.000	
	U	235	823	2.549	0.000	
	U	238	16206	0.689	0.000	
	U 232	232	275	8.704	0.000	
⌈	U-tot	238	17060	0.727	0.000	
|	U-238a	238	16206	0.689	0.000	
|	U-235a	235	823	2.549	0.000	
⌊>	U 236	236	4329	1.721	0.000	
	U 236-IS	236	4329	1.721	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	21.000				ng/L
	U	235	823.371				ng/L
	U	238	16205.765				ng/L
	U 232	232	275.338				ng/L
⌈	U-tot	238	3.941	**1905.281**	25.50	1.3	ng/L
|	U-238a	238	3.744	**1866.185**	22.73	1.2	ng/L
|	U-235a	235	0.190	**33.621**	2.90	8.6	ng/L
⌊>	U 236	236	4329.364				ng/L
	U 236-IS	236	4329.364	**95.372**	1.64	1.7	%R

010254

Quantitative Analysis - Summary Report

Sample ID: 469501d10

Sample Date/Time: Tuesday, July 26, 2011 18:47:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d10.205
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	12	52.755	0.000	
	U	234	27	20.653	0.000	
	U	235	1285	2.249	0.000	
	U	238	35696	0.989	0.000	
	U 232	232	166	12.909	0.000	
⌈	U-tot	238	37020	1.014	0.000	
|	U-238a	238	35696	0.989	0.000	
|	U-235a	235	1285	2.249	0.000	
⌊>	U 236	236	4260	1.630	0.000	
	U 236-IS	236	4260	1.630	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	12.333				ng/L
	U	234	26.667				ng/L
	U	235	1284.757				ng/L
	U	238	35696.283				ng/L
	U 232	232	165.668				ng/L
⌈	U-tot	238	8.691	**4288.935**	28.49	0.7	ng/L
|	U-238a	238	8.380	**4189.344**	29.50	0.7	ng/L
|	U-235a	235	0.302	**85.878**	1.30	1.5	ng/L
⌊>	U 236	236	4259.998				ng/L
	U 236-IS	236	4259.998	**93.844**	1.53	1.6	%R

010255

Quantitative Analysis - Summary Report

Sample ID: 469501d10D

Sample Date/Time: Tuesday, July 26, 2011 18:49:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469501d10D.206
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	25.000	0.000	
	U	234	13	31.225	0.000	
	U	235	1346	2.297	0.000	
	U	238	39874	0.794	0.000	
	U 232	232	217	14.434	0.000	
⌈	U-tot	238	41238	0.683	0.000	
|	U-238a	238	39874	0.794	0.000	
|	U-235a	235	1346	2.297	0.000	
⌊>	U 236	236	4315	1.832	0.000	
	U 236-IS	236	4315	1.832	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.000				ng/L
	U	234	13.333				ng/L
	U	235	1346.433				ng/L
	U	238	39874.260				ng/L
	U 232	232	217.003				ng/L
⌈	U-tot	238	9.558	**4724.255**	91.35	1.9	ng/L
|	U-238a	238	9.242	**4621.303**	89.91	1.9	ng/L
|	U-235a	235	0.312	**90.812**	4.40	4.8	ng/L
⌊>	U 236	236	4315.358				ng/L
	U 236-IS	236	4315.358	**95.063**	1.74	1.8	%R

010256

Quantitative Analysis - Summary Report

Sample ID: 469506d10

Sample Date/Time: Tuesday, July 26, 2011 18:51:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\469506d10.207
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	15.746	0.000	
	U	234	15	15.746	0.000	
	U	235	1383	3.038	0.000	
	U	238	37660	0.594	0.000	
	U 232	232	140	22.913	0.000	
⌈	U-tot	238	39062	0.672	0.000	
|	U-238a	238	37660	0.594	0.000	
|	U-235a	235	1383	3.038	0.000	
⌊>	U 236	236	4311	0.904	0.000	
	U 236-IS	236	4311	0.904	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	14.667				ng/L
	U	235	1383.439				ng/L
	U	238	37659.845				ng/L
	U 232	232	140.001				ng/L
⌈	U-tot	238	9.062	**4475.396**	64.52	1.4	ng/L
|	U-238a	238	8.737	**4368.242**	58.38	1.3	ng/L
|	U-235a	235	0.321	**94.997**	5.76	6.1	ng/L
⌊>	U 236	236	4310.688				ng/L
	U 236-IS	236	4310.688	**94.960**	0.86	0.9	%R

010257

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, July 26, 2011 18:54:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\zzz.208
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	57.735	0.000	
	U	234	14	17.558	0.000	
	U	235	537	1.290	0.000	
	U	238	118	12.936	0.000	
	U 232	232	6	26.956	0.000	
⌜	U-tot	238	673	1.264	0.000	
|	U-238a	238	118	12.936	0.000	
|	U-235a	235	537	1.290	0.000	
⌞>	U 236	236	4510	0.754	0.000	
	U 236-IS	236	4510	0.754	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	14.333				ng/L
	U	235	537.016				ng/L
	U	238	118.334				ng/L
	U 232	232	5.667				ng/L
⌜	U-tot	238	0.149	**2.331**	1.32	56.4	ng/L
|	U-238a	238	0.026	**3.432**	1.68	49.0	ng/L
|	U-235a	235	0.119	**0.229**	1.10	481.8	ng/L
⌞>	U 236	236	4510.119				ng/L
	U 236-IS	236	4510.119	**99.353**	0.75	0.8	%R

0110258

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, July 26, 2011 18:56:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\critotU.209
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	13.323	0.000	
	U	234	9	0.000	0.000	
	U	235	548	1.595	0.000	
	U	238	452	3.432	0.000	
	U 232	232	2	69.282	0.000	
⌈	U-tot	238	1013	2.428	0.000	
|	U-238a	238	452	3.432	0.000	
|	U-235a	235	548	1.595	0.000	
⌊>	U 236	236	4496	1.207	0.000	
	U 236-IS	236	4496	1.207	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	9.000				ng/L
	U	235	547.683				ng/L
	U	238	451.678				ng/L
	U 232	232	1.667				ng/L
⌈	U-tot	238	0.225	**40.509**	1.40	3.5	ng/L
|	U-238a	238	0.100	**40.619**	1.14	2.8	ng/L
|	U-235a	235	0.122	**1.514**	0.22	14.8	ng/L
⌊>	U 236	236	4495.778				ng/L
	U 236-IS	236	4495.778	**99.038**	1.20	1.2	%R

010259

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Tuesday, July 26, 2011 18:58:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\cri235.210
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	47.889	0.000	
	U	234	18	47.467	0.000	
	U	235	573	8.433	0.000	
	U	238	6568	1.594	0.000	
	U 232	232	9	43.684	0.000	
⌈	U-tot	238	7166	0.694	0.000	
|	U-238a	238	6568	1.594	0.000	
|	U-235a	235	573	8.433	0.000	
⌊>	U 236	236	4500	1.872	0.000	
	U 236-IS	236	4500	1.872	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.333				ng/L
	U	234	18.000				ng/L
	U	235	573.351				ng/L
	U	238	6567.705				ng/L
	U 232	232	8.667				ng/L
⌈	U-tot	238	1.593	**726.868**	11.92	1.6	ng/L
|	U-238a	238	1.460	**721.738**	12.48	1.7	ng/L
|	U-235a	235	0.128	**4.189**	5.75	137.2	ng/L
⌊>	U 236	236	4499.780				ng/L
	U 236-IS	236	4499.780	**99.126**	1.86	1.9	%R

010260

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, July 26, 2011 19:01:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccv.211
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	17	38.413	0.000	
	U	234	29	21.314	0.000	
	U	235	1020	2.066	0.000	
	U	238	70419	0.478	0.000	
	U 232	232	16	7.370	0.000	
⌈	U-tot	238	71485	0.451	0.000	
|	U-238a	238	70419	0.478	0.000	
|	U-235a	235	1020	2.066	0.000	
⌊>	U 236	236	4441	1.019	0.000	
	U 236-IS	236	4441	1.019	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	17.333				ng/L
	U	234	28.667				ng/L
	U	235	1020.057				ng/L
	U	238	70418.685				ng/L
	U 232	232	15.667				ng/L
⌈	U-tot	238	16.097	**8005.988**	95.58	1.2	ng/L
|	U-238a	238	15.857	**7936.104**	95.78	1.2	ng/L
|	U-235a	235	0.230	**52.133**	1.26	2.4	ng/L
⌊>	U 236	236	4441.085				ng/L
	U 236-IS	236	4441.085	**97.833**	1.00	1.0	%R

010261

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, July 26, 2011 19:03:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 July 2\ccb.212
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	19	22.942	0.000	
	U	234	24	7.217	0.000	
	U	235	531	5.348	0.000	
	U	238	108	6.989	0.000	
	U 232	232	18	11.783	0.000	
⌜	U-tot	238	682	4.087	0.000	
|	U-238a	238	108	6.989	0.000	
|	U-235a	235	531	5.348	0.000	
⌞>	U 236	236	4395	1.958	0.000	
	U 236-IS	236	4395	1.958	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	19.000				ng/L
	U	234	24.000				ng/L
	U	235	530.682				ng/L
	U	238	108.334				ng/L
	U 232	232	17.667				ng/L
⌜	U-tot	238	0.155	**5.340**	1.94	36.4	ng/L
|	U-238a	238	0.025	**2.632**	0.70	26.5	ng/L
|	U-235a	235	0.121	**0.995**	2.17	218.1	ng/L
⌞>	U 236	236	4394.729				ng/L
	U 236-IS	236	4394.729	**96.812**	1.90	2.0	%R

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010262

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ 6020a TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ICP-MS CALIB. STD. ID's **TVs**

std /0238/023

S0	11-083-09	
STD. 1	11-064-02	44984/41572/319
I. STD	11-064-09	0.5ppb
I. STD		

QC STD. ID's

ICV/CCV	11-083-08	7660/7612/54.1
UCL	—	—
CRI	110860102	40/39.7/4.9
ICSA	11-080-12	—
ICSAB	11-078-01	30444/20898/145 mg

ANALYSIS

~~Ut, Th, U~~ NP JR 8/23/11

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/11
STD's Spex, ME 1-4 expire 9/15/11

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Fluor	1106|4-6	8|15|11	SO	WC 15 0082 - 15 0086

INSTRUMENT: DRCII FILENAME: 110815.rep

Analyst: M. Sadler Date: 8/15/11 ☐ CONVERTED (.DAT)

0110263

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Monday, August 15, 2011 09:17:40
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Daily Performance Check.920
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Michelle Seiler
8/15/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5033.9	5033.928	186.623	3.7
	In	114.9	29068.7	29068.741	419.299	1.4
	U	238.1	14351.1	14351.121	215.786	1.5
>	Ce	139.9	25574.2	25574.190	176.933	0.7
	CeO	155.9	1405.3	0.055	0.003	5.1
>	Ba	137.9	221068.2	221068.174	2879.164	1.3
	Ba++	69.0	4138.2	0.019	0.000	1.2
	Bkgd	220.0	1.6	1.600	0.596	37.3
	Bkgd	8.5	1.6	1.633	0.582	35.6

Current Optimization File Data

Current Value	Description
0.98	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
9.75	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

4/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	7.0	416.0
Co	59	45	8.8	14874.2
In	115	45	10.3	30969.7

010264

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Monday, August 15, 2011 09:17:40
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Daily Performance Check.920
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Michelle Seiler
8/15/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	11.925	2752	2058	0.665	
Mg	23.985	23.925	5668	2066	0.664	
Ar2	75.930	75.925	18319	2097	0.687	
In	114.904	114.875	27793	2123	0.690	
Ce	139.905	139.925	33886	2141	0.675	
Pb	207.977	208.025	50476	2177	0.670	
Th	232.038	232.025	56333	2199	0.678	
U	238.050	238.075	57800	2217	0.677	

0110265

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Monday, August 15, 2011 10:51:42
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\S-0.923
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	30.199	0.000	
	U	234	23	21.141	0.000	
	U	235	808	2.602	0.000	
	U	238	122	11.475	0.000	
	U 232	232	19	26.316	0.000	
⌈	U-tot	238	962	2.826	0.000	
|	U-238a	238	122	11.475	0.000	
|	U-235a	235	808	2.602	0.000	
⌊>	U 236	236	6970	0.974	0.000	
	U 236-IS	236	6970	0.974	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.333				ng/L
	U	234	23.333				ng/L
	U	235	808.369				ng/L
	U	238	122.001				ng/L
	U 232	232	19.000				ng/L
⌈	U-tot	238	0.138				ng/L
|	U-238a	238	0.018				ng/L
|	U-235a	235	0.116				ng/L
⌊>	U 236	236	6970.004				ng/L
	U 236-IS	236	6970.004	**100.000**	0.97	1.0	%R

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Monday, August 15, 2011 10:54:00
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\S-1.924
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	43.589	0.000	
	U	234	63	7.937	0.000	
	U	235	5490	1.028	0.000	
	U	238	604468	0.349	0.000	
	U 232	232	23	5.094	0.000	
⌈	U-tot	238	610031	0.350	0.000	
|	U-238a	238	604468	0.349	0.000	
|	U-235a	235	5490	1.028	0.000	
⌊>	U 236	236	7115	1.649	0.000	
	U 236-IS	236	7115	1.649	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	63.000				ng/L
	U	235	5489.657				ng/L
	U	238	604468.204				ng/L
	U 232	232	22.667				ng/L
⌈	U-tot	238	85.757	**44984.000**	758.01	1.7	ng/L
|	U-238a	238	84.975	**44572.000**	746.20	1.7	ng/L
|	U-235a	235	0.772	**319.000**	9.81	3.1	ng/L
⌊>	U 236	236	7114.784				ng/L
	U 236-IS	236	7114.784	**102.077**	1.68	1.6	%R

010267

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Monday, August 15, 2011 10:56:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icv.925
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	39.165	0.000	
	U	234	21	16.496	0.000	
	U	235	1644	4.412	0.000	
	U	238	100383	0.624	0.000	
	U 232	232	21	42.857	0.000	
⌈	U-tot	238	102058	0.546	0.000	
|	U-238a	238	100383	0.624	0.000	
|	U-235a	235	1644	4.412	0.000	
⌊>	U 236	236	7201	0.531	0.000	
	U 236-IS	236	7201	0.531	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	21.000				ng/L
	U	235	1644.482				ng/L
	U	238	100382.857				ng/L
	U 232	232	21.000				ng/L
⌈	U-tot	238	14.173	**7373.890**	77.43	1.1	ng/L
|	U-238a	238	13.940	**7304.462**	81.97	1.1	ng/L
|	U-235a	235	0.228	**54.639**	4.30	7.9	ng/L
⌊>	U 236	236	7201.184				ng/L
	U 236-IS	236	7201.184	**103.317**	0.55	0.5	%R

010268

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Monday, August 15, 2011 10:58:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icb.926
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	52.678	0.000	
	U	234	17	45.943	0.000	
	U	235	792	4.484	0.000	
	U	238	148	5.060	0.000	
	U 232	232	19	5.263	0.000	
⌈	U-tot	238	964	3.196	0.000	
|	U-238a	238	148	5.060	0.000	
|	U-235a	235	792	4.484	0.000	
⌊>	U 236	236	7034	1.430	0.000	
	U 236-IS	236	7034	1.430	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	17.000				ng/L
	U	235	792.035				ng/L
	U	238	148.335				ng/L
	U 232	232	19.000				ng/L
⌈	U-tot	238	0.137	**-0.501**	2.85	567.5	ng/L
|	U-238a	238	0.021	**1.879**	0.41	21.6	ng/L
|	U-235a	235	0.113	**-1.631**	3.06	187.4	ng/L
⌊>	U 236	236	7033.720				ng/L
	U 236-IS	236	7033.720	**100.914**	1.44	1.4	%R

010269

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, August 15, 2011 11:00:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\critotU.927
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	29.038	0.000	
	U	234	13	22.913	0.000	
	U	235	807	1.549	0.000	
	U	238	665	2.301	0.000	
	U 232	232	20	13.229	0.000	
⌜	U-tot	238	1495	1.572	0.000	
|	U-238a	238	665	2.301	0.000	
|	U-235a	235	807	1.549	0.000	
⌞>	U 236	236	7070	0.862	0.000	
	U 236-IS	236	7070	0.862	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	13.333				ng/L
	U	235	807.369				ng/L
	U	238	665.358				ng/L
	U 232	232	20.000				ng/L
⌜	U-tot	238	0.211	**38.556**	2.58	6.7	ng/L
|	U-238a	238	0.094	**40.193**	1.28	3.2	ng/L
|	U-235a	235	0.114	**-0.876**	1.32	151.2	ng/L
⌞>	U 236	236	7070.415				ng/L
	U 236-IS	236	7070.415	**101.441**	0.87	0.9	%R

010270

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, August 15, 2011 11:03:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\cri235.928
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	26.964	0.000	
	U	234	16	3.535	0.000	
	U	235	894	5.508	0.000	
	U	238	9318	1.778	0.000	
	U 232	232	21	28.255	0.000	
⌈	U-tot	238	10237	1.548	0.000	
|	U-238a	238	9318	1.778	0.000	
|	U-235a	235	894	5.508	0.000	
⌊>	U 236	236	7224	1.555	0.000	
	U 236-IS	236	7224	1.555	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.333				ng/L
	U	234	16.333				ng/L
	U	235	893.711				ng/L
	U	238	9317.774				ng/L
	U 232	232	21.333				ng/L
⌈	U-tot	238	1.417	**671.995**	2.03	0.3	ng/L
|	U-238a	238	1.290	**667.485**	2.16	0.3	ng/L
|	U-235a	235	0.124	**3.763**	3.57	94.9	ng/L
⌊>	U 236	236	7224.203				ng/L
	U 236-IS	236	7224.203	**103.647**	1.61	1.6	%R

0010271

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Monday, August 15, 2011 11:05:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icsa.929
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	49.487	0.000	
	U	234	19	20.282	0.000	
	U	235	926	3.624	0.000	
	U	238	227	5.724	0.000	
	U 232	232	456	3.529	0.000	
⌈	U-tot	238	1179	3.227	0.000	
|	U-238a	238	227	5.724	0.000	
|	U-235a	235	926	3.624	0.000	
⌊>	U 236	236	8042	2.079	0.000	
	U 236-IS	236	8042	2.079	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	18.667				ng/L
	U	235	925.714				ng/L
	U	238	227.336				ng/L
	U 232	232	456.011				ng/L
⌈	U-tot	238	0.147	**4.470**	1.52	33.9	ng/L
|	U-238a	238	0.028	**5.658**	1.01	17.8	ng/L
|	U-235a	235	0.115	**-0.446**	1.11	248.9	ng/L
⌊>	U 236	236	8042.223				ng/L
	U 236-IS	236	8042.223	**115.383**	2.40	2.1	%R

010272

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Monday, August 15, 2011 11:07:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icsab.930
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	62.422	0.000	
	U	234	45	4.660	0.000	
	U	235	3415	1.461	0.000	
	U	238	312137	1.148	0.000	
	U 232	232	324	3.581	0.000	
⌈	U-tot	238	315607	1.135	0.000	
|	U-238a	238	312137	1.148	0.000	
|	U-235a	235	3415	1.461	0.000	
⌊>	U 236	236	8132	0.974	0.000	
	U 236-IS	236	8132	0.974	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.667				ng/L
	U	234	44.667				ng/L
	U	235	3414.641				ng/L
	U	238	312136.615				ng/L
	U 232	232	323.672				ng/L
⌈	U-tot	238	38.811	**20318.856**	187.27	0.9	ng/L
|	U-238a	238	38.385	**20128.900**	189.09	0.9	ng/L
|	U-235a	235	0.420	**147.822**	1.76	1.2	ng/L
⌊>	U 236	236	8131.969				ng/L
	U 236-IS	236	8131.969	**116.671**	1.14	1.0	%R

010273

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 11:10:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.931
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	31.492	0.000	
	U	234	15	10.415	0.000	
	U	235	778	1.611	0.000	
	U	238	129	14.359	0.000	
	U 232	232	26	18.412	0.000	
⌈	U-tot	238	925	2.408	0.000	
|	U-238a	238	129	14.359	0.000	
|	U-235a	235	778	1.611	0.000	
⌊>	U 236	236	6748	2.236	0.000	
	U 236-IS	236	6748	2.236	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	14.667				ng/L
	U	235	778.033				ng/L
	U	238	128.668				ng/L
	U 232	232	25.667				ng/L
⌈	U-tot	238	0.137	**-0.470**	2.82	601.2	ng/L
|	U-238a	238	0.019	**0.821**	1.39	169.9	ng/L
|	U-235a	235	0.115	**-0.311**	2.15	691.3	ng/L
⌊>	U 236	236	6747.838				ng/L
	U 236-IS	236	6747.838	**96.813**	2.16	2.2	%R

0010274

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, August 15, 2011 11:12:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccv.932
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	8	41.929	0.000	
	U	234	20	28.005	0.000	
	U	235	1509	3.842	0.000	
	U	238	96775	0.638	0.000	
	U 232	232	19	21.535	0.000	
⌈	U-tot	238	98312	0.658	0.000	
|	U-238a	238	96775	0.638	0.000	
|	U-235a	235	1509	3.842	0.000	
⌊>	U 236	236	6830	1.109	0.000	
	U 236-IS	236	6830	1.109	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.667				ng/L
	U	234	19.667				ng/L
	U	235	1508.792				ng/L
	U	238	96775.388				ng/L
	U 232	232	19.333				ng/L
⌈	U-tot	238	14.395	**7490.845**	39.14	0.5	ng/L
|	U-238a	238	14.171	**7425.288**	42.42	0.6	ng/L
|	U-235a	235	0.221	**51.020**	3.35	6.6	ng/L
⌊>	U 236	236	6829.565				ng/L
	U 236-IS	236	6829.565	**97.985**	1.09	1.1	%R

010275

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, August 15, 2011 11:14:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccb.933
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	33.333	0.000	
	U	234	14	29.572	0.000	
	U	235	766	5.352	0.000	
	U	238	111	12.392	0.000	
	U 232	232	20	19.876	0.000	
⌈	U-tot	238	894	5.695	0.000	
|	U-238a	238	111	12.392	0.000	
|	U-235a	235	766	5.352	0.000	
⌊>	U 236	236	6675	1.573	0.000	
	U 236-IS	236	6675	1.573	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	13.667				ng/L
	U	235	766.366				ng/L
	U	238	111.334				ng/L
	U 232	232	20.333				ng/L
⌈	U-tot	238	0.134	**-2.161**	2.93	135.6	ng/L
|	U-238a	238	0.017	**-0.435**	1.01	230.9	ng/L
|	U-235a	235	0.115	**-0.601**	2.13	354.0	ng/L
⌊>	U 236	236	6674.783				ng/L
	U 236-IS	236	6674.783	**95.764**	1.51	1.6	%R

010276

Quantitative Analysis - Summary Report

Sample ID: 469506d10D

Sample Date/Time: Monday, August 15, 2011 11:20:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469506d10D.934
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	16.667	0.000	
	U	234	26	25.942	0.000	
	U	235	2212	1.018	0.000	
	U	238	59854	1.097	0.000	
	U 232	232	325	17.523	0.000	
⌈	U-tot	238	62098	1.035	0.000	
|	U-238a	238	59854	1.097	0.000	
|	U-235a	235	2211	1.018	0.000	
⌊>	U 236	236	7303	1.575	0.000	
	U 236-IS	236	7303	1.575	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	25.667				ng/L
	U	235	2211.602				ng/L
	U	238	59854.409				ng/L
	U 232	232	324.673				ng/L
⌈	U-tot	238	8.503	**4395.048**	25.43	0.6	ng/L
|	U-238a	238	8.196	**4290.763**	22.57	0.5	ng/L
|	U-235a	235	0.303	**90.910**	3.56	3.9	ng/L
⌊>	U 236	236	7303.266				ng/L
	U 236-IS	236	7303.266	**104.781**	1.65	1.6	%R

010277

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 11:22:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.935
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	93.264	0.000	
	U	234	14	14.523	0.000	
	U	235	788	1.714	0.000	
	U	238	135	8.816	0.000	
	U 232	232	25	34.953	0.000	
⌈	U-tot	238	942	1.064	0.000	
|	U-238a	238	135	8.816	0.000	
|	U-235a	235	788	1.714	0.000	
⌊>	U 236	236	6919	2.084	0.000	
	U 236-IS	236	6919	2.084	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	14.333				ng/L
	U	235	787.701				ng/L
	U	238	135.334				ng/L
	U 232	232	24.667				ng/L
⌈	U-tot	238	0.136	**-1.014**	0.76	74.5	ng/L
|	U-238a	238	0.020	**1.074**	0.77	71.9	ng/L
|	U-235a	235	0.114	**-1.037**	1.48	143.1	ng/L
⌊>	U 236	236	6919.300				ng/L
	U 236-IS	236	6919.300	**99.273**	2.07	2.1	%R

010278

Quantitative Analysis - Summary Report

Sample ID: Blankd14

Sample Date/Time: Monday, August 15, 2011 11:24:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Blankd14.936
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	51.626	0.000	
	U	234	29	10.070	0.000	
	U	235	2371	1.639	0.000	
	U	238	61829	0.531	0.000	
	U 232	232	141	14.050	0.000	
⌈	U-tot	238	64236	0.568	0.000	
|	U-238a	238	61829	0.531	0.000	
|	U-235a	235	2371	1.639	0.000	
⌊>	U 236	236	7096	1.228	0.000	
	U 236-IS	236	7096	1.228	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.333				ng/L
	U	234	28.667				ng/L
	U	235	2370.976				ng/L
	U	238	61828.544				ng/L
	U 232	232	141.334				ng/L
⌈	U-tot	238	9.053	**4683.759**	32.70	0.7	ng/L
|	U-238a	238	8.714	**4562.287**	32.54	0.7	ng/L
|	U-235a	235	0.334	**106.098**	1.53	1.4	ng/L
⌊>	U 236	236	7096.102				ng/L
	U 236-IS	236	7096.102	**101.809**	1.25	1.2	%R

0110279

Quantitative Analysis - Summary Report

Sample ID: 469500d14

Sample Date/Time: Monday, August 15, 2011 11:27:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d14.937
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	58.076	0.000	
	U	234	21	5.587	0.000	
	U	235	1107	0.887	0.000	
	U	238	19650	0.751	0.000	
	U 232	232	467	9.193	0.000	
⌈	U-tot	238	20782	0.658	0.000	
|	U-238a	238	19650	0.751	0.000	
|	U-235a	235	1107	0.887	0.000	
⌊>	U 236	236	6735	1.769	0.000	
	U 236-IS	236	6735	1.769	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	20.667				ng/L
	U	235	1106.734				ng/L
	U	238	19649.881				ng/L
	U 232	232	467.012				ng/L
⌈	U-tot	238	3.086	**1549.074**	34.02	2.2	ng/L
|	U-238a	238	2.918	**1521.906**	33.11	2.2	ng/L
|	U-235a	235	0.164	**23.518**	1.06	4.5	ng/L
⌊>	U 236	236	6734.828				ng/L
	U 236-IS	236	6734.828	**96.626**	1.71	1.8	%R

010280

Quantitative Analysis - Summary Report

Sample ID: ~~469500d14L df5~~ 469500d14 D (EE) 8/15/11 1105

Sample Date/Time: Monday, August 15, 2011 11:29:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d14L df5.938
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	84.254	0.000	
	U	234	23	30.987	0.000	
	U	235	1161	0.348	0.000	
	U	238	20263	0.246	0.000	
	U 232	232	157	9.730	0.000	
⌈	U-tot	238	21456	0.312	0.000	
|	U-238a	238	20263	0.246	0.000	
|	U-235a	235	1161	0.348	0.000	
⌊>	U 236	236	6858	1.372	0.000	
	U 236-IS	236	6858	1.372	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	22.667				ng/L
	U	235	1160.741				ng/L
	U	238	20262.890				ng/L
	U 232	232	157.335				ng/L
⌈	U-tot	238	3.129	**1571.483**	25.48	1.6	ng/L
|	U-238a	238	2.955	**1541.165**	23.05	1.5	ng/L
|	U-235a	235	0.169	**25.914**	1.27	4.9	ng/L
⌊>	U 236	236	6857.919				ng/L
	U 236-IS	236	6857.919	**98.392**	1.35	1.4	%R

010281

Quantitative Analysis - Summary Report

Sample ID: ~~469500d14D~~ 469500d14 L df5 (EE) 8/15/11 DS

Sample Date/Time: Monday, August 15, 2011 11:31:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d14D.939
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	84.548	0.000	
	U	234	16	19.500	0.000	
	U	235	807	2.554	0.000	
	U	238	3991	0.579	0.000	
	U 232	232	111	7.248	0.000	
⌈	U-tot	238	4818	0.301	0.000	
|	U-238a	238	3991	0.579	0.000	
|	U-235a	235	807	2.554	0.000	
⌊>	U 236	236	6591	0.891	0.000	
	U 236-IS	236	6591	0.891	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	15.667				ng/L
	U	235	806.702				ng/L
	U	238	3990.542				ng/L
	U 232	232	110.667				ng/L
⌈	U-tot	238	0.731	**311.574**	3.96	1.3	ng/L
|	U-238a	238	0.605	**308.476**	3.06	1.0	ng/L
|	U-235a	235	0.122	**3.117**	1.93	62.0	ng/L
⌊>	U 236	236	6591.055				ng/L
	U 236-IS	236	6591.055	**94.563**	0.84	0.9	%R

010282

Quantitative Analysis - Summary Report

Sample ID: 469500d14AS

Sample Date/Time: Monday, August 15, 2011 11:33:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d14AS.940
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

8/15/11 DS FL

1° Natural Uranium spiked 20 uL of 1% of 100 ~~Natural~~ (075-Rad-Sol 2, 11-064-06) in 5 mL

Tot U
TU = 40924 ppt

U232
TU = 40632 ppt

U235
TU = 290 ppt

8/15/11 DS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	31.604	0.000	
	U	234	49	14.432	0.000	
	U	235	5534	0.645	0.000	
	U	238	566733	0.676	0.000	
	U 232	232	443	4.100	0.000	
⌈	U-tot	238	572325	0.667	0.000	
|	U-238a	238	566733	0.676	0.000	
|	U-235a	235	5534	0.645	0.000	
⌊>	U 236	236	7207	1.153	0.000	
	U 236-IS	236	7207	1.153	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.667				ng/L
	U	234	48.667				ng/L
	U	235	5534.017				ng/L
	U	238	566733.089				ng/L
	U 232	232	442.677				ng/L
⌈	U-tot	238	79.414	**41651.234**	236.32	0.6	ng/L
|	U-238a	238	78.638	**41247.209**	229.11	0.6	ng/L
|	U-235a	235	0.768	**317.119**	6.08	1.9	ng/L
⌊>	U 236	236	7207.189				ng/L
	U 236-IS	236	7207.189	**103.403**	1.19	1.2	%R

Quantitative Analysis - Summary Report

010283

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 11:36:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.941
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	60.000	0.000	
	U	234	16	19.500	0.000	
	U	235	751	2.796	0.000	
	U	238	257	5.276	0.000	
	U 232	232	35	30.102	0.000	
⌈	U-tot	238	1029	2.965	0.000	
|	U-238a	238	257	5.276	0.000	
|	U-235a	235	751	2.796	0.000	
⌊>	U 236	236	6552	0.218	0.000	
	U 236-IS	236	6552	0.218	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.000				ng/L
	U	234	15.667				ng/L
	U	235	751.031				ng/L
	U	238	257.337				ng/L
	U 232	232	35.000				ng/L
⌈	U-tot	238	0.157	**9.989**	2.33	23.4	ng/L
|	U-238a	238	0.039	**11.424**	1.04	9.1	ng/L
|	U-235a	235	0.115	**-0.669**	1.52	227.7	ng/L
⌊>	U 236	236	6551.693				ng/L
	U 236-IS	236	6551.693	**93.998**	0.21	0.2	%R

010284

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, August 15, 2011 11:38:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\critotU.942
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	24.119	0.000	
	U	234	22	16.952	0.000	
	U	235	805	2.377	0.000	
	U	238	652	3.074	0.000	
	U 232	232	18	19.245	0.000	
⌈	U-tot	238	1486	2.559	0.000	
|	U-238a	238	652	3.074	0.000	
|	U-235a	235	805	2.377	0.000	
⌊>	U 236	236	6871	0.721	0.000	
	U 236-IS	236	6871	0.721	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.333				ng/L
	U	234	22.333				ng/L
	U	235	805.369				ng/L
	U	238	651.690				ng/L
	U 232	232	18.000				ng/L
⌈	U-tot	238	0.216	**41.081**	2.59	6.3	ng/L
|	U-238a	238	0.095	**40.580**	1.38	3.4	ng/L
|	U-235a	235	0.117	**0.589**	1.17	198.0	ng/L
⌊>	U 236	236	6870.595				ng/L
	U 236-IS	236	6870.595	**98.574**	0.71	0.7	%R

010285

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, August 15, 2011 11:41:00
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\cri235.943
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	31.225	0.000	
	U	234	19	18.232	0.000	
	U	235	881	7.668	0.000	
	U	238	9084	1.927	0.000	
	U 232	232	19	10.767	0.000	
⌈	U-tot	238	9990	2.422	0.000	
|	U-238a	238	9084	1.927	0.000	
|	U-235a	235	881	7.668	0.000	
⌊>	U 236	236	6928	0.833	0.000	
	U 236-IS	236	6928	0.833	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	19.000				ng/L
	U	235	881.043				ng/L
	U	238	9083.537				ng/L
	U 232	232	19.333				ng/L
⌈	U-tot	238	1.442	**685.184**	19.92	2.9	ng/L
|	U-238a	238	1.311	**678.761**	14.47	2.1	ng/L
|	U-235a	235	0.127	**5.446**	4.92	90.4	ng/L
⌊>	U 236	236	6927.639				ng/L
	U 236-IS	236	6927.639	**99.392**	0.83	0.8	%R

010286

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, August 15, 2011 11:43:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccv.944
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	62.984	0.000	
	U	234	23	23.007	0.000	
	U	235	1547	4.462	0.000	
	U	238	99280	0.829	0.000	
	U 232	232	15	30.821	0.000	
⌈	U-tot	238	100853	0.882	0.000	
|	U-238a	238	99280	0.829	0.000	
|	U-235a	235	1547	4.462	0.000	
⌊>	U 236	236	6870	2.483	0.000	
	U 236-IS	236	6870	2.483	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.667				ng/L
	U	234	23.000				ng/L
	U	235	1546.798				ng/L
	U	238	99279.854				ng/L
	U 232	232	15.333				ng/L
⌈	U-tot	238	14.689	**7645.096**	253.80	3.3	ng/L
|	U-238a	238	14.460	**7577.020**	246.20	3.2	ng/L
|	U-235a	235	0.225	**53.204**	7.09	13.3	ng/L
⌊>	U 236	236	6869.596				ng/L
	U 236-IS	236	6869.596	**98.559**	2.45	2.5	%R

010287

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, August 15, 2011 11:45:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccb.945
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	56.727	0.000	
	U	234	16	28.641	0.000	
	U	235	808	2.593	0.000	
	U	238	132	2.654	0.000	
	U 232	232	20	13.229	0.000	
⌈	U-tot	238	962	1.351	0.000	
|	U-238a	238	132	2.654	0.000	
|	U-235a	235	808	2.593	0.000	
⌊>	U 236	236	6963	0.229	0.000	
	U 236-IS	236	6963	0.229	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	16.000				ng/L
	U	235	808.036				ng/L
	U	238	132.334				ng/L
	U 232	232	20.000				ng/L
⌈	U-tot	238	0.138	**0.057**	0.82	1436.5	ng/L
|	U-238a	238	0.019	**0.789**	0.28	35.8	ng/L
|	U-235a	235	0.116	**0.016**	1.34	8471.0	ng/L
⌊>	U 236	236	6963.332				ng/L
	U 236-IS	236	6963.332	**99.904**	0.23	0.2	%R

010288

Quantitative Analysis - Summary Report

Sample ID: Blankd21

Sample Date/Time: Monday, August 15, 2011 11:47:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Blankd21.946
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	24.744	0.000	
	U	234	27	25.956	0.000	
	U	235	2413	1.977	0.000	
	U	238	62932	0.642	0.000	
	U 232	232	53	13.996	0.000	
⌈	U-tot	238	65377	0.650	0.000	
|	U-238a	238	62932	0.642	0.000	
|	U-235a	235	2413	1.977	0.000	
⌊>	U 236	236	7488	0.396	0.000	
	U 236-IS	236	7488	0.396	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	27.333				ng/L
	U	235	2412.654				ng/L
	U	238	62932.079				ng/L
	U 232	232	52.667				ng/L
⌈	U-tot	238	8.731	**4514.578**	13.76	0.3	ng/L
|	U-238a	238	8.404	**4400.029**	14.52	0.3	ng/L
|	U-235a	235	0.322	**100.295**	2.70	2.7	ng/L
⌊>	U 236	236	7488.083				ng/L
	U 236-IS	236	7488.083	**107.433**	0.42	0.4	%R

010289

Quantitative Analysis - Summary Report

Sample ID: 469500d21

Sample Date/Time: Monday, August 15, 2011 11:50:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d21.947
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	47.186	0.000	
	U	234	25	21.166	0.000	
	U	235	1339	5.678	0.000	
	U	238	26159	0.171	0.000	
	U 232	232	180	13.755	0.000	
⌈	U-tot	238	27528	0.179	0.000	
|	U-238a	238	26159	0.171	0.000	
|	U-235a	235	1339	5.678	0.000	
⌊>	U 236	236	7469	1.527	0.000	
	U 236-IS	236	7469	1.527	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	25.000				ng/L
	U	235	1338.765				ng/L
	U	238	26158.915				ng/L
	U 232	232	180.002				ng/L
⌈	U-tot	238	3.686	**1864.276**	30.53	1.6	ng/L
|	U-238a	238	3.503	**1828.658**	30.51	1.7	ng/L
|	U-235a	235	0.179	**30.765**	4.85	15.8	ng/L
⌊>	U 236	236	7468.734				ng/L
	U 236-IS	236	7468.734	**107.155**	1.64	1.5	%R

010290

Quantitative Analysis - Summary Report

Sample ID: ~~469500d21L df5~~ 469500d21D (EE) 8/15/11 NS

Sample Date/Time: Monday, August 15, 2011 11:52:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d21L df5.948
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	20.830	0.000	
	U	234	22	34.780	0.000	
	U	235	1198	4.445	0.000	
	U	238	19111	0.505	0.000	
	U 232	232	205	4.653	0.000	
⌈	U-tot	238	20339	0.413	0.000	
|	U-238a	238	19111	0.505	0.000	
|	U-235a	235	1198	4.445	0.000	
⌊>	U 236	236	7438	0.426	0.000	
	U 236-IS	236	7438	0.426	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.333				ng/L
	U	234	22.333				ng/L
	U	235	1198.412				ng/L
	U	238	19111.401				ng/L
	U 232	232	205.002				ng/L
⌈	U-tot	238	2.734	**1364.122**	3.15	0.2	ng/L
|	U-238a	238	2.569	**1338.781**	6.18	0.5	ng/L
|	U-235a	235	0.161	**21.937**	3.32	15.1	ng/L
⌊>	U 236	236	7438.375				ng/L
	U 236-IS	236	7438.375	**106.720**	0.45	0.4	%R

0110291

Quantitative Analysis - Summary Report

Sample ID: ~~469500d21D~~ 469500d21L dj 5 (EE) 8/15/11 NJS

Sample Date/Time: Monday, August 15, 2011 11:54:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d21D.949
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	58.076	0.000	
	U	234	19	30.308	0.000	
	U	235	922	2.986	0.000	
	U	238	5049	0.895	0.000	
	U 232	232	50	21.149	0.000	
⌈	U-tot	238	5995	1.143	0.000	
|	U-238a	238	5049	0.895	0.000	
|	U-235a	235	922	2.986	0.000	
⌊>	U 236	236	7342	1.112	0.000	
	U 236-IS	236	7342	1.112	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	19.333				ng/L
	U	235	922.380				ng/L
	U	238	5048.735				ng/L
	U 232	232	49.667				ng/L
⌈	U-tot	238	0.817	**356.554**	9.68	2.7	ng/L
|	U-238a	238	0.688	**351.660**	7.23	2.1	ng/L
|	U-235a	235	0.126	**4.702**	2.44	51.9	ng/L
⌊>	U 236	236	7341.630				ng/L
	U 236-IS	236	7341.630	**105.332**	1.17	1.1	%R

GW0292

Quantitative Analysis - Summary Report

Sample ID: 469500d21AS

Sample Date/Time: Monday, August 15, 2011 11:57:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d21AS.950
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

re-run with 10 mL of sample
8/15/11 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	66.667	0.000	
	U	234	51	8.900	0.000	
	U	235	5943	0.592	0.000	
	U	238	613718	0.536	0.000	
	U 232	232	156	11.341	0.000	
⌈	U-tot	238	619715	0.527	0.000	
|	U-238a	238	613718	0.536	0.000	
|	U-235a	235	5943	0.592	0.000	
⌊>	U 236	236	7479	2.767	0.000	
	U 236-IS	236	7479	2.767	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	50.667				ng/L
	U	235	5942.942				ng/L
	U	238	613718.015				ng/L
	U 232	232	156.001				ng/L
⌈	U-tot	238	82.901	**43483.388**	1076.38	2.5	ng/L
|	U-238a	238	82.098	**43062.982**	1064.15	2.5	ng/L
|	U-235a	235	0.795	**330.308**	11.00	3.3	ng/L
⌊>	U 236	236	7478.743				ng/L
	U 236-IS	236	7478.743	**107.299**	2.97	2.8	%R

010293

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 11:59:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.951
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	4	74.182	0.000	
	U	234	15	35.919	0.000	
	U	235	831	2.018	0.000	
	U	238	318	4.880	0.000	
	U 232	232	17	32.805	0.000	
⌈	U-tot	238	1169	2.955	0.000	
|	U-238a	238	318	4.880	0.000	
|	U-235a	235	831	2.018	0.000	
⌊>	U 236	236	7314	0.519	0.000	
	U 236-IS	236	7314	0.519	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.333				ng/L
	U	234	15.333				ng/L
	U	235	831.371				ng/L
	U	238	317.672				ng/L
	U 232	232	17.333				ng/L
⌈	U-tot	238	0.160	**11.430**	2.87	25.1	ng/L
|	U-238a	238	0.043	**13.608**	1.21	8.9	ng/L
|	U-235a	235	0.114	**-1.134**	1.38	121.4	ng/L
⌊>	U 236	236	7314.275				ng/L
	U 236-IS	236	7314.275	**104.939**	0.54	0.5	%R

010294

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, August 15, 2011 12:02:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\critotU.952
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	33.333	0.000	
	U	234	16	27.243	0.000	
	U	235	831	5.135	0.000	
	U	238	696	5.600	0.000	
	U 232	232	11	43.301	0.000	
⌈	U-tot	238	1546	1.479	0.000	
|	U-238a	238	696	5.600	0.000	
|	U-235a	235	831	5.135	0.000	
⌊>	U 236	236	7430	0.276	0.000	
	U 236-IS	236	7430	0.276	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	3.000				ng/L
	U	234	16.000				ng/L
	U	235	831.038				ng/L
	U	238	696.027				ng/L
	U 232	232	10.667				ng/L
⌈	U-tot	238	0.208	**36.795**	1.86	5.0	ng/L
|	U-238a	238	0.094	**39.962**	2.71	6.8	ng/L
|	U-235a	235	0.112	**-2.020**	2.92	144.5	ng/L
⌊>	U 236	236	7430.369				ng/L
	U 236-IS	236	7430.369	**106.605**	0.29	0.3	%R

040295

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, August 15, 2011 12:04:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\cri235.953
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	31.109	0.000	
	U	234	17	15.563	0.000	
	U	235	918	4.559	0.000	
	U	238	9925	0.610	0.000	
	U 232	232	16	9.352	0.000	
⌈	U-tot	238	10871	0.690	0.000	
|	U-238a	238	9925	0.610	0.000	
|	U-235a	235	918	4.559	0.000	
⌊>	U 236	236	7455	1.822	0.000	
	U 236-IS	236	7455	1.822	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.333				ng/L
	U	234	17.000				ng/L
	U	235	918.380				ng/L
	U	238	9925.082				ng/L
	U 232	232	16.333				ng/L
⌈	U-tot	238	1.458	**693.678**	10.18	1.5	ng/L
|	U-238a	238	1.332	**689.389**	11.96	1.7	ng/L
|	U-235a	235	0.123	**3.473**	1.70	49.0	ng/L
⌊>	U 236	236	7455.390				ng/L
	U 236-IS	236	7455.390	**106.964**	1.95	1.8	%R

0210296

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, August 15, 2011 12:06:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccv.954
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	43.684	0.000	
	U	234	30	20.937	0.000	
	U	235	1714	3.156	0.000	
	U	238	107418	1.102	0.000	
	U 232	232	18	44.096	0.000	
⌈	U-tot	238	109171	1.117	0.000	
|	U-238a	238	107418	1.102	0.000	
|	U-235a	235	1714	3.156	0.000	
⌊>	U 236	236	7450	1.905	0.000	
	U 236-IS	236	7450	1.905	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	30.333				ng/L
	U	235	1714.162				ng/L
	U	238	107417.947				ng/L
	U 232	232	18.000				ng/L
⌈	U-tot	238	14.656	**7627.668**	66.85	0.9	ng/L
|	U-238a	238	14.421	**7556.444**	67.99	0.9	ng/L
|	U-235a	235	0.230	**55.489**	2.24	4.0	ng/L
⌊>	U 236	236	7449.719				ng/L
	U 236-IS	236	7449.719	**106.883**	2.04	1.9	%R

0110297

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, August 15, 2011 12:09:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccb.955
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	55.678	0.000	
	U	234	28	15.568	0.000	
	U	235	868	3.575	0.000	
	U	238	161	8.806	0.000	
	U 232	232	17	30.199	0.000	
⌈	U-tot	238	1067	3.637	0.000	
|	U-238a	238	161	8.806	0.000	
|	U-235a	235	868	3.575	0.000	
⌊>	U 236	236	7660	0.972	0.000	
	U 236-IS	236	7660	0.972	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	28.000				ng/L
	U	235	867.708				ng/L
	U	238	161.001				ng/L
	U 232	232	16.667				ng/L
⌈	U-tot	238	0.139	**0.627**	2.10	334.8	ng/L
|	U-238a	238	0.021	**1.849**	1.01	54.5	ng/L
|	U-235a	235	0.113	**-1.335**	1.44	108.0	ng/L
⌊>	U 236	236	7659.893				ng/L
	U 236-IS	236	7659.893	**109.898**	1.07	1.0	%R

010298

Quantitative Analysis - Summary Report

Sample ID: 469500d21AS

Sample Date/Time: Monday, August 15, 2011 12:25:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469500d21AS.956
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20uL of 100 Primary natural uranium (11-064-06, 075-Rad-Sol2) in 10mL

Tot U
TV = 20462 ppt

U238
TV = 20316 ppt 8/15/11 LS

U235
TV = 145 ppt

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	11.111	0.000	
	U	234	38	10.861	0.000	
	U	235	3543	1.172	0.000	
	U	238	316987	0.574	0.000	
	U 232	232	358	10.974	0.000	
⌈	U-tot	238	320578	0.574	0.000	
|	U-238a	238	316987	0.574	0.000	
|	U-235a	235	3543	1.172	0.000	
⌊>	U 236	236	7634	1.049	0.000	
	U 236-IS	236	7634	1.049	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	9.000				ng/L
	U	234	38.333				ng/L
	U	235	3543.357				ng/L
	U	238	316987.199				ng/L
	U 232	232	358.340				ng/L
⌈	U-tot	238	41.994	**21991.177**	170.22	0.8	ng/L
|	U-238a	238	41.524	**21775.915**	170.73	0.8	ng/L
|	U-235a	235	0.464	**169.344**	1.02	0.6	ng/L
⌊>	U 236	236	7634.204				ng/L
	U 236-IS	236	7634.204	**109.529**	1.15	1.0	%R

010299

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 12:27:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.957
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	57.282	0.000	
	U	234	17	41.177	0.000	
	U	235	812	3.885	0.000	
	U	238	256	6.287	0.000	
	U 232	232	19	26.543	0.000	
⌈	U-tot	238	1090	1.376	0.000	
|	U-238a	238	256	6.287	0.000	
|	U-235a	235	812	3.885	0.000	
⌊>	U 236	236	7165	0.717	0.000	
	U 236-IS	236	7165	0.717	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	17.000				ng/L
	U	235	811.703				ng/L
	U	238	256.004				ng/L
	U 232	232	19.333				ng/L
⌈	U-tot	238	0.152	**7.406**	1.57	21.2	ng/L
|	U-238a	238	0.036	**9.559**	1.06	11.1	ng/L
|	U-235a	235	0.113	**-1.311**	2.54	193.8	ng/L
⌊>	U 236	236	7165.156				ng/L
	U 236-IS	236	7165.156	**102.800**	0.74	0.7	%R

010300

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, August 15, 2011 12:29:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\critotU.958
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	22.913	0.000	
	U	234	18	36.430	0.000	
	U	235	874	3.956	0.000	
	U	238	691	12.101	0.000	
	U 232	232	13	18.875	0.000	
⌈	U-tot	238	1590	6.907	0.000	
|	U-238a	238	691	12.101	0.000	
|	U-235a	235	874	3.956	0.000	
⌊>	U 236	236	7465	2.365	0.000	
	U 236-IS	236	7465	2.365	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	18.000				ng/L
	U	235	874.375				ng/L
	U	238	691.027				ng/L
	U 232	232	13.333				ng/L
⌈	U-tot	238	0.213	**39.537**	10.26	26.0	ng/L
|	U-238a	238	0.093	**39.489**	6.96	17.6	ng/L
|	U-235a	235	0.117	**0.585**	3.19	545.0	ng/L
⌊>	U 236	236	7465.398				ng/L
	U 236-IS	236	7465.398	**107.108**	2.53	2.4	%R

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, August 15, 2011 12:32:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\cri235.959
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	31.225	0.000	
	U	234	18	8.332	0.000	
	U	235	971	2.880	0.000	
	U	238	10065	1.954	0.000	
	U 232	232	13	13.323	0.000	
⌈	U-tot	238	11062	1.538	0.000	
|	U-238a	238	10065	1.954	0.000	
|	U-235a	235	971	2.880	0.000	
⌊>	U 236	236	7492	2.553	0.000	
	U 236-IS	236	7492	2.553	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.667				ng/L
	U	234	18.333				ng/L
	U	235	971.385				ng/L
	U	238	10065.237				ng/L
	U 232	232	13.000				ng/L
⌈	U-tot	238	1.477	**703.386**	11.38	1.6	ng/L
|	U-238a	238	1.344	**695.790**	10.35	1.5	ng/L
|	U-235a	235	0.130	**6.686**	2.98	44.6	ng/L
⌊>	U 236	236	7491.754				ng/L
	U 236-IS	236	7491.754	**107.486**	2.74	2.6	%R

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, August 15, 2011 12:34:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccv.960
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	28.571	0.000	
	U	234	21	2.706	0.000	
	U	235	1726	1.689	0.000	
	U	238	109887	1.275	0.000	
	U 232	232	14	30.463	0.000	
⌈	U-tot	238	111641	1.261	0.000	
|	U-238a	238	109887	1.275	0.000	
|	U-235a	235	1726	1.689	0.000	
⌊>	U 236	236	7624	1.145	0.000	
	U 236-IS	236	7624	1.145	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	21.333				ng/L
	U	235	1726.497				ng/L
	U	238	109886.542				ng/L
	U 232	232	13.667				ng/L
⌈	U-tot	238	14.644	**7621.591**	45.54	0.6	ng/L
|	U-238a	238	14.414	**7553.067**	46.93	0.6	ng/L
|	U-235a	235	0.226	**53.732**	1.25	2.3	ng/L
⌊>	U 236	236	7623.529				ng/L
	U 236-IS	236	7623.529	**109.376**	1.25	1.1	%R

010303

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, August 15, 2011 12:36:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccb.961
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	7	37.796	0.000	
	U	234	20	12.796	0.000	
	U	235	882	4.607	0.000	
	U	238	140	4.345	0.000	
	U 232	232	16	40.765	0.000	
⌈	U-tot	238	1049	4.119	0.000	
|	U-238a	238	140	4.345	0.000	
|	U-235a	235	882	4.607	0.000	
⌊>	U 236	236	7696	0.806	0.000	
	U 236-IS	236	7696	0.806	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	7.000				ng/L
	U	234	19.667				ng/L
	U	235	882.376				ng/L
	U	238	140.001				ng/L
	U 232	232	16.333				ng/L
⌈	U-tot	238	0.136	**-0.901**	3.19	354.7	ng/L
|	U-238a	238	0.018	**0.365**	0.48	131.0	ng/L
|	U-235a	235	0.115	**-0.650**	2.68	412.2	ng/L
⌊>	U 236	236	7695.589				ng/L
	U 236-IS	236	7695.589	**110.410**	0.89	0.8	%R

SOUTHWEST RESEARCH INSTITUTE

010304

☐ 200.8 TAP No. 01-0406-107 Rev 5/Feb 10

☒ 6020 TAP No. 01-0406-046 Rev14/Jan 11

☐ 6020a TAP No. 01-0406-046 Rev14/Jan 11

☐ TAP No. 01-0406-148 Rev0/Apr07

☐ Other_____

ANALYSIS (NJP 8/23/11

U101, Hg56, U235

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/11
STD's Spex, ME 1-4 expire 9/15/11

ICP-MS CALIB. STD. ID's		**TVs**
S0	11-083-09	for U/U235/U
STD. 1	11-064-02	44984/44573/
I. STD	11-064-09	0.5ppb
I. STD		

QC STD. ID's

ICV/CCV	11-083-08	7666/7612/54.5
UCL		
CRI	11-086-01102	40/39.7/4.95
ICSA	11-080-12	
ICSAB	11-078-01	20444/20298/145

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Huco	11061-8	8/15/11	<SO	WC 15 0082 - 150086

INSTRUMENT: DRCII FILENAME: 110815c.rep

Analyst: JJ Sachs Date: 8 / 15 / 11 ☐ CONVERTED (.DAT)

010305

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Monday, August 15, 2011 09:17:40
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Daily Performance Check.920
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Michelle Seiler
8/15/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	5033.9	5033.928	186.623	3.7
	In	114.9	29068.7	29068.741	419.299	1.4
	U	238.1	14351.1	14351.121	215.786	1.5
⌈>	Ce	139.9	25574.2	25574.190	176.933	0.7
⌊	CeO	155.9	1405.3	0.055	0.003	5.1
⌈>	Ba	137.9	221068.2	221068.174	2879.164	1.3
⌊	Ba++	69.0	4138.2	0.019	0.000	1.2
	Bkgd	220.0	1.6	1.600	0.596	37.3
	Bkgd	8.5	1.6	1.633	0.582	35.6

Current Optimization File Data

Current Value	Description
0.98	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
9.75	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

8/23/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	7.0	416.0
Co	59	45	8.8	14874.2
In	115	45	10.3	30969.7

010306

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Michelle Seiler
8/15/11

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Monday, August 15, 2011 09:17:40
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 August 1\Daily Performance Check.920
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	11.925	2752	2058	0.665	
Mg	23.985	23.925	5668	2066	0.664	
Ar2	75.930	75.925	18319	2097	0.687	
In	114.904	114.875	27793	2123	0.690	
Ce	139.905	139.925	33886	2141	0.675	
Pb	207.977	208.025	50476	2177	0.670	
Th	232.038	232.025	56333	2199	0.678	
U	238.050	238.075	57800	2217	0.677	

Quantitative Analysis - Summary Report

010307

Sample ID: S-0

Sample Date/Time: Monday, August 15, 2011 14:49:50
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\S-0.978
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	60.093	0.000	
	U	234	17	13.856	0.000	
	U	235	972	5.077	0.000	
	U	238	154	4.258	0.000	
	U 232	232	24	8.796	0.000	
⌈	U-tot	238	1148	3.572	0.000	
|	U-238a	238	154	4.258	0.000	
|	U-235a	235	972	5.077	0.000	
⌊>	U 236	236	8251	2.020	0.000	
	U 236-IS	236	8251	2.020	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	16.667				ng/L
	U	235	971.719				ng/L
	U	238	154.001				ng/L
	U 232	232	23.667				ng/L
⌈	U-tot	238	0.139				ng/L
|	U-238a	238	0.019				ng/L
|	U-235a	235	0.118				ng/L
⌊>	U 236	236	8251.411				ng/L
	U 236-IS	236	8251.411	**100.000**	2.02	2.0	%R

610308

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Monday, August 15, 2011 14:52:08
Sample Description:
Solution Type: Standard
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\S-1.979
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	3	57.282	0.000	
	U	234	58	6.020	0.000	
	U	235	6631	2.693	0.000	
	U	238	716319	0.682	0.000	
	U 232	232	26	26.923	0.000	
⌈	U-tot	238	723012	0.673	0.000	
|	U-238a	238	716319	0.682	0.000	
|	U-235a	235	6631	2.693	0.000	
⌊>	U 236	236	8369	0.613	0.000	
	U 236-IS	236	8369	0.613	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.667				ng/L
	U	234	58.334				ng/L
	U	235	6631.419				ng/L
	U	238	716319.309				ng/L
	U 232	232	26.000				ng/L
⌈	U-tot	238	86.398	**44984.000**	570.23	1.3	ng/L
|	U-238a	238	85.598	**44572.000**	569.77	1.3	ng/L
|	U-235a	235	0.792	**319.000**	9.40	2.9	ng/L
⌊>	U 236	236	8368.850				ng/L
	U 236-IS	236	8368.850	**101.423**	0.62	0.6	%R

010309

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Monday, August 15, 2011 14:54:26
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icv.980
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	33.333	0.000	
	U	234	27	9.799	0.000	
	U	235	1941	4.110	0.000	
	U	238	121161	0.952	0.000	
	U 232	232	34	15.242	0.000	
⌈	U-tot	238	123136	0.957	0.000	
|	U-238a	238	121161	0.952	0.000	
|	U-235a	235	1941	4.110	0.000	
⌊>	U 236	236	8352	0.543	0.000	
	U 236-IS	236	8352	0.543	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	6.000				ng/L
	U	234	27.000				ng/L
	U	235	1941.207				ng/L
	U	238	121161.442				ng/L
	U 232	232	33.667				ng/L
⌈	U-tot	238	14.744	**7616.647**	115.64	1.5	ng/L
|	U-238a	238	14.508	**7546.405**	113.05	1.5	ng/L
|	U-235a	235	0.232	**54.247**	4.78	8.8	ng/L
⌊>	U 236	236	8351.835				ng/L
	U 236-IS	236	8351.835	**101.217**	0.55	0.5	%R

0210310

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Monday, August 15, 2011 14:56:45
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icb.981
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	26.458	0.000	
	U	234	22	12.026	0.000	
	U	235	971	1.500	0.000	
	U	238	171	4.319	0.000	
	U 232	232	26	15.347	0.000	
⌈	U-tot	238	1174	1.485	0.000	
|	U-238a	238	171	4.319	0.000	
|	U-235a	235	971	1.500	0.000	
⌊>	U 236	236	8277	0.679	0.000	
	U 236-IS	236	8277	0.679	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	22.000				ng/L
	U	235	971.385				ng/L
	U	238	170.668				ng/L
	U 232	232	26.333				ng/L
⌈	U-tot	238	0.142	**1.408**	1.39	98.4	ng/L
|	U-238a	238	0.021	**1.013**	0.53	52.6	ng/L
|	U-235a	235	0.117	**-0.170**	0.87	514.2	ng/L
⌊>	U 236	236	8277.100				ng/L
	U 236-IS	236	8277.100	**100.311**	0.68	0.7	%R

010311

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, August 15, 2011 14:59:04
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\critotU.982
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	11	24.052	0.000	
	U	234	20	8.660	0.000	
	U	235	979	0.966	0.000	
	U	238	763	5.720	0.000	
	U 232	232	34	20.863	0.000	
⌜	U-tot	238	1773	2.507	0.000	
|	U-238a	238	763	5.720	0.000	
|	U-235a	235	979	0.966	0.000	
⌞>	U 236	236	8318	1.142	0.000	
	U 236-IS	236	8318	1.142	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	11.000				ng/L
	U	234	20.000				ng/L
	U	235	978.719				ng/L
	U	238	763.365				ng/L
	U 232	232	33.667				ng/L
⌜	U-tot	238	0.213	**38.630**	4.07	10.5	ng/L
|	U-238a	238	0.092	**38.095**	3.29	8.6	ng/L
|	U-235a	235	0.118	**-0.021**	0.83	4025.1	ng/L
⌞>	U 236	236	8317.804				ng/L
	U 236-IS	236	8317.804	**100.805**	1.15	1.1	%R

010312

Quantitative Analysis - Summary Report

Sample ID: cri235

Sample Date/Time: Monday, August 15, 2011 15:01:26
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\cri235.983
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	43.684	0.000	
	U	234	25	24.771	0.000	
	U	235	1033	2.762	0.000	
	U	238	11188	0.753	0.000	
	U 232	232	33	33.045	0.000	
⌈	U-tot	238	12255	0.852	0.000	
|	U-238a	238	11188	0.753	0.000	
|	U-235a	235	1033	2.762	0.000	
⌊>	U 236	236	8355	0.914	0.000	
	U 236-IS	236	8355	0.914	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	24.667				ng/L
	U	235	1033.392				ng/L
	U	238	11188.214				ng/L
	U 232	232	33.333				ng/L
⌈	U-tot	238	1.467	**692.370**	7.02	1.0	ng/L
|	U-238a	238	1.339	**687.726**	6.57	1.0	ng/L
|	U-235a	235	0.124	**2.814**	1.16	41.3	ng/L
⌊>	U 236	236	8355.171				ng/L
	U 236-IS	236	8355.171	**101.257**	0.93	0.9	%R

010313

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Monday, August 15, 2011 15:03:46
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icsa.984
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	15	22.904	0.000	
	U	234	25	23.755	0.000	
	U	235	920	2.595	0.000	
	U	238	219	2.511	0.000	
	U 232	232	491	8.815	0.000	
⌈	U-tot	238	1179	1.589	0.000	
|	U-238a	238	219	2.511	0.000	
|	U-235a	235	920	2.595	0.000	
⌊>	U 236	236	8086	1.360	0.000	
	U 236-IS	236	8086	1.360	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	15.333				ng/L
	U	234	24.667				ng/L
	U	235	919.713				ng/L
	U	238	219.336				ng/L
	U 232	232	491.013				ng/L
⌈	U-tot	238	0.146	**3.482**	1.62	46.6	ng/L
|	U-238a	238	0.027	**4.403**	0.51	11.5	ng/L
|	U-235a	235	0.114	**-1.880**	1.35	72.0	ng/L
⌊>	U 236	236	8086.262				ng/L
	U 236-IS	236	8086.262	**97.999**	1.33	1.4	%R

010314

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Monday, August 15, 2011 15:06:04
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\icsab.985
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	9	24.019	0.000	
	U	234	43	22.414	0.000	
	U	235	3592	0.492	0.000	
	U	238	326972	0.572	0.000	
	U 232	232	359	4.178	0.000	
⌈	U-tot	238	330616	0.573	0.000	
|	U-238a	238	326972	0.572	0.000	
|	U-235a	235	3592	0.492	0.000	
⌊>	U 236	236	8368	1.570	0.000	
	U 236-IS	236	8368	1.570	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	8.667				ng/L
	U	234	43.333				ng/L
	U	235	3592.376				ng/L
	U	238	326971.655				ng/L
	U 232	232	359.340				ng/L
⌈	U-tot	238	39.513	**20533.568**	219.53	1.1	ng/L
|	U-238a	238	39.077	**20342.879**	217.59	1.1	ng/L
|	U-235a	235	0.429	**147.344**	2.29	1.6	ng/L
⌊>	U 236	236	8368.184				ng/L
	U 236-IS	236	8368.184	**101.415**	1.59	1.6	%R

010315

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 15:08:41
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.986
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	6	20.377	0.000	
	U	234	19	7.901	0.000	
	U	235	884	3.133	0.000	
	U	238	158	9.000	0.000	
	U 232	232	43	10.906	0.000	
⌈	U-tot	238	1066	2.382	0.000	
|	U-238a	238	158	9.000	0.000	
|	U-235a	235	884	3.133	0.000	
⌊>	U 236	236	7809	2.182	0.000	
	U 236-IS	236	7809	2.182	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.667				ng/L
	U	234	19.333				ng/L
	U	235	883.710				ng/L
	U	238	157.668				ng/L
	U 232	232	43.333				ng/L
⌈	U-tot	238	0.137	**-1.337**	1.99	149.1	ng/L
|	U-238a	238	0.020	**0.777**	0.71	91.9	ng/L
|	U-235a	235	0.113	**-2.128**	2.38	111.9	ng/L
⌊>	U 236	236	7809.020				ng/L
	U 236-IS	236	7809.020	**94.639**	2.06	2.2	%R

010316

Quantitative Analysis - Summary Report

Sample ID: 469498d10AS

Sample Date/Time: Monday, August 15, 2011 15:11:02
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\469498d10AS.987
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

20uL of 1° Natural Uranium (075-Red-Soil) @ df 100 (11-064-06) in 10 mL

U tot
TV = 20462 ng/L

U 238
TV = 20316 ng/L

U 235
TV = 145 ng/L 8/15/11 JS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	10	17.321	0.000	
	U	234	54	14.109	0.000	
	U	235	4827	1.610	0.000	
	U	238	380363	1.197	0.000	
	U 232	232	300	2.082	0.000	
⌜	U-tot	238	385254	1.193	0.000	
|	U-238a	238	380363	1.197	0.000	
|	U-235a	235	4827	1.610	0.000	
⌞>	U 236	236	7852	1.031	0.000	
	U 236-IS	236	7852	1.031	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	10.000				ng/L
	U	234	53.667				ng/L
	U	235	4827.282				ng/L
	U	238	380363.182				ng/L
	U 232	232	300.005				ng/L
⌜	U-tot	238	49.062	**25513.369**	145.13	0.6	ng/L
|	U-238a	238	48.439	**25218.675**	146.69	0.6	ng/L
|	U-235a	235	0.615	**235.005**	2.36	1.0	ng/L
⌞>	U 236	236	7852.390				ng/L
	U 236-IS	236	7852.390	**95.164**	0.98	1.0	%R

610317

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, August 15, 2011 15:13:23
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\zzz.988
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	78.062	0.000	
	U	234	9	38.490	0.000	
	U	235	834	1.451	0.000	
	U	238	199	7.335	0.000	
	U 232	232	37	23.092	0.000	
⌈	U-tot	238	1047	1.437	0.000	
|	U-238a	238	199	7.335	0.000	
|	U-235a	235	834	1.451	0.000	
⌊>	U 236	236	7300	0.682	0.000	
	U 236-IS	236	7300	0.682	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	5.333				ng/L
	U	234	9.000				ng/L
	U	235	833.705				ng/L
	U	238	198.669				ng/L
	U 232	232	37.000				ng/L
⌈	U-tot	238	0.143	**2.219**	1.58	71.3	ng/L
|	U-238a	238	0.027	**4.452**	1.14	25.6	ng/L
|	U-235a	235	0.114	**-1.656**	0.92	55.3	ng/L
⌊>	U 236	236	7299.596				ng/L
	U 236-IS	236	7299.596	**88.465**	0.60	0.7	%R

010318

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, August 15, 2011 15:15:42
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccv.989
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	5	49.487	0.000	
	U	234	21	29.166	0.000	
	U	235	1744	4.314	0.000	
	U	238	108804	0.957	0.000	
	U 232	232	20	5.679	0.000	
⌈	U-tot	238	110573	0.951	0.000	
|	U-238a	238	108804	0.957	0.000	
|	U-235a	235	1744	4.314	0.000	
⌊>	U 236	236	7586	1.496	0.000	
	U 236-IS	236	7586	1.496	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	4.667				ng/L
	U	234	20.667				ng/L
	U	235	1743.501				ng/L
	U	238	108803.939				ng/L
	U 232	232	20.333				ng/L
⌈	U-tot	238	14.577	**7529.622**	84.95	1.1	ng/L
|	U-238a	238	14.344	**7461.196**	88.33	1.2	ng/L
|	U-235a	235	0.230	**52.988**	3.35	6.3	ng/L
⌊>	U 236	236	7585.831				ng/L
	U 236-IS	236	7585.831	**91.934**	1.38	1.5	%R

Quantitative Analysis - Summary Report

010319

Sample ID: ccb

Sample Date/Time: Monday, August 15, 2011 15:18:00
Sample Description:
Solution Type: Sample
Blank File: C:\Elandata\DataSet\11 August 1\Blank.962
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\tot u-236is a.mth
Dataset File: C:\Elandata\DataSet\11 August 1\ccb.990
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	Mass 233	233	2	98.974	0.000	
	U	234	19	18.977	0.000	
	U	235	916	3.080	0.000	
	U	238	142	6.932	0.000	
	U 232	232	30	34.430	0.000	
⌈	U-tot	238	1080	2.620	0.000	
|	U-238a	238	142	6.932	0.000	
|	U-235a	235	916	3.080	0.000	
⌊>	U 236	236	7633	0.727	0.000	
	U 236-IS	236	7633	0.727	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	Mass 233	233	2.333				ng/L
	U	234	19.000				ng/L
	U	235	916.046				ng/L
	U	238	142.334				ng/L
	U 232	232	29.667				ng/L
⌈	U-tot	238	0.141	**1.194**	1.59	133.3	ng/L
|	U-238a	238	0.019	**-0.019**	0.62	3234.8	ng/L
|	U-235a	235	0.120	**1.080**	1.58	146.3	ng/L
⌊>	U 236	236	7633.203				ng/L
	U 236-IS	236	7633.203	**92.508**	0.67	0.7	%R

010320

Standard Logs and Certificates of Analysis

BOOK / PAGE 03 0038 Book I.D: 10-0406-017

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard : 038RadSOL3 Vendor(s) : NIST

Radionuclide(s) : Tc99 Source I.D. : SRM4288a
034RadSOL1

Dilution : Secondary

Procedure :

20mL of 034RadSOL1 was diluted to a final volume of 200mL with 2.5% nitric acid (Inorg #9052, exp: 11/2013).

$\frac{20\text{mL} \times 9993.1\ \text{pCi/mL}}{200\text{mL}} = 999.31\ \text{pCi/mL}$

WAN 07/07/11

Final Activity :	999.31 pCi/mL	Reference Date :	08/27/2004
Date Prepared :	07/07/11	Certification Date :	07/08/11
Prepared By :	WAN	Re-Certification Date :	07/08/12
Reviewed By :		Date:	07/4/11

FRM-059 (Rev 1/Apr 10)

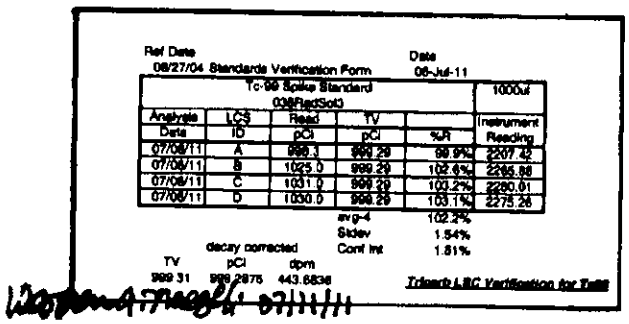
010322

BOOK / PAGE 03 0039 Book I.D: 10-0406-017

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard Verification(s) :



Ref Date 08/27/04 Standards Verification Form Date 06-Jul-11

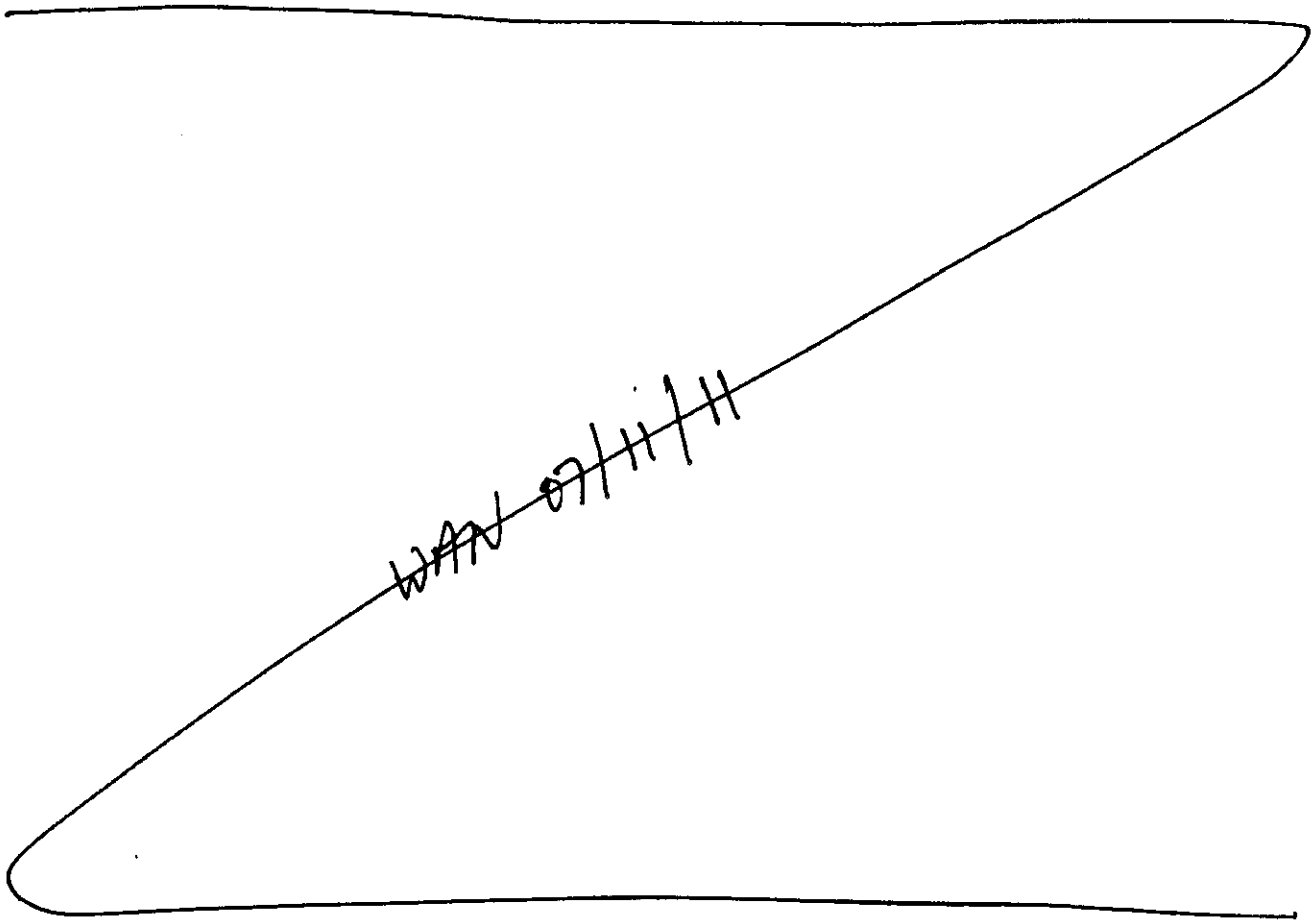
Tc-99 Spike Standard 1000ul
038RadSol3

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
07/08/11	A	998.3	999.29	99.9%	2207.42
07/08/11	B	1025.0	999.29	102.6%	2265.88
07/08/11	C	1031.0	999.29	103.2%	2280.61
07/08/11	D	1030.0	999.29	103.1%	2275.26
			avg-4	102.5%	
			Stdev	1.54%	
			Conf Int	1.81%	

decay corrected

TV	pCi	dpm
999.31	999.2875	443.6836

Triaxis LSC Verification for Tritium



010323

National Institute of Standards & Technology

Certificate

Standard Reference Material 4288A
Technetium-99 Radioactivity Standard

DATE RECEIVED: 9/25/01
DATE EXPIRED: Sept. 2006 OK
DATE OPENED: 10/17/01
INORG: 3083 PO: Client Supplied

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1996 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

010324

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

*Notes and references are on pages 5 and 6.

010325

PROPERTIES OF SRM 4288A
(Certified values are shown in bold type)

Source identification number	NIST SRM 4288A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter: (16.5 ± 0.5) mm Wall Thickness: (0.60 ± 0.04) mm Barium content: Less than 2.5% Lead-oxide content: Less than 0.02% Other heavy elements: Trace quantities		
Solution density	(0.998 ± 0.003) $g \cdot mL^{-1}$ at 21 °C [b]*		
Solution mass	(4.998 ± 0.003) g [b]		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration ($mol \cdot L^{-1}$)	Mass Fraction ($g \cdot g^{-1}$)
	H_2O KOH $K^{99}TcO_4$	55 0.001 0.0005	1.00 0.00006 0.0001
Radiological Properties:			
Radionuclide	Technetium-99		
Reference time	1200 EST, 1 September 1996		
Massic activity of the solution [c]	32.61 $kBq \cdot g^{-1}$		
Relative expanded uncertainty (k=2)	1.14% [d] [e]		
Photon-emitting impurities	None detected [f]		
Half lives used in the decay corrections	Cobalt-60: (5.2714 ± 0.0005) a [g] Technetium-99: (2.111 ± 0.012) × 10^5 a [g]		
Measuring instrument	NIST 4πβ(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.		

*Notes and references are on pages 5 and 6.

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [h]	Relative Sensitivity Factor, $\lvert \partial y/\partial x_i \rvert \cdot (x_i/y)$ [i]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [j]
Extrapolated massic liquid-scintillation count rate of the Tc-99 solution, corrected for background, Co-60 tracer count rate, and decay.	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	0.10	1.0	0.10
Half life of Co-60 Half life of Tc-99	Standard uncertainty of the half life (A)	0.01 [k] 0.6 [k]	0.01 [m] 0.000005	0.0001 0.000003
Decay scheme data	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.40	1.0	0.40
Calibration of the Co-60 tracer solution using the $4\pi\beta(LS)$-γ-anticoincidence counting system	Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live time [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.00004	0.004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.57
Coverage Factor, k				x 2
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.14

*Notes and references are on pages 5 and 6.

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	<0.1		(Not detectable)

[b] The stated uncertainty is two times the standard uncertainty.

[c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a *standard uncertainty*, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| \cdot u(x_i)$, called a component of combined standard uncertainty of y.

The combined standard uncertainty of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U, the expanded uncertainty of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] Estimated limits of detection for photon-emitting impurities are:
2×10^{-4} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 20 and 85 keV,
2×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 93 and 503 keV,
1×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 519 and 1457 keV, and
5×10^{-6} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 1465 and 3250 keV.

[g] The stated uncertainty is the standard uncertainty. See reference [5].

[h] Relative standard uncertainty of the input quantity x_i.

[i] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[j] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[k] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Tc-99})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Tc-99})\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

010329

ERA

A Waters Company

Certificate of Analysis

Lot No. P165-977

WasteWatR™ pH

Catalog No. 977
Issue Date: January 5, 2009
Revision Date: Original

Certification

Parameter	Certified Value [1] (s.u.)	Uncertainty [2]	QC PALs™ [3] (s.u.)	PT PALs™ [4] (s.u.)
pH	7.13	2.8%	6.99 - 7.27	6.93 - 7.33

Analytical Verification

Parameter	Round Robin Data [5] Mean (s.u.)	Round Robin Data [5] Recovery (%)	n	NIST Traceability SRM Number	NIST Traceability Recovery (%)
pH	7.13	100%	297	SRM 187e	101%

Please see footnotes on back

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/23/08
DATE EXPIRED: 03/01/2012
DATE OPENED: 07/01/10 SW
INORG: 8301 PO: PE

ERA

A Waters Company

1. The **Certified Value** is the actual "made-to" concentration confirmed by ERA analytical verification.

2. The stated **Uncertainty** is the total propagated uncertainty at the 95% confidence interval. The uncertainty is based on the preparation and internal analytical verification of the product by ERA, times a coverage factor which is equal to the student t factor at a 95% confidance interval at n-1 degrees of freedom.

3. The **QC Performance Acceptance Limits (QC PALs™)** are based on actual historical data collected in ERA's Proficiency Testing program. The **QC PALs™** reflect any inherent biases in the methods used to establish the limits and closely approximate a 95% confidence interval of the performance that experienced laboratories should achieve using accepted environmental methods. Use the **QC PALs™** to realistically evaluate your performance against your peers.

4. The **PT Performance Acceptance Limits (PT PALs™)** are calculated using the regression equations and fixed acceptance criteria specified in the NELAC proficiency testing requirements. Use the **PT PALs™** when analyzing this QC standard alongside USEPA and NELAC compliant PT standards. Please note that many PT study acceptance limits are concentration dependent (some non-linearly) and, therefore, the acceptance limits of this QC standard and any PT standard may differ relative to their difference in concentrations.

5. The **Analytical Verification** data include the mean value, percent recovery and number of data points reported by the laboratories in our Proficiency Testing study compared to the Certified Values. In addition, where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed.

Traceability Recovery (%) = [(% recovery certified standard)/(% recovery NIST SRM)]*100

The traceability data shown were compiled by analyzing the ERA standards or their associated stock solutions against the applicable NIST SRMs.

6. This standard **expires 3/2012.** The certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or email to info@eraqc.com.

Certifying Officer: Tom Widera

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SOUTHWEST RESEARCH INSTITUTE

6220 CULEBRA RD. 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

Chemistry and Chemical Engineering Division
Department of Analytical and Environmental Chemistry

October 31, 2011

Fluor-B&W Portsmouth LLC
3930 U.S. Route 23 South
Bldg. X-1000
Piketon, OH 45661

Attn: Gerald Fulkerson

Subject:		
	Client ID:	FXP02234L04
	SwRI Project Number:	16526.05.00X
	SDG:	473754
	SwRI Task Order Number:	110825-I0
	SwRI Sample Receipt Number:	45484, 45511
	Samples Received:	08.23.11, 08.25.11
	Fraction:	Distribution Coefficient Results

Dear Mr. Fulkerson:

Please find the enclosed results for the eleven (11) samples received on the above referenced date. Should you have any questions, please feel free to contact me at 210-522-3242.

Sincerely,

Radonna Spies
Group Leader

APPROVED:

Michael J. Dammann
Director

RS:aa

Encl

000001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

NARRATIVE

Client: Fluor-B&W Portsmouth LLC
SDG: 473754
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110825-10

INORGANICS ANALYSIS

The Distribution Coefficients (K_d) for Tc-99 and Total Uranium (U) were determined using the following modification to ASTM C1733.

The contact solution was be prepared by spiking the client provided Tc-99 contaminated groundwater, which had been filtered through a Whatman #1810-125 acid treated TCLP filter, at 100 ppb Uranium. (Tc-99 groundwaters 749-WPW-03, 749-WPW-04 and 749-WPW-05 were used). Only the minimum volume needed for the sample batch was prepared. Samples were weighted in duplicate for 5 time points (Day 7, Day 10, Day 14, Day 21 and Day X). The method specifies a 1:25 soil to contact solution test ratio; therefore, 200 mL of contact solution was added to 8 g of soil in a 250-mL Nalgene bottle. Samples were tumbled using the TCLP tumbler for 12-hours a day. For each time point, a 200 mL of the contact solution was added to an empty Nalgene and processed alongside the sample as a time point "Blank" for each Day n.

At each time point, the sample duplicates and time point "Blank" were filtered using a Whatman #1810-125 acid treated TCLP filter. The filtrate was preserved with nitric acid and stored for analysis. After the 4th time point (Day 21), all samples and "Blanks" were submitted for Tc-99 and total uranium analysis. Please note that the Day 10 time point was inadvertently pulled on Day 9.

To calculate Kd in C1733, the following equation is used:

$$K_d = \frac{\frac{(C_s x V) - (C_f x V)}{m}}{C_f}$$

Where:
Cs = Starting Concentration of analyte of interest in contact solution
Cf = Final Concentration of analyte of interest in contact solution
V = Total Volume of contact liquid (mL)
m = Dry Mass of Solid (g)

For the purposes of this modified analysis at multiple time points, the concentrations of all "Blanks" analyzed were averaged and used as the starting concentration of the contact solution. The samples were not dried prior to the sample analysis; therefore, a percent solids was performed, and the results are reported on a dry weight basis. Therefore, following equation was used:

$$K_d = \frac{\frac{(C_{avg\ blk} x V) - (C_{day\ x} x V)}{m x \%\ soilds}}{C_{day\ x}}$$

Client: Fluor-B&W Portsmouth LLC
SDG: 473754
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110825-10

Where:
$C_{avg\ blk}$ = average "Blank" concentration which represents the starting concentration of analyte of interest in contact solution
$C_{day\ x}$ = concentration of analyte of interest in contact solution at time point x
V = total volume of contact liquid (mL)
m = weight of Solid (g)

In addition to the K_d values, the propagated uncertainties were also calculated. The K_d values and the uncertainties for the sample duplicates were averaged for each time point. By evaluating these values, it was established when the Tc-99 and U sorption equilibrium had been reached. It was determined that all samples had reached equilibrium by Day 21; therefore, the analysis of Day X was not necessary.

The final K_d value reported is an average of all K_d time points values once equilibrium was achieved. With the exception of SwRI ID #473758 (WDSB02-07-4.5), it appeared that equilibrium was reached by the first time point (Day 7). Therefore, the final K_d and uncertainties values are the averages of Days 7-21. Equilibrium wasn't reached until Day 14; average of Days 14 and 21 was reported. Also, SwRI ID #473757 (WDSB02-07-24.5) contained two outliers compared to the time points and replicates; therefore, they were not used in the K_d calculation/

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Group Leader

10/28/11
Date

Client: Fluor B&W Portsmouth
SDG: 473754
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110825-10

RADIOLOGICAL ANALYSIS

The sample SDG 473754 consisted of eleven soil samples received for radiological analysis. The soil samples for radiological analysis were reported on an "as received" basis. The recommended sample holding time of six months was met.

The samples were analyzed for the following:

Matrix	Analysis	Method
Soil	^{99}Technetium	Liquid Scintillation Spectroscopy

^{99}Technetium

A 100ml aliquot of each sample fraction was analyzed for ^{99}Technetium. The sample aliquots were digested at 80°C for 4 hours with nitric acid and then one additional hour with hydrogen peroxide. The aliquots were then brought to a final volume of 50ml and then chemically separated using resins. A preparation blank and two laboratory control samples were analyzed with each sample batch. Each sample fraction was analyzed in duplicate.

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

For ^{99}Tc analysis, the ^{99}Tc was separated from the digestion using chemical separation resins. After chemical separation, the resin containing the ^{99}Tc was placed into a liquid scintillation vial and 15 ml of scintillation cocktail was added. The samples were counted on a liquid scintillation counter programmed to count only the ^{99}Tc region of interest. The liquid scintillation counter ^{99}Tc program was standardized using ^{99}Tc as the radioisotope to establish a specific efficiency quench curve. A total of eight preparation blanks and sixteen laboratory control samples were analyzed with the sample batches. All of the results for the preparation blanks were less than 1.65 times the TPU, the MDA, and the RL with the exception of SwRI sample ID PBWK11JV1. The preparation blank result for SwRI sample ID PBWK11JV1 was greater than 1.65 times the TPU, but was less than the MDA and the RL. The results for all of the laboratory control samples were within the recovery control limits of 75-125%. Each sample fraction was analyzed in duplicate and the sample duplicate evaluation ratio was less than three for all duplicates. A matrix spike and matrix spike duplicate were not performed with any of the analyses.

000005

Client: Fluor B&W Portsmouth
SDG: 473754
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110825-10

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Warren A. Naegeli
Research Scientist

10/25/11
Date

Client: Fluor – B&W Portsmouth LLC
SDG: 473754
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110825-10

TOTAL URANIUM ANALYSIS

The acidified leachates were analyzed directly (no digestion was required) for total uranium by ICP-MS. All instrument QC criteria were met. The percent recoveries for the initial and continuing calibration verifications were within 90-110%. Total uranium was not detected above SwRI's reporting limit in the initial and continuing calibration blanks. The low level, CRI standard recoveries were within 50-150%. The percent recoveries for the interference check sample ICSABs were within 80-120%. The internal standard recoveries were within 80-120% for the ICV/CCV/ICB/CCBs and within 30-120% for all samples.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Ranger
Group Leader

10/28/11
Date

000007

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

Sample Receipt

Sample Receipt Number: 45484

Southwest Research Institute

VTSR: 08/23/11

Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged In by: DRoman
Creation Date: 08/22/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #s:
875591109330
874541431008
875591109340
874541430950

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Aug 23 2011 10:24AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
473633	231A-01G-03	08/19/11	WG	1	
473634	749-WPW-03	08/19/11	WG	1	
Containers: 2				**Samples: 2**	

These documents are associated with this receipt: 106111[COC for SRR 45484], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports

SR#: 45484

FRM-002

Page Printed: 31 Oct 2011 9:11:09

Sample Receipt

Sample Receipt Number: 45511

Southwest Research Institute

VTSR: 08/25/11

Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 08/24/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #875591109395

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Aug 25 2011 3:05PM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
473754	WDSB02-07-12.0	08/23/11	SO	1	
473755	WDSB02-07-19.5	08/23/11	SO	1	
473756	WDSB02-07-2.0	08/23/11	SO	1	
473757	WDSB02-07-24.5	08/23/11	SO	1	
473758	WDSB02-07-4.5	08/23/11	SO	1	
473759	WDSB02-09-12.0	08/23/11	SO	1	
473760	WDSB02-09-19.5	08/23/11	SO	1	
473761	WDSB02-09-2.0	08/23/11	SO	1	
473762	WDSB02-09-24.5	08/23/11	SO	1	
473763	WDSB02-09-4.5	08/23/11	SO	1	
473764	WDSB05-04-12.0	08/23/11	SO	1	
473765	WDSB05-04-19.5	08/23/11	SO	1	
473766	WDSB05-04-2.0	08/23/11	SO	1	
473767	WDSB05-04-24.5	08/23/11	SO	1	
473768	WDSB05-07-12.0	08/23/11	SO	1	
473769	WDSB05-07-19.5	08/23/11	SO	1	
473770	WDSB05-07-2.0	08/23/11	SO	1	
473771	WDSB05-07-24.5	08/23/11	SO	1	
473772	WDSB05-07-4.5	08/23/11	SO	1	
473773	WDSB05-09-12.0	08/23/11	SO	1	
473774	WDSB05-09-19.5	08/23/11	SO	1	
473775	WDSB05-09-2.0	08/23/11	SO	1	
473776	WDSB05-09-24.5	08/23/11	SO	1	
473777	WDSB05-09-4.5	08/23/11	SO	1	
473778	WDSB05-22-12.0	08/23/11	SO	1	
473779	WDSB05-23-12.0	08/23/11	SO	1	

Containers: 26 **Samples: 26**

Client: Fluor-B&W Ports

SR#: 45511

FRM-002

000010

Sample Receipt

Sample Receipt Number: 45511

Southwest Research Institute

VTSR: 08/25/11

Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged In by: DRoman
Creation Date: 08/24/11

These documents are associated with this receipt: 106185[COC for SRR 45511], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports

SR#: 4551

FRM-002

Page Printed: 31 Oct 2011 9:23:58

Sample Receipt

Sample Receipt Number: 45547

Southwest Research Institute

VTSR: 08/30/11

Time: 09:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 08/30/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #s:
875591109682
874541430814
874541430755
874541430803
875591109454

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Aug 30 2011 3:15PM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
474203	231A-01G-04	08/19/11	WG	1	
474204	749-WPW-04	08/19/11	WG	1	
474205	WDSB01-04-12.0	08/27/11	SO	1	
474206	WDSB01-04-19.5	08/27/11	SO	1	
474207	WDSB01-04-2.0	08/26/11	SO	1	
474208	WDSB01-04-24.5	08/27/11	SO	1	
474209	WDSB01-04-4.5	08/26/11	SO	1	
474210	WDSB07-04-12.0	08/25/11	SO	1	
474211	WDSB07-04-4.5	08/25/11	SO	1	
474212	WDSB07-07-12.0	08/25/11	SO	1	
474213	WDSB07-07-2.0	08/25/11	SO	1	
474214	WDSB07-07-4.5	08/25/11	SO	1	
474215	WDSB07-09-12.0	08/25/11	SO	1	
474216	WDSB07-09-2.0	08/25/11	SO	1	
474217	WDSB07-09-4.5	08/25/11	SO	1	
474218	WDSB07-15-4.5	08/25/11	WQ	3	
474219	WDSB09-04-2.0	08/25/11	SO	1	
474220	WDSB09-04-4.5	08/25/11	SO	1	
474221	WDSB09-07-2.0	08/25/11	SO	1	
474222	WDSB09-07-4.5	08/25/11	SO	1	
474223	WDSB09-09-2.0	08/25/11	SO	1	
474224	WDSB09-09-4.5	08/25/11	SO	1	
474225	WDSB09-15-4.5	08/25/11	WQ	3	
474226	WDSB09-28-19.5	08/25/11	WQ	3	

Containers: 30 **Samples: 24**

Client: Fluor-B&W Ports

SR#: 45547

FRM-002

Sample Receipt

Sample Receipt Number: 45547

Southwest Research Institute

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

VTSR: 08/30/11

Time: 09:30:00

Manager: DAMMANN, MIKE
Logged In by: DRoman
Creation Date: 08/30/11

These documents are associated with this receipt: 106365[COC for SRR 45547], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports SR#: 4554[redacted] FRM-002

Page Printed: 31 Oct 2011 10:22:18

000013

Sample Receipt

Southwest Research Institute

Sample Receipt Number: 45654
Revision: 1

VTSR: 09/15/11

Time: 08:45:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

This Receipt was Revised Sep 23 2011 8:42AM

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 09/14/11

Notes

Samples were received intact 3.0°C (blue & wet ice)
Fed Ex Tracking #s:
874541430218
874541430207
874541430229

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Sep 15 2011 10:29AM ***
Rev. 1
Revised matrix from SO to BR
*** DRoman Sep 23 2011 8:42AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
475063	749-WPW-05	09/13/11	WG	1	
475064	749-WPW-06	09/13/11	WG	1	
475065	749-WPW-07	09/13/11	WG	1	
475066	WDMW04B-33-BE01	09/13/11	BR	1	
475067	WDMW04B-33-BE10	09/13/11	BR	1	
475068	WDMW04B-33-CU01	09/13/11	BR	1	
475069	WDMW04B-33-CU10	09/13/11	BR	1	
475070	WDMW04B-33-SU01	09/13/11	BR	1	
475071	WDMW04B-33-SU10	09/13/11	BR	1	

Containers: 9 **Samples: 9**

These documents are associated with this receipt: 107011[COC for SRR 45654], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports

SR#: 45654

FRM-002

000014

Southwest Research Institute

Laboratory Task Order

TO #: 110825-10 Revision: 1

SDG: 473754
VTSR: 08/25/11
CASE: FXP02234L04

SRR #'s: 45484, 45511
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 09/20/11
To QA: 09/20/11
To Client: 09/21/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 473754. SDG IS CLOSED.

28-day TAT HARDCOPY. Using 26-day TAT for Report/EDD.
FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 09/22/11.

26 overall SO samples (26 containers) received on 08/25/11 for SOW FXP02234L04.
OUT of the 26 samples, only the 11 SOIL samples for DISTRIBUTION COEFFICIENT are listed in this task order.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 09/14/11: Task Order revised to change SDG from 473033 to 473754. Also, samples 473633 and 473634 WG samples added to task order, which are used for the spiking and blanks.

Documents Related to this task order: 106111[COC for SRR 45484], 106185[COC for SRR 45511], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 13

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
473633		1	WG	231A-01G-03	19 Aug 11	15 Feb 12
473634		1	WG	749-WPW-03	19 Aug 11	15 Feb 12
473754		1	SO	WDSB02-07-12.0	23 Aug 11	19 Feb 12
473755		1	SO	WDSB02-07-19.5	23 Aug 11	19 Feb 12
473756		1	SO	WDSB02-07-2.0	23 Aug 11	19 Feb 12
473757		1	SO	WDSB02-07-24.5	23 Aug 11	19 Feb 12
473758		1	SO	WDSB02-07-4.5	23 Aug 11	19 Feb 12
473768		1	SO	WDSB05-07-12.0	23 Aug 11	19 Feb 12
473769		1	SO	WDSB05-07-19.5	23 Aug 11	19 Feb 12
473770		1	SO	WDSB05-07-2.0	23 Aug 11	19 Feb 12
473771		1	SO	WDSB05-07-24.5	23 Aug 11	19 Feb 12
473772		1	SO	WDSB05-07-4.5	23 Aug 11	19 Feb 12
473778		1	SO	WDSB05-22-12.0	23 Aug 11	19 Feb 12

Southwest Research Institute

Laboratory Task Order

TO #: 110825-10 Revision: 1

SDG: 473754
VTSR: 08/25/11
CASE: FXP02234L04

SRR #'s: 45484, 45511
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 09/20/11
To QA: 09/20/11
To Client: 09/21/11

Test: ICPMS-SWRI-ISO_U Holding: 180 days from ASTM_C1733
Section: METALS ICPMS SwRI Method Isotopic Uranium Cnt: 11

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
473754		1	SO	WDSB02-07-12.0		Unknown
473755		1	SO	WDSB02-07-19.5		Unknown
473756		1	SO	WDSB02-07-2.0		Unknown
473757		1	SO	WDSB02-07-24.5		Unknown
473758		1	SO	WDSB02-07-4.5		Unknown
473768		1	SO	WDSB05-07-12.0		Unknown
473769		1	SO	WDSB05-07-19.5		Unknown
473770		1	SO	WDSB05-07-2.0		Unknown
473771		1	SO	WDSB05-07-24.5		Unknown
473772		1	SO	WDSB05-07-4.5		Unknown
473778		1	SO	WDSB05-22-12.0		Unknown

Test: LSC-TC99_SWRI Holding: 180 days from ASTM_C1733
Section: RADCHEM Technetium-99 by liquid scintillation counting Cnt: 11

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
473754		1	SO	WDSB02-07-12.0		Unknown
473755		1	SO	WDSB02-07-19.5		Unknown
473756		1	SO	WDSB02-07-2.0		Unknown
473757		1	SO	WDSB02-07-24.5		Unknown
473758		1	SO	WDSB02-07-4.5		Unknown
473768		1	SO	WDSB05-07-12.0		Unknown
473769		1	SO	WDSB05-07-19.5		Unknown
473770		1	SO	WDSB05-07-2.0		Unknown
473771		1	SO	WDSB05-07-24.5		Unknown
473772		1	SO	WDSB05-07-4.5		Unknown
473778		1	SO	WDSB05-22-12.0		Unknown

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC127LL**

Page: 1 for OSDC127LL
Date: 08/22/2011 07:31 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
231A-01G-03	OSDC127	5UA	WG	REG	2.5	GAL	CUBI	1	19-AUG-2011	803		Distribution Coefficient	None	WATER CONTAINING URANIUM TO RUN Kd Distribution Coefficient

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	22-AUG-2011	OSDC	OSDC127LL	DEG C		FXP02234L04

Relinquished by:	Date(mm/dd/yyyy): 8/22/11	Time: 0913	Received by: Benjy J. Kenney	Date(mm/dd/yyyy): 8-22-11	Time: 0913
Relinquished by: Benjy J. Kenney	Date(mm/dd/yyyy): 8-22-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-22-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/23/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 8/23/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

Client: Flour B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/23/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45484
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

000016

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC125LL**

Page: 1 for OSDC125LL
Date: 08/22/2011 07:31 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-03	OSDC125	X-749	WG	REG	2.5	GAL	CUBI	1	19-AUG-2011	906		Distribution Coefficient	None	Water containing TC99 to run Kd Distribution Coefficient

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	22-AUG-2011	OSDC	OSDC125LL	DEG C		FXP02234L04

Relinquished by:	Date(mm/dd/yyyy): 8/22/11	Time: 0913	Received by: Benj J. Thomas	Date(mm/dd/yyyy): 8-22-11	Time: 0913
Relinquished by: Benj J. Thomas	Date(mm/dd/yyyy): 8-22-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-22-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/23/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 8/23/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Sc

Client: Flour B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/23/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45484
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

000017

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.06-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45484

Airbill: SEE SRR NOTES

1. Custody Seal. Present
2. Chain of Custody Present
3. Sample Tags Not Present
   Sample Tag Numbers Not on COC
4. SMO Forms Not Present

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
				Sample Tag #	Cont #		
08/23/11	08:30:00	OSDC127LL	231A-01G-03	None	473633	YES	Intact
08/23/11	08:30:00	OSDC125LL	749-WPW-03	None	473634	YES	Intact

WO: 45484

FRM-217

000018

SAMPLE LOG-IN SHEET

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DINO ROMAN	Log-in Date: 08/22/2011
Received By (Signature): [signature]	
Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1. Custody Seal(s)	Present / Absent* Intact / Broken	
2. Custody Seal Nos.	N/A	
3. Chain-of Custody Records	Present / Absent*	
4. Traffic Reports or Packing Lists	Present / Absent	
5. Airbill	Airbill/Sticker Present / Absent*	
6. Airbill No.	SEE SRR NOTES	
7. Sample Tags	Present / Absent	
Sample Tag Numbers	Listed / Not listed on Chain of Custody	
8. Sample Condition	Intact / Broken*/ Leaking	
9. Cooler Temperature	3.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	Yes / No*	
11. Date Received at Lab	08/23/2011	
12. Time Received	08:30:00	

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
231A-01G-03	None	473633	Intact
749-WPW-03	None	473634	Intact

Sample Transfer	
Fraction: Inorg	Fraction
Area #: R13	Area #
By: DINO ROMAN	By
On: 08/23/2011	On

* Contact SMO and attach record of resolution

Reviewed By: [signature]	Logbook No.: Sample Receipt (45484)
Date: 8.24.11	Logbook Page No.: 7729 SEC 4 of 4

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC129LL**

RECEIVED
AUG 25 2011

Page: 1 for OSDC129LL
Date: 08/23/2011 04:34 PM

Client: Fluor B&W
SwRI Project #16526.05.00X
VTSR: 08/25/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45511
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB02-07-12.0	OSDC129	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1330		Distribution Coefficient	DEG4C	
WDSB02-07-19.5	OSDC129	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1415		Distribution Coefficient	DEG4C	
WDSB02-07-2.0	OSDC129	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1222		Distribution Coefficient	DEG4C	
WDSB02-07-24.5	OSDC129	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1445		Distribution Coefficient	DEG4C	
WDSB02-07-4.5	OSDC129	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1236		Distribution Coefficient	DEG4C	
WDSB02-09-12.0	OSDC129	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1330		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB02-09-19.5	OSDC129	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1415		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB02-09-2.0	OSDC129	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1222		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB02-09-24.5	OSDC129	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1445		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB02-09-4.5	OSDC129	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1236		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	24-AUG-2011	OSDC	OSDC129LL	DEG C		FXP02234L04

Relinquished by: Henry Glasgow III	Date(mm/dd/yyyy): 8-24-11	Time: 0830	Received by: FWS Fedex	Date(mm/dd/yyyy): 82411	Time: 0830		
Relinquished by: FWS	Date(mm/dd/yyyy): 82411	Time: 1200	Received by:	Date(mm/dd/yyyy): 82411	Time: 1200		

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC44LL**

Page: 2 for OSDC44LL
Date: 08/23/2011 04:35 PM

WDSB05-09-19.5	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1400		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB05-09-2.0	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1220		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB05-09-24.5	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1430		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB05-09-4.5	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1230		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB05-22-12.0	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1310		Distribution Coefficient	DEG4C	
WDSB05-23-12.0	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1310		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	24-AUG-2011	OSDC	OSDC44LL	DEG C		FXP02234L04

Relinquished by: Stacy Flaggs	Date(mm/dd/yyyy): 8-24-11	Time: 0830	Received by: AWS Fedex	Date(mm/dd/yyyy): 82411	Time: 0830
Relinquished by: AWS Fed Ex	Date(mm/dd/yyyy): 82411	Time: 1700	Received by:	Date(mm/dd/yyyy): 82411	Time: 1700
Relinquished by:	Date(mm/dd/yyyy): 8/25/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 8/25/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

RT

Client: Fluor B&W
SwRI Project #16526.05.00X
VTSR: 08/25/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45511
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

000020

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC129LL**

Page: 2 for OSDC129LL
Date: 08/23/2011 04:34 PM

Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/25/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 8/25/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

Client: Fluor B&W
SwRI Project #16526.05.00X
VTSR: 08/25/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45511
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

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000021

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC44LL**

Page: 1 for OSDC44LL
Date: 08/23/2011 04:35 PM

Client: Fluor B&W
SwRI Project #16526.05.00X
VTSR: 08/25/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45511
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB05-04-12.0	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1310		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB05-04-19.5	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1400		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB05-04-2.0	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1220		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB05-04-24.5	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1430		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB05-07-12.0	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1310		Distribution Coefficient	DEG4C	
WDSB05-07-19.5	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1400		Distribution Coefficient	DEG4C	
WDSB05-07-2.0	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1220		Distribution Coefficient	DEG4C	
WDSB05-07-24.5	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1430		Distribution Coefficient	DEG4C	
WDSB05-07-4.5	OSDC44	SS	SO	REG	8	OZ	AGLS	1	23-AUG-2011	1230		Distribution Coefficient	DEG4C	
WDSB05-09-12.0	OSDC44	SS	SO	REG	4	OZ	AGLS	1	23-AUG-2011	1310		Cation-Exchange Capacity (SW846-9081)	DEG4C	

0002214 AA 10.3.11

000022

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45511

Airbill: 875591109395

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
08/25/11	08:30:00	OSDC129LL	WDSB02-07-12.0	None	473754	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-07-19.5	None	473755	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-07-2.0	None	473756	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-07-24.5	None	473757	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-07-4.5	None	473758	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-09-12.0	None	473759	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-09-19.5	None	473760	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-09-2.0	None	473761	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-09-24.5	None	473762	YES	Intact
08/25/11	08:30:00	OSDC129LL	WDSB02-09-4.5	None	473763	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-04-12.0	None	473764	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-04-19.5	None	473765	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-04-2.0	None	473766	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-04-24.5	None	473767	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-07-12.0	None	473768	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-07-19.5	None	473769	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-07-2.0	None	473770	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-07-24.5	None	473771	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-07-4.5	None	473772	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-09-12.0	None	473773	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-09-19.5	None	473774	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-09-2.0	None	473775	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-09-24.5	None	473776	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-09-4.5	None	473777	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-22-12.0	None	473778	YES	Intact
08/25/11	08:30:00	OSDC44LL	WDSB05-23-12.0	None	473779	YES	Intact

Pacific Southwest Lab-B&W
WO: 45511
FRM-217

000023

SAMPLE LOG-IN SHEET

Lab Name: Southwest Research Institute	Page 1 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/24/2011
Received By (Signature)	
Case Number: FXP02234L04	Sample Delivery Group No.: NA
Remarks: 16526.05.00X	SAS Number: NA

1.	Custody Seal(s)	(Present)/Absent* (Intact)/Broken
2.	Custody Seal Nos.	NA
3.	Chain-of Custody Records	(Present)/Absent*
4.	Traffic Reports or Packing Lists	Present/(Absent)
5.	Airbill	Airbill/Sticker (Present)/Absent*
6.	Airbill No.	875591109395
7.	Sample Tags	Present/(Absent)
	Sample Tag Numbers	Listed/(Not listed on Chain of Custody
8.	Sample Condition	(Intact)/Broken*/ Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	(Yes)/No*
11.	Date Received at Lab	08/25/2011
12.	Time Received	08:30:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB02-07-12.0	None	473754	Intact
WDSB02-07-19.5	None	473755	Intact
WDSB02-07-2.0	None	473756	Intact
WDSB02-07-24.5	None	473757	Intact
WDSB02-07-4.5	None	473758	Intact
WDSB02-09-12.0	None	473759	Intact
WDSB02-09-19.5	None	473760	Intact
WDSB02-09-2.0	None	473761	Intact
WDSB02-09-24.5	None	473762	Intact
WDSB02-09-4.5	None	473763	Intact
WDSB05-04-12.0	None	473764	Intact
WDSB05-04-19.5	None	473765	Intact
WDSB05-04-2.0	None	473766	Intact
WDSB05-04-24.5	None	473767	Intact
WDSB05-07-12.0	None	473768	Intact
WDSB05-07-19.5	None	473769	Intact
WDSB05-07-2.0	None	473770	Intact
WDSB05-07-24.5	None	473771	Intact
WDSB05-07-4.5	None	473772	Intact
WDSB05-09-12.0	None	473773	Intact
WDSB05-09-19.5	None	473774	Intact
WDSB05-09-2.0	None	473775	Intact
WDSB05-09-24.5	None	473776	Intact

Sample Transfer	
Fraction: Fbrg	Fraction
Area #: R17	Area #
By: DINO ROMAN	By
On: 08/25/2011	On

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45511)
Date: 8.26.11	Logbook Page No.: 7731 SOC 3, 4 of 5

7730

SAMPLE LOG-IN SHEET

000024

Lab Name: Southwest Research Institute	Page 2 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/24/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1. Custody Seal(s)	(Present)/Absent* (Intact)/Broken	
2. Custody Seal Nos.	N/A	
3. Chain-of Custody Records	(Present)/Absent*	
4. Traffic Reports or Packing Lists	Present/(Absent)	
5. Airbill	Airbill/Sticker (Present)/Absent*	
6. Airbill No.	875591109395	
7. Sample Tags	Present/(Absent)	
Sample Tag Numbers	Listed/(Not) listed on Chain of Custody	
8. Sample Condition	(Intact)/Broken*/Leaking	
9. Cooler Temperature	3.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	(Yes)/No*	
11. Date Received at Lab	08/25/2011	
12. Time Received	08:30:00	

Sample Transfer	
Fraction: Trans	Fraction:
Area #: R13	Area #:
By: DINO ROMAN	By:
On: 08/25/2011	On:

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB05-09-4.5	None	473777	Intact
WDSB05-22-12.0	None	473778	Intact
WDSB05-23-12.0	None	473779	Intact

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45511)
Date: 8.26.11	Logbook Page No.: ~~7731~~ 7730 SEC 3, 4 OF 5

1063365

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC126LL**

Page: 1 for OSDC126LL
Date: 08/24/2011 07:01 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-04	OSDC126	X-749	WG	REG	2.5	GAL	CUBI	1	19-AUG-2011	920		Distribution Coefficient	None	Water containing TC99 to run Kd Distribution Coefficient

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC126LL	DEG C		FXP02234L04

Relinquished by: Stacy Clegg	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Sandy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Sandy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

LR

000025

000026

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45547

Airbill: SEE SRR NOTES

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
08/30/11	09:30:00	OSDC128LL	231A-01G-04	None	474203	YES	Intact
08/30/11	09:30:00	OSDC126LL	749-WPW-04	None	474204	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-12.0	None	474205	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-19.5	None	474206	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-2.0	None	474207	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-24.5	None	474208	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-4.5	None	474209	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-04-12.0	None	474210	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-04-4.5	None	474211	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-12.0	None	474212	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-2.0	None	474213	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-4.5	None	474214	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-12.0	None	474215	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-2.0	None	474216	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-4.5	None	474217	YES	Intact
08/30/11	09:30:00	OSDC112LL	WDSB07-15-4.5	None	474218	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-04-2.0	None	474219	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-04-4.5	None	474220	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-07-2.0	None	474221	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-07-4.5	None	474222	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-09-2.0	None	474223	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-09-4.5	None	474224	YES	Intact
08/30/11	09:30:00	OSDC116LL	WDSB09-15-4.5	None	474225	YES	Intact
08/30/11	09:30:00	OSDC116LL	WDSB09-28-19.5	None	474226	YES	Intact

WO: 45547 Portsmouth Lwr-B&W
FRM-217

SAMPLE LOG-IN SHEET

000027

Lab Name: Southwest Research Institute	Page 1 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/30/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent*
5.	Airbill	Airbill/Sticker Present/Absent*
6.	Airbill No.	SEE SRR NOTES
7.	Sample Tags	Present/Absent*
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	Intact/Broken*/Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	08/30/2011
12.	Time Received	09:30:00

Sample Transfer		
Fraction: Inorg	Fraction	
Area #: R13	Area #	
By: DINO ROMAN	By	
On: 08/30/2011	On	

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
231A-01G-04	None	474203	Intact
749-WPW-04	None	474204	Intact
WDSB01-04-12.0	None	474205	Intact
WDSB01-04-19.5	None	474206	Intact
WDSB01-04-2.0	None	474207	Intact
WDSB01-04-24.5	None	474208	Intact
WDSB01-04-4.5	None	474209	Intact
WDSB07-04-12.0	None	474210	Intact
WDSB07-04-4.5	None	474211	Intact
WDSB07-07-12.0	None	474212	Intact
WDSB07-07-2.0	None	474213	Intact
WDSB07-07-4.5	None	474214	Intact
WDSB07-09-12.0	None	474215	Intact
WDSB07-09-2.0	None	474216	Intact
WDSB07-09-4.5	None	474217	Intact
WDSB07-15-4.5	None	474218	Intact
WDSB09-04-2.0	None	474219	Intact
WDSB09-04-4.5	None	474220	Intact
WDSB09-07-2.0	None	474221	Intact
WDSB09-07-4.5	None	474222	Intact
WDSB09-09-2.0	None	474223	Intact
WDSB09-09-4.5	None	474224	Intact
WDSB09-15-4.5	None	474225	Intact

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45547)
Date: 8.31.11	Logbook Page No.: ✓ 7736 SEC 2, 3 or 6

SAMPLE LOG-IN SHEET

000028

Lab Name: Southwest Research Institute	Page 2 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/30/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: MA
Remarks: 16526.05.00X	SAS Number: MA

1. Custody Seal(s)	Present/Absent* Intact/Broken	
2. Custody Seal Nos.	MA	
3. Chain-of Custody Records	Present/Absent*	
4. Traffic Reports or Packing Lists	Present/Absent	
5. Airbill	Airbill/Sticker Present/Absent*	
6. Airbill No.	SEE SRR NOTES	
7. Sample Tags	Present/Absent	
Sample Tag Numbers	Listed/Not listed on Chain of Custody	
8. Sample Condition	Intact/Broken*/Leaking	
9. Cooler Temperature	3.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*	
11. Date Received at Lab	08/30/2011	
12. Time Received	09:30:00	

EPA Sample #	Corresponding: Sample Tag #	Corresponding: Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB09-28-19.5	None	474226	Intact

Sample Transfer		
Fraction	Thers	Fraction
Area #	RB	Area #
By	DINO ROMAN	By
On	08/30/2011	On

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45547)
Date: 8.31.11	Logbook Page No.: 7736 SEC 2, 30E6

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC135LL**

Page: 1 for OSDC135LL
Date: 09/13/2011 05:19 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-05	OSDC135	X-749	WG	REG	2.5	GAL	CUBI	1	13-SEP-2011	1353		Distribution Coefficient	None	WATER CONTAINING TC-99 TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	14-SEP-2011	X749	OSDC135LL	DEG C		FXP02234L04

Relinquished by: Stacy Cloyd	Date(mm/dd/yyyy): 9-14-11	Time: 0830	Received by: AMS	Date(mm/dd/yyyy): 91411	Time: 0830
Relinquished by: AMS Fed Ex	Date(mm/dd/yyyy): 91411	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 91411	Time: 1200
Relinquished by:	Date(mm/dd/yyyy): 9/15/11	Time: 0845	Received by:	Date(mm/dd/yyyy): 9/15/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

KI

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000029

000030

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45654

Airbill: SEE SRR NOTES

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
09/15/11	08:45:00	OSDC135LL	749-WPW-05	None	475063	YES	Intact
09/15/11	08:45:00	OSDC137LL	749-WPW-06	None	475064	YES	Intact
09/15/11	08:45:00	OSDC139LL	749-WPW-07	None	475065	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-BE01	None	475066	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-BE10	None	475067	YES	Broken
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-CU01	None	475068	YES	Broken
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-CU10	None	475069	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-SU01	None	475070	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-SU10	None	475071	YES	Intact

PoClsmoutnFlu&r-Baw
WO: 45654
FRM-217

SAMPLE LOG-IN SHEET

000031

Lab Name: Southwest Research Institute

Page 1 of 1

Received By (Print Name): DINO ROMAN

Log-in Date: 09/14/2011

Received By (Signature):

Case Number: FXP02234L04

Sample Delivery Group No.: N/A

SAS Number: N/A

Remarks: 16526.05.00X

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent
5.	Airbill	Airbill/Sticker Present/Absent*
6.	Airbill No.	SEE SRR NOTES
7.	Sample Tags	Present/Absent
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	Intact/Broken*/Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	09/15/2011
12.	Time Received	08:45:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
749-WPW-05	None	475063	Intact
749-WPW-06	None	475064	Intact
749-WPW-07	None	475065	Intact
WDMW04B-33-BE01	None	475066	Intact
WDMW04B-33-BE10	None	475067	Broken
WDMW04B-33-CU01	None	475068	Broken
WDMW04B-33-CU10	None	475069	Intact
WDMW04B-33-SU01	None	475070	Intact
WDMW04B-33-SU10	None	475071	Intact

Sample Transfer

Fraction	Fraction
Area # DMG RLJ	Area #
By DINO ROMAN	By
On 09/15/2011	On

* Contact SMO and attach record of resolution

Reviewed By	Logbook No. Sample Receipt (45654)
Date 9.16.11	Logbook Page No. 7752 SEC 7 OF 7 1995

000032

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

pH TABLE

SwRI

pH Preservation Report

Sample Receipt Report 45547

Project: 16526.05.00X
Case: FXP022341.04

Customer: Fluor-B&W Portsmouth LLC
Received: Aug 30 2011 9:30AM
pH Adjuster:
Adjusted:

SwRI #	Customer's ID	pH
474203 1/1	231A-01G-04	Login
Container ID	Adjustment	Final
474204 1/1	749-WPW-04	Login
Container ID	Adjustment	Final
474205 1/1	WDSB01-04-12.0	Login
Container ID	Adjustment	Final
474206 1/1	WDSB01-04-19.5	Login
Container ID	Adjustment	Final
474207 1/1	WDSB01-04-2.0	Login
Container ID	Adjustment	Final
474208 1/1	WDSB01-04-24.5	Login
Container ID	Adjustment	Final
474209 1/1	WDSB01-04-4.5	Login
Container ID	Adjustment	Final
474210 1/1	WDSB07-04-12.0	Login
Container ID	Adjustment	Final
474211 1/1	WDSB07-04-4.5	Login
Container ID	Adjustment	Final
474212 1/1	WDSB07-07-12.0	Login
Container ID	Adjustment	Final
474213 1/1	WDSB07-07-2.0	Login
Container ID	Adjustment	Final
474214 1/1	WDSB07-07-4.5	Login
Container ID	Adjustment	Final
474215 1/1	WDSB07-09-12.0	Login
Container ID	Adjustment	Final
474216 1/1	WDSB07-09-2.0	Login
Container ID	Adjustment	Final
474217 1/1	WDSB07-09-4.5	Login
Container ID	Adjustment	Final
474218 1/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474218 2/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474218 3/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474219 1/1	WDSB09-04-2.0	Login
Container ID	Adjustment	Final

SwRI #	Customer's ID	pH
474220 1/1	WDSB09-04-4.5	Login
Container ID	Adjustment	Final
474221 1/1	WDSB09-07-2.0	Login
Container ID	Adjustment	Final
474222 1/1	WDSB09-07-4.5	Login
Container ID	Adjustment	Final
474223 1/1	WDSB09-09-2.0	Login
Container ID	Adjustment	Final
474224 1/1	WDSB09-09-4.5	Login
Container ID	Adjustment	Final
474225 1/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474225 2/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474225 3/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474226 1/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
474226 2/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
474226 3/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final

FRM-115

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

METALS ANALYSIS

010002

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

SAMPLE DATA

SOUTHWEST RESEARCH INSTITUTE 010003

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

SOW: FXP02234L04

SRR #: 45511

Date Received: 08/25/11

Method: ASTM C1733

Task Order #: 110825-10

		Tc99		Total Uranium	
Sample ID	Lab System ID	K_d Results (mL/g)	Uncertainty	K_d Results (mL/g)	Uncertainty
Prep Blank	Blank	0.300	0.909	0.222	1.01
WDSB02-07-12.0	473754	3.03	0.689	5.56	0.822
WDSB02-07-19.5	473755	8.16	0.767	12.3	0.944
WDSB02-07-2.0	473756	3.41	0.701	39.4	1.62
WDSB02-07-24.5	473757	7.29	0.771	15.3	1.21
WDSB02-07-4.5	473758	2.81	0.685	118	4.71
WDSB05-07-12.0	473768	3.81	0.705	6.04	0.844
WDSB05-07-19.5	473769	4.19	0.711	12.1	0.965
WDSB05-07-2.0	473770	2.72	0.686	5.98	0.809
WDSB05-07-24.5	473771	4.07	0.714	3.67	0.793
WDSB05-07-4.5	473772	3.75	0.707	6.32	0.855
WDSB05-22-12.0	473778	4.72	0.723	11.3	0.961

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Sample Note

010005

GROUNDWATER SAMPLES USED			
Sample ID	Lab System ID	Date Received	SRR #
749-WPW-03	473634	08/23/11	45484
749-WPW-04	474204	08/30/11	45547
749-WPW-05	475063	09/15/11	45654

010006

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110825-10
SRR: 45484, 45511
CASE: FXP02234L04
VTSR: 08.23.11, 08.25.11
PROJECT#: 16526.05.00X

RAW DATA

Distribution Coefficient Tabulation

TC-99 - Kd Values

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21		Report Kd (pooled)		
			K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	
Blank			0.36	1.82	-0.39	1.77	1.03	1.87	0.20	1.81	**0.300**	**0.909**	
473754			2.69	1.93	2.51	1.92	2.45	1.92	3.32	1.96			
473754D			5.50	2.07	3.20	1.95	2.45	1.91	2.15	1.90	**3.03**	**0.689**	Day 7-21
473754-Avg			4.10	1.42	2.85	1.37	2.45	1.35	2.73	1.37			
473755			9.08	2.21	5.30	2.03	9.02	2.21	10.85	2.30			
473755D			8.94	2.21	6.98	2.11	7.19	2.13	7.89	2.15	**8.16**	**0.767**	Day 7-21
473755-Avg			9.01	1.56	6.14	1.46	8.10	1.54	9.37	1.58			
473756			4.31	2.04	4.27	2.02	2.89	1.95	2.45	1.93			
473756D			4.24	2.04	3.45	1.98	2.76	1.94	2.94	1.95	**3.41**	**0.701**	Day 7-21
473756-Avg			4.28	1.44	3.86	1.42	2.83	1.37	2.69	1.37			
473757			7.10	2.18	8.00	2.22	9.05	2.27	7.64	2.19			
473757D			5.72	2.09	6.50	2.14	6.72	2.15	7.61	2.20	**7.29**	**0.771**	Day 7-21
473757-Avg			6.41	1.51	7.25	1.54	7.88	1.56	7.62	1.55			
473758			3.28	1.97	2.93	1.95	2.86	1.94	2.52	1.93			
473758D			3.43	1.97	2.82	1.95	2.85	1.94	1.79	1.87	**2.81**	**0.685**	Day 7-21
473758-Avg			3.36	1.39	2.87	1.38	2.86	1.37	2.15	1.34			
473768			3.29	1.97	3.70	1.99	4.07	2.01	3.86	1.99			
473768D			4.29	2.02	3.26	1.95	4.00	2.01	4.04	2.01	**3.81**	**0.705**	Day 7-21
473768-Avg			3.79	1.41	3.48	1.40	4.03	1.42	3.95	1.41			
473769			4.39	2.02	5.06	2.06	3.26	1.96	3.88	1.99			
473769D			3.42	1.96	4.65	2.04	4.08	2.01	4.77	2.03	**4.19**	**0.711**	Day 7-21
473769-Avg			3.91	1.41	4.86	1.45	3.67	1.40	4.32	1.42			
473770			3.74	2.00	2.89	1.95	1.79	1.89	2.83	1.94			
473770D			3.44	1.98	3.01	1.96	2.51	1.92	1.53	1.87	**2.72**	**0.686**	Day 7-21
473770-Avg			3.59	1.41	2.95	1.38	2.15	1.35	2.18	1.35			
473771			3.19	1.97	5.27	2.09	3.83	2.01	3.97	2.02			
473771D			3.47	1.97	3.97	2.02	4.08	2.02	4.77	2.07	**4.07**	**0.714**	Day 7-21
473771-Avg			3.33	1.39	4.62	1.45	3.95	1.42	4.37	1.44			
473772			4.61	2.04	3.33	1.98	3.22	1.97	3.34	1.98			
473772D			3.96	2.01	4.14	2.02	3.86	2.01	3.50	1.98	**3.75**	**0.707**	Day 7-21
473772-Avg			4.29	1.43	3.74	1.41	3.54	1.41	3.42	1.40			
473778			3.96	2.00	4.32	2.01	5.69	2.10	3.50	1.98			
473778D			4.53	2.04	5.06	2.07	5.52	2.10	5.17	2.07	**4.72**	**0.723**	Day 7-21
473778-Avg			4.25	1.43	4.69	1.44	5.61	1.48	4.34	1.43			
473045			4.52	2.04	5.05	2.07	5.02	2.07	4.04	2.02			
473045D			4.97	2.08	5.79	2.12	5.18	2.08	5.17	2.09	**4.97**	**0.732**	Day 7-21
473045-Avg			4.74	1.46	5.42	1.48	5.10	1.47	4.61	1.45			

$$Kd = \frac{200\,(C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids} \Big/ C_{day\ x}$$

Sample calc
473754 Day21 $= \frac{200(632 - 575)}{8.0072 \times 0.7457} \Big/ 575 = 3.32$ ✓

RApreo 10/27/11

Total U - Kd Values

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21		Report Kd (pooled)		
			K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	
Blank			0.32	2.03	-0.92	1.95	-0.45	1.97	1.93	2.15	**0.222**	**1.01**	
473754			2.32	2.14	2.86	2.17	2.98	2.18	8.71	2.50			
473754D			8.68	2.49	5.13	2.30	6.13	2.35	7.70	2.44	**5.56**	**0.822**	Day 7-10
473754-Avg			5.50	1.64	4.00	1.58	4.56	1.60	8.21	1.74			
473755			14.2	2.77	9.80	2.53	13.2	2.72	14.7	2.79			
473755D			14.1	2.76	12.0	2.65	11.1	2.60	9.53	2.52	**12.3**	**0.944**	Day 7-21
473755-Avg			14.2	1.96	10.9	1.83	12.2	1.88	12.1	1.88			
473756			35.1	4.28	43.5	4.85	39.4	4.58	39.9	4.61			
473756D			39.1	4.54	35.8	4.34	38.4	4.53	43.7	4.87	**39.4**	**1.62**	Day 7-21
473756-Avg			37.1	3.12	39.6	3.26	38.9	3.22	41.8	3.35			
473757			13.9	2.86	13.7	2.84	outlier	--	20.7	3.29			
473757D			outlier	--	19.7	3.22	11.7	2.72	12.1	2.74	**15.3**	**1.21**	Day 7-21
473757-Avg			13.92	2.86	16.7	2.15	11.7	2.72	16.4	2.14			
473758			94.3	7.88	101	8.32	124	9.80	122	9.63			
473758D			96.2	8.04	120	9.51	116	9.27	110	8.94	**118**	**4.71**	Day 14-21
473758-Avg			95.2	5.63	111	6.32	120	6.74	116	6.57			
473768			6.65	2.42	5.35	2.34	5.27	2.34	6.53	2.42			
473768D			5.11	2.33	8.17	2.52	6.20	2.40	5.07	2.33	**6.04**	**0.844**	Day 7-21
473768-Avg			5.88	1.68	6.76	1.72	5.74	1.67	5.80	1.68			
473769			14.4	2.86	11.2	2.67	11.0	2.7	12.3	2.74			
473769D			10.8	2.66	11.4	2.68	12.9	2.8	12.8	2.77	**12.1**	**0.965**	Day 7-21
473769-Avg			12.6	1.95	11.3	1.89	11.9	1.9	12.5	1.95			
473770			6.99	2.47	6.26	2.42	5.91	2.39	6.41	2.43			
473770D			6.42	1.29	5.90	2.40	5.95	2.40	4.00	2.27	**5.98**	**0.809**	Day 7-21
473770-Avg			6.71	1.39	6.08	1.70	5.93	1.70	5.21	1.66			
473771			3.87	2.26	4.26	2.28	3.43	2.23	3.48	2.23			
473771D			3.56	2.24	4.78	2.31	3.07	2.21	2.94	2.20	**3.67**	**0.793**	Day 7-21
473771-Avg			3.72	1.59	4.52	1.62	3.25	1.57	3.21	1.56			
473772			6.67	2.44	6.71	2.44	7.39	2.49	4.84	2.32			
473772D			5.87	2.39	6.01	2.40	7.52	2.49	5.54	2.37	**6.32**	**0.855**	Day 7-21
473772-Avg			6.27	1.71	6.36	1.71	7.45	1.76	5.19	1.66			
473778			11.6	2.74	13.0	2.83	9.84	2.63	9.55	2.61			
473778D			8.37	2.53	12.1	2.76	9.68	2.61	16.0	3.01	**11.3**	**0.961**	Day 7-21
473778-Avg			9.98	1.86	12.6	1.98	9.76	1.85	12.8	1.99			
473045			1.79	2.13	2.78	2.19	2.79	2.19	1.66	2.12			
473045D			2.22	2.16	1.31	2.09	2.11	2.15	1.77	2.12	**2.05**	**0.758**	Day 7-21
473045-Avg			2.01	1.51	2.05	1.52	2.45	1.53	1.71	1.50			

7-21 RSS 10/27/11

$$Kd = \frac{200\,(C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids}$$

$C_{day\ x}$

Sample calc 473045 Day 7

$$= \frac{(100180 - 94300) \times 200}{630687 \times 0.842} = \frac{1179}{94300} = 1.79 \checkmark$$

RSS 10/27/11

010009

Fluor 16526.05.006
110825-10, 110915-9

TC-99 - Instrument Results

Sample ID	Day 0		Day 7		Day 10 (9)		Day 14		Day 21	
	pCi/mL	err	pCi/mL	err	pCi/L	err	pCi/L	err	pCi/L	err
Blank	663	39.0	623	36.7	642	37.8	607	35.8	627	37.0
473754			585	34.6	588	34.7	589	34.8	575	34.0
473754D			543	32.1	577	34.1	589	34.7	594	35.1
473755			502	29.8	549	32.5	503	29.9	483	28.7
473755D			504	29.9	527	31.2	525	31.1	516	30.6
473756			551	32.6	551	32.6	575	34.0	583	34.4
473756D			552	32.6	565	33.4	577	34.1	574	33.9
473757			514	30.5	502	29.8	488	29.0	506	30.0
473757D			533	31.6	522	30.9	519	30.8	507	30.1
473758			571	33.7	577	34.1	578	34.1	584	34.5
473758D			568	33.6	579	34.2	578	34.2	597	35.2
473768			570	33.7	563	33.2	557	32.9	560	33.1
473768D			553	32.7	570	33.7	558	33.0	557	33.0
473769			555	32.8	545	32.3	573	33.9	563	33.3
473769D			570	33.7	551	32.6	560	33.1	549	32.4
473770			559	33.0	574	33.9	595	35.1	575	34.0
473770D			564	33.3	572	33.8	581	34.3	600	35.4
473771			570	33.7	536	31.7	559	33.1	557	32.9
473771D			565	33.4	557	32.9	555	32.8	544	32.2
473772			545	32.3	567	33.5	569	33.6	567	33.5
473772D			556	32.9	553	32.7	558	33.0	564	33.3
473778			558	33.0	552	32.6	531	31.4	566	33.4
473778D			549	32.5	541	32.0	534	31.6	539	31.9
473045			546	32.3	537	31.8	538	31.8	554	32.8
473045D			539	31.9	526	31.1	535	31.7	536	31.7

$C_{avg\ blk}$	err	Rel Err
632	**16.67**	**2.64%**

10/27/11

010010

Fluor 16526.05.006
110825-10, 110915-9

Total U - Instrument Results

Sample ID	Day 0		Day 7		Day 10 (9)		Day 14		Day 21		$C_{avg\ blk}$	err	
	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err			
Blank	103000	6936	98900	6675	104000	7034	102000	6871	93000	6279	**100180**	**3025.08**	**3.02%**
473754			93700	6323	92300	6229	92000	6213	79500	5366			
473754D			79600	5373	86900	5868	84700	5717	81500	5499			
473755			71300	4811	78300	5286	72800	4913	70700	4772			
473755D			71500	4826	74600	5037	76200	5141	78800	5317			
473756			45600	3081	40100	2704	42600	2876	42300	2857			
473756D			42900	2896	44900	3028	43100	2913	40000	2700			
473757			69100	4666	69400	4687	41800	2825	59800	4040			
473757D			96200	6495	61100	4126	72600	4904	72000	4858			
473758			24600	1659	23300	1572	19800	1338	20100	1354			
473758D			24100	1624	20400	1379	20900	1410	21700	1467			
473768			82100	5544	85100	5746	85300	5756	82300	5555			
473768D			85600	5779	78700	5310	83100	5613	85700	5783			
473769			68900	4653	74000	4997	74300	5014	72200	4876			
473769D			74500	5027	73700	4976	71300	4815	71300	4813			
473770			80500	5438	82200	5550	83100	5611	81800	5525			
473770D			81800	520	83100	5613	82900	5595	87900	5936			
473771			88500	5973	87500	5909	89700	6053	89600	6047			
473771D			89300	6028	86200	5816	90700	6126	91100	6148			
473772			81400	5492	81400	5496	79900	5393	85900	5802			
473772D			83300	5625	83000	5603	79600	5375	84100	5675			
473778			72200	4873	69700	4704	75400	5088	76000	5129			
473778D			78300	5283	71500	4828	75800	5118	65300	4406			
473045			94300	6363	91300	6164	91300	6162	94700	6395			
473045D			93000	6281	95800	6464	93300	6300	94400	6373			

10/27/11

010011

Distribution Coefficient pH Data

010013

Fluor 16526.05.006
110825-10, 110915-9

pH Data

Sample ID	Day 7	Day 10 (9)	Day 14	Day 21
	pH	pH	pH	pH
Blank	7.76	7.61	8.06	8.05
473754	7.62	7.45	7.72	7.71
473754D	7.79	7.44	7.88	7.61
473755	7.68	7.60	7.81	7.88
473755D	7.65	7.56	7.76	7.84
473756	7.78	7.85	7.97	7.90
473756D	7.82	7.81	7.98	7.98
473757	7.88	7.78	8.18	8.09
473757D	7.87	7.77	8.01	7.90
473758	7.93	7.84	7.99	8.03
473758D	7.97	7.88	8.05	8.12
473768	8.07	7.81	8.23	8.10
473768D	7.99	7.94	8.16	8.14
473769	7.89	7.75	8.21	8.01
473769D	7.86	7.77	8.03	7.95
473770	7.76	7.76	7.85	7.85
473770D	7.80	7.64	7.90	7.80
473771	7.85	7.74	7.86	8.03
473771D	7.90	7.64	7.82	7.86
473772	7.92	7.71	8.12	7.83
473772D	7.89	7.66	7.92	7.85
473778	8.38	7.86	8.38	8.25
473778D	8.46	7.82	8.30	8.13
473045	7.99	7.54	8.25	7.86
473045D	7.91	7.57	8.21	7.92

10/27/11

Southwest Research Institute® Logbook: pH

010014

Analysis/Method: pH DAY 7 Project#: 16626.05.006

Client: Fluor-B&W Portsmouth TO#: 110825-10, 110915-9

TB SAM 9/26/11

QC Source: INORG# 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00 ~~8958~~*	8958	1/13	22.0
7.0	7.01	8960	2/13	22.0
10.0	10.04	8961	1/13	21.9
N/A				

* TE JAM 9/26/11

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.51				21.9
473754	7.62				21.3
473754D	7.79				21.5
473755	7.68				21.4
473755D	7.65				21.5
473756	7.78				21.8
473756D	7.82				21.8
473757	7.88				21.8
473757D	7.87				21.8
473758	7.93				21.7
473758D	7.97				21.8
CCV	7.55				21.9
473768	8.07				21.9
473768D	7.99				21.9
473769	7.89				21.8
473769D	7.86				21.8
473770	7.76				21.9
473770D	7.80				21.9

JAM 9/26/11

Analyst Signature: James Maher Date: 9/26/11

Reviewed by: L Spies Date: 9/28/11

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010015

Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAY 7 Project#: 16526.05.006

Client: Fluor - B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8958	1/13	22.0
7.0	7.01	8960	2/13	22.0
10.0	10.04	8961	1/13	21.9
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
473771	7.85				21.9
473771D	7.90				21.9
473772	7.92				20.4
473772D	7.89				20.9
CCV2	7.54				21.8
473778	8.28				18.9
473778D	8.46				19.2
473045	7.99				20.9
473045D	7.91				20.8
Blank D7	7.76				22.0
CCV3	7.57				21.9

JAM 9/26/11

JAM 9/26/11

Analyst Signature: James Mather Date: 9/26/11

Reviewed by: [signature] Date: 9/28/11

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010016

Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAY 10 Project#: K0526.04.005.006

Client: Fluor B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: 8325 TV: 7.52

Notes: taken off on DAY 9 ** QC Range 7.43 - 7.61

Standardization of pH Meter: * TB JAM 9/28/11

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
4.0	4.01	8958	1/13	23.0
7.0	7.01	8960	2/13	23.0
10.0	10.03	8961	1/13	23.0

	Liquids	Solids/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.49				23.0
473754	7.45				22.2
473754D	7.44				21.9
473755	7.60				21.9
473755D	7.56				21.9
473756	7.85				21.8
473756D	7.81				21.9
473757	7.78				22.1
473757D	7.77				22.2
473758	7.84				22.2
473758D	7.88				22.2
CCV	7.49				22.9
473768	7.81				22.4
473768D	7.94				22.3
473769	7.75				22.2
473769D	7.77				22.2
473770	7.76				22.1
473770D	7.64				22.2

JAM 9/28/11

Analyst Signature: Jamie Maher Date: 9/28/11

Reviewed by: DBPW Date: 9/28/11

Southwest Research Institute® Logbook: pH 010017

Analysis/Method: pH DAY 10 Project#: 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: 8325 TV: 7.52 s.u.

Notes: taken out on DAY 9 QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.01	8958	1113	23.0
7.0	7.01	8960	2113	23.0
10.0	10.03	8961	1113	23.0
N/A				

	Liquids	Solids/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
473771	7.74				22.6
473771D	7.64				22.6
473772	7.71				22.4
473772D	7.66				22.7
CCV2	7.54				23.1
473778	7.86				22.4
473778D	7.82				22.5
473045	7.54				22.4
473045D	7.57				22.4
~~CCV3~~ Blank DI 0	7.61				22.5
CCV3	7.55				23.0

JAM 9/28/11

JAM 9/28/11

Analyst Signature: James Mohan Date: 9/28/11

Reviewed by: RSpeis Date: 9/28/11

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Southwest Research Institute® Logbook: pH10018

Analysis/Method: pH DAY 14 Project#: 16526.05.006

Client: Fluor-B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8958	1/13	21.9
7.0	7.01	8960	2/13	21.9
10.0	10.04	8961	1/13	21.9
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.52				21.6
473754	7.72				20.7
473754D	7.88				20.7
473755	7.81				20.6
473755D	7.76				20.8
473756	7.97				20.8
473756D	7.98				20.7
473757	8.18				20.9
473757D	8.01				20.8
473758	7.99				20.7
473758D	8.05				21.0
CCV	7.55				21.8
473768	8.23				20.4
473768D	8.16				20.8
473769	8.21				20.4
473769D	8.03				20.6
473770	7.85				20.5
473770D	7.90				20.9

JAM 10/3/11

Analyst Signature: James Mohler Date: 10/3/11

Reviewed by: M. Mendoza Date: 10/27/11

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Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAY 14 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: 8325 TV: 7.52 s.u.

Notes: QC Range: 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8958	1/13	21.9
7.0	7.01	8960	2/13	21.9
10.0	10.04	8961	1/13	21.9
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
473771	7.86				21.4
473771D	7.87				21.2
473772	8.12				20.6
473772D	7.92				20.9
CCV2	7.55				22.1
473778	8.38				21.7
473778D	8.30				21.5
473045	8.25				21.9
473045D	8.21				21.6
CCV3	7.54				21.8
Blank D14	8.06				21.6
CCV4	7.55				22.0

JAM 10/3/11

JAM 10/3/11

Analyst Signature: James Maher Date: 10/3/11

Reviewed by: M. Mendoza Date: 10/27/11

Southwest Research Institute® Logbook: pH 10020

Analysis/Method: pH DAY 21 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110825-10, 110915-9

QC Source: INORG# 8325 TV: 7.52 s.u.

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8958	1/13	22.4
7.0	7.01	8960	2/13	22.4
10.0	10.03	8961	1/13	22.7
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.52				23.3
473754	7.71				22.2
473754D	7.61				22.1
473755	7.88				22.1
473755D	7.84				22.1
473756	7.90				22.1
473756D	7.98				22.1
473757	8.09				22.0
473757D	7.90				22.1
473758	8.03				21.9
473758D	8.12				21.9
CCV	7.54				23.1
473768	8.10				22.0
473768D	8.14				21.9
473769	8.01				22.0
473769D	7.95				22.1
473770	7.85				21.9
473770D	7.80				22.2

JM 10/10/11

Analyst Signature: James Graham Date: 10/10/11

Reviewed by: M. Mendoza Date: 10/21/11

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010021

Southwest Research Institute® Logbook: pH

Analysis/Method: pH D21 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110826-10, 110915-9

QC Source: INORG# 8235 3 2 ⓒ 10/13/11 mm TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
N/A				
4.0	4.00	8958	1/13	22.4
7.0	7.01	8960	2/13	22.4
10.0	10.03	8961	1/13	22.7
N/A				

	Liquids	Solids/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
473771	8.03				21.7
473771D	7.86				21.9
473772	7.83				21.4
473772D	7.85				21.8
CCV2	7.54				23.0
473778	8.25				21.7
473778D	8.13				21.7
473045	7.86				21.7
473045D	7.92				21.8
Blank D21	8.05				22.3
CCV3	7.54				23.4

SAM 10/10/11

SAM 10/10/11

Analyst Signature: James Maher Date: 10/10/11

Reviewed by: J.M. Mendoza Date: 10/27/11

Fluor-B&W Portsmouth, LLC
FXP02234L04
010022

Distribution Coefficient Prep

Prep Information

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21	
		% Solids	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL
Blank		100.0%	8.0000	200	8.0000	200	8.0000	200	8.0000	200
473754		74.57%	8.0007	200	8.0011	200	8.0062	200	8.0072	200
473754D		74.40%	8.0075	200	8.0085	200	8.0087	200	8.0020	200
473755		70.54%	8.0826	200	8.0832	200	8.0611	200	8.0607	200
473755D		70.54%	8.0574	200	8.0905	200	8.0411	200	8.0756	200
473756		85.33%	8.0024	200	8.0724	200	8.0482	200	8.0344	200
473756D		85.33%	8.0022	200	8.0641	200	8.0850	200	8.0614	200
473757		80.59%	8.0197	200	8.0357	200	8.0893	200	8.0858	200
473757D		80.59%	8.0648	200	8.0472	200	8.0464	200	8.0432	200
473758		81.16%	8.0296	200	8.0304	200	8.0541	200	8.0299	200
473758D		81.16%	8.0866	200	8.0069	200	8.0656	200	8.0876	200
473768		82.51%	8.0249	200	8.0212	200	8.0250	200	8.0662	200
473768D		82.51%	8.0789	200	8.0990	200	8.0341	200	8.0729	200
473769		78.68%	8.0295	200	8.0158	200	8.0328	200	8.0346	200
473769D		78.68%	8.0865	200	8.0275	200	8.0055	200	8.0527	200
473770		86.71%	8.0613	200	8.0635	200	8.0279	200	8.0852	200
473770D		86.71%	8.0729	200	8.0356	200	8.0773	200	8.0463	200
473771		84.68%	8.0507	200	8.0287	200	8.0449	200	8.0118	200
473771D		84.68%	8.0816	200	8.0090	200	8.0394	200	8.0100	200
473772		85.54%	8.0883	200	8.0441	200	8.0320	200	8.0273	200
473772D		85.54%	8.0745	200	8.0592	200	8.0380	200	8.0656	200
473778		82.85%	8.0741	200	8.0917	200	8.0664	200	8.0456	200
473778D		82.85%	8.0591	200	8.0261	200	8.0210	200	8.0535	200
473045		86.42%	8.0687	200	8.1036	200	8.0577	200	8.0623	200
473045D		86.42%	8.0361	200	8.0600	200	8.0944	200	8.0182	200

RSpies 10/27/14

010023

0110024

Southwest Research Institute

Electronic Bench Sheet

% Solids

Fluor Review 09/14/11

Project #: 16526.05.006
Client: Fluor - B&W Portsmouth LLC
Method: %solid
TO# 110825-10, 110830-12, 110831-5

Date: 09/01/11
Analyst: James Moken JM

Seq #	Sample ID	A Tare Wt(g)	B Wet Sample + Tare Wt(g)	(B - A) Wet Sample Wt(g)	C Dried Sample + Tare Wt(g)	(C - A) Dried Sample Wt(g)	% Solids	RPD
1	PB	0.9611	0.9611	0.0000	0.9610	-0.0001	<0.05	
2	473754	0.9623	6.8311	5.8688	5.3388	4.3765	74.57	
3	473754D	0.9598	6.7724	5.8126	5.2845	4.3247	74.40	0.228%
4	473755	0.9601	6.8940	5.9339	5.1459	4.1858	70.54	
5	473756	0.9654	6.7588	5.7934	5.9091	4.9437	85.33	
6	473757	0.9629	6.8881	5.9252	5.7378	4.7749	80.59	
7	473758	0.9630	6.5646	5.6016	5.5092	4.5462	81.16	
8	473768	0.9612	6.9096	5.9484	5.8694	4.9082	82.51	
9	473769	0.9613	6.4828	5.5215	5.3054	4.3441	78.68	
10	473770	0.9589	6.3777	5.4188	5.6575	4.6986	86.71	
11	473771	0.9557	6.6900	5.7343	5.8116	4.8559	84.68	
12	PB2	0.9571	0.9571	0.0000	0.9571	0.0000	<0.05	
13	473772	0.9575	6.8693	5.9118	6.0142	5.0567	85.54	
14	473778	0.9633	6.6260	5.6627	5.6551	4.6918	82.85	
15	474212	0.9640	6.8165	5.8525	6.2547	5.2907	90.40	
16	474212D	0.9590	6.9142	5.9552	6.3621	5.4031	90.73	0.363%
17	474213	1.0153	6.7501	5.7348	6.0538	5.0385	87.86	
18	474214	1.0146	6.6879	5.6733	6.0996	5.0850	89.63	
19	474221	1.0068	6.5495	5.5427	5.4183	4.4115	79.59	
20	474222	1.0063	6.6579	5.6516	5.5944	4.5881	81.18	
21	474300	0.9971	6.3794	5.3823	5.7209	4.7238	87.77	
22	474301	0.9599	6.3362	5.3763	5.5632	4.6033	85.62	
23	PB3	1.0439	1.0439	0.0000	1.0437	-0.0002	<0.05	
24	474302	1.0182	6.7701	5.7519	5.9726	4.9544	86.14	

% Solids = Dried Sample Wt(g)*100 / Wet Sample Wt(g)

Sample Calculation: 473754

$$\frac{4.37659}{5.86889} \times 100 = 74.57\%$$

Southwest Research Institute®
Logbook: Physical Testing

010025

Analysis / Method: % Solid Project# 16526.05.006

Client: Fluor B&W Portsmouth TO# 110825-10, 110830-12, 110831-5

LCS Info: N/A TV= N/A Balance#: 88

Notes: in oven # 31 12:00 9/1/11

out oven # 31 7:00 9/2/11

Sample ID	tare wt (g)	tare + sump (g)	dried + tare (g)
PB	0.9611	0.9611	0.9610
473754	0.9623	6.8311	5.3388
473754D	0.9598	6.7724	5.2845
473755	0.9601	6.8940	5.1459
473756	0.9654	6.7588	5.9091
473757	0.9629	6.8881	5.7378
473758	0.9630	6.5646	5.5092
473768	0.9612	6.9096	5.8694
473769	0.9628*	6.4828	5.3054
473770	0.9589	6.3777	5.6575
473771	0.9557	6.6900	5.8116
PB2	0.9571	0.9571	0.9571
473772	0.9575	6.8693	6.0142
473778	0.9633	6.6260	5.6551
474212	0.9640	6.8165	6.2547
474212D	0.9590	6.9142	6.3621
474213	1.0153	6.7501	6.0538
474214	1.0146	6.6879	6.0996
474221	1.0068	6.5495	5.4183

JAM 9/2/11

Calculation: *TE JAM 9/1/11

Analyst Signature: James Mahen Date: 9/1/11

Reviewed by: Julia Herrera Date: 09/14/11

Logbook #/Page # 10 153

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid Project# 16526.05.006
Client: Fluor B&W Portsmouth TO# 11825-10, 110830-12, 110831-5

LCS Info: N/A TV= N/A Balance#: 88
Notes: In oven #31 12:00 9/1/11
Out oven #31 7:00 9/2/11

Sample ID	tare wt (g)	samp + tare (g)	dried + tare (g)		
474222	1.0063	6.6579	5.5944		
474300	0.9971	6.3794	5.7209		
474301	0.9599	6.3362	5.5632		
PB3	1.0439	1.0439	1.0437		
474302	1.0182	6.7701	5.9726		

JAM 9/2/11

Calculation:

Analyst Signature: James Mohon Date: 9/1/11
Reviewed by: Tracy Herrera Date: 09/14/11
Logbook #/ Page # 10 154

010027

Southwest Research Institute

Electronic Bench Sheet

% Solids

Project #: 16526.05.006
Client: Fluor - B&W Portsmouth LLC
Method: %solid
TO# 110902-3, 110901-7, ~~110813-4~~ 110915-9

Date: 09/12/11
Analyst: James Moken JM

(C) 10/27/11 mm

Seq #	Sample ID	A Tare Wt(g)	B Wet Sample + Tare Wt(g)	(B - A) Wet Sample Wt(g)	C Dried Sample + Tare Wt(g)	(C - A) Dried Sample Wt(g)	% Solids	RPD
1	PB	0.9699	0.9699	0.0000	0.9698	-0.0001	<0.05	
2	473045	0.9804	4.8778	3.8974	4.3486	3.3682	86.42	
3	474401	0.9825	4.0451	3.0626	3.8466	2.8641	93.52	
4	474401D	0.9804	4.0037	3.0233	3.7929	2.8125	93.03	0.527%
5	474402	0.9559	3.7876	2.8317	3.4167	2.4608	86.90	
6	474341	1.0125	3.6139	2.6014	3.4489	2.4364	93.66	
7	474344	1.0169	3.6565	2.6396	3.4128	2.3959	90.77	
8	474340	0.9864	3.6943	2.7079	3.3926	2.4062	88.86	

% Solids = Dried Sample Wt(g)*100 / Wet Sample Wt(g)

Sample Calculation : 473045

$$\frac{3.3682\,g}{3.8974\,g} \times 100 = 86.42\ \%$$

010028

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid Project# 16.526.05.006

Client: Pluor B&W Portsmouth TO# 110902-3, 110901-7, 110902-4, 110915-9

@ 10/21/11 mm

LCS Info: N/A TV= N/A Balance#: 12

Notes: in oven #31 14:15 9/12/11

out oven #31 8:15 9/13/11

Sample ID	tare wt. (g)	samp + tare (g)	dried + tare (g)		
PB	0.9699	0.9699	0.9698		
473015	0.9804	4.8778	4.3486		
474401	0.9825	4.0451	3.8466		
474401D	0.9804	4.0037	3.7929		
474402	0.9559	3.7876	3.4167		
474341	1.0125	3.6139	3.4489		
474344	1.0169	3.6565	3.4128		
474340	0.9864	3.6943	3.3926		

Calculation:

Analyst Signature: James Moran Date: 9/12/11

Reviewed by: Jay Herrera Date: 09/13/11

Logbook #/ Page # 10 156

Southwest Research Institute
WC Sample Prep Logbook

010029

Book/Page:_15_ 00132_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.05.006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12

Digestion Apparatus: N/A

LCS ID: N/A

Pipette ID: 5000- / 1000- / 200- /

Temperature: N/A

LCS TV = N/A

Notes / Prep: Solution preped using 473634, 474204, 475063 and spiked with 2.6mL of INORG#9204 1000ppm Uranium 9/9/11 9/19/11 Preped 26L of solution. DAY 1, 2 and 4 were removed from the analysis. DAY 10 was taken out a day early by mistake so it is now DAY 9.

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)
473754 D1	8.0011	200 ml
473754D D1	8.0036	
473754 D2	8.0047	
473754D D2	8.0079	
473754 D1 DK*	8.0090	
473754D D1	8.0001	
473754 D7	8.0007	
473754D D7	8.0075	
473754 D10	8.0011	
473754D D10	8.0085	
473754 DM	8.0062	
473754D DM	8.0087	
473754 D21	8.0072	
473754D D21	8.0020	
473754 DX	8.0053	
473754D DX	8.0036	
473755 D1	8.0643	
473755D D1	8.0121	
473755 D2	8.0710	
473755D D2	8.0157	
473755 D4	8.0277	

*TE SAM 9/9/11

Analyst Signature: [signature] Date: 09/09/11

Reviewed by: [signature] Date: 10/13/11

Continued to: 15-60133

Southwest Research Institute
WC Sample Prep Logbook

010030

Book/Page:_15_ 00133_

Book I.D. #_10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 166526.05.0006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12

Digestion Apparatus: N/A

LCS ID: N/A

Notes / Prep: see PB 15-00132

Pipette ID: 5000 ___ 1000 ___ 200 ___

Temperature: N/A

LCS TV = N/A

9/9/11 9/19/11

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)
4733755D D1	8.0524	200 ml
4733755 D7	8.0826	
4733755D D7	8.0574	
4733755 D10	8.0832	
4733755D D10	8.0905	
4733755 D14	8.0611	
4733755D D14	8.0411	
4733755 D21	8.0607	
4733755D D21	8.0756	
4733755 Dx	8.0367	
4733755D Dx	8.0031	
4733756 D1	8.0733	
4733756D D1	8.0035	
4733756 D2	8.0138	
4733756D D2	8.0619	
4733756 D4	8.0064	
4733756D D4	8.0268	
4733756 D7	8.0024	
4733756D D7	8.0022	
4733756 D10	8.0724	
4733756D D10	8.0641	

large rocks removed

total sample wt.(g) = 371.57g

rocks removed wt.(g) = 44.37g

% rocks = $\frac{44.37}{371.57}$ = 11.9 %

Analyst Signature: Jacqueline Herrera Date: 09/09/11

Reviewed by: [signature] Date: 10/13/11

continued from 15-00132

continued to 15-00134

Southwest Research Institute
WC Sample Prep Logbook

010031

Book/Page: _15_ 00134_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.05.006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12 | 88 (473756) (473757)

Digestion Apparatus: N/A

LCS ID: NA

Notes / Prep: See pg. 15-00132

Pipette ID: 5000 ✓ 1000 — 200 —

Temperature: N/A

LCS TV = N/A

9/9/11 9/19/11

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	
4737756 D14	8.0482	200 mL	
4737756D D14	8.0850		
4737756 D21	8.0344		see note pg. 15-00133
4737756D D21	8.0614		
4737756 DX	8.0790		
4737756D DX	8.0934		
4737757 D1	8.0670		
757D D1	8.0247		
757 D2	8.0749		
757D D2	8.0465		
757 D1	8.0517		
757D D4	8.0208		
757 D7	8.0147		
757D D7	8.0648		
757 D10	8.0357		
757D D10	8.0472		
757 D14	8.0893		
757D D14	8.0464		
757 D21	8.0858		
757D D21	8.0432		
757 DX	8.0631		

large rocks removed

total wgt sample 297.75g

rocks removed 87.29g

% rock = 87.29 / 297.75 = 29.3%

Analyst Signature: Juan Herrera / James Mahon Date: 09/09/11

Reviewed by: [signature] Date: 10/13/11

Continued from 15-00133

Continued to 15-00135

Southwest Research Institute
WC Sample Prep Logbook

010032

Book/Page: _15_ 00135_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / (Extraction) / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.05.006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 88

Digestion Apparatus: N/A

LCS ID: N/A

Notes / Prep: See Pg. 15-00132

Pipette ID: 5000-✓ 1000-✓ 200-___

Temperature: N/A

LCS TV = N/A

Sample ID	Sample Wt (g) / Sample Vol (ml) 9/9/11	Final Volume (ml) 9/19/11			
473757D DX	8.0437	200mL		↑ see note Pg. 15-00134	
473758 D1	8.0745				
758D D1	8.0861				
758 D2	8.0443				
758D D2	8.0445				
758 D4	8.0728				
758D D4	8.0356				
758 D7	8.0296				
758D D7	8.0866				
758 D10	8.0304				
758D D10	8.0069				
758 D14	8.0541				
758D D14	8.0656				
758 D21	8.0299				
758D D21	8.0876				
758 DX	8.0604				
758D DX	8.0928				
473768 D1	8.0355				
768D D1	8.0315				
768 D2	8.0750				
768D D2	8.0234				

Analyst Signature: James Mabon Date: 9/9/11

Reviewed by: [signature] Date: 10/13/11

continued from 15-00134

Southwest Research Institute
WC Sample Prep Logbook

010033

Book/Page: 15 00136

Book I.D. # 10-0406-057

Analysis: ASTM C1733
Method (circle) Digestion / Distillation / Extraction / Bomb
Client: Fluor B&W Portsmouth

Project #: 160526.05.006
Task Order#: 110825-10, 110915-9
TAP#: N/A

Balance ID: ~~(4737668)~~ / 12 TE JAM 12/13/11
Digestion Apparatus: N/A
LCS ID: N/A TE JAM 9/9/11
Notes / Prep: See pg 15.00132

Pipette ID: 5000- 1 1000- 1 200- 1
Temperature: N/A
LCS TV = N/A

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml) 9/19/11			
4737668 D1	8.0774	200mL			
768D D1	8.0671				
768 D2	8.0249				
768D D2	8.0789				
768 D3	8.0212				
768D D3	8.0990				
768 D4	8.0250				
768D D4	8.0341				
768 D21	8.0662				
768D D21	8.0729				
768 Dx	8.0629				
768D Dx	8.0648				
4737669 D1	8.0264				
769D D1	8.0510				
769 D2	8.0366				
769D D2	8.0899				
769 D4	8.0243				
769D D4	8.0712				
769 D7	8.0295				
769D D7	8.0865				
769 D8	8.0158				

Analyst Signature: M Mendoza / James Mather Date: 9/9/11
Reviewed by: [signature] Date: 10/13/11

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Southwest Research Institute
WC Sample Prep Logbook

010034

Book/Page: 15 00137

Book I.D. # 10-0406-057

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.05.0006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12 (473770) / 88 (473769)

Digestion Apparatus: N/A

LCS ID: N/A

Notes / Prep: See pg. 15.00132

Pipette ID: 5000- ✓ 1000- ✓ 200-

Temperature: N/A

LCS TV = N/A

Sample ID	Sample Wt (g) / Sample Vol (ml) 9/9/11	Final Volume (ml) 9/19/11
473769D D10	8.0275	200ml
769 D14	8.0328	
769D D14	8.0055	
769 D21	8.0346	
769D D21	8.0527	
769 DX	8.0030	
769D DX	8.0625	
473770 D1	8.0808	
770D D1	8.0879	
770 D2	8.0440	
770D D2	8.0448	
770 D4	8.0513	
770D D4	8.0506	
770 D7	8.0613	
770D D7	8.0729	
770 D0	8.0635	
770D D10	8.0356	
770 D14	8.0279	
770D D14	8.0773	
770 D21	8.0952	
770D D21	8.0463	

large rocks removed

sample weight #20G 132.25g

rock weight 2.02g

% rock $\frac{2.02}{132.25} \times 100 = 1.53\%$

*TE SAM 9/9/11

Analyst Signature: Tracy Ferreira/m.mundy Date: 09109111

Reviewed by: [signature] Date: 10/13/11

Continued from 15_00136

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 00138_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.05.006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12 | 88 (4BTO+473771) (473772)

Pipette ID: 5000- / 1000- / 200- /

Digestion Apparatus: N/A

Temperature: N/A

LCS ID: N/A

LCS TV = N/A

Notes / Prep: See pg. 15-00132

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml) 9/9/11			9/19/11
473770 DX	8.0167	200mL			↑ see pg. 15-137
473770D DX	7.8777				
473771 D1	8.0005				
771D D1	8.0044				
771 D2	8.0097				
771D D2	8.0507				
771 D4	8.0303				
771D D4	8.0947				
771 D7	8.0507				
771D D7	8.0816				
771 D10	8.0287				
771D D10	8.0090				
771 DM	8.0449				
771D DX 14*	8.0394				
771 DX 21*	8.0118				
771D DX 21*	8.0100				
771 DX	8.0405				
771D DX	8.0350				
473772 D1	8.0539				
772D D1	8.0278				
772 D2	8.0578	↓			

* (EE) 9/9/11 mm

Analyst Signature: M. Mendiola

Date: 9/9/11

Reviewed by: J Reneyel

Date: 10/13/11

continued from 15-00137

continued to 15-00139

Southwest Research Institute
WC Sample Prep Logbook

010036

Book/Page: _15_ 00139_

Book I.D. # _10-0406-057_

Analysis: ASTM C1733

Method (circle) Digestion / Distillation / (Extraction) / Bomb

Client: Fluor B&W Portsmouth

Project #: 16526.035.006

Task Order#: 110825-10, 110915-9

TAP#: N/A

Balance ID: 12 / 88 (473772) (473776)

Digestion Apparatus: N/A

LCS ID: N/A

Pipette ID: 5000-✓ 1000-✓ 200-✓

Temperature: N/A

LCS TV = N/A

Notes / Prep: See PR 15-00132 9/9/11

*TE JAM 9/10/11

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)	
473772D D2	8.0587	200ml	large rocks removed
~~772D~~ D4	8.0596		
~~772D~~ D4	8.0637		sample weight = 170.0273g
~~772D~~ D7	8.0883		
~~772D~~ D7	8.0745		rock weight = 5.0573g
~~772D~~ D10	8.0441		
~~772D~~ D10	8.0592		
~~772D~~ D14	8.0320		
~~772D~~ D14	8.0380		% rock = 5.0573g / 170.0273g = 2.9%
~~772D~~ D21	8.0273		
~~772D~~ D21	8.0656		
~~772D~~ DX	8.0519		
~~772D~~ DX	8.0761		
473778 D1	8.0005		
~~778D~~ D1	8.0740		
~~778~~ D2	8.0150		
~~778D~~ D2	8.0549		
~~778~~ D4	8.0124		
~~778D~~ D4	8.0834		
~~778~~ D7	8.0741		
~~778D~~ D7	8.0591		

Analyst Signature: Judy Llorera

Date: 9/9/11

Reviewed by: [signature]

Date: 10/13/11

Continued from 15_00138

Continued

Southwest Research Institute
WC Sample Prep Logbook

010037

Book/Page:_15_ 00140_ Book I.D. # _10-0406-057_

Analysis: ASTM C1733 Project #: 16526.05.0006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110825-10, 110915-9
Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 12 (473778) /12 Pipette ID: 5000- / 1000- / 200- /
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: *Sample 473045 initially had 4g weight more sample was aquired 9/9/11 so final wgt was brought up to 8g

Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml) 9/19/11	Final (wgt) g	Final volume (mL) 9/19/11	
473778 D10	8.0917	?		200mL	
~~778D~~ D10	8.0261				
~~778~~ D14	8.0664				
~~778D~~ D14	8.0210				
~~778~~ D21	8.0456				
~~778D~~ D21	8.0535				
~~778~~ DX	8.0414				
~~778D~~ DX	8.0311				
473045* D14	4.0090	4.0487	8.0577		
045D D14	4.0014	4.0930	8.0944		
045 D21	4.0047	4.0576	8.0623		
045D D21	4.0084	4.0098 (RF) 9/19/11 mm	8.0182		
045 DX	4.0062	4.0864	8.0926		
045D DX	4.0063	4.0392	8.0455		
045 *D10	4.0006	4.0*1681	8.0687		
045D *D10	4.0041	4.0320	8.0361		
045 D10	4.0113	4.0923	8.*1036		
045D D10	4.0128	4.0472	8.0600	↓	
		*(RF) 9/19/11 mm			

TE 09/13/11 jeu
TE 09/13/11 jeu

Analyst Signature: Judy Herrera/M. Mendoza Date: 9/9/11
Reviewed by: J Ramirez Date: 10/12/11

continued from 15-00139

Tc99 Data for Distribution Coefficient

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-190
Prep Date: 30-Sep-11 WAN

✓ JWW 10/25/11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWJ30JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWJ30JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWJ30JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-0	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-7	0.10	50.0	0.00200	50.0	0.100	10.00		
473754	0.10	50.0	0.00200	50.0	0.100	10.00		
473754D	0.10	50.0	0.00200	50.0	0.100	10.00		
473755	0.10	50.0	0.00200	50.0	0.100	10.00		
473755D	0.10	50.0	0.00200	50.0	0.100	10.00		
473756	0.10	50.0	0.00200	50.0	0.100	10.00		
473756D	0.10	50.0	0.00200	50.0	0.100	10.00		
473757	0.10	50.0	0.00200	50.0	0.100	10.00		
473757D	0.10	50.0	0.00200	50.0	0.100	10.00		
473758	0.10	50.0	0.00200	50.0	0.100	10.00		
473758D	0.10	50.0	0.00200	50.0	0.100	10.00		
473768	0.10	50.0	0.00200	50.0	0.100	10.00		
473768D	0.10	50.0	0.00200	50.0	0.100	10.00		
473769	0.10	50.0	0.00200	50.0	0.100	10.00		
473769D	0.10	50.0	0.00200	50.0	0.100	10.00		
473770	0.10	50.0	0.00200	50.0	0.100	10.00		
473770D	0.10	50.0	0.00200	50.0	0.100	10.00		
473771	0.10	50.0	0.00200	50.0	0.100	10.00		
473771D	0.10	50.0	0.00200	50.0	0.100	10.00		
473772	0.10	50.0	0.00200	50.0	0.100	10.00		
473772D	0.10	50.0	0.00200	50.0	0.100	10.00		
473778	0.10	50.0	0.00200	50.0	0.100	10.00		
473778D	0.10	50.0	0.00200	50.0	0.100	10.00		
473045	0.10	50.0	0.00200	50.0	0.100	10.00		
473045D	0.10	50.0	0.00200	50.0	0.100	10.00		
PBWJ30JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWJ30JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWJ30JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010039

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-190
Prep Date: 30-Sep-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	303.20	14.85	8.50	15.27	97.26	
BKG-2	Tc-99	Water	60	357.83	15.46	8.23	15.65	98.81	
				AVG BKG	15.16	AVG BKG	15.46		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWJ30JV1	Tc-99	Water	60	349.77	15.86	8.11	0.71	98.64		3.22E+00	3.29E+00	1.09E+01	3.28E+00		PB < 1.65*TPU	
LCSWJ30JV1	Tc-99	Water	60	359.19	1098.57	0.78	1096.24	98.83		4.94E+03	2.85E+02	1.09E+01	1.96E+01	5000	98.8%	-0.012
LCSWJ30JV2	Tc-99	Water	60	324.95	1098.44	0.78	1107.43	97.82		4.99E+03	2.88E+02	1.10E+01	1.98E+01	5000	99.8%	-0.002
Blank-0	Tc-99	Water	60	353.03	160.46	2.24	147.20	98.71		6.63E+02	3.90E+01	1.09E+01	7.81E+00			
Blank-7	Tc-99	Water	60	358.73	151.93	2.15	138.39	98.83		6.23E+02	3.67E+01	1.09E+01	7.61E+00			
473754	Tc-99	Water	60	346.73	143.25	2.22	129.94	98.58		5.85E+02	3.46E+01	1.09E+01	7.42E+00	RPD	Dup Evaluation	
473754D	Tc-99	Water	60	347.43	133.93	2.31	120.47	98.59		5.43E+02	3.21E+01	1.09E+01	7.20E+00	7.56	0.90	Pass
473755	Tc-99	Water	60	325.70	124.30	2.40	111.54	97.85		5.02E+02	2.98E+01	1.10E+01	7.02E+00	RPD	Dup Evaluation	
473755D	Tc-99	Water	60	316.30	124.19	2.40	111.88	97.46		5.04E+02	2.99E+01	1.10E+01	7.04E+00	0.30	0.04	Pass
473756	Tc-99	Water	60	346.34	135.77	2.29	122.36	98.57		5.51E+02	3.26E+01	1.09E+01	7.25E+00	RPD	Dup Evaluation	
473756D	Tc-99	Water	60	308.54	134.20	2.30	122.45	97.22		5.52E+02	3.26E+01	1.11E+01	7.31E+00	0.07	0.01	Pass
473757	Tc-99	Water	60	346.72	127.65	2.36	114.12	98.58		5.14E+02	3.05E+01	1.09E+01	7.05E+00	RPD	Dup Evaluation	
473757D	Tc-99	Water	60	354.99	132.01	2.32	118.33	98.75		5.33E+02	3.16E+01	1.09E+01	7.14E+00	3.63	0.43	Pass
473758	Tc-99	Water	60	355.76	140.38	2.25	126.80	98.76		5.71E+02	3.37E+01	1.09E+01	7.34E+00	RPD	Dup Evaluation	
473758D	Tc-99	Water	60	346.61	139.43	2.26	126.07	98.58		5.68E+02	3.36E+01	1.09E+01	7.33E+00	0.58	0.07	Pass
473768	Tc-99	Water	60	338.41	139.61	2.25	126.50	98.38		5.70E+02	3.37E+01	1.09E+01	7.35E+00	RPD	Dup Evaluation	
473768D	Tc-99	Water	60	369.12	136.58	2.28	122.66	98.99		5.53E+02	3.27E+01	1.09E+01	7.24E+00	3.08	0.37	Pass
473769	Tc-99	Water	60	333.44	136.10	2.29	123.19	98.18		5.55E+02	3.28E+01	1.10E+01	7.28E+00	RPD	Dup Evaluation	
473769D	Tc-99	Water	60	325.82	139.07	2.26	126.62	97.86		5.70E+02	3.37E+01	1.10E+01	7.38E+00	2.75	0.33	Pass
473770	Tc-99	Water	60	327.71	136.64	2.28	124.05	97.93		5.59E+02	3.30E+01	1.10E+01	7.32E+00	RPD	Dup Evaluation	
473770D	Tc-99	Water	60	373.20	139.05	2.26	125.18	98.97		5.64E+02	3.33E+01	1.09E+01	7.30E+00	0.91	0.11	Pass
473771	Tc-99	Water	60	334.53	139.43	2.26	126.53	98.22		5.70E+02	3.37E+01	1.09E+01	7.36E+00	RPD	Dup Evaluation	
473771D	Tc-99	Water	60	356.25	139.02	2.26	125.41	98.77		5.65E+02	3.34E+01	1.09E+01	7.31E+00	0.89	0.11	Pass
473772	Tc-99	Water	60	339.98	134.35	2.30	121.08	98.44		5.45E+02	3.23E+01	1.09E+01	7.22E+00	RPD	Dup Evaluation	
473772D	Tc-99	Water	60	329.38	136.09	2.28	123.40	98.00		5.56E+02	3.29E+01	1.10E+01	7.30E+00	1.90	0.23	Pass
473778	Tc-99	Water	60	320.99	136.16	2.28	123.92	97.65		5.58E+02	3.30E+01	1.10E+01	7.33E+00	RPD	Dup Evaluation	
473778D	Tc-99	Water	60	354.04	135.48	2.29	121.87	98.73		5.49E+02	3.25E+01	1.09E+01	7.23E+00	1.66	0.20	Pass
473045	Tc-99	Water	60	354.79	134.75	2.29	121.12	98.74		5.46E+02	3.23E+01	1.09E+01	7.21E+00	RPD	Dup Evaluation	
473045D	Tc-99	Water	60	350.68	133.27	2.31	119.72	98.66		5.39E+02	3.19E+01	1.09E+01	7.18E+00	1.16	0.14	Pass
PBWJ30JV2	Tc-99	Water	60	342.71	13.63	9.04	-1.55	98.50		-6.97E+00	3.19E+00	1.09E+01	3.17E+00		PB < 1.65*TPU	
LCSWJ30JV3	Tc-99	Water	60	350.22	1099.66	0.78	1099.35	98.65		4.95E+03	2.86E+02	1.09E+01	1.97E+01	5000	99.0%	-0.010
LCSWJ30JV4	Tc-99	Water	60	338.16	1101.97	0.78	1104.82	98.37		4.98E+03	2.88E+02	1.09E+01	1.98E+01	5000	99.5%	-0.005

Notes: Day #7 results.

010040

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-190
Prep Date: 30-Sep-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010041

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111003_1114\Replay_20111004_225324
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111003_1114\20111003_1114.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

F/UOR BTW Portsmouth
16526.05.00X
TO# 110825-10, 110915-9
12-190
UAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010042

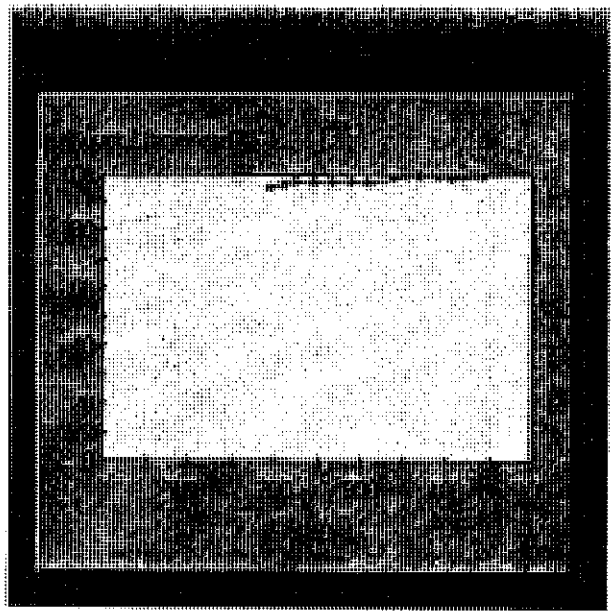
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 9.02 Date Processed: 10/3/2011 2:49:05 AM
14C Chi Square: 19.91 Date Processed: 10/3/2011 2:49:05 AM
3H E^2/B (1-18.6 keV): 1629.47 Date Processed: 10/3/2011 2:49:05 AM
14C E^2/B (4-156 keV): 6115.31 Date Processed: 10/3/2011 2:49:05 AM
3H Efficiency (1-18.6 keV): 64.59 Date Processed: 10/3/2011 2:49:05 AM
14C Efficiency (4-156 keV): 93.42 Date Processed: 10/3/2011 2:49:05 AM
IPA Background Date Processed: 10/3/2011 2:49:05 AM
3H Background CPM (1-18.6 keV): 2.56 Date Processed: 10/3/2011 2:49:05 AM
14C Background CPM (4-156 keV): 1.43 Date Processed: 10/3/2011 2:49:05 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010043



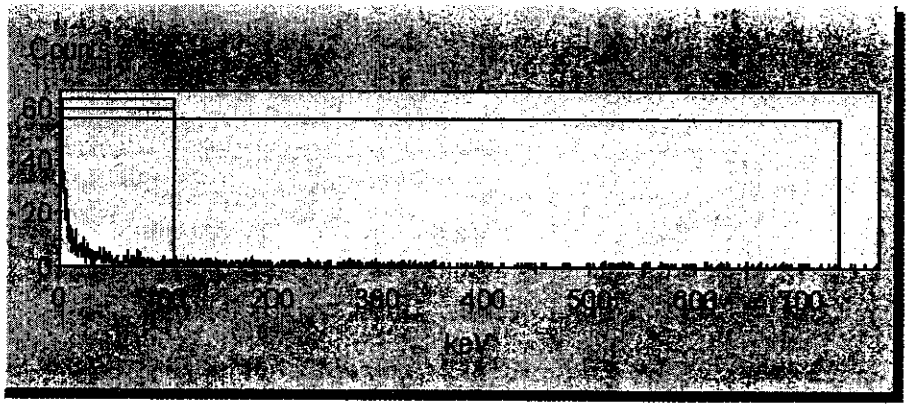
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nuc1 In A									
1	5	19	60.00	Bkg.-1	14.85	15	418.29	303.20		8.50	0:00:02	16
10/3/2011			11:15:53 AM 97.26									

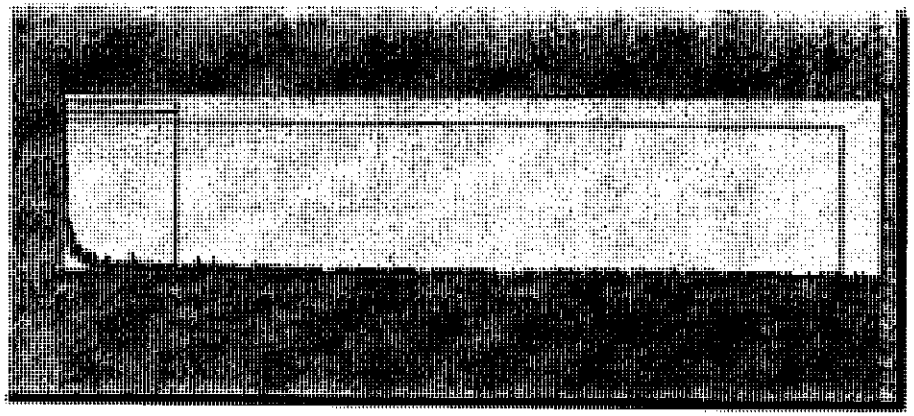
010044

SpectraView Block Data



2	5	19	60.00	Bkg.-2	15.46	16	467.77	357.83	8.23	0:00:03	16
10/3/2011	12:17:25 PM		98.81								

SpectraView Block Data

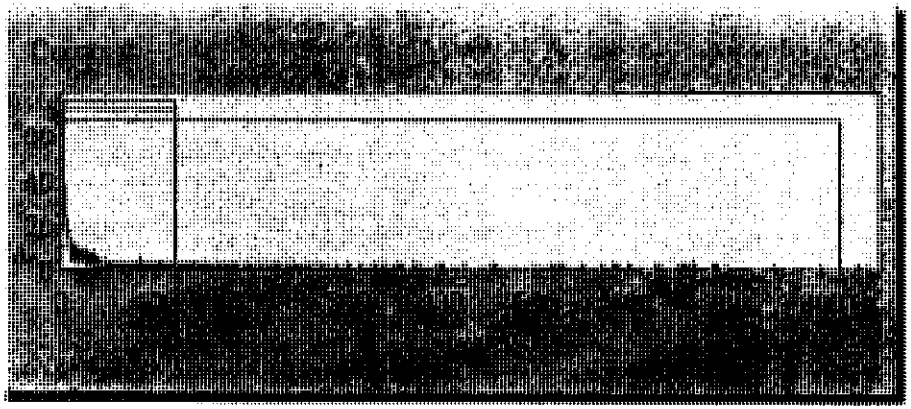


Missing vial 3.

4	5	19	60.00	PBWJ30JV1	15.86	16	460.43	349.77	8.11	0:00:04	16
10/3/2011	1:18:57 PM		98.64								

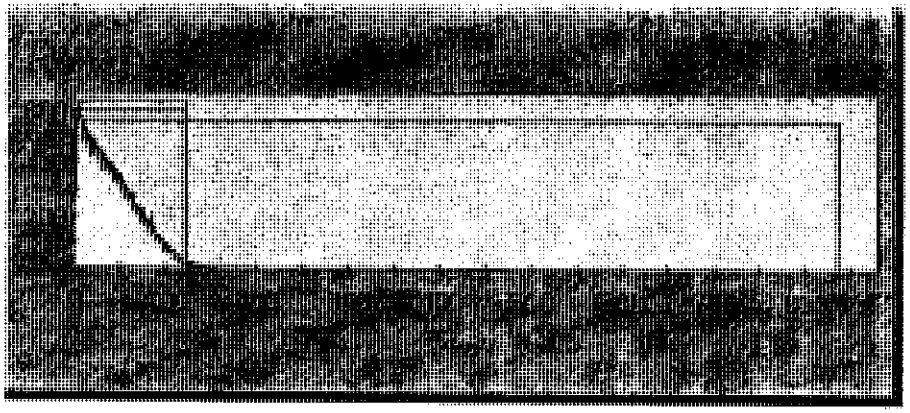
010045

SpectraView Block Data



5	5	19	60.00	LCSWJ30JV1	1098.57	1112	139.42	359.19		0.78	0:00:05	0
10/3/2011	2:20:28	PM		98.83								

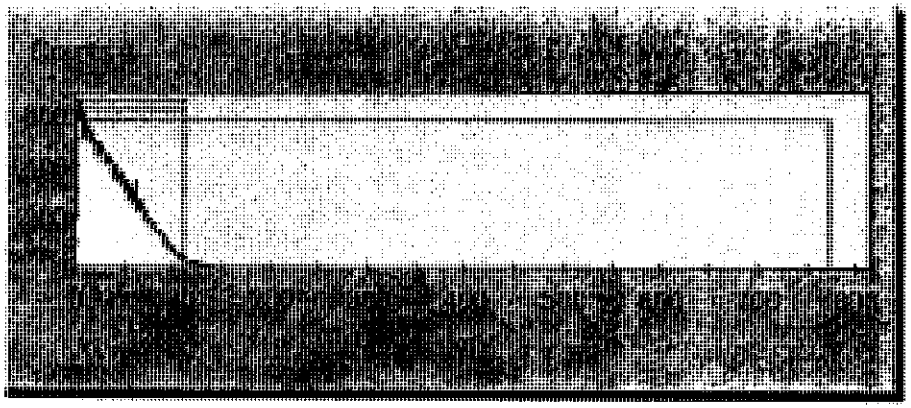
SpectraView Block Data



6	5	19	60.00	LCSWJ30JV2	1098.44	1123	135.11	324.95		0.78	0:00:07	0
10/3/2011	3:22:01	PM		97.82								

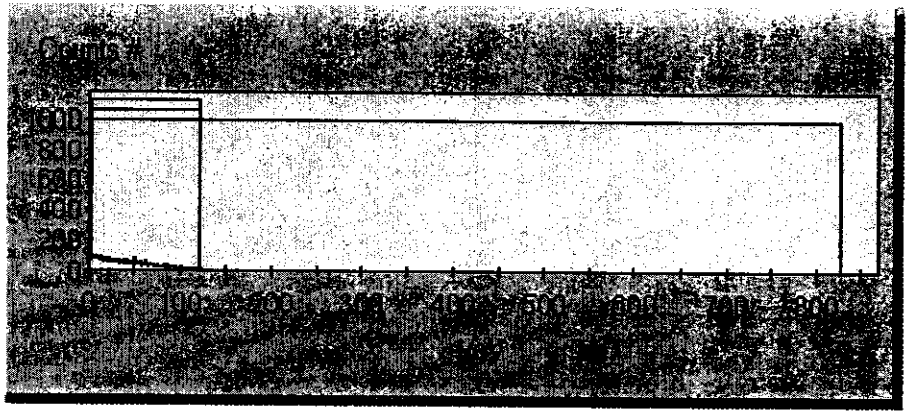
SpectraView Block Data

010046



7	5	19	60.00	Blank-0	160.46	163	169.10	353.03	2.24	0:00:08	9
10/3/2011	4:23:33 PM		98.71								

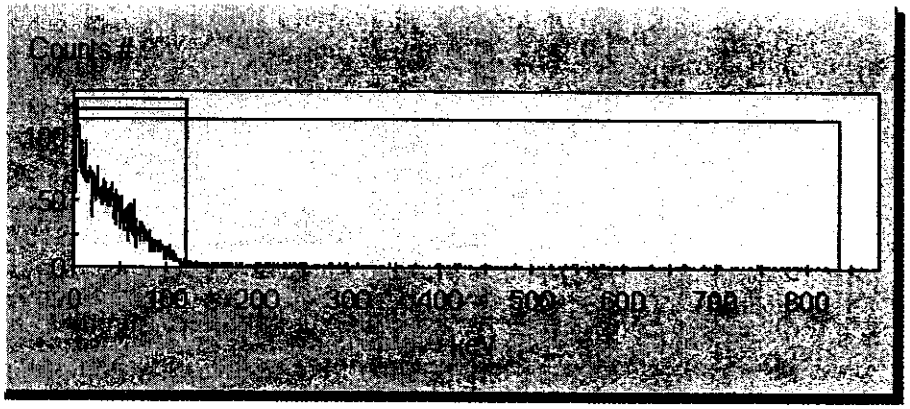
SpectraView Block Data



8	5	19	60.00	Blank-7	151.93	154	190.20	358.73	2.15	0:00:09	3
10/3/2011	5:25:04 PM		98.83								

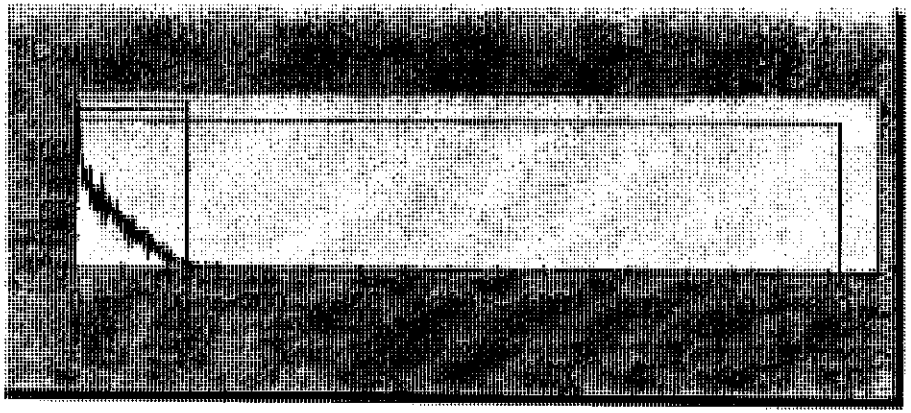
SpectraView Block Data

010047



9	5	19	60.00	473754-7	143.25	145	191.91	346.73		2.22	0:00:10	3
10/3/2011	6:26:34	PM		98.58								

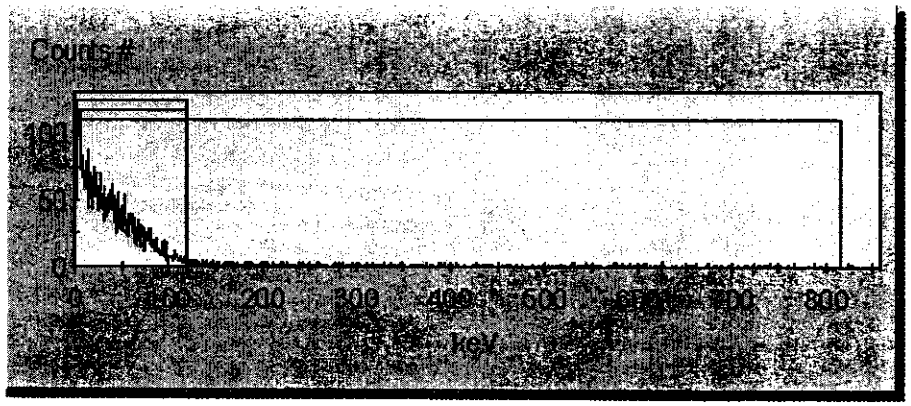
SpectraView Block Data



10	5	19	60.00	473754D-7	133.93	136	190.35	347.43		2.31	0:00:11	3
10/3/2011	7:28:05	PM		98.59								

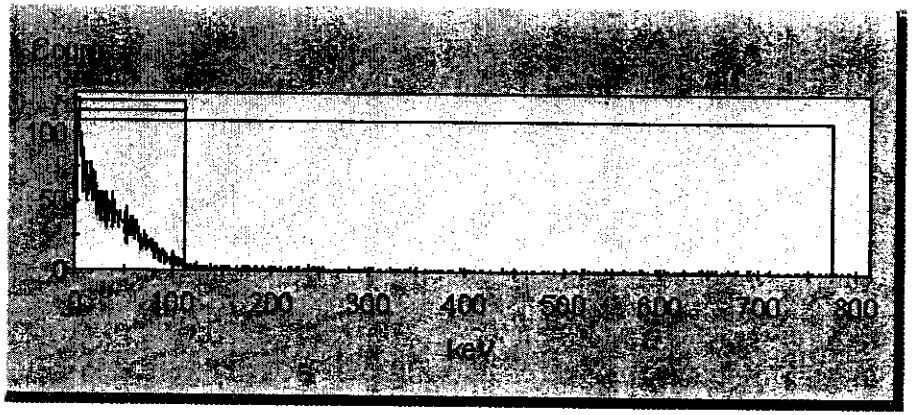
SpectraView Block Data

0100048



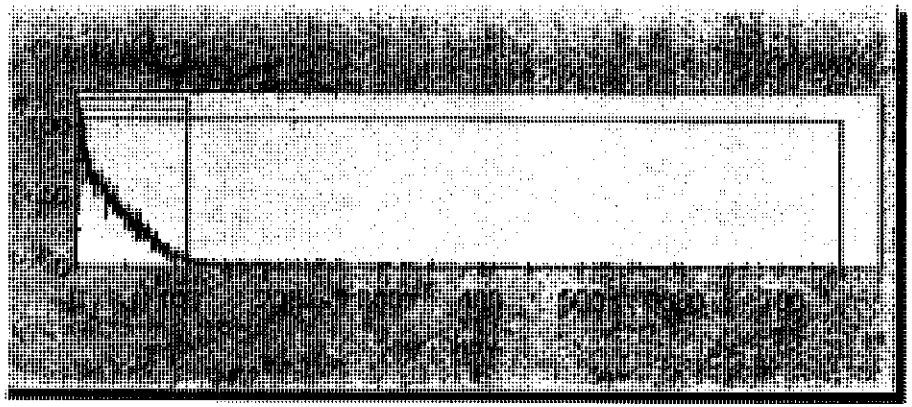
11	5	19	60.00	473755-7	124.30	127	185.89	325.70		2.40	0:00:13	3
10/3/2011	8:29:37 PM		97.85									

SpectraView Block Data



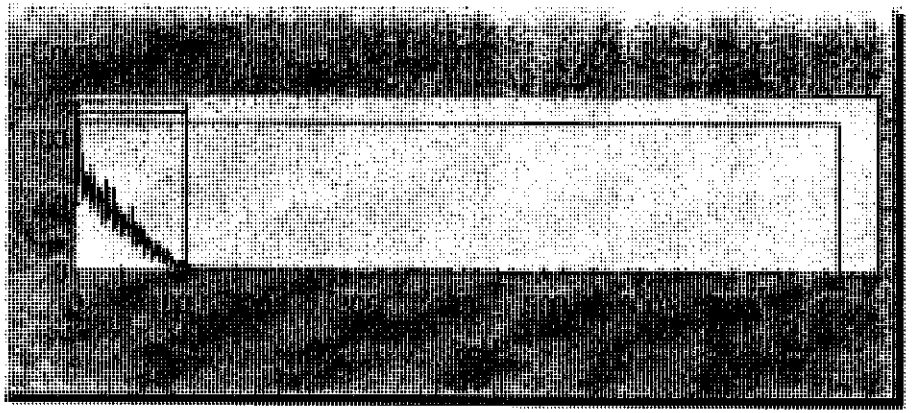
12	5	19	60.00	473755D-7	124.19	127	186.21	316.30		2.40	0:00:14	3
10/3/2011	9:31:08 PM		97.46									

SpectraView Block Data



13	5	9	60.00	473756-7	135.77	138	190.16	346.34		2.29	0:00:15	3
10/3/2011	10:32:43 PM		98.57									

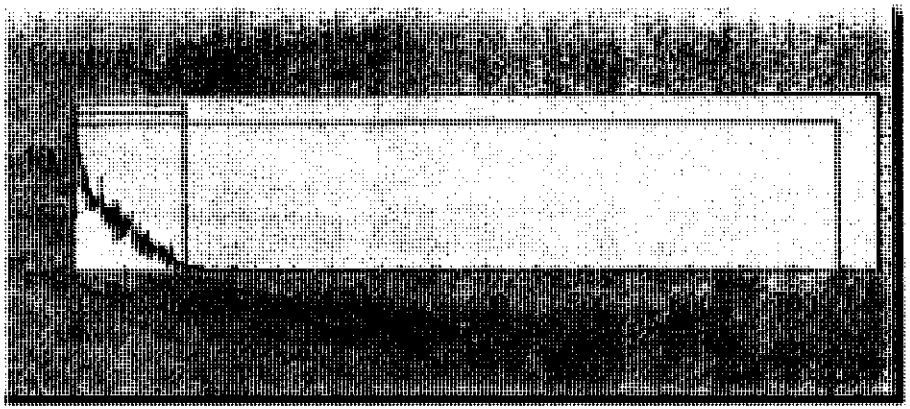
SpectraView Block Data



14	5	9	60.00	473756D-7	134.20	138	183.94	308.54		2.30	0:00:16	3
10/3/2011	11:34:14 PM		97.22									

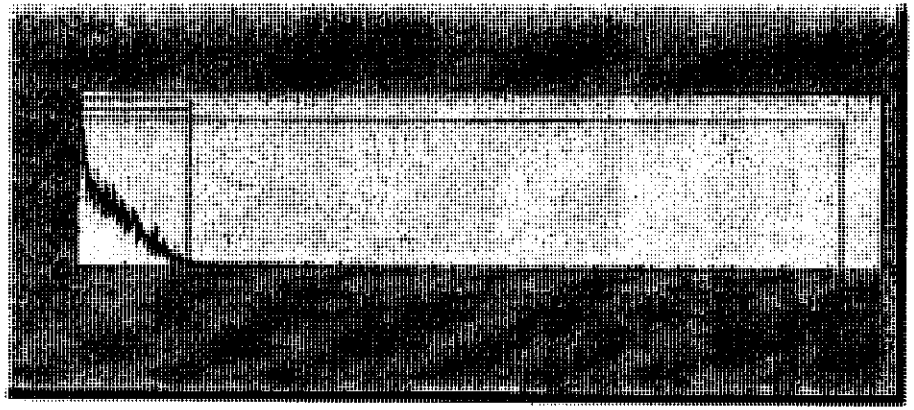
SpectraView Block Data

010050



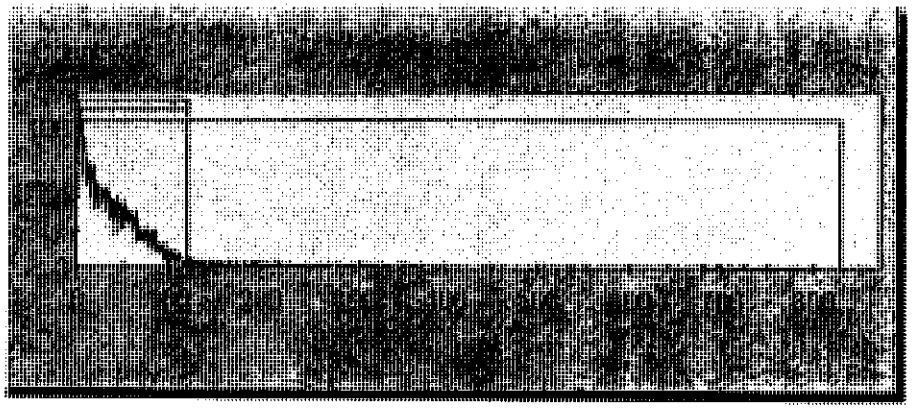
15	5	9	60.00	473757-7	127.65	129	191.98	346.72		2.36	0:00:17	3
10/4/2011	12:35:45 AM		98.58									

SpectraView Block Data



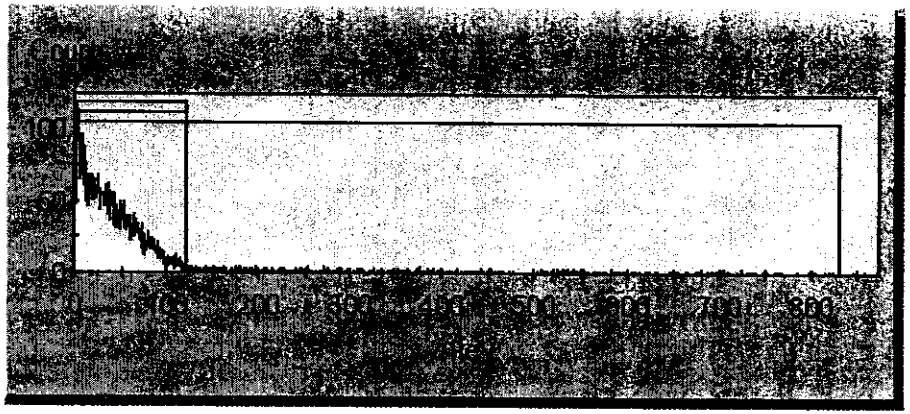
16	5	9	60.00	473757D-7	132.01	134	183.62	354.99		2.32	0:00:18	3
10/4/2011	1:37:15 AM		98.75									

SpectraView Block Data



17	5	9	60.00	473758-7	140.38	142	194.15	355.76		2.25	0:00:19	3
10/4/2011	2:38:46 AM		98.76									

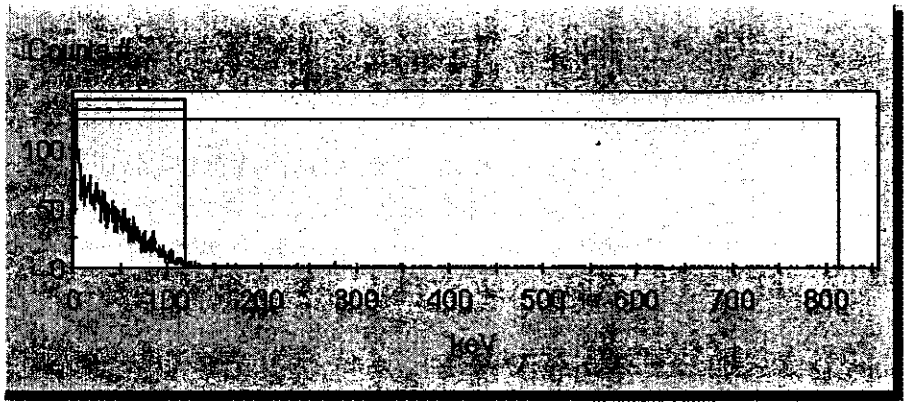
SpectraView Block Data



18	5	9	60.00	473758D-7	139.43	141	191.89	346.61		2.26	0:00:21	3
10/4/2011	3:40:17 AM		98.58									

SpectraView Block Data

010052



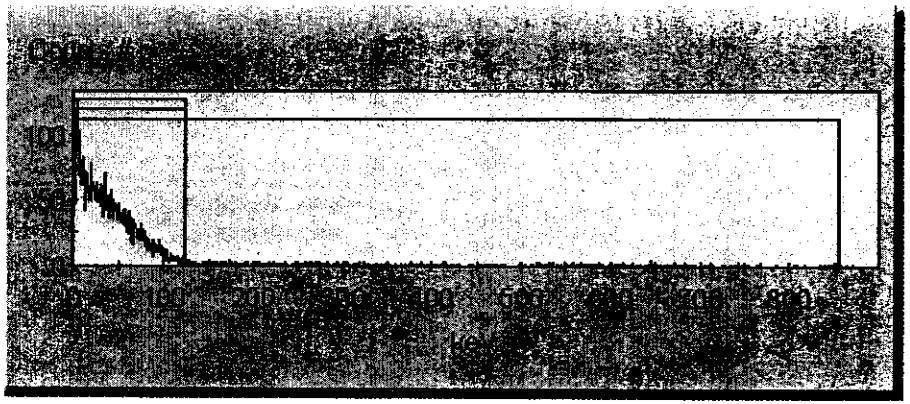
19	5	9	60.00	473768-7	139.61	142	191.45	338.41		2.25	0:00:22	3
10/4/2011	4:41:48 AM		98.38									

SpectraView Block Data

20	5	9	60.00	473768D-7	136.58	138	193.13	369.12		2.28	0:00:23	3
10/4/2011	5:43:19 AM		98.99									

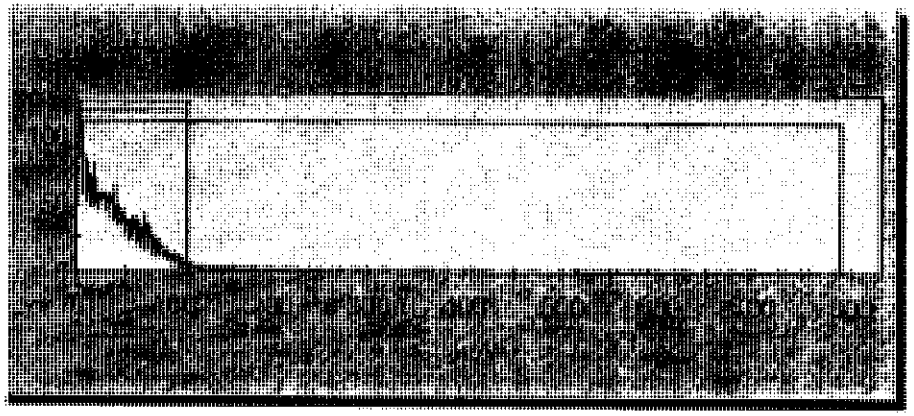
SpectraView Block Data

010053



21	5	9	60.00	473769-7	136.10	139	191.46	333.44		2.29	0:00:24	3
10/4/2011	6:44:51 AM			98.18								

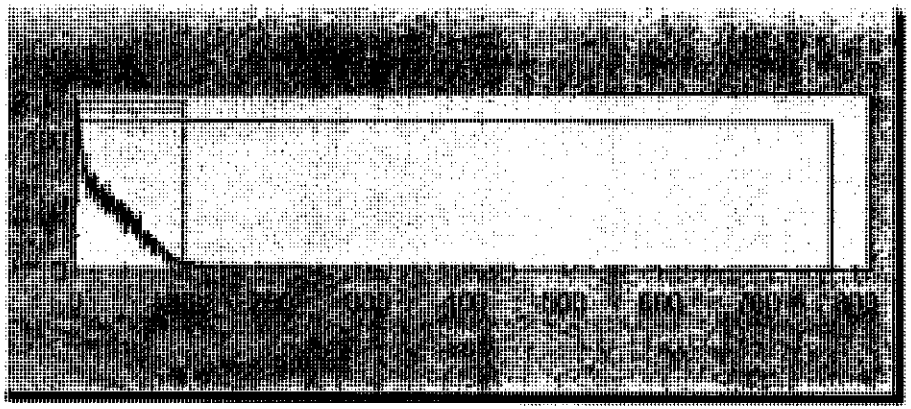
SpectraView Block Data



22	5	9	60.00	4743769D-7	139.07	142	187.29	325.82		2.26	0:00:25	3
10/4/2011	7:46:22 AM			97.86								

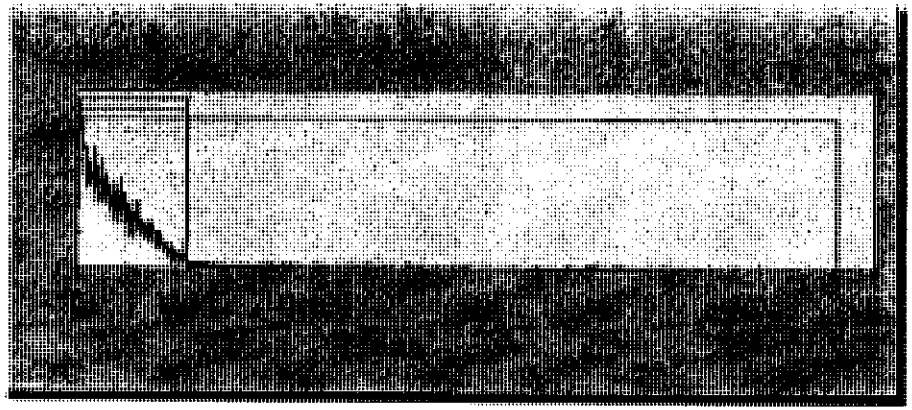
SpectraView Block Data

010054



23	5	9	60.00	473770-7	136.64	140	190.05	327.71		2.28	0:00:26	3
10/4/2011	8:47:54 AM		97.93									

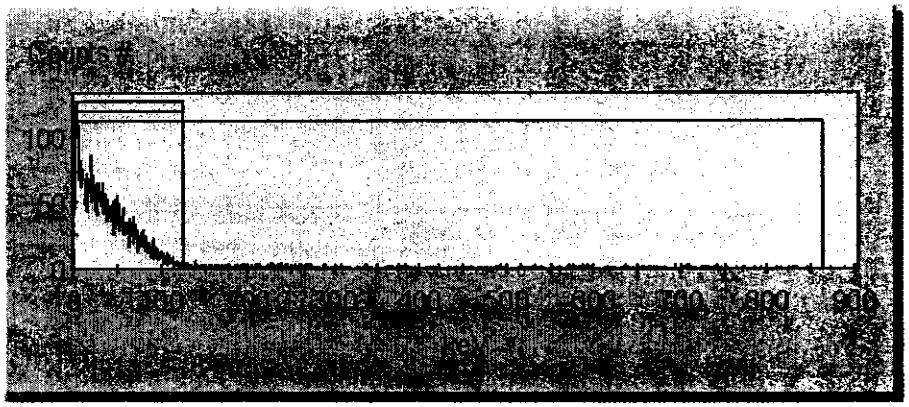
SpectraView Block Data



24	5	9	60.00	473770D-7	139.05	140	189.60	373.20		2.26	0:00:28	3
10/4/2011	9:49:24 AM		98.97									

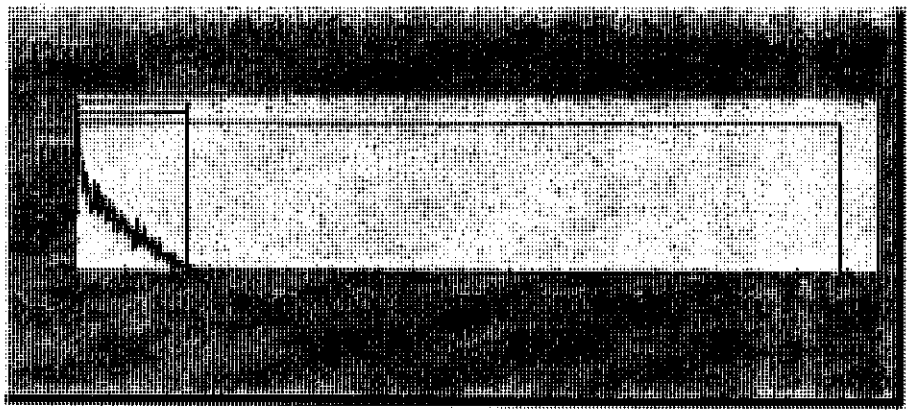
SpectraView Block Data

010055



25	5	1	60.00	473771-7	139.43	142	192.12	334.53	2.26	0:00:29	3
10/4/2011	10:51:02 AM		98.22								

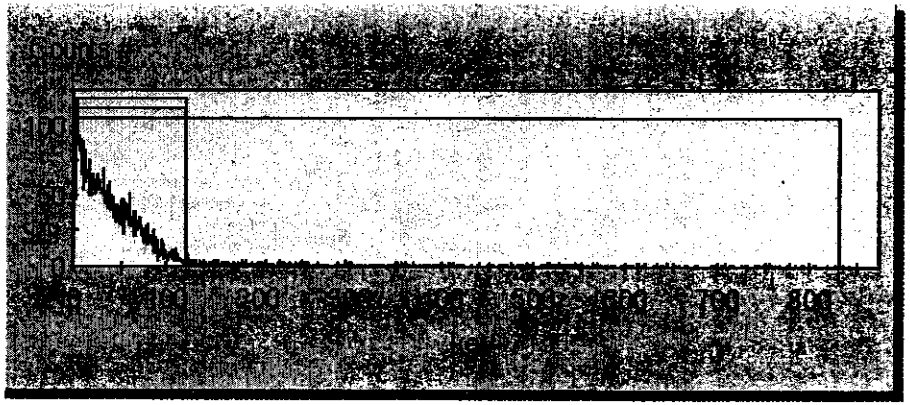
SpectraView Block Data



26	5	1	60.00	473771D-7	139.02	141	191.32	356.25	2.26	0:00:30	3
10/4/2011	11:52:32 AM		98.77								

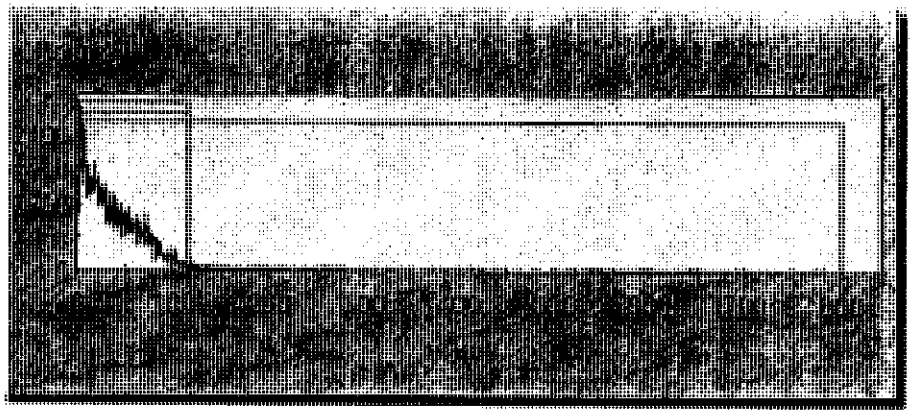
SpectraView Block Data

010056



27	5	1	60.00	473772-7	134.35	136	191.54	339.98		2.30	0:00:31	3
10/4/2011	12:54:04 PM		98.44									

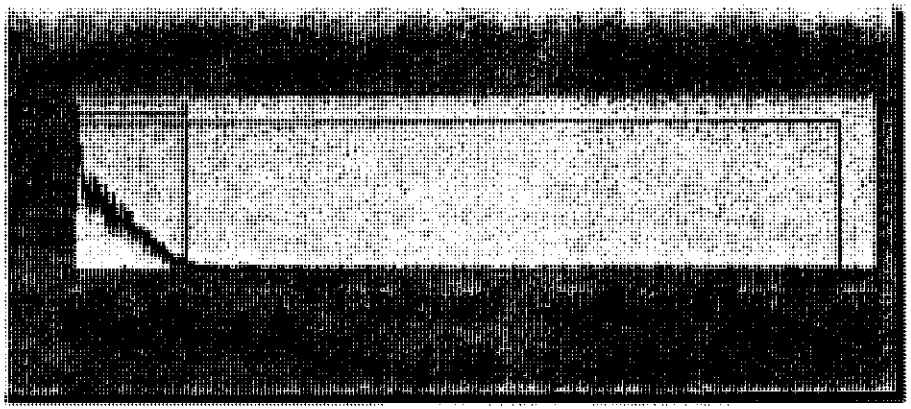
SpectraView Block Data



28	5	1	60.00	473772D-7	136.09	139	196.47	329.38		2.28	0:00:32	3
10/4/2011	1:55:35 PM		98.00									

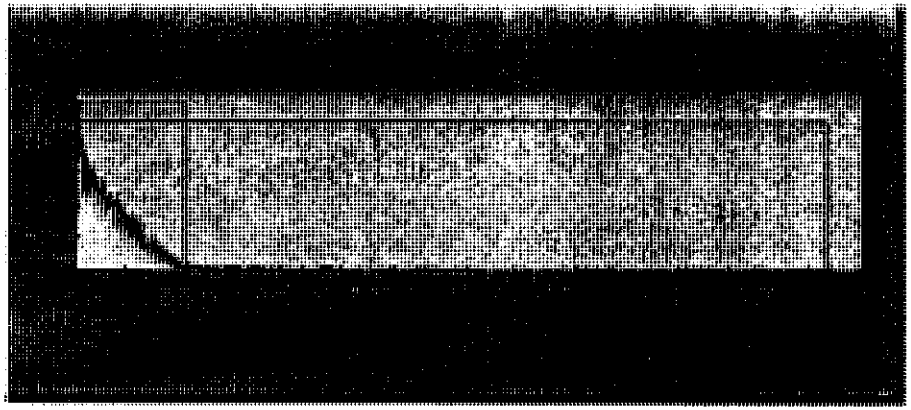
SpectraView Block Data

010057



29	5	1	60.00	473778-7	136.16	139	179.81	320.99		2.28	0:00:33	3
10/4/2011	2:57:06 PM		97.65									

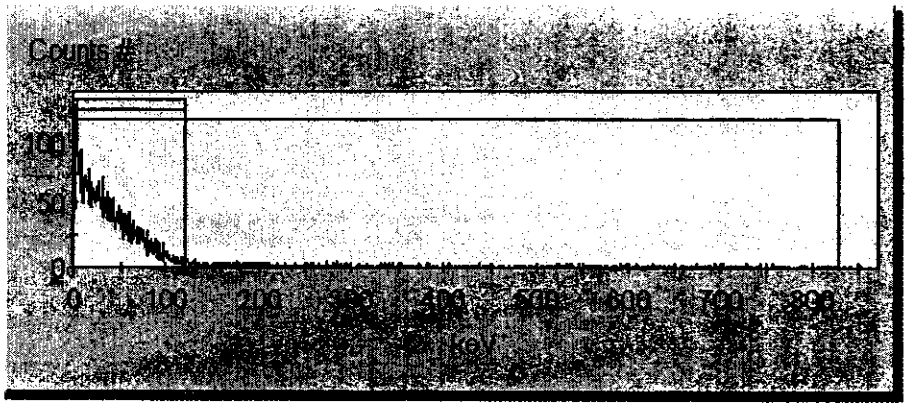
SpectraView Block Data



30	5	1	60.00	473778D-7	135.48	137	205.32	354.04		2.29	0:00:34	3
10/4/2011	3:58:37 PM		98.73									

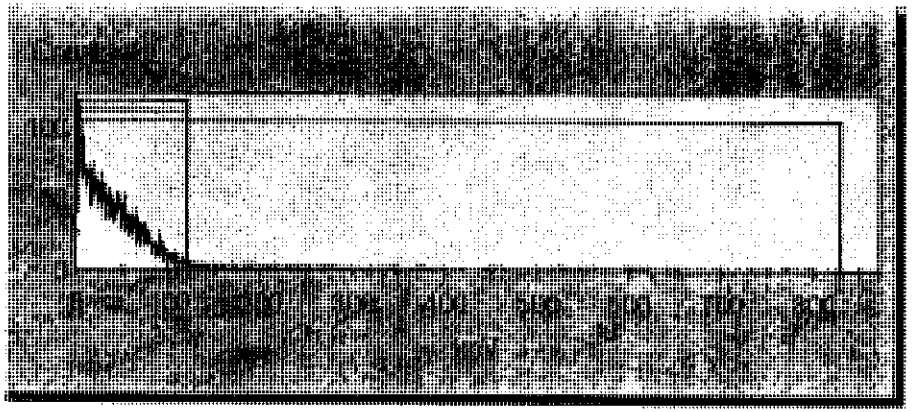
SpectraView Block Data

010058



31	5	1	60.00	473045-7	134.75	136	196.49	354.79		2.29	0:00:35	3
10/4/2011	5:00:07 PM		98.74									

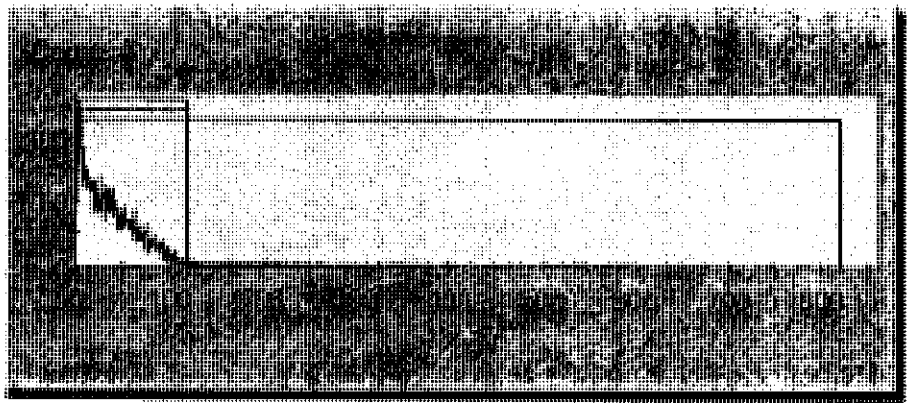
SpectraView Block Data



32	5	1	60.00	473045D-7	133.27	135	185.21	350.68		2.31	0:00:36	3
10/4/2011	6:01:38 PM		98.66									

SpectraView Block Data

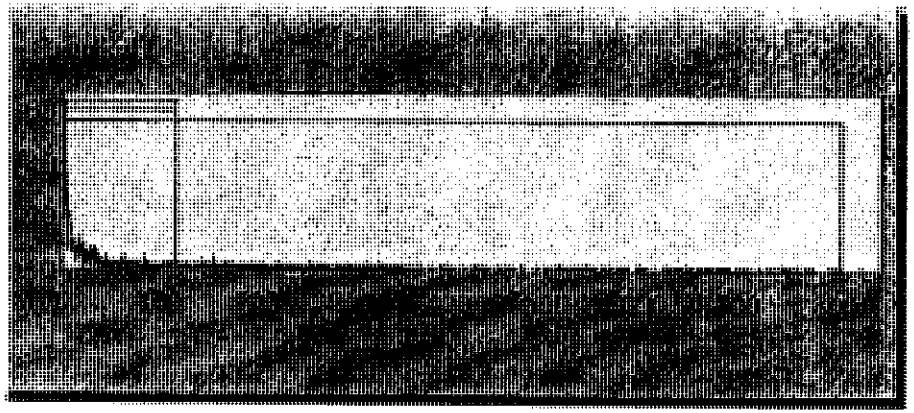
010059



PBWJ30JV2

33	5	1	60.00	Sample #33	13.63	14	486.68	342.71		9.04	0:00:37	17
10/4/2011	7:03:10 PM			98.50								

SpectraView Block Data

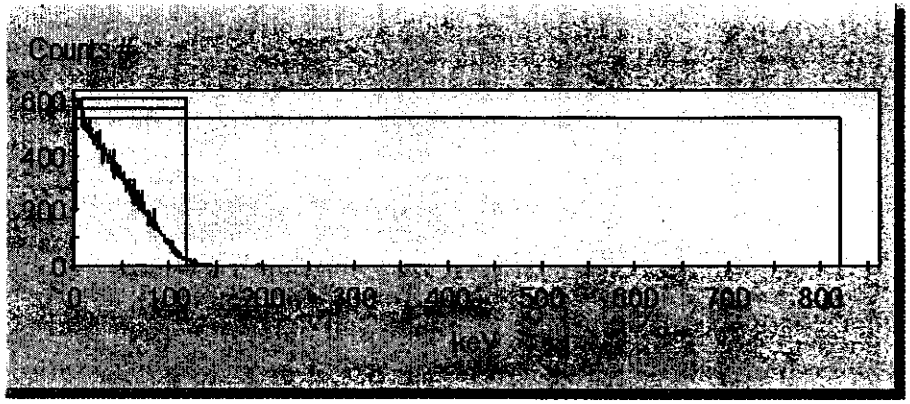


LCSWJ30JV3

34	5	1	60.00	Sample #34	1099.66	1115	139.95	350.22		0.78	0:00:38	0
10/4/2011	8:04:40 PM			98.65								

SpectraView Block Data

010060



LCSWJ30JV4

35	5	1	60.00	Sample #35	1101.97	1120	136.59	338.16		0.78	0:00:40	0
10/4/2011	9:06:14 PM			98.37								

SpectraView Block Data

010061

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-192
Prep Date: 3-Oct-11

✓ JNW 10/25/11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK03JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK03JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK03JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-10	0.10	50.0	0.00200	50.0	0.100	10.00		
473754	0.10	50.0	0.00200	50.0	0.100	10.00		
473754D	0.10	50.0	0.00200	50.0	0.100	10.00		
473755	0.10	50.0	0.00200	50.0	0.100	10.00		
473755D	0.10	50.0	0.00200	50.0	0.100	10.00		
473756	0.10	50.0	0.00200	50.0	0.100	10.00		
473756D	0.10	50.0	0.00200	50.0	0.100	10.00		
473757	0.10	50.0	0.00200	50.0	0.100	10.00		
473757D	0.10	50.0	0.00200	50.0	0.100	10.00		
473758	0.10	50.0	0.00200	50.0	0.100	10.00		
473758D	0.10	50.0	0.00200	50.0	0.100	10.00		
473768	0.10	50.0	0.00200	50.0	0.100	10.00		
473768D	0.10	50.0	0.00200	50.0	0.100	10.00		
473769	0.10	50.0	0.00200	50.0	0.100	10.00		
473769D	0.10	50.0	0.00200	50.0	0.100	10.00		
473770	0.10	50.0	0.00200	50.0	0.100	10.00		
473770D	0.10	50.0	0.00200	50.0	0.100	10.00		
473771	0.10	50.0	0.00200	50.0	0.100	10.00		
473771D	0.10	50.0	0.00200	50.0	0.100	10.00		
473772	0.10	50.0	0.00200	50.0	0.100	10.00		
473772D	0.10	50.0	0.00200	50.0	0.100	10.00		
473778	0.10	50.0	0.00200	50.0	0.100	10.00		
473778D	0.10	50.0	0.00200	50.0	0.100	10.00		
473045	0.10	50.0	0.00200	50.0	0.100	10.00		
473045D	0.10	50.0	0.00200	50.0	0.100	10.00		
PBWK03JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK03JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK03JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010082

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-192
Prep Date: 3-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	Raw cpm	Raw %error	Raw dpm	Raw eff-1	
BKG-1	Tc-99	Water	60	334.89	15.35	8.28	15.63	98.24	
BKG-2	Tc-99	Water	60	361.20	15.51	8.17	15.69	98.88	
				AVG BKG	15.43	AVG BKG	15.66		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK03JV1	Tc-99	Water	60	334.94	14.70	8.51	-0.74	98.54		-3.34E+00	3.25E+00	1.10E+01	3.24E+00		PB < 1.65*TPU	
LCSWK03JV1	Tc-99	Water	60	351.21	1090.26	0.79	1089.32	98.67		4.91E+03	2.84E+02	1.10E+01	1.96E+01	5000	98.1%	-0.019
LCSWK03JV2	Tc-99	Water	60	367.28	1104.01	0.78	1099.58	99.00		4.95E+03	2.86E+02	1.10E+01	1.97E+01	5000	99.1%	-0.009
Blank-10	Tc-99	Water	60	336.66	155.59	2.13	142.57	98.31		6.42E+02	3.78E+01	1.10E+01	7.74E+00			
473754	Tc-99	Water	60	372.17	144.62	2.21	130.52	98.98		5.88E+02	3.47E+01	1.10E+01	7.43E+00	RPD	Dup Evaluation	
473754D	Tc-99	Water	60	349.09	141.87	2.24	128.20	98.63		5.77E+02	3.41E+01	1.10E+01	7.39E+00	1.80	0.22	Pass
473755	Tc-99	Water	60	376.27	135.96	2.29	121.80	98.96		5.49E+02	3.25E+01	1.10E+01	7.23E+00	RPD	Dup Evaluation	
473755D	Tc-99	Water	60	349.15	130.92	2.33	117.09	98.63		5.27E+02	3.12E+01	1.10E+01	7.13E+00	3.94	0.47	Pass
473756	Tc-99	Water	60	343.38	135.92	2.28	122.31	98.51		5.51E+02	3.26E+01	1.10E+01	7.26E+00	RPD	Dup Evaluation	
473756D	Tc-99	Water	60	360.39	139.40	2.25	125.40	98.86		5.65E+02	3.34E+01	1.10E+01	7.32E+00	2.49	0.30	Pass
473757	Tc-99	Water	60	353.49	125.35	2.39	111.35	98.72		5.02E+02	2.98E+01	1.10E+01	6.99E+00	RPD	Dup Evaluation	
473757D	Tc-99	Water	60	360.89	129.92	2.34	115.80	98.87		5.22E+02	3.09E+01	1.10E+01	7.09E+00	3.92	0.47	Pass
473758	Tc-99	Water	60	376.71	142.18	2.23	128.08	98.96		5.77E+02	3.41E+01	1.10E+01	7.38E+00	RPD	Dup Evaluation	
473758D	Tc-99	Water	60	366.07	142.57	2.23	128.45	98.98		5.79E+02	3.42E+01	1.10E+01	7.39E+00	0.29	0.03	Pass
473768	Tc-99	Water	60	378.76	139.00	2.26	124.88	98.95		5.63E+02	3.32E+01	1.10E+01	7.30E+00	RPD	Dup Evaluation	
473768D	Tc-99	Water	60	366.11	140.75	2.25	126.61	98.98		5.70E+02	3.37E+01	1.10E+01	7.34E+00	1.38	0.16	Pass
473769	Tc-99	Water	60	358.30	135.07	2.30	121.07	98.82		5.45E+02	3.23E+01	1.10E+01	7.22E+00	RPD	Dup Evaluation	
473769D	Tc-99	Water	60	366.67	136.42	2.28	122.22	98.99		5.51E+02	3.26E+01	1.10E+01	7.24E+00	0.95	0.11	Pass
473770	Tc-99	Water	60	381.54	141.43	2.24	127.35	98.94		5.74E+02	3.39E+01	1.10E+01	7.36E+00	RPD	Dup Evaluation	
473770D	Tc-99	Water	60	356.58	140.87	2.25	126.99	98.78		5.72E+02	3.38E+01	1.10E+01	7.36E+00	0.28	0.03	Pass
473771	Tc-99	Water	60	353.16	132.87	2.31	118.97	98.71		5.36E+02	3.17E+01	1.10E+01	7.17E+00	RPD	Dup Evaluation	
473771D	Tc-99	Water	60	377.28	137.78	2.27	123.64	98.96		5.57E+02	3.29E+01	1.10E+01	7.27E+00	3.84	0.46	Pass
473772	Tc-99	Water	60	364.76	139.94	2.25	125.83	98.95		5.67E+02	3.35E+01	1.10E+01	7.33E+00	RPD	Dup Evaluation	
473772D	Tc-99	Water	60	379.58	136.88	2.28	122.74	98.95		5.53E+02	3.27E+01	1.10E+01	7.25E+00	2.49	0.30	Pass
473778	Tc-99	Water	60	336.75	135.88	2.29	122.52	98.31		5.52E+02	3.26E+01	1.10E+01	7.26E+00	RPD	Dup Evaluation	
473778D	Tc-99	Water	60	370.89	134.35	2.30	120.15	98.98		5.41E+02	3.20E+01	1.10E+01	7.19E+00	1.96	0.23	Pass
473045	Tc-99	Water	60	355.57	133.13	2.31	119.18	98.76		5.37E+02	3.18E+01	1.10E+01	7.18E+00	RPD	Dup Evaluation	
473045D	Tc-99	Water	60	367.94	131.01	2.33	116.75	99.00		5.26E+02	3.11E+01	1.10E+01	7.11E+00	2.06	0.25	Pass
PBWK03JV2	Tc-99	Water	60	363.19	14.91	8.45	-0.53	98.92		-2.37E+00	3.24E+00	1.10E+01	3.24E+00		PB < 1.65*TPU	
LCSWK03JV3	Tc-99	Water	60	340.22	1096.22	0.78	1097.81	98.45		4.95E+03	2.86E+02	1.10E+01	1.97E+01	5000	98.9%	-0.011
LCSWK03JV4	Tc-99	Water	60	373.78	1098.22	0.78	1094.06	98.97		4.93E+03	2.85E+02	1.10E+01	1.96E+01	5000	98.6%	-0.014

Notes: Day #10 results.

010063

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-192
Prep Date: 3-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010064

20111005_1749.results

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111005_1749\Replay_20111008_170016
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111005_1749\20111005_1749.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.1sa

Count Conditions

Nuclide: 99tc
Quench Indicator: tSIE/AEC
External Std Terminator (sec): 10 sec
Pre-Count Delay (min): 0.00
Quench Set:
Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B+W Portsmouth
16526.05.00X
TO# 110825-10, 110915-9
12-192, 12-193
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010065

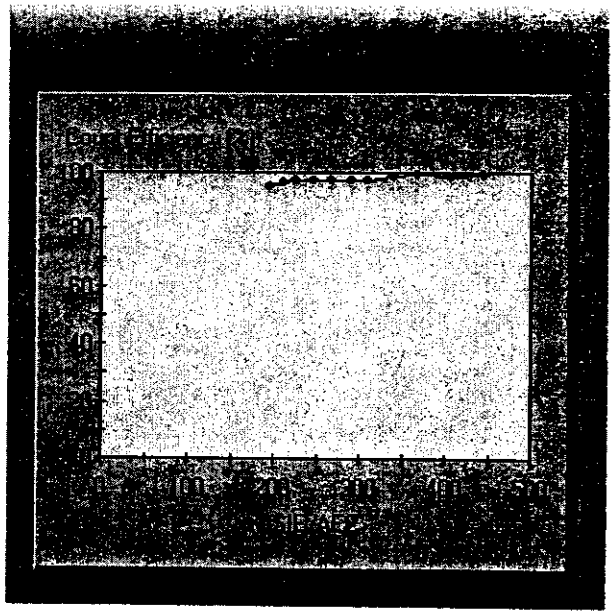
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 22.41 Date Processed: 10/5/2011 2:01:32 AM
14C Chi Square: 26.42 Date Processed: 10/5/2011 2:01:32 AM
3H E^2/B (1-18.6 keV): 1482.66 Date Processed: 10/5/2011 2:01:32 AM
14C E^2/B (4-156 keV): 5759.51 Date Processed: 10/5/2011 2:01:32 AM
3H Efficiency (1-18.6 keV): 64.86 Date Processed: 10/5/2011 2:01:32 AM
14C Efficiency (4-156 keV): 93.40 Date Processed: 10/5/2011 2:01:32 AM
IPA Background Date Processed: 10/5/2011 2:01:32 AM
3H Background CPM (1-18.6 keV): 2.84 Date Processed: 10/5/2011 2:01:32 AM
14C Background CPM (4-156 keV): 1.51 Date Processed: 10/5/2011 2:01:32 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010066



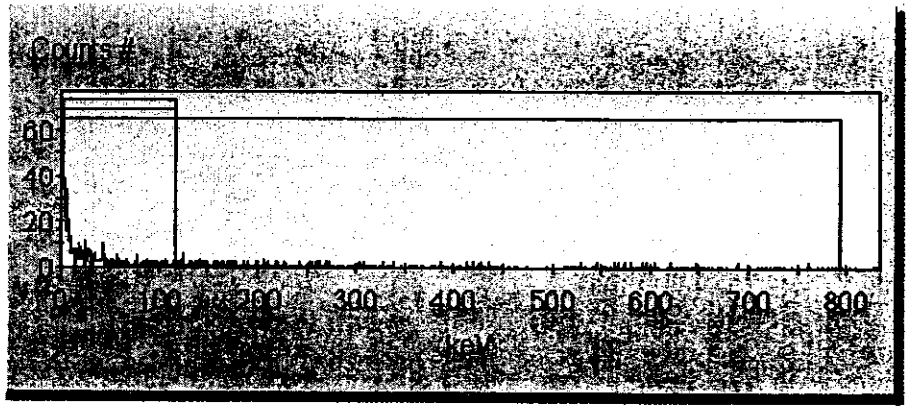
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE		TIME	Eff Nucl In A									
1	5	1	60.00	Bkg-1	15.35	16	436.99	334.89		8.28	0:00:03	16
10/5/2011		5:50:53 PM	98.24									

010067

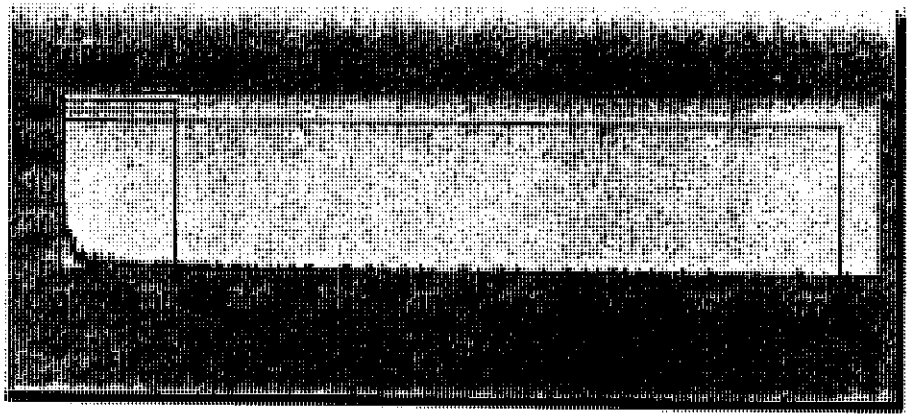
SpectraView Block Data



---

2 5 1 60.00 Bkg-2 15.51 16 485.33 361.20 8.17 0:00:04 15
10/5/2011 6:52:23 PM 98.88

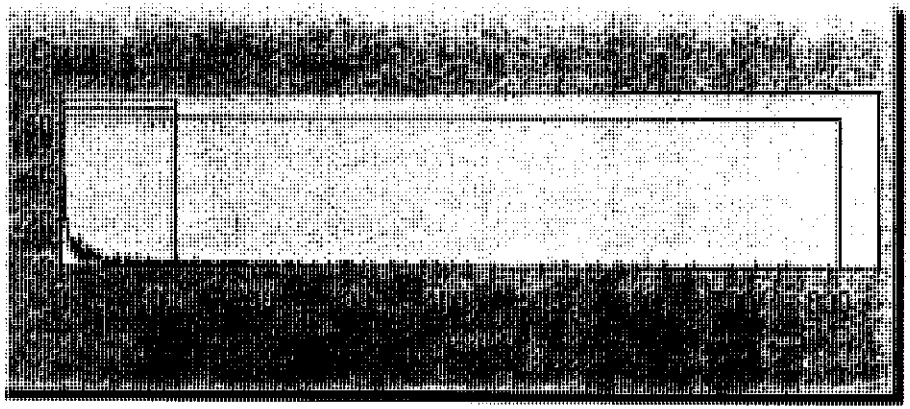
SpectraView Block Data



Missing vial 3.
4 5 1 60.00 PBWK03JV1 14.70 15 462.98 344.94 8.51 0:00:05 16
10/5/2011 7:53:54 PM 98.54

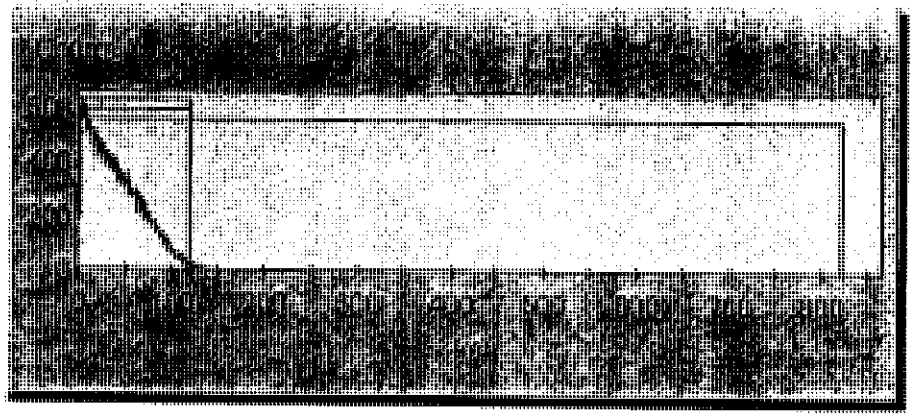
010068

SpectraView Block Data



5	5	1	60.00	LCSWK03JV1	1090.26	1105	139.20	351.21		0.79	0:00:07	0
10/5/2011	8:55:25 PM			98.67								

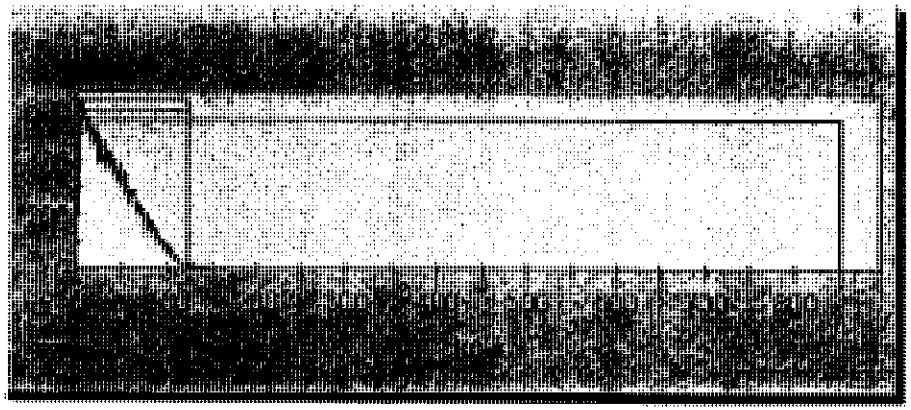
SpectraView Block Data



6	5	1	60.00	LCSWK03JV2	1104.01	1115	133.91	367.28		0.78	0:00:08	0
10/5/2011	9:56:59 PM			99.00								

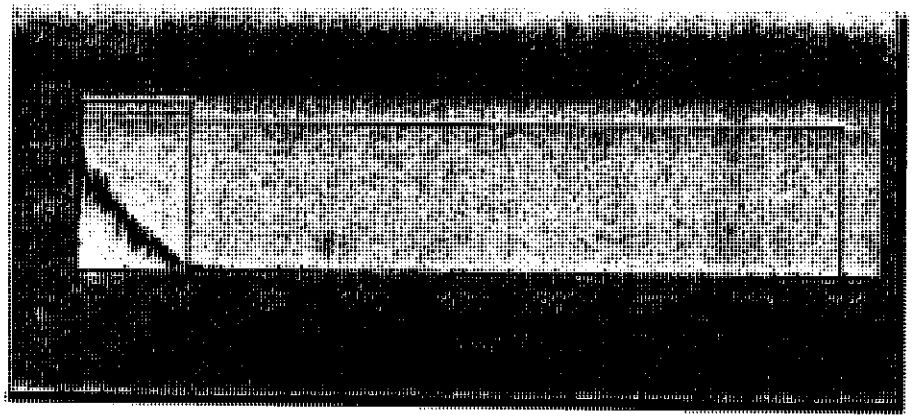
SpectraView Block Data

0100690



7	5	1	60.00	Blank Day #10	155.59	158	176.82	336.66		2.13	0:00:09	3
10/5/2011	10:58:34 PM			98.31								

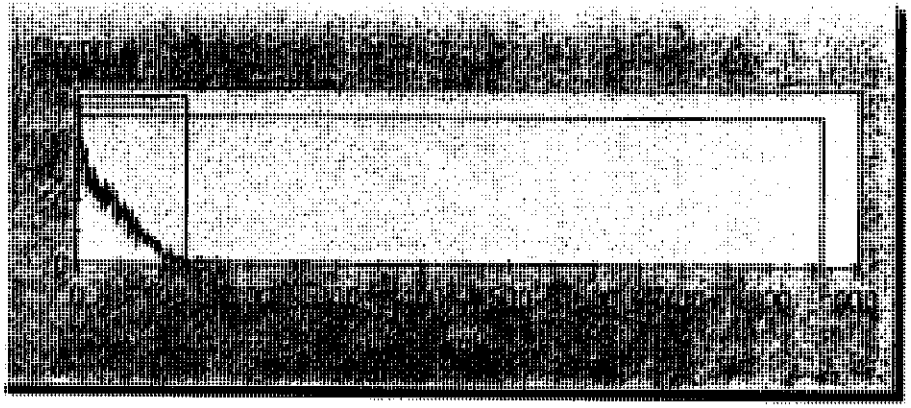
SpectraView Block Data



8	5	1	60.00	473754-10	144.62	146	187.41	372.17		2.21	0:00:10	3
10/6/2011	12:00:06 AM			98.98								

SpectraView Block Data

010070



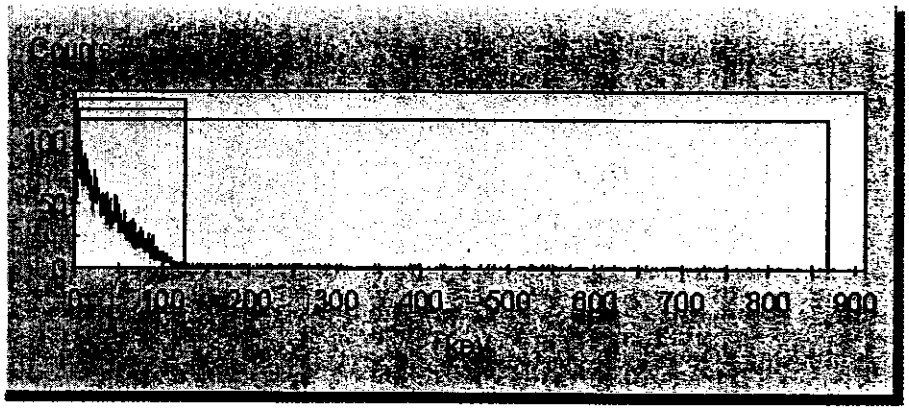
9	5	1	60.00	473754D-10	141.87	144	192.43	349.09		2.24	0:00:11	3
10/6/2011		1:01:36 AM		98.63								

SpectraView Block Data

10	5	1	60.00	473755-10	135.96	137	187.04	376.27		2.29	0:00:12	3
10/6/2011		2:03:07 AM		98.96								

SpectraView Block Data

010071



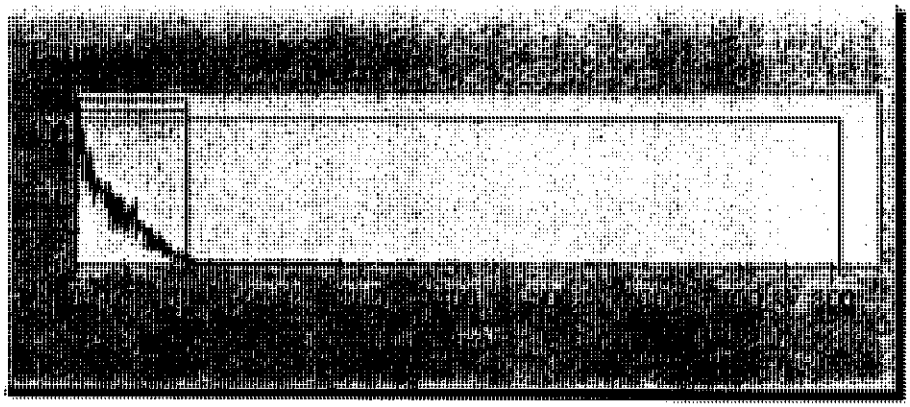
11	5	1	60.00	473755D-10	130.92	133	198.09	349.15		2.33	0:00:14	3
10/6/2011	3:04:38 AM			98.63								

SpectraView Block Data

12	5	1	60.00	473756-10	135.92	138	187.20	343.38		2.28	0:00:15	3
10/6/2011	4:06:09 AM			98.51								

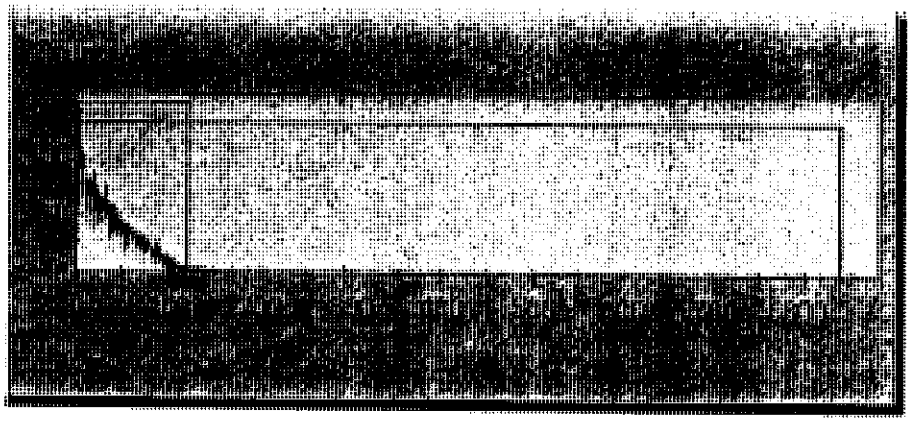
SpectraView Block Data

010072



13	5	2	60.00	473756D-10	139.40	141	177.85	360.39		2.25	0:00:16	3
10/6/2011	5:07:45 AM			98.86								

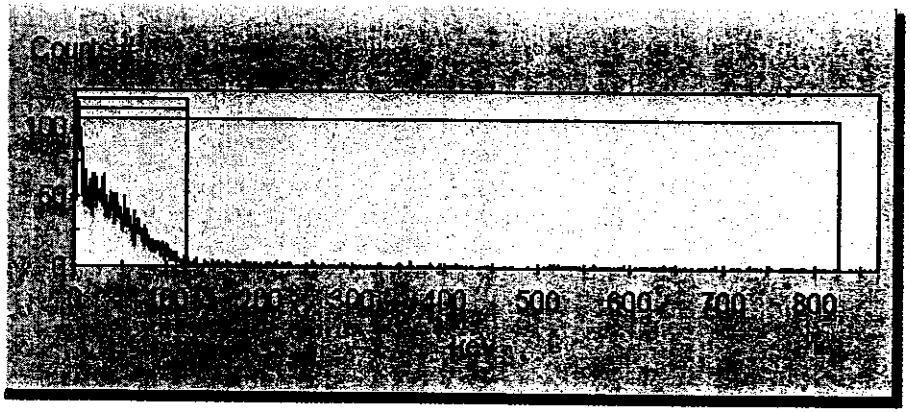
SpectraView Block Data



14	5	2	60.00	473757-10	125.35	127	195.99	353.49		2.39	0:00:17	3
10/6/2011	6:09:16 AM			98.72								

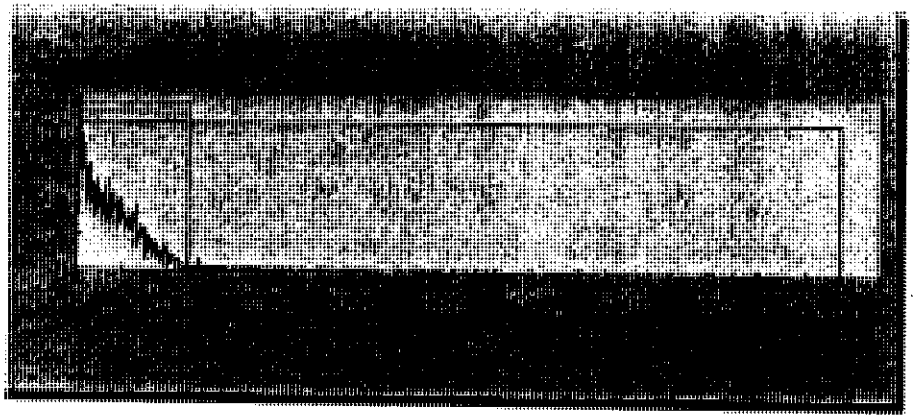
SpectraView Block Data

0100073



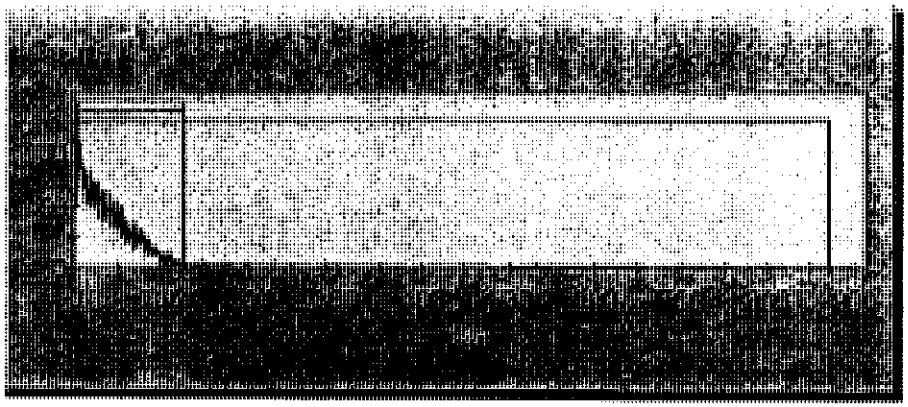
15	5	2	60.00	473757D-10	129.92	131	200.37	360.89		2.34	0:00:18	3
10/6/2011	7:10:47 AM			98.87								

SpectraView Block Data



16	5	2	60.00	473758-10	142.18	144	183.21	376.71		2.23	0:00:19	3
10/6/2011	8:12:17 AM			98.96								

SpectraView Block Data



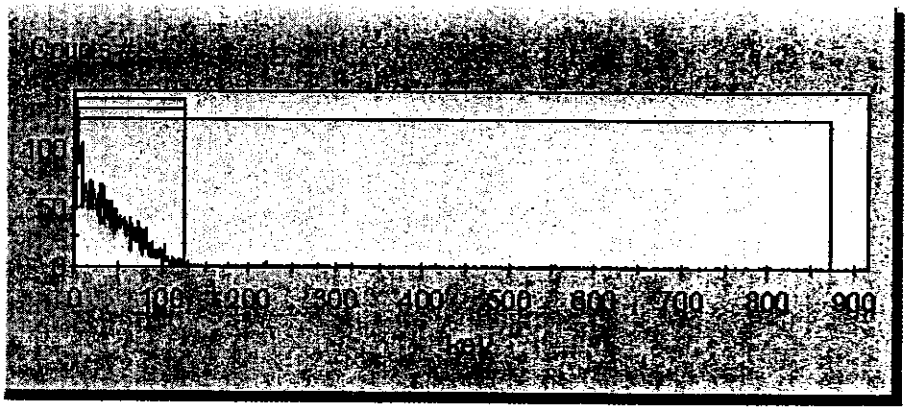
17	5	2	60.00	473758D-10	142.57	144	191.45	366.07		2.23	0:00:21	3
10/6/2011	9:13:47 AM			98.98								

SpectraView Block Data

18	5	2	60.00	473768-10	139.00	140	186.23	378.76		2.26	0:00:22	3
10/6/2011	10:15:18 AM			98.95								

SpectraView Block Data

010075



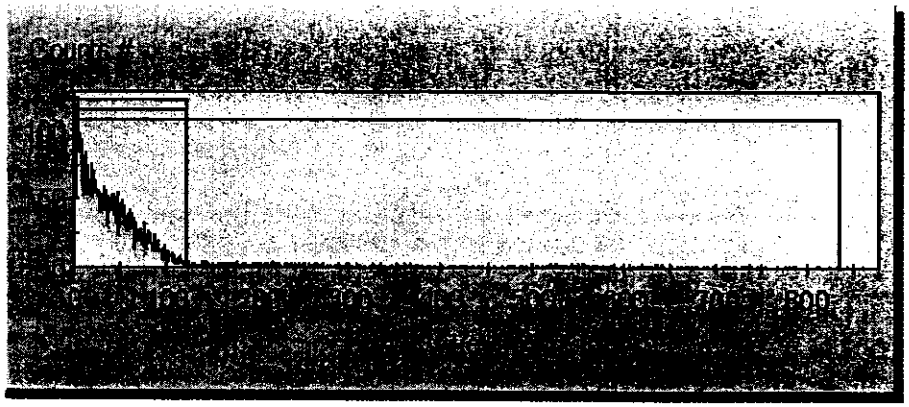
19	5	2	60.00	473768D-10	140.75	142	195.15	366.11		2.25	0:00:23	3
10/6/2011	11:16:49 AM			98.98								

SpectraView Block Data

20	5	2	60.00	473769-10	135.07	137	186.99	358.30		2.30	0:00:24	3
10/6/2011	12:18:20 PM			98.82								

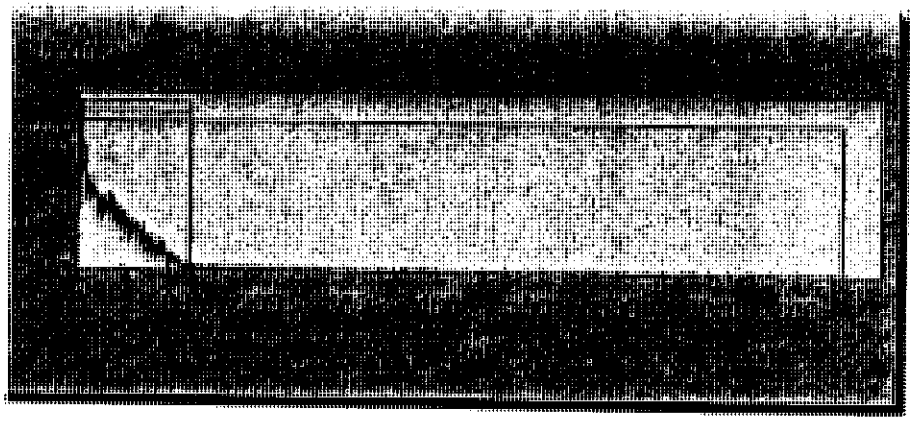
SpectraView Block Data

010076



21	5	2	60.00	473769D-10	136.42	138	193.86	366.67		2.28	0:00:25	3
10/6/2011	1:19:49 PM			98.99								

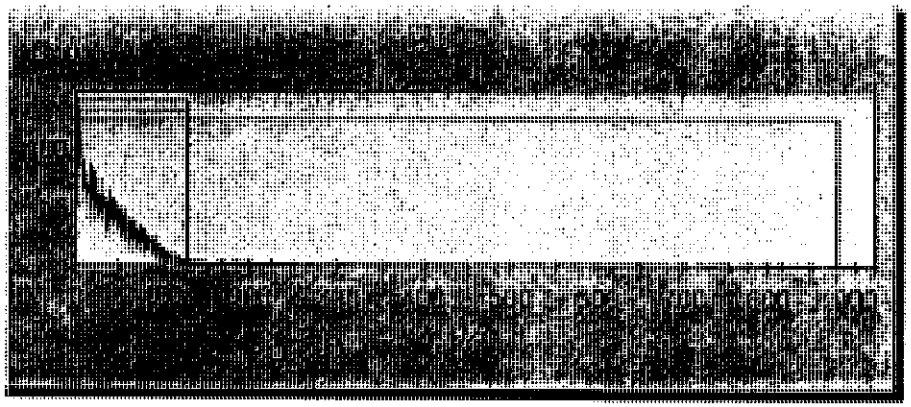
SpectraView Block Data



22	5	2	60.00	473770-10	141.43	143	193.50	381.54		2.24	0:00:26	3
10/6/2011	2:21:19 PM			98.94								

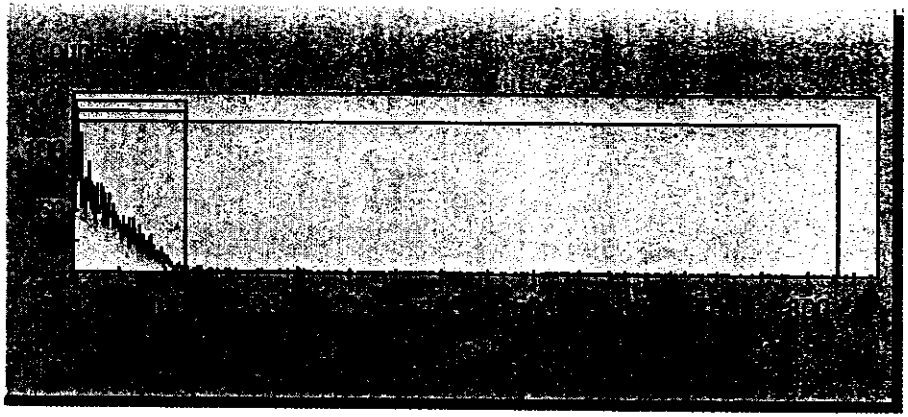
SpectraView Block Data

010077



23	5	2	60.00	473770D-10	140.87	143	189.20	356.58		2.25	0:00:28	3
10/6/2011	3:22:49 PM			98.78								

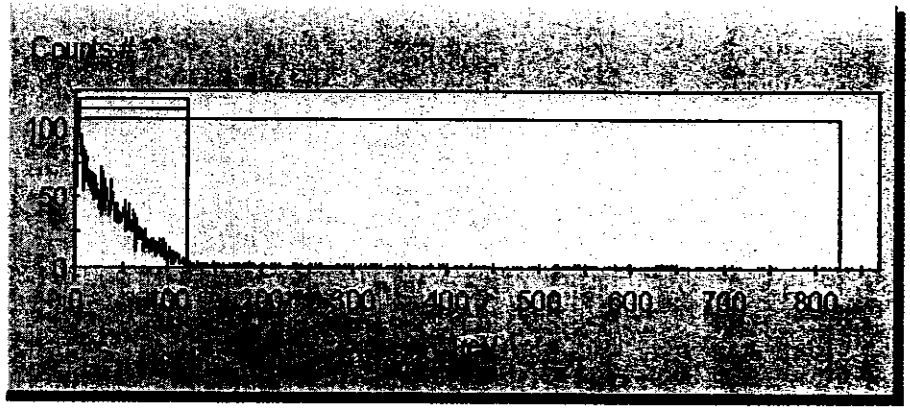
SpectraView Block Data



24	5	2	60.00	473771-10	132.87	135	191.54	353.16		2.31	0:00:29	3
10/6/2011	4:24:20 PM			98.71								

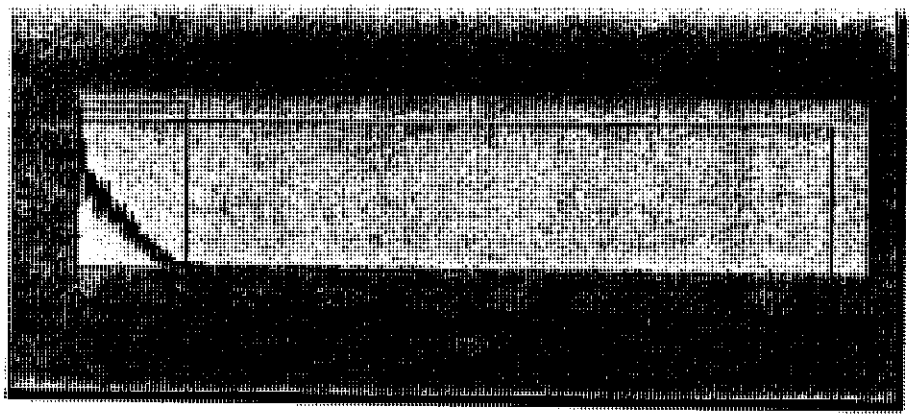
SpectraView Block Data

010078



25	5	9	60.00	473771D-10	137.78	139	182.42	377.28		2.27	0:00:30	3
10/6/2011	5:25:56 PM			98.96								

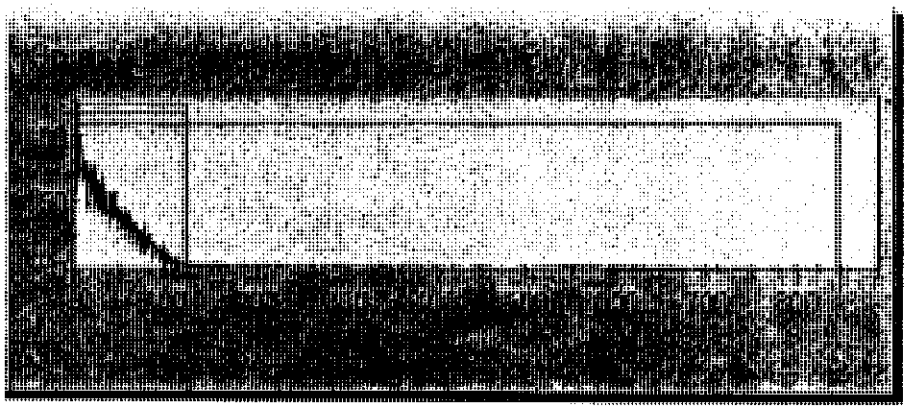
SpectraView Block Data



26	5	9	60.00	473772-10	139.94	141	186.34	364.76		2.25	0:00:31	3
10/6/2011	6:27:27 PM			98.95								

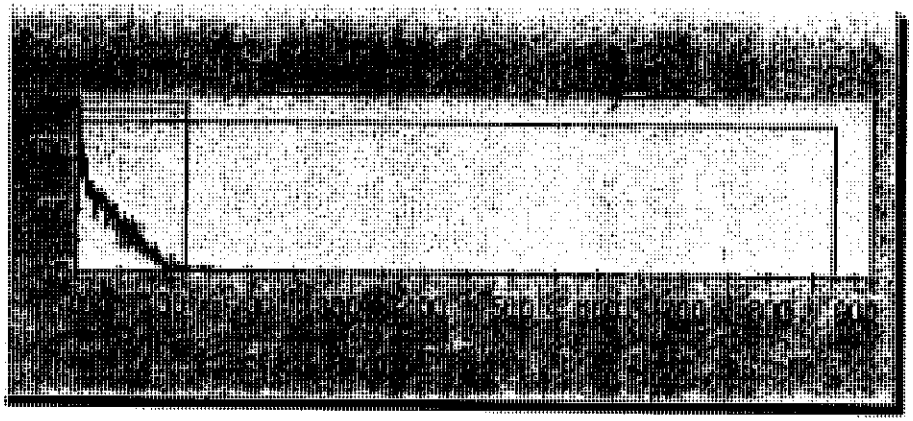
SpectraView Block Data

0100079



27	5	9	60.00	473772D-10	136.88	138	188.18	379.58		2.28	0:00:32	3
10/6/2011	7:28:58 PM			98.95								

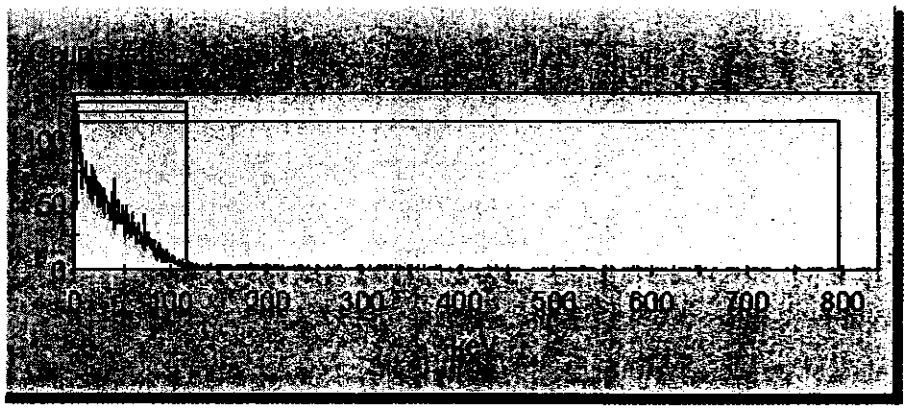
SpectraView Block Data



28	5	9	60.00	473778-10	135.88	138	182.57	336.75		2.29	0:00:34	3
10/6/2011	8:30:29 PM			98.31								

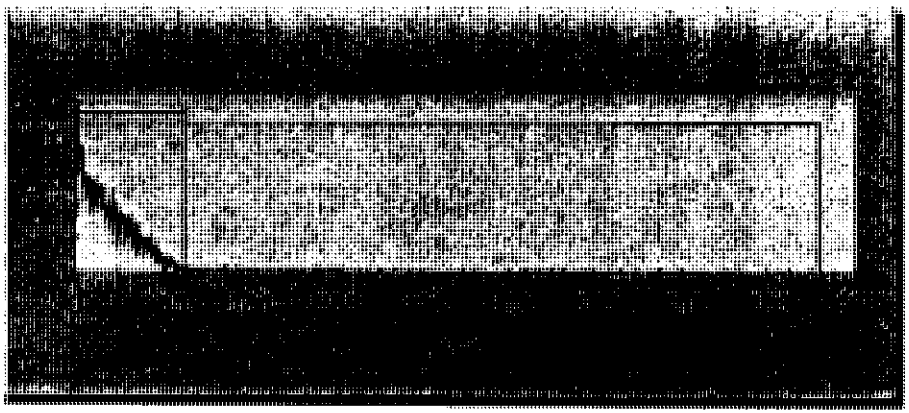
SpectraView Block Data

010080



29	5	9	60.00	473778D-10	134.35	136	195.14	370.89		2.30	0:00:35	3
10/6/2011	9:31:59 PM			98.98								

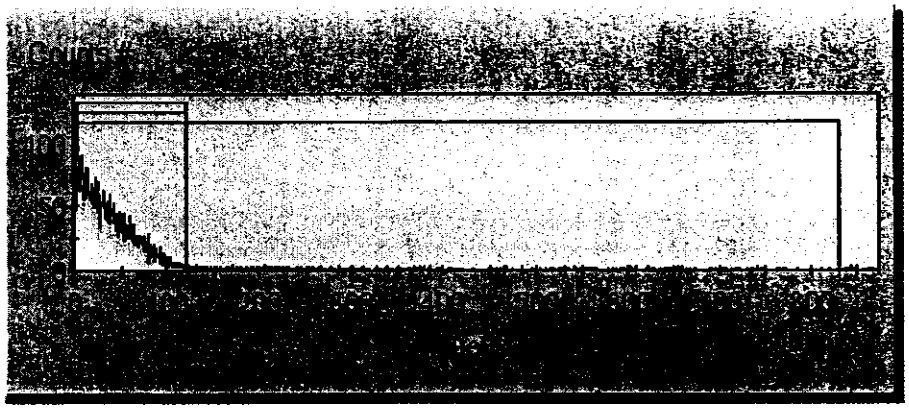
SpectraView Block Data



30	5	9	60.00	473045-10	133.13	135	183.31	355.57		2.31	0:00:36	3
10/6/2011	10:33:30 PM			98.76								

SpectraView Block Data

0100081



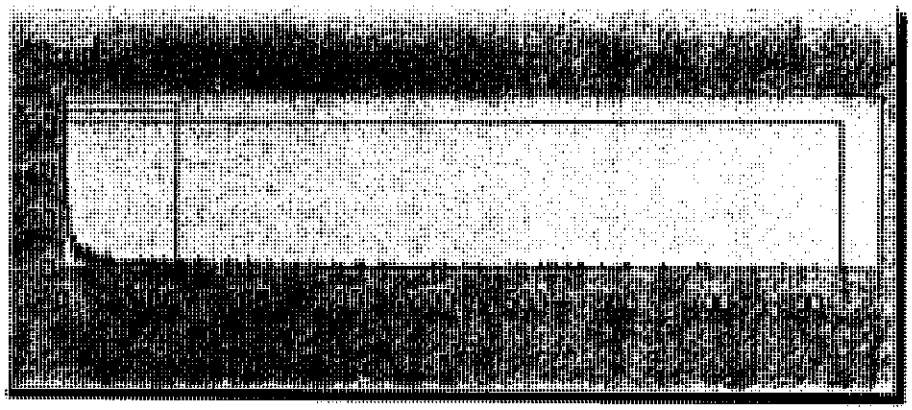
31	5	9	60.00	473045D-10	131.01	132	189.53	367.94		2.33	0:00:37	3
10/6/2011	11:35:00 PM			99.00								

SpectraView Block Data

32	5	9	60.00	PBWK03JV2	14.91	15	483.11	363.19		8.45	0:00:38	16
10/7/2011	12:36:30 AM			98.92								

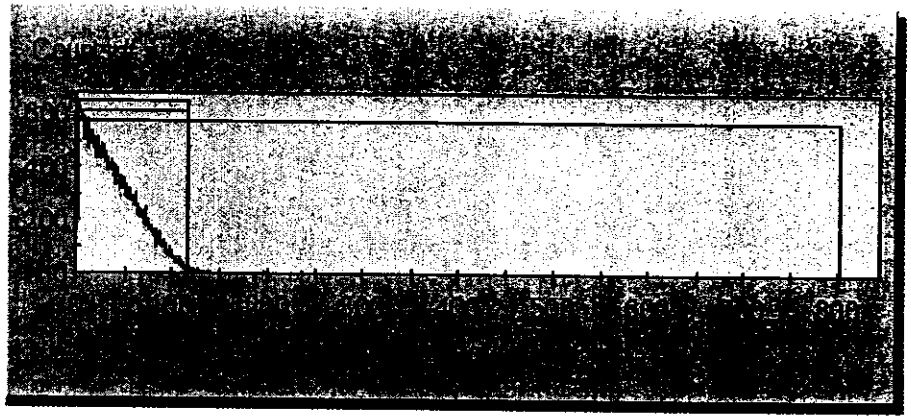
SpectraView Block Data

0100822



33	5	9	60.00	LCSWK03JV3	1096.22	1114	133.77	340.22		0.78	0:00:40	0
10/7/2011	1:37:59 AM			98.45								

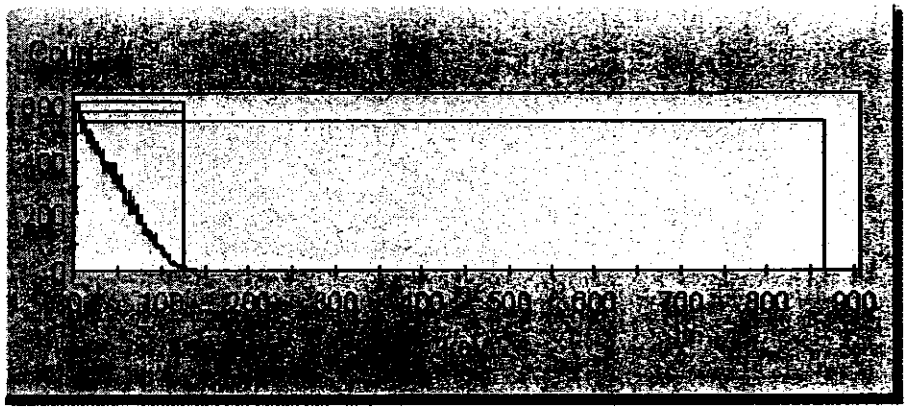
SpectraView Block Data



34	5	9	60.00	LCSWK03JV4	1098.22	1110	136.44	373.78		0.78	0:00:41	0
10/7/2011	2:39:31 AM			98.97								

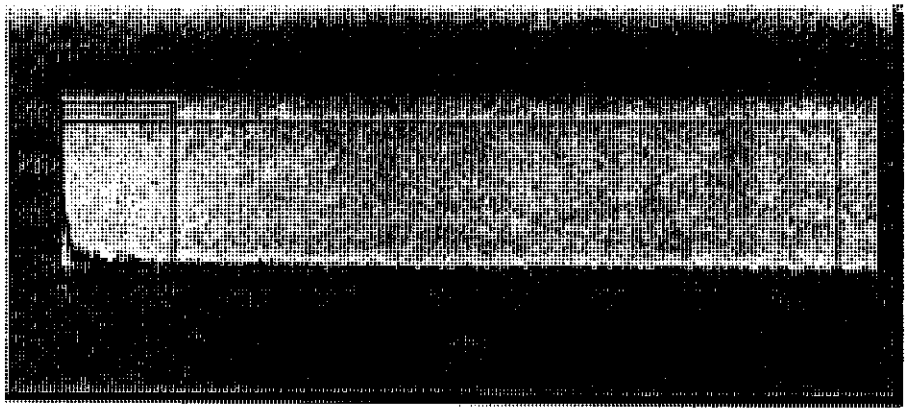
SpectraView Block Data

010083



35	5	9	60.00	PBWK04JV1	15.34	15	454.34	368.90		8.29	0:00:42	16
10/7/2011	3:41:02 AM		98.99									

SpectraView Block Data



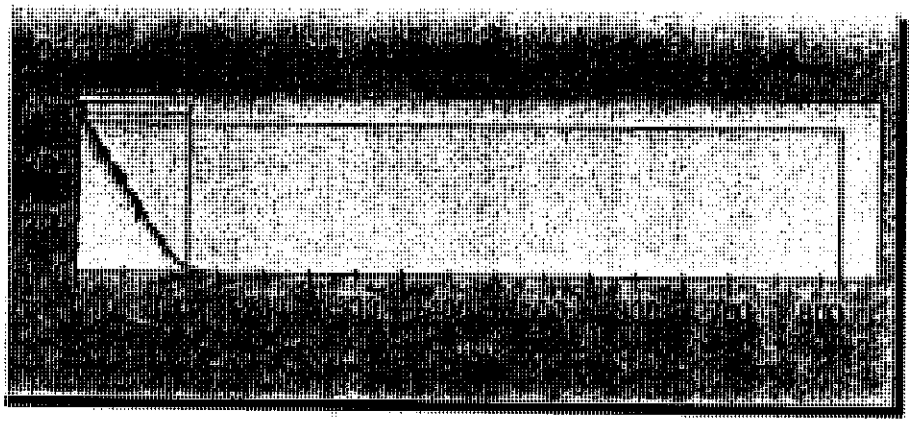
36	5	9	60.00	LCSWK04JV1	1096.72	1108	138.31	368.08		0.78	0:00:43	0
10/7/2011	4:42:32 AM		98.99									

SpectraView Block Data

010084

37	5	16	60.00	LCSWK04JV2	1106.36	1122	134.74	349.89	0.78	0:00:44	0
10/7/2011	5:44:10 AM			98.64							

SpectraView Block Data



38	5	16	60.00	Blank Day #14	148.47	150	179.98	357.64	2.18	0:00:46	3
10/7/2011	6:45:45 AM			98.80							
39	5	16	60.00	473754-14	144.78	146	178.73	362.68	2.21	0:00:46	3
10/7/2011	7:47:16 AM			98.91							
40	5	16	60.00	473754D-14	144.76	146	189.77	366.19	2.21	0:00:46	3
10/7/2011	8:48:47 AM			98.98							

010085

41	5	16	60.00	473755-14	125.85	127	190.03	359.11	2.38	0:00:46	3
10/7/2011	9:50:18 AM			98.83							
42	5	16	60.00	473755D-14	130.84	132	195.86	377.41	2.33	0:00:47	3
10/7/2011	10:51:47 AM			98.96							
43	5	16	60.00	473756-14	141.56	143	182.25	359.67	2.24	0:00:47	3
10/7/2011	11:53:17 AM			98.84							
44	5	16	60.00	473756D-14	141.51	144	186.11	341.59	2.24	0:00:47	3
10/7/2011	12:54:47 PM			98.47							
45	5	16	60.00	473757-14	120.75	124	202.69	310.20	2.43	0:00:47	3
10/7/2011	1:56:18 PM			97.21							
46	5	16	60.00	473757D-14	129.14	131	189.41	349.43	2.35	0:00:48	3
10/7/2011	2:57:50 PM			98.63							
47	5	16	60.00	473758-14	142.47	144	186.50	370.50	2.23	0:00:48	3
10/7/2011	3:59:19 PM			98.98							
48	5	16	60.00	473758D-14	142.50	144	187.73	370.67	2.23	0:00:48	3
10/7/2011	5:00:51 PM			98.98							
49	5	19	60.00	473768-14	137.67	139	188.46	359.87	2.27	0:00:48	3
10/7/2011	6:02:27 PM			98.85							
50	5	19	60.00	473768D-14	137.67	140	184.10	350.50	2.27	0:00:48	3
10/7/2011	7:03:58 PM			98.66							
51	5	19	60.00	473769-14	141.05	143	180.44	354.36	2.24	0:00:49	3
10/7/2011	8:05:28 PM			98.74							
52	5	19	60.00	473769D-14	138.43	140	190.31	366.86	2.26	0:00:49	3
10/7/2011	9:06:58 PM			98.99							
53	5	19	60.00	473770-14	145.79	148	182.82	356.26	2.20	0:00:49	3
10/7/2011	10:08:27 PM			98.77							
54	5	19	60.00	473770D-14	142.99	144	183.09	374.57	2.22	0:00:49	3
10/7/2011	11:09:57 PM			98.97							
55	5	19	60.00	473771-14	137.70	140	191.10	341.12	2.27	0:00:49	3
10/8/2011	12:11:27 AM			98.46							
56	5	19	60.00	473771D-14	135.15	139	179.50	309.09	2.29	0:00:50	3
10/8/2011	1:12:58 AM			97.21							
57	5	19	60.00	473772-14	140.06	142	187.16	348.19	2.25	0:00:50	3
10/8/2011	2:14:27 AM			98.61							
58	5	19	60.00	473772D-14	137.52	140	195.44	345.67	2.27	0:00:50	3
10/8/2011	3:15:57 AM			98.56							
59	5	19	60.00	473778-14	131.72	134	191.66	349.83	2.33	0:00:50	3
10/8/2011	4:17:27 AM			98.64							
60	5	19	60.00	473778D-14	132.43	134	190.79	355.26	2.32	0:00:51	3
10/8/2011	5:18:58 AM			98.75							
61	5	7	60.00	473045-14	133.63	135	193.57	369.26	2.31	0:00:51	3
10/8/2011	6:20:34 AM			98.99							
62	5	7	60.00	473045D-14	132.15	134	191.23	336.55	2.32	0:00:51	3
10/8/2011	7:22:03 AM			98.31							
63	5	7	60.00	PBWK04JV2	14.31	14	472.16	351.30	8.69	0:00:51	17
10/8/2011	8:23:34 AM			98.67							

010086

64	5	7	60.00	LCSWK04JV3	1094.65	1111	133.57	345.86		0.78	0:00:51	0
10/8/2011	9:25:04 AM			98.56								
65	5	7	60.00	LCSWK04JV4	1099.34	1111	136.89	382.62		0.78	0:00:52	0
10/8/2011	10:26:36 AM			98.94								

0100877

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-193
Prep Date: 4-Oct-11
WAW

✓ JWW 10/25/11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK04JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK04JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK04JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-14	0.10	50.0	0.00200	50.0	0.100	10.00		
473754	0.10	50.0	0.00200	50.0	0.100	10.00		
473754D	0.10	50.0	0.00200	50.0	0.100	10.00		
473755	0.10	50.0	0.00200	50.0	0.100	10.00		
473755D	0.10	50.0	0.00200	50.0	0.100	10.00		
473756	0.10	50.0	0.00200	50.0	0.100	10.00		
473756D	0.10	50.0	0.00200	50.0	0.100	10.00		
473757	0.10	50.0	0.00200	50.0	0.100	10.00		
473757D	0.10	50.0	0.00200	50.0	0.100	10.00		
473758	0.10	50.0	0.00200	50.0	0.100	10.00		
473758D	0.10	50.0	0.00200	50.0	0.100	10.00		
473768	0.10	50.0	0.00200	50.0	0.100	10.00		
473768D	0.10	50.0	0.00200	50.0	0.100	10.00		
473769	0.10	50.0	0.00200	50.0	0.100	10.00		
473769D	0.10	50.0	0.00200	50.0	0.100	10.00		
473770	0.10	50.0	0.00200	50.0	0.100	10.00		
473770D	0.10	50.0	0.00200	50.0	0.100	10.00		
473771	0.10	50.0	0.00200	50.0	0.100	10.00		
473771D	0.10	50.0	0.00200	50.0	0.100	10.00		
473772	0.10	50.0	0.00200	50.0	0.100	10.00		
473772D	0.10	50.0	0.00200	50.0	0.100	10.00		
473778	0.10	50.0	0.00200	50.0	0.100	10.00		
473778D	0.10	50.0	0.00200	50.0	0.100	10.00		
473045	0.10	50.0	0.00200	50.0	0.100	10.00		
473045D	0.10	50.0	0.00200	50.0	0.100	10.00		
PBWK04JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK04JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK04JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010088

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-193
Prep Date: 4-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	334.89	15.35	8.28	15.63	98.24	
BKG-2	Tc-99	Water	60	361.20	15.51	8.17	15.69	98.88	
				AVG BKG	15.43	AVG BKG	15.66		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK04JV1	Tc-99	Water	60	368.90	15.34	8.29	-0.09	98.99		-4.10E-01	3.26E+00	1.10E+01	3.26E+00		PB < 1.65*TPU	
LCSWK04JV1	Tc-99	Water	60	368.08	1096.72	0.78	1092.32	98.99		4.92E+03	2.84E+02	1.10E+01	1.96E+01	5000	98.4%	-0.016
LCSWK04JV2	Tc-99	Water	60	349.89	1106.36	0.78	1105.97	98.64		4.98E+03	2.88E+02	1.10E+01	1.97E+01	5000	99.6%	-0.004
Blank-14	Tc-99	Water	60	357.64	148.47	2.18	134.66	98.80		6.07E+02	3.58E+01	1.10E+01	7.54E+00			
473754	Tc-99	Water	60	362.68	144.78	2.21	130.78	98.91		5.89E+02	3.48E+01	1.10E+01	7.44E+00	RPD	Dup Evaluation	
473754D	Tc-99	Water	60	366.19	144.76	2.21	130.66	98.98		5.89E+02	3.47E+01	1.10E+01	7.44E+00	0.09	0.01	Pass
473755	Tc-99	Water	60	359.11	125.85	2.38	111.73	98.83		5.03E+02	2.99E+01	1.10E+01	6.99E+00	RPD	Dup Evaluation	
473755D	Tc-99	Water	60	377.41	130.84	2.33	116.62	98.96		5.25E+02	3.11E+01	1.10E+01	7.11E+00	4.29	0.51	Pass
473756	Tc-99	Water	60	359.67	141.56	2.24	127.61	98.84		5.75E+02	3.40E+01	1.10E+01	7.37E+00	RPD	Dup Evaluation	
473756D	Tc-99	Water	60	341.59	141.51	2.24	128.04	98.47		5.77E+02	3.41E+01	1.10E+01	7.40E+00	0.34	0.04	Pass
473757	Tc-99	Water	60	310.20	120.75	2.43	108.34	97.21		4.88E+02	2.90E+01	1.12E+01	6.98E+00	RPD	Dup Evaluation	
473757D	Tc-99	Water	60	349.43	129.14	2.35	115.29	98.63		5.19E+02	3.08E+01	1.10E+01	7.09E+00	6.21	0.74	Pass
473758	Tc-99	Water	60	370.50	142.47	2.23	128.35	98.98		5.78E+02	3.41E+01	1.10E+01	7.38E+00	RPD	Dup Evaluation	
473758D	Tc-99	Water	60	370.67	142.50	2.23	128.38	98.98		5.78E+02	3.42E+01	1.10E+01	7.38E+00	0.02	0.00	Pass
473768	Tc-99	Water	60	359.87	137.67	2.27	123.66	98.85		5.57E+02	3.29E+01	1.10E+01	7.28E+00	RPD	Dup Evaluation	
473768D	Tc-99	Water	60	350.50	137.67	2.27	123.90	98.66		5.58E+02	3.30E+01	1.10E+01	7.29E+00	0.19	0.02	Pass
473769	Tc-99	Water	60	354.36	141.05	2.24	127.22	98.74		5.73E+02	3.39E+01	1.10E+01	7.37E+00	RPD	Dup Evaluation	
473769D	Tc-99	Water	60	366.86	138.43	2.26	124.25	98.99		5.60E+02	3.31E+01	1.10E+01	7.29E+00	2.36	0.28	Pass
473770	Tc-99	Water	60	356.26	145.79	2.20	131.98	98.77		5.95E+02	3.51E+01	1.10E+01	7.48E+00	RPD	Dup Evaluation	
473770D	Tc-99	Water	60	374.57	142.99	2.22	128.89	98.97		5.81E+02	3.43E+01	1.10E+01	7.40E+00	2.37	0.28	Pass
473771	Tc-99	Water	60	341.12	137.70	2.27	124.18	98.46		5.59E+02	3.31E+01	1.10E+01	7.31E+00	RPD	Dup Evaluation	
473771D	Tc-99	Water	60	309.09	135.15	2.29	123.16	97.21		5.55E+02	3.28E+01	1.12E+01	7.34E+00	0.83	0.10	Pass
473772	Tc-99	Water	60	348.19	140.06	2.25	126.39	98.61		5.69E+02	3.36E+01	1.10E+01	7.35E+00	RPD	Dup Evaluation	
473772D	Tc-99	Water	60	345.67	137.52	2.27	123.87	98.56		5.58E+02	3.30E+01	1.10E+01	7.30E+00	2.01	0.24	Pass
473778	Tc-99	Water	60	349.83	131.72	2.33	117.89	98.64		5.31E+02	3.14E+01	1.10E+01	7.15E+00	RPD	Dup Evaluation	
473778D	Tc-99	Water	60	355.26	132.43	2.32	118.48	98.75		5.34E+02	3.16E+01	1.10E+01	7.16E+00	0.50	0.06	Pass
473045	Tc-99	Water	60	369.26	133.63	2.31	119.41	98.99		5.38E+02	3.18E+01	1.10E+01	7.17E+00	RPD	Dup Evaluation	
473045D	Tc-99	Water	60	336.55	132.15	2.32	118.73	98.31		5.35E+02	3.17E+01	1.10E+01	7.19E+00	0.57	0.07	Pass
PBWK04JV2	Tc-99	Water	60	351.30	14.31	8.69	-1.14	98.67		-5.11E+00	3.23E+00	1.10E+01	3.21E+00		PB < 1.65*TPU	
LCSWK04JV3	Tc-99	Water	60	345.86	1094.65	0.78	1094.99	98.56		4.93E+03	2.85E+02	1.10E+01	1.97E+01	5000	98.6%	-0.014
LCSWK04JV4	Tc-99	Water	60	382.62	1099.34	0.78	1095.52	98.94		4.93E+03	2.85E+02	1.10E+01	1.96E+01	5000	98.7%	-0.013

Notes: Day #14 results.

010089

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-193
Prep Date: 4-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010090

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111005_1749\Replay_20111008_170016
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111005_1749\20111005_1749.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B+W Portsmouth
16526.05.00X
TO# 110825-10, 110915-9
12-192, 12-193
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010091

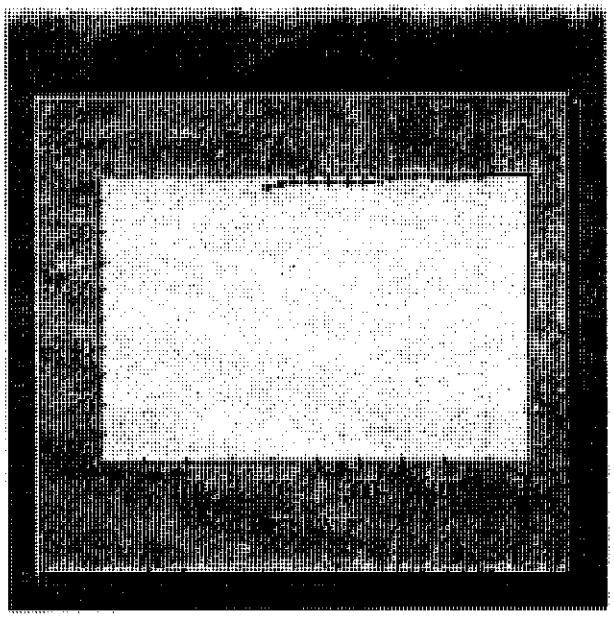
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 22.41 Date Processed: 10/5/2011 2:01:32 AM
14C Chi Square: 26.42 Date Processed: 10/5/2011 2:01:32 AM
3H E^2/B (1-18.6 keV): 1482.66 Date Processed: 10/5/2011 2:01:32 AM
14C E^2/B (4-156 keV): 5759.51 Date Processed: 10/5/2011 2:01:32 AM
3H Efficiency (1-18.6 keV): 64.86 Date Processed: 10/5/2011 2:01:32 AM
14C Efficiency (4-156 keV): 93.40 Date Processed: 10/5/2011 2:01:32 AM
IPA Background Date Processed: 10/5/2011 2:01:32 AM
3H Background CPM (1-18.6 keV): 2.84 Date Processed: 10/5/2011 2:01:32 AM
14C Background CPM (4-156 keV): 1.51 Date Processed: 10/5/2011 2:01:32 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010092



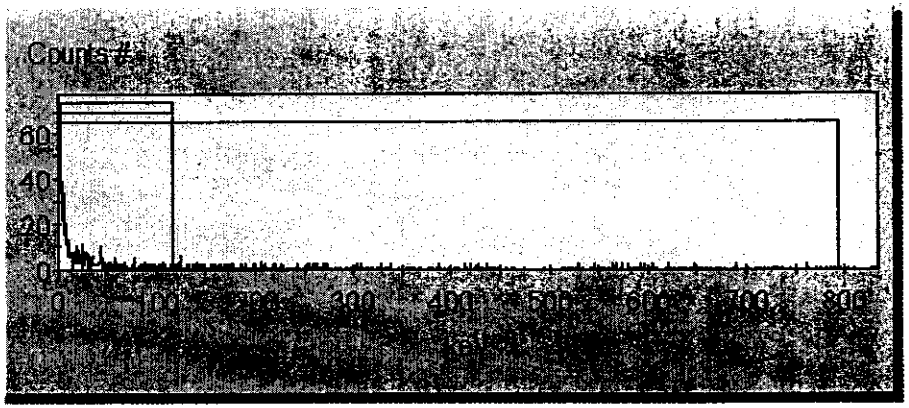
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nucl In A									
1	5	1	60.00	Bkg-1	15.35	16	436.99	334.89		8.28	0:00:03	16
10/5/2011			5:50:53 PM 98.24									

010093

SpectraView Block Data



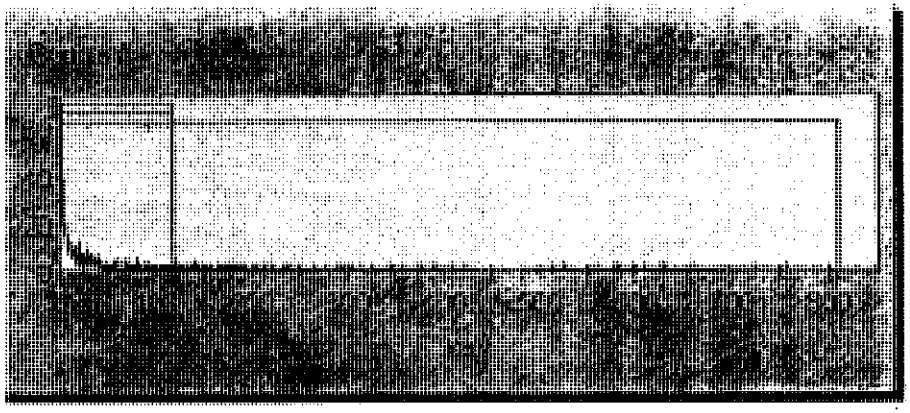
2	5	1	60.00		Bkg-2	15.51	16	485.33	361.20	8.17	0:00:04	15
10/5/2011	6:52:23 PM		98.88									

SpectraView Block Data

Missing vial 3.

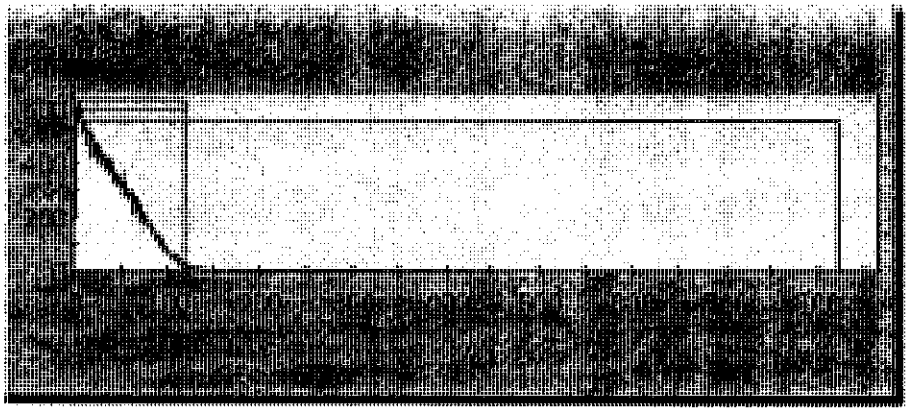
4	5	1	60.00		PBWK03JV1	14.70	15	462.98	344.94	8.51	0:00:05	16
10/5/2011	7:53:54 PM		98.54									

SpectraView Block Data



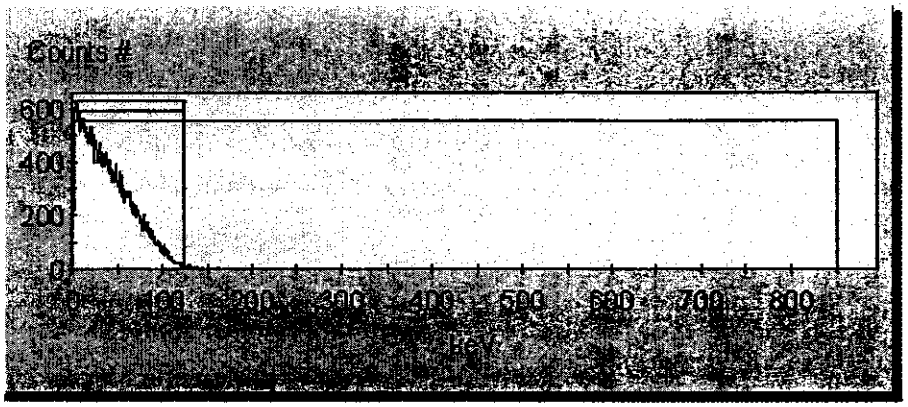
5	5	1	60.00	LCSWK03JV1	1090.26	1105	139.20	351.21		0.79	0:00:07	0
10/5/2011	8:55:25 PM			98.67								

SpectraView Block Data



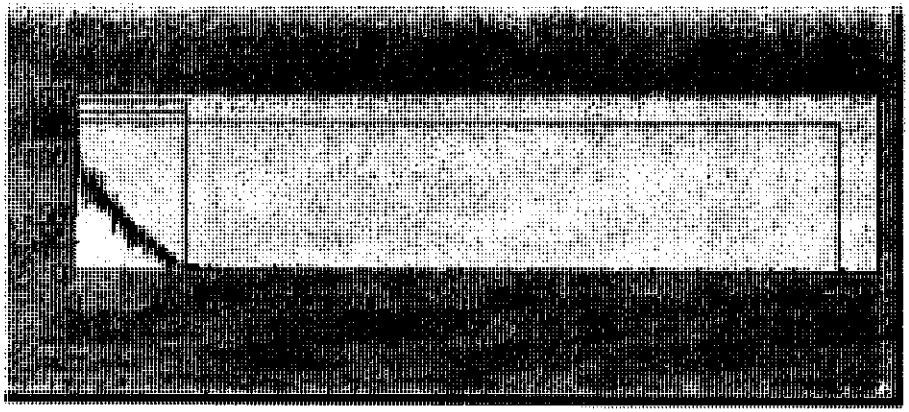
6	5	1	60.00	LCSWK03JV2	1104.01	1115	133.91	367.28		0.78	0:00:08	0
10/5/2011	9:56:59 PM			99.00								

SpectraView Block Data



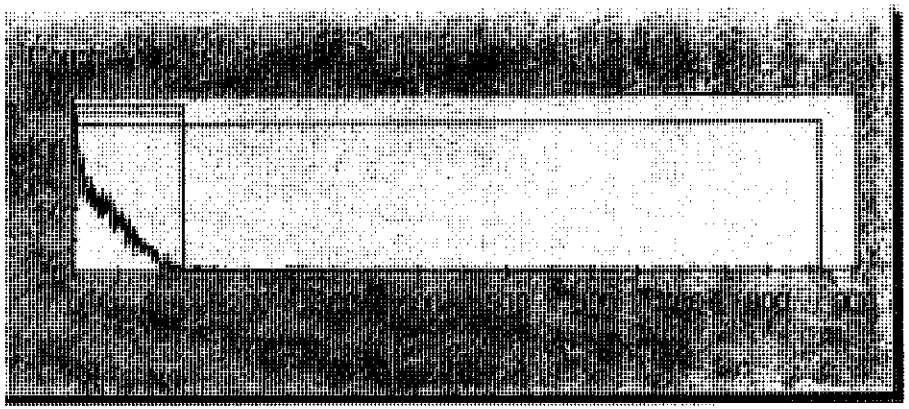
7	5	1	60.00	Blank Day #10	155.59	158	176.82	336.66		2.13	0:00:09	3
10/5/2011	10:58:34 PM			98.31								

SpectraView Block Data



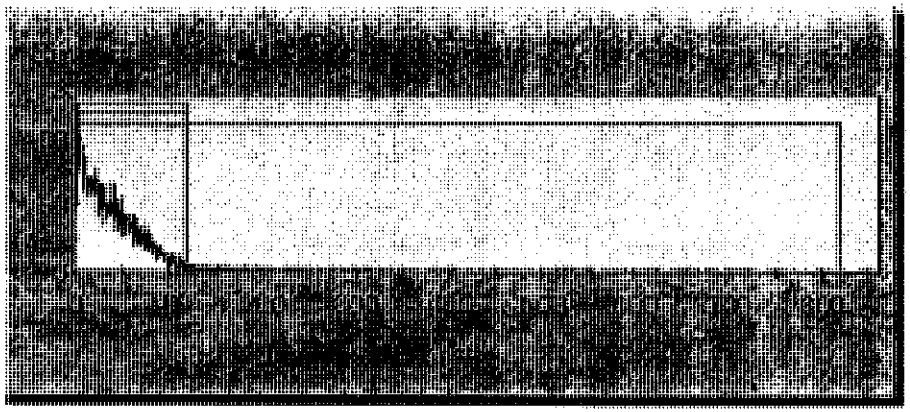
8	5	1	60.00	473754-10	144.62	146	187.41	372.17		2.21	0:00:10	3
10/6/2011	12:00:06 AM			98.98								

SpectraView Block Data



9	5	1	60.00	473754D-10	141.87	144	192.43	349.09		2.24	0:00:11	3
10/6/2011	1:01:36 AM			98.63								

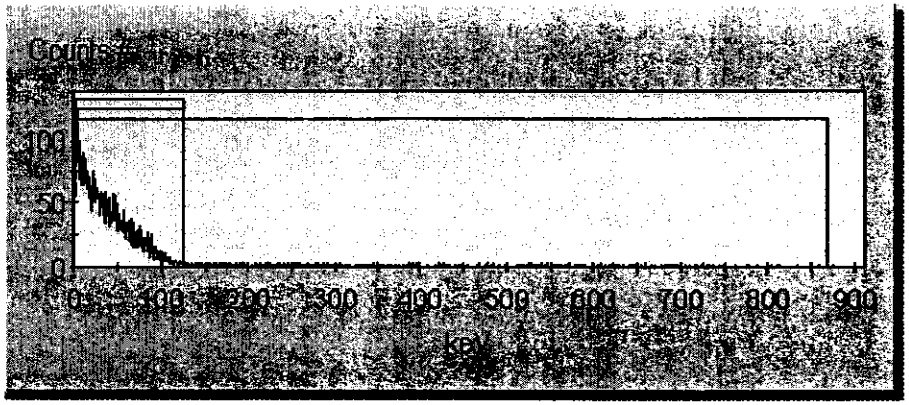
SpectraView Block Data



10	5	1	60.00	473755-10	135.96	137	187.04	376.27		2.29	0:00:12	3
10/6/2011	2:03:07 AM			98.96								

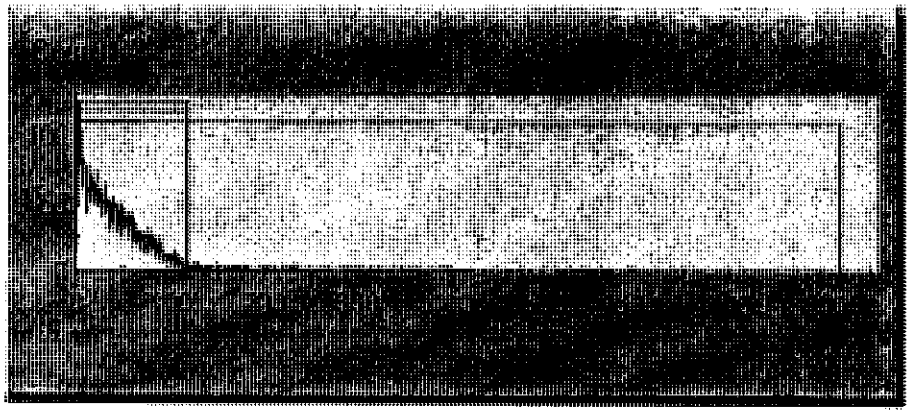
SpectraView Block Data

010097



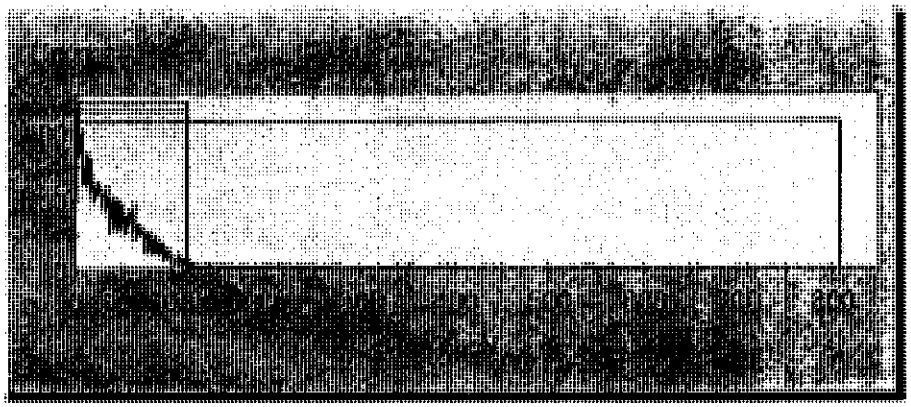
11	5	1	60.00	473755D-10	130.92	133	198.09	349.15	2.33	0:00:14	3
10/6/2011	3:04:38 AM			98.63							

SpectraView Block Data



12	5	1	60.00	473756-10	135.92	138	187.20	343.38	2.28	0:00:15	3
10/6/2011	4:06:09 AM			98.51							

SpectraView Block Data

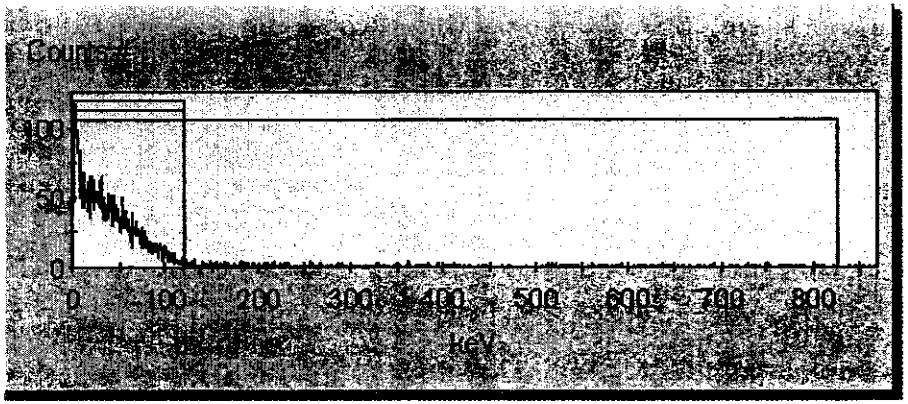


13	5	2	60.00	473756D-10	139.40	141	177.85	360.39		2.25	0:00:16	3
10/6/2011	5:07:45 AM		98.86									

SpectraView Block Data

14	5	2	60.00	473757-10	125.35	127	195.99	353.49		2.39	0:00:17	3
10/6/2011	6:09:16 AM		98.72									

SpectraView Block Data



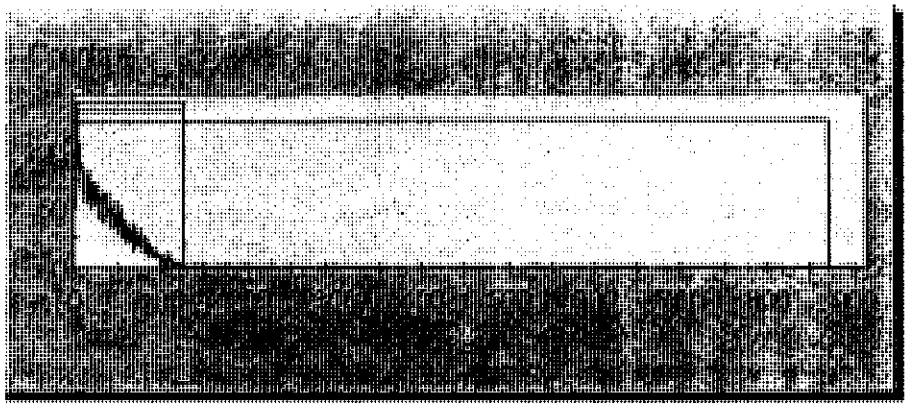
15	5	2	60.00	473757D-10	129.92	131	200.37	360.89		2.34	0:00:18	3
10/6/2011	7:10:47 AM			98.87								

SpectraView Block Data

16	5	2	60.00	473758-10	142.18	144	183.21	376.71		2.23	0:00:19	3
10/6/2011	8:12:17 AM			98.96								

SpectraView Block Data

010100

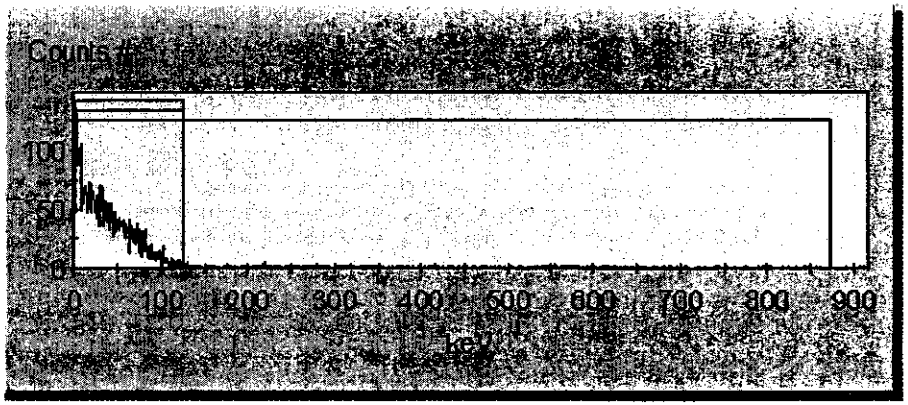


17	5	2	60.00	473758D-10	142.57	144	191.45	366.07		2.23	0:00:21	3
10/6/2011	9:13:47 AM			98.98								

SpectraView Block Data

18	5	2	60.00	473768-10	139.00	140	186.23	378.76		2.26	0:00:22	3
10/6/2011	10:15:18 AM			98.95								

SpectraView Block Data



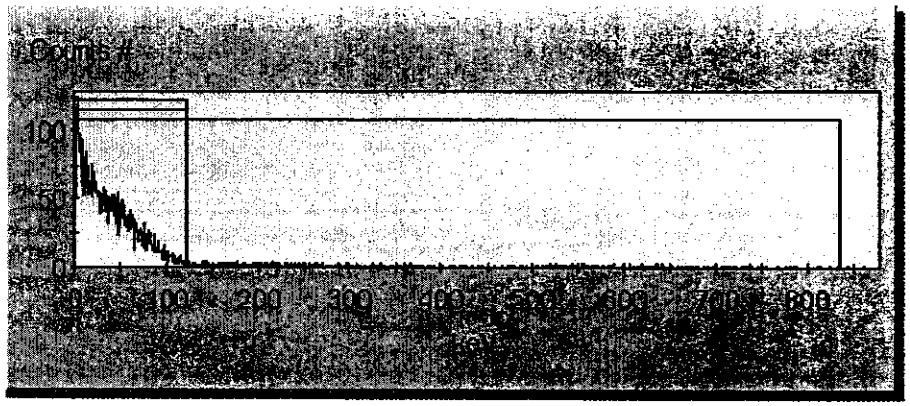
19	5	2	60.00	473768D-10	140.75	142	195.15	366.11		2.25	0:00:23	3
10/6/2011	11:16:49 AM			98.98								

SpectraView Block Data

20	5	2	60.00	473769-10	135.07	137	186.99	358.30		2.30	0:00:24	3
10/6/2011	12:18:20 PM			98.82								

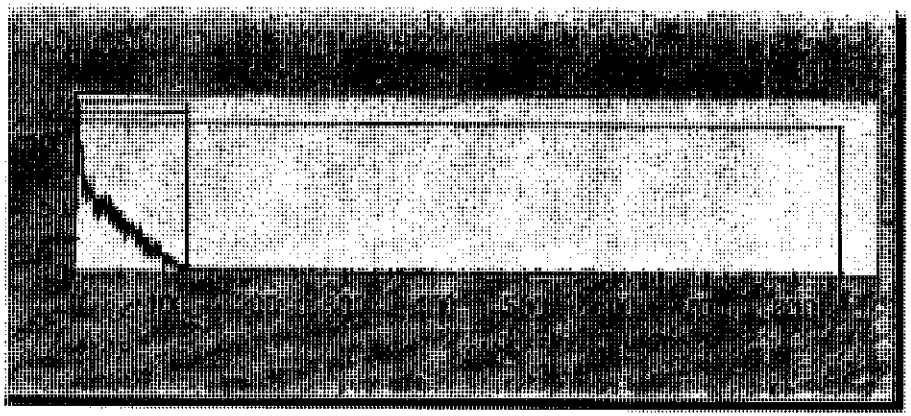
SpectraView Block Data

010102



21	5	2	60.00	473769D-10	136.42	138	193.86	366.67		2.28	0:00:25	3
10/6/2011	1:19:49 PM			98.99								

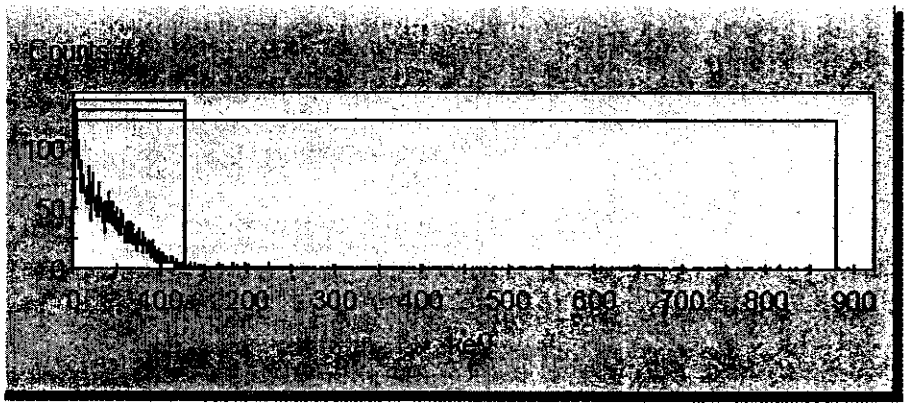
SpectraView Block Data



22	5	2	60.00	473770-10	141.43	143	193.50	381.54		2.24	0:00:26	3
10/6/2011	2:21:19 PM			98.94								

SpectraView Block Data

010103



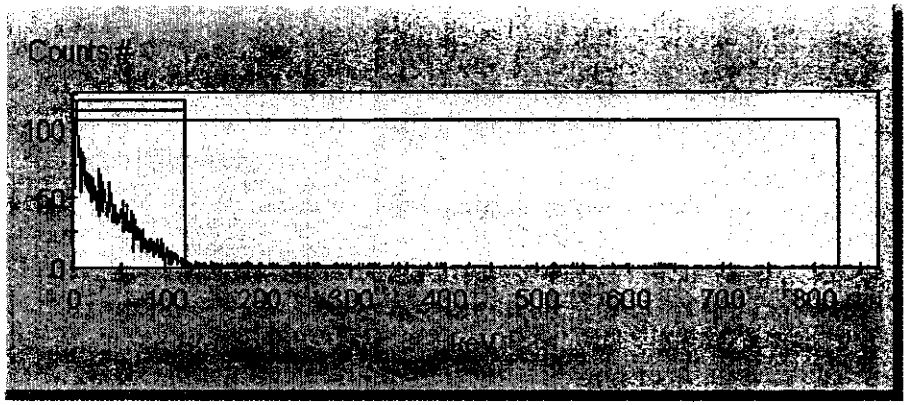
23	5	2	60.00	473770D-10	140.87	143	189.20	356.58		2.25	0:00:28	3
10/6/2011	3:22:49 PM			98.78								

SpectraView Block Data

24	5	2	60.00	473771-10	132.87	135	191.54	353.16		2.31	0:00:29	3
10/6/2011	4:24:20 PM			98.71								

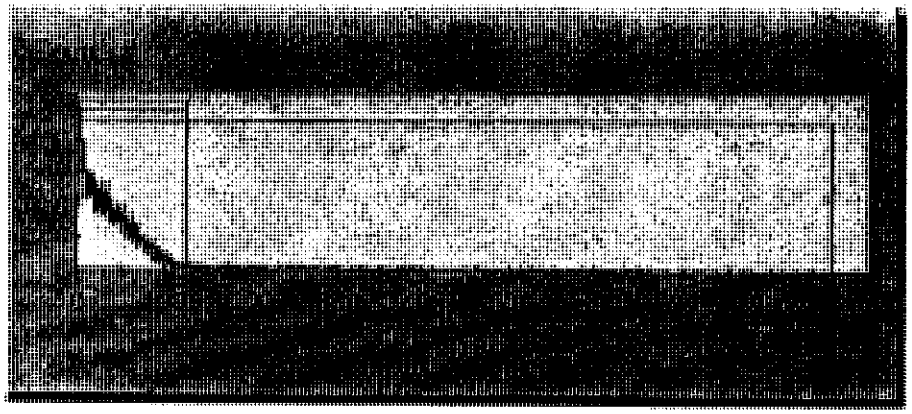
SpectraView Block Data

010104



25	5	9	60.00	473771D-10	137.78	139	182.42	377.28	2.27	0:00:30	3
10/6/2011	5:25:56 PM			98.96							

SpectraView Block Data



26	5	9	60.00	473772-10	139.94	141	186.34	364.76	2.25	0:00:31	3
10/6/2011	6:27:27 PM			98.95							

SpectraView Block Data

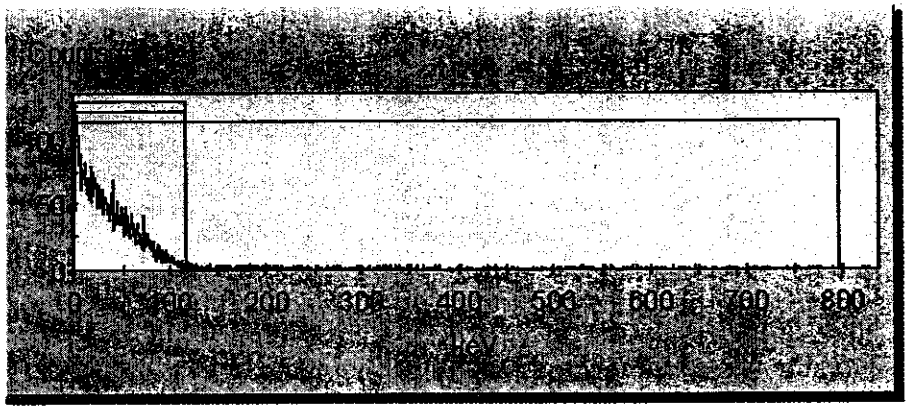
0110105

27	5	9	60.00	473772D-10	136.88	138	188.18	379.58		2.28	0:00:32	3
10/6/2011	7:28:58 PM			98.95								

SpectraView Block Data

28	5	9	60.00	473778-10	135.88	138	182.57	336.75		2.29	0:00:34	3
10/6/2011	8:30:29 PM			98.31								

SpectraView Block Data

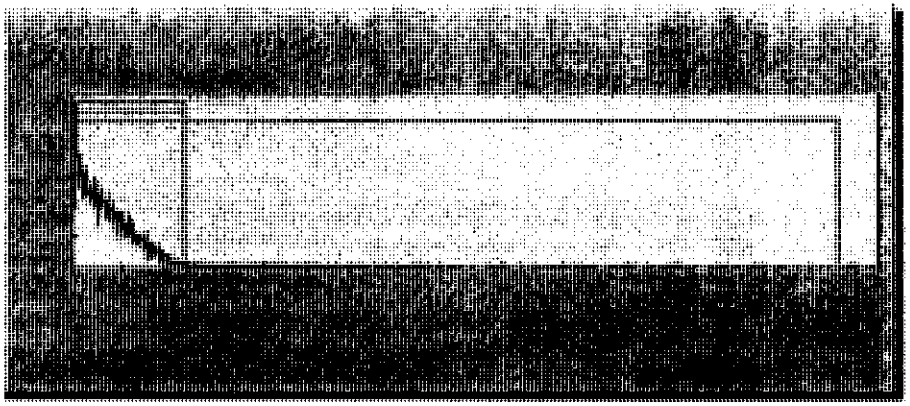


29	5	9	60.00	473778D-10	134.35	136	195.14	370.89		2.30	0:00:35	3
10/6/2011	9:31:59 PM			98.98								

SpectraView Block Data

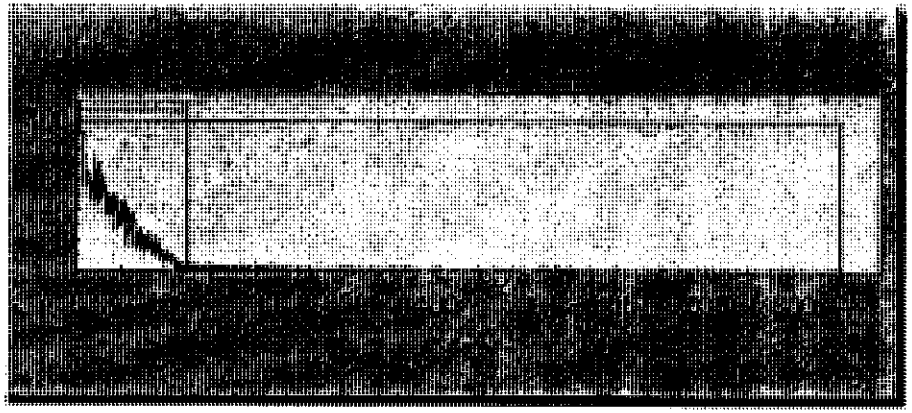
30	5	9	60.00	473045-10	133.13	135	183.31	355.57		2.31	0:00:36	3
10/6/2011	10:33:30 PM			98.76								

SpectraView Block Data



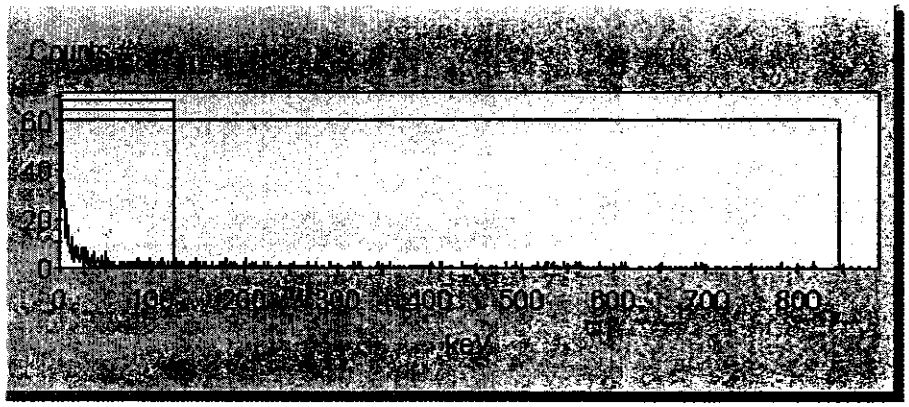
31	5	9	60.00	473045D-10	131.01	132	189.53	367.94		2.33	0:00:37	3
10/6/2011	11:35:00 PM			99.00								

SpectraView Block Data



32	5	9	60.00	PBWK03JV2	14.91	15	483.11	363.19		8.45	0:00:38	16
10/7/2011	12:36:30 AM			98.92								

SpectraView Block Data

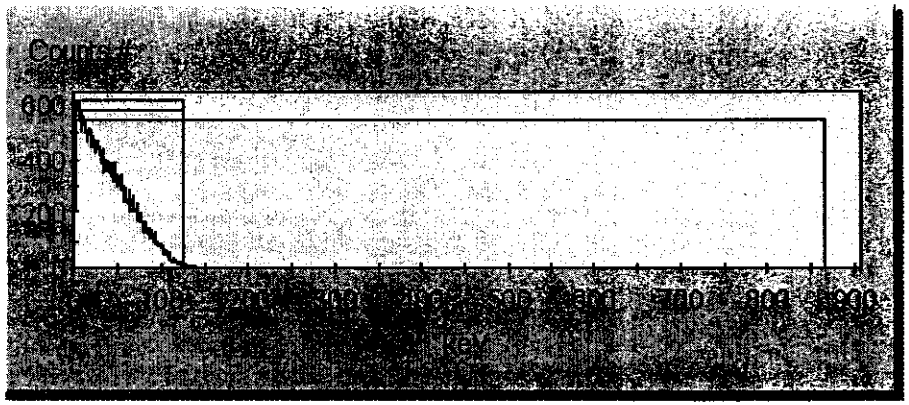


33	5	9	60.00	LCSWK03JV3	1096.22	1114	133.77	340.22		0.78	0:00:40	0
10/7/2011	1:37:59 AM			98.45								

SpectraView Block Data

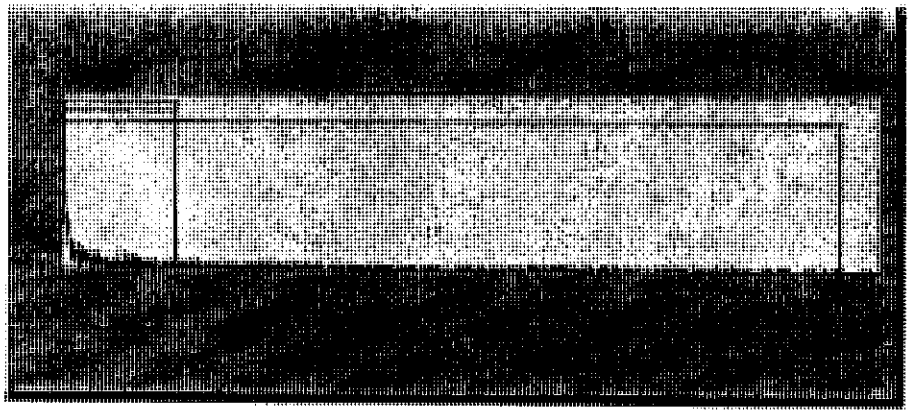
34	5	9	60.00	LCSWK03JV4	1098.22	1110	136.44	373.78		0.78	0:00:41	0
10/7/2011	2:39:31 AM			98.97								

SpectraView Block Data



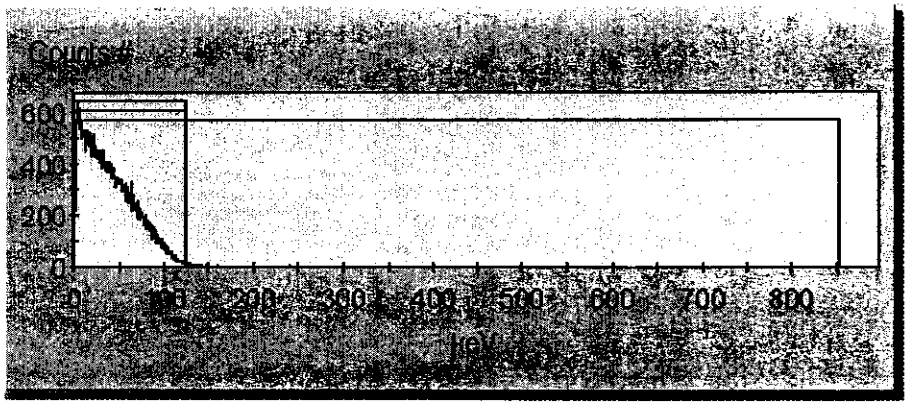
35	5	9	60.00	PBWK04JV1	15.34	15	454.34	368.90		8.29	0:00:42	16
10/7/2011	3:41:02 AM		98.99									

SpectraView Block Data



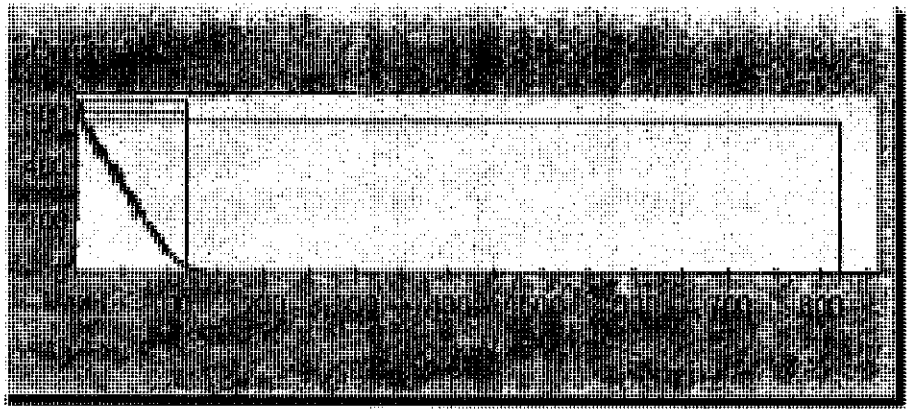
36	5	9	60.00	LCSWK04JV1	1096.72	1108	138.31	368.08		0.78	0:00:43	0
10/7/2011	4:42:32 AM		98.99									

SpectraView Block Data



37	5	16	60.00	LCSWK04JV2	1106.36	1122	134.74	349.89		0.78	0:00:44	0
10/7/2011	5:44:10 AM			98.64								

SpectraView Block Data



38	5	16	60.00	Blank Day #14	148.47	150	179.98	357.64		2.18	0:00:46	3
10/7/2011	6:45:45 AM			98.80								
39	5	16	60.00	473754-14	144.78	146	178.73	362.68		2.21	0:00:46	3
10/7/2011	7:47:16 AM			98.91								
40	5	16	60.00	473754D-14	144.76	146	189.77	366.19		2.21	0:00:46	3
10/7/2011	8:48:47 AM			98.98								

0010111

41	5	16	60.00	473755-14	125.85	127	190.03	359.11		2.38	0:00:46	3
10/7/2011	9:50:18	AM		98.83								
42	5	16	60.00	473755D-14	130.84	132	195.86	377.41		2.33	0:00:47	3
10/7/2011	10:51:47	AM		98.96								
43	5	16	60.00	473756-14	141.56	143	182.25	359.67		2.24	0:00:47	3
10/7/2011	11:53:17	AM		98.84								
44	5	16	60.00	473756D-14	141.51	144	186.11	341.59		2.24	0:00:47	3
10/7/2011	12:54:47	PM		98.47								
45	5	16	60.00	473757-14	120.75	124	202.69	310.20		2.43	0:00:47	3
10/7/2011	1:56:18	PM		97.21								
46	5	16	60.00	473757D-14	129.14	131	189.41	349.43		2.35	0:00:48	3
10/7/2011	2:57:50	PM		98.63								
47	5	16	60.00	473758-14	142.47	144	186.50	370.50		2.23	0:00:48	3
10/7/2011	3:59:19	PM		98.98								
48	5	16	60.00	473758D-14	142.50	144	187.73	370.67		2.23	0:00:48	3
10/7/2011	5:00:51	PM		98.98								
49	5	19	60.00	473768-14	137.67	139	188.46	359.87		2.27	0:00:48	3
10/7/2011	6:02:27	PM		98.85								
50	5	19	60.00	473768D-14	137.67	140	184.10	350.50		2.27	0:00:48	3
10/7/2011	7:03:58	PM		98.66								
51	5	19	60.00	473769-14	141.05	143	180.44	354.36		2.24	0:00:49	3
10/7/2011	8:05:28	PM		98.74								
52	5	19	60.00	473769D-14	138.43	140	190.31	366.86		2.26	0:00:49	3
10/7/2011	9:06:58	PM		98.99								
53	5	19	60.00	473770-14	145.79	148	182.82	356.26		2.20	0:00:49	3
10/7/2011	10:08:27	PM		98.77								
54	5	19	60.00	473770D-14	142.99	144	183.09	374.57		2.22	0:00:49	3
10/7/2011	11:09:57	PM		98.97								
55	5	19	60.00	473771-14	137.70	140	191.10	341.12		2.27	0:00:49	3
10/8/2011	12:11:27	AM		98.46								
56	5	19	60.00	473771D-14	135.15	139	179.50	309.09		2.29	0:00:50	3
10/8/2011	1:12:58	AM		97.21								
57	5	19	60.00	473772-14	140.06	142	187.16	348.19		2.25	0:00:50	3
10/8/2011	2:14:27	AM		98.61								
58	5	19	60.00	473772D-14	137.52	140	195.44	345.67		2.27	0:00:50	3
10/8/2011	3:15:57	AM		98.56								
59	5	19	60.00	473778-14	131.72	134	191.66	349.83		2.33	0:00:50	3
10/8/2011	4:17:27	AM		98.64								
60	5	19	60.00	473778D-14	132.43	134	190.79	355.26		2.32	0:00:51	3
10/8/2011	5:18:58	AM		98.75								
61	5	7	60.00	473045-14	133.63	135	193.57	369.26		2.31	0:00:51	3
10/8/2011	6:20:34	AM		98.99								
62	5	7	60.00	473045D-14	132.15	134	191.23	336.55		2.32	0:00:51	3
10/8/2011	7:22:03	AM		98.31								
63	5	7	60.00	PBWK04JV2	14.31	14	472.16	351.30		8.69	0:00:51	17
10/8/2011	8:23:34	AM		98.67								

010112

64	5	7	60.00	LCSWK04JV3	1094.65	1111	133.57	345.86		0.78	0:00:51	0
10/8/2011	9:25:04 AM			98.56								
65	5	7	60.00	LCSWK04JV4	1099.34	1111	136.89	382.62		0.78	0:00:52	0
10/8/2011	10:26:36 AM			98.94								

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-217
Prep Date: 11-Oct-11 10/25/11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK11JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK11JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK11JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-21	0.10	50.0	0.00200	50.0	0.100	10.00		
473754	0.10	50.0	0.00200	50.0	0.100	10.00		
473754D	0.10	50.0	0.00200	50.0	0.100	10.00		
473755	0.10	50.0	0.00200	50.0	0.100	10.00		
473755D	0.10	50.0	0.00200	50.0	0.100	10.00		
473756	0.10	50.0	0.00200	50.0	0.100	10.00		
473756D	0.10	50.0	0.00200	50.0	0.100	10.00		
473757	0.10	50.0	0.00200	50.0	0.100	10.00		
473757D	0.10	50.0	0.00200	50.0	0.100	10.00		
473758	0.10	50.0	0.00200	50.0	0.100	10.00		
473758D	0.10	50.0	0.00200	50.0	0.100	10.00		
473768	0.10	50.0	0.00200	50.0	0.100	10.00		
473768D	0.10	50.0	0.00200	50.0	0.100	10.00		
473769	0.10	50.0	0.00200	50.0	0.100	10.00		
473769D	0.10	50.0	0.00200	50.0	0.100	10.00		
473770	0.10	50.0	0.00200	50.0	0.100	10.00		
473770D	0.10	50.0	0.00200	50.0	0.100	10.00		
473771	0.10	50.0	0.00200	50.0	0.100	10.00		
473771D	0.10	50.0	0.00200	50.0	0.100	10.00		
473772	0.10	50.0	0.00200	50.0	0.100	10.00		
473772D	0.10	50.0	0.00200	50.0	0.100	10.00		
473778	0.10	50.0	0.00200	50.0	0.100	10.00		
473778D	0.10	50.0	0.00200	50.0	0.100	10.00		
473045	0.10	50.0	0.00200	50.0	0.100	10.00		
473045D	0.10	50.0	0.00200	50.0	0.100	10.00		
PBWK11JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK11JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK11JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010114

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-217
Prep Date: 11-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	317.14	15.38	8.30	15.78	97.49	
BKG-2	Tc-99	Water	60	370.96	14.33	8.69	14.48	98.98	
				AVG BKG	14.86	AVG BKG	15.13		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK11JV1	Tc-99	Water	60	363.85	16.18	8.03	1.34	98.93		6.03E+00	3.29E+00	1.08E+01	3.27E+00		PB > 1.65*TPU	
LCSWK11JV1	Tc-99	Water	60	353.51	1106.59	0.78	1105.89	98.72		4.98E+03	2.88E+02	1.08E+01	1.97E+01	5000	99.6%	-0.004
LCSWK11JV2	Tc-99	Water	60	341.10	1100.57	0.78	1102.70	98.46		4.97E+03	2.87E+02	1.08E+01	1.97E+01	5000	99.3%	-0.007
Blank-21	Tc-99	Water	60	390.00	152.57	2.15	139.25	98.90		6.27E+02	3.70E+01	1.08E+01	7.61E+00			
473754	Tc-99	Water	60	346.80	140.72	2.25	127.68	98.58		5.75E+02	3.40E+01	1.08E+01	7.36E+00	RPD	Dup Evaluation	
473754D	Tc-99	Water	60	308.82	143.12	2.23	131.93	97.22		5.94E+02	3.51E+01	1.10E+01	7.52E+00	3.28	0.39	Pass
473755	Tc-99	Water	60	354.86	120.85	2.44	107.34	98.75		4.83E+02	2.87E+01	1.08E+01	6.86E+00	RPD	Dup Evaluation	
473755D	Tc-99	Water	60	354.99	127.92	2.37	114.50	98.75		5.16E+02	3.06E+01	1.08E+01	7.04E+00	6.45	0.77	Pass
473756	Tc-99	Water	60	377.23	142.95	2.23	129.44	98.96		5.83E+02	3.44E+01	1.08E+01	7.38E+00	RPD	Dup Evaluation	
473756D	Tc-99	Water	60	352.64	140.70	2.25	127.50	98.70		5.74E+02	3.39E+01	1.08E+01	7.35E+00	1.51	0.18	Pass
473757	Tc-99	Water	60	361.67	125.84	2.38	112.23	98.89		5.06E+02	3.00E+01	1.08E+01	6.98E+00	RPD	Dup Evaluation	
473757D	Tc-99	Water	60	373.68	126.28	2.38	112.58	98.97		5.07E+02	3.01E+01	1.08E+01	6.98E+00	0.31	0.04	Pass
473758	Tc-99	Water	60	342.28	142.59	2.23	129.69	98.49		5.84E+02	3.45E+01	1.08E+01	7.41E+00	RPD	Dup Evaluation	
473758D	Tc-99	Water	60	369.42	146.04	2.20	132.52	98.99		5.97E+02	3.52E+01	1.08E+01	7.45E+00	2.16	0.26	Pass
473768	Tc-99	Water	60	385.75	137.88	2.27	124.37	98.92		5.60E+02	3.31E+01	1.08E+01	7.27E+00	RPD	Dup Evaluation	
473768D	Tc-99	Water	60	367.58	137.37	2.27	123.75	99.00		5.57E+02	3.30E+01	1.08E+01	7.25E+00	0.50	0.06	Pass
473769	Tc-99	Water	60	345.40	138.13	2.27	125.09	98.55		5.63E+02	3.33E+01	1.08E+01	7.30E+00	RPD	Dup Evaluation	
473769D	Tc-99	Water	60	361.66	135.28	2.29	121.78	98.89		5.49E+02	3.24E+01	1.08E+01	7.21E+00	2.68	0.32	Pass
473770	Tc-99	Water	60	356.25	140.94	2.24	127.66	98.77		5.75E+02	3.40E+01	1.08E+01	7.35E+00	RPD	Dup Evaluation	
473770D	Tc-99	Water	60	364.42	146.57	2.20	133.13	98.94		6.00E+02	3.54E+01	1.08E+01	7.47E+00	4.20	0.50	Pass
473771	Tc-99	Water	60	347.80	136.76	2.28	123.64	98.60		5.57E+02	3.29E+01	1.08E+01	7.26E+00	RPD	Dup Evaluation	
473771D	Tc-99	Water	60	342.17	133.70	2.31	120.67	98.49		5.44E+02	3.22E+01	1.08E+01	7.20E+00	2.43	0.29	Pass
473772	Tc-99	Water	60	350.90	139.10	2.26	125.93	98.66		5.67E+02	3.35E+01	1.08E+01	7.31E+00	RPD	Dup Evaluation	
473772D	Tc-99	Water	60	340.59	138.05	2.27	125.13	98.45		5.64E+02	3.33E+01	1.08E+01	7.30E+00	0.64	0.08	Pass
473778	Tc-99	Water	60	315.72	137.18	2.27	125.55	97.43		5.66E+02	3.34E+01	1.09E+01	7.36E+00	RPD	Dup Evaluation	
473778D	Tc-99	Water	60	357.03	133.17	2.31	119.76	98.79		5.39E+02	3.19E+01	1.08E+01	7.16E+00	4.72	0.56	Pass
473045	Tc-99	Water	60	371.31	136.65	2.28	123.05	98.98		5.54E+02	3.28E+01	1.08E+01	7.23E+00	RPD	Dup Evaluation	
473045D	Tc-99	Water	60	368.23	132.60	2.32	118.95	98.99		5.36E+02	3.17E+01	1.08E+01	7.13E+00	3.39	0.41	Pass
PBWK11JV2	Tc-99	Water	60	355.45	14.24	8.77	-0.62	98.76		-2.81E+00	3.18E+00	1.08E+01	3.18E+00		PB < 1.65*TPU	
LCSWK11JV3	Tc-99	Water	60	337.94	1105.28	0.78	1108.61	98.36		4.99E+03	2.89E+02	1.08E+01	1.98E+01	5000	99.9%	-0.001
LCSWK11JV4	Tc-99	Water	60	353.16	1112.94	0.78	1112.44	98.71		5.01E+03	2.90E+02	1.08E+01	1.98E+01	5000	100.2%	0.002

Notes: Day #21 results.

0101115

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110825-10, 110915-9
Prep Page: 12-217
Prep Date: 11-Oct-11

Project #: 16526.05.00X
SRR: 45511, 45412
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

0101116

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111012_1229
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111012_1229\20111012_1229.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor BTW Portsmouth
116526.05.00K
TO# 110825-10, 110915-9
12-217
WAN
Day 21

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

0101117

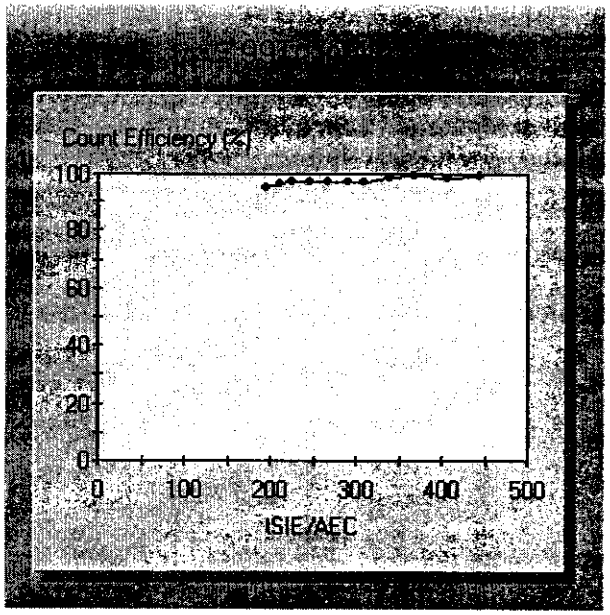
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 19.79 Date Processed: 10/12/2011 10:53:32 AM
14C Chi Square: 23.31 Date Processed: 10/12/2011 10:53:32 AM
3H E^2/B (1-18.6 keV): 1496.07 Date Processed: 10/12/2011 10:53:32 AM
14C E^2/B (4-156 keV): 5915.62 Date Processed: 10/12/2011 10:53:32 AM
3H Efficiency (1-18.6 keV): 64.51 Date Processed: 10/12/2011 10:53:32 AM
14C Efficiency (4-156 keV): 93.41 Date Processed: 10/12/2011 10:53:32 AM
IPA Background Date Processed: 10/12/2011 10:53:32 AM
3H Background CPM (1-18.6 keV): 2.78 Date Processed: 10/12/2011 10:53:32 AM
14C Background CPM (4-156 keV): 1.48 Date Processed: 10/12/2011 10:53:32 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010118



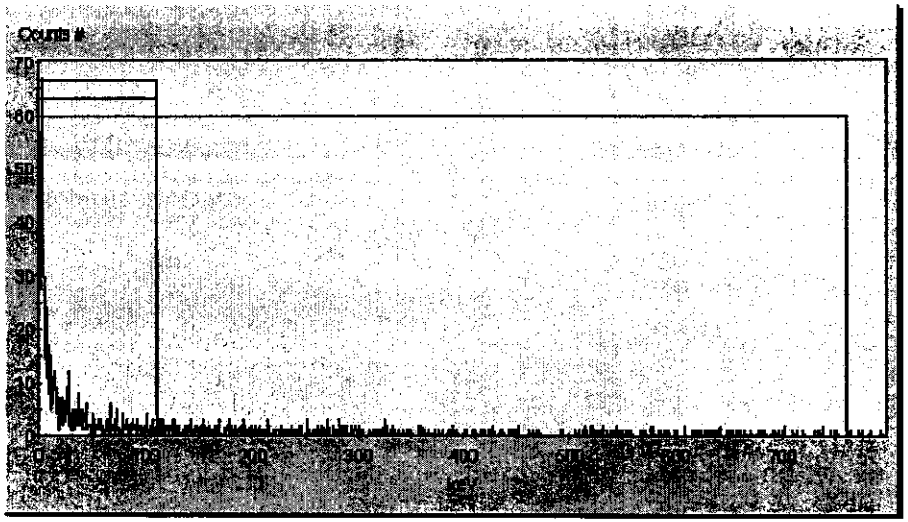
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nucl In A									
1	5	1	60.00	Bkg-1	15.38	16	430.96	317.14		8.30	1:01:33	16
10/12/2011			12:30:48 PM 97.49									

0101119

SpectraView Block Data

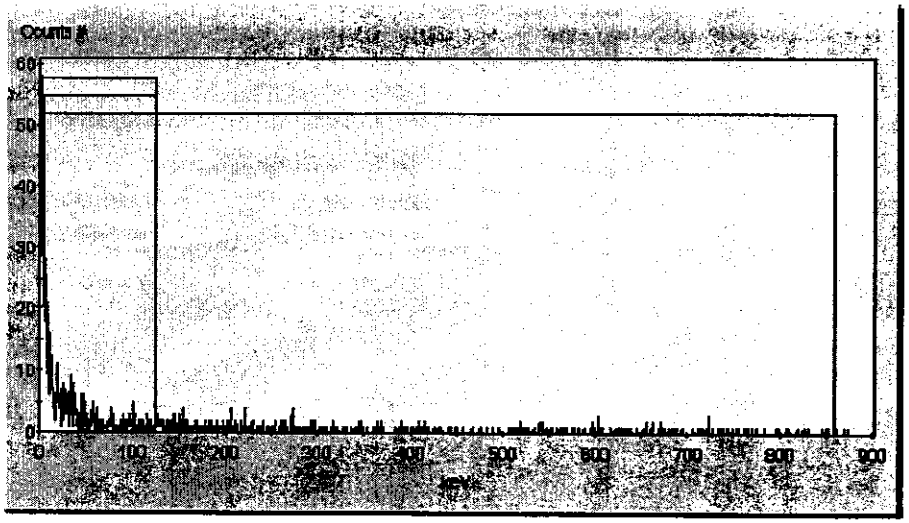


2	5	1	60.00	Bkg-2	14.33	14	441.73	370.96	8.69	2:03:03	17

10/12/2011 1:32:20 PM 98.98

SpectraView Block Data

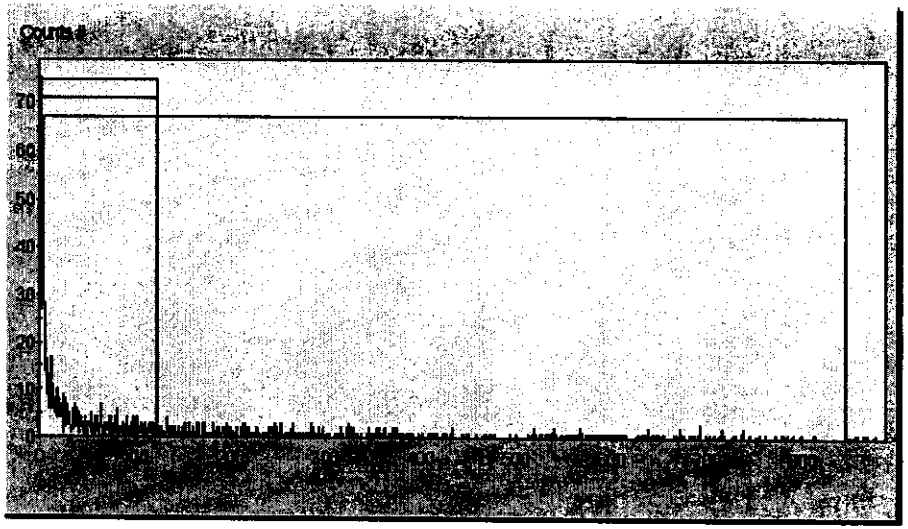
010120



Missing vial 3.

4	5	1	60.00	PBWK11JV1	16.18	16	446.29	363.85		8.03	3:04:36	16
10/12/2011	2:33:52 PM			98.93								

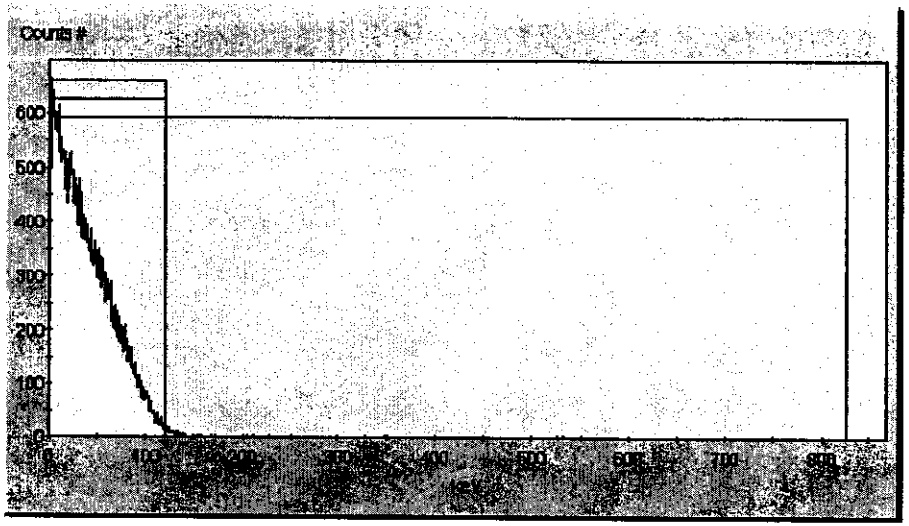
SpectraView Block Data



010121

5	5	1	60.00	LCSWK11JV1	1106.59	1121	135.33	353.51		0.78	4:06:20	0
10/12/2011	3:35:23 PM			98.72								

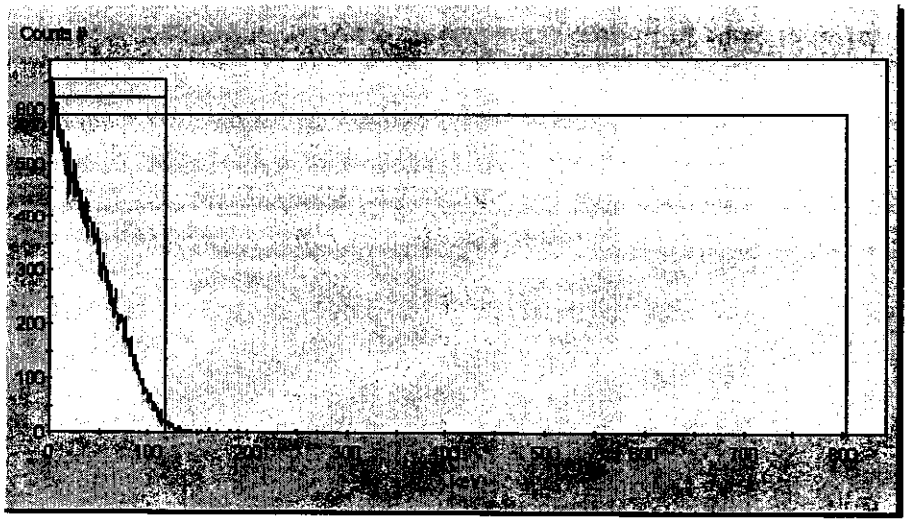
SpectraView Block Data



6	5	1	60.00	LCSWK11JV2	1100.57	1118	133.38	341.10		0.78	5:07:52	0
10/12/2011	4:37:07 PM			98.46								

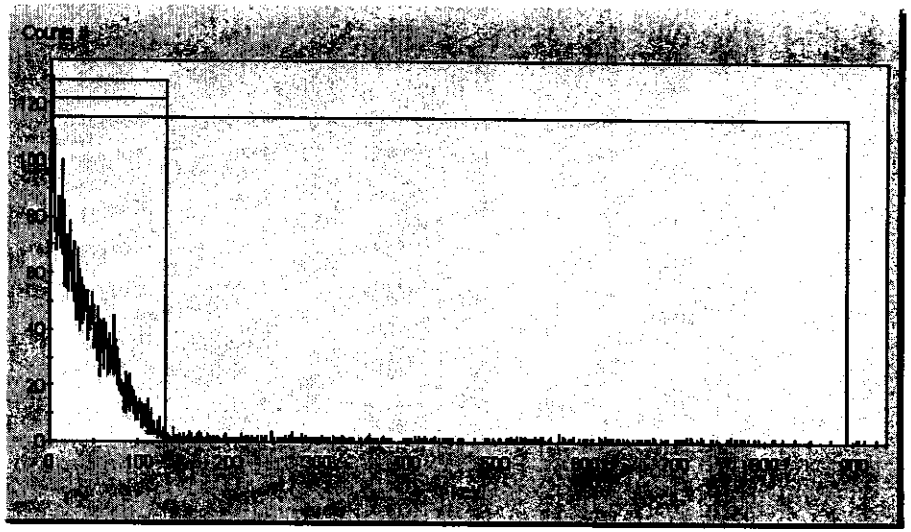
SpectraView Block Data

010122



7	5	1	60.00	Blank Day #21	152.57	154	190.36	390.00		2.15	6:10:21	3
10/12/2011	5:38:40 PM			98.90								

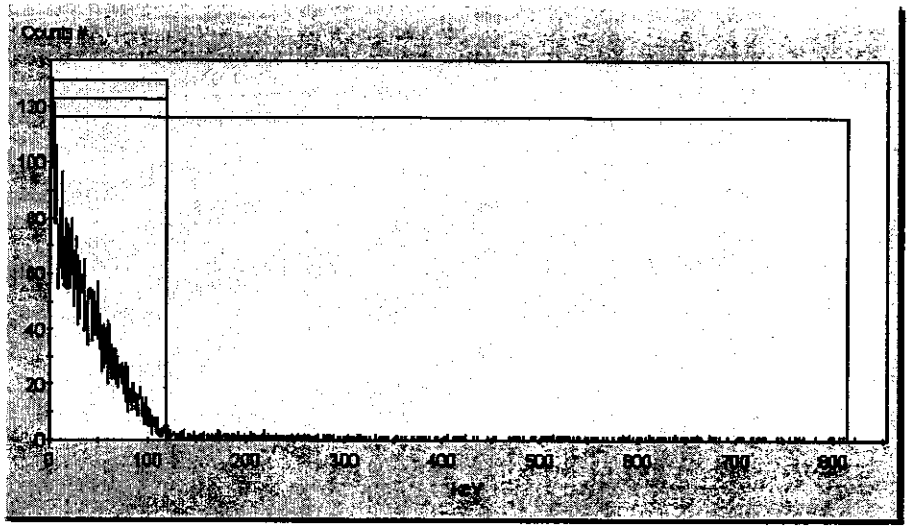
SpectraView Block Data



010123

8	5	1	60.00	473754-21	140.72	143	179.73	346.80		2.25	7:12:50	3
10/12/2011	6:41:08 PM			98.58								

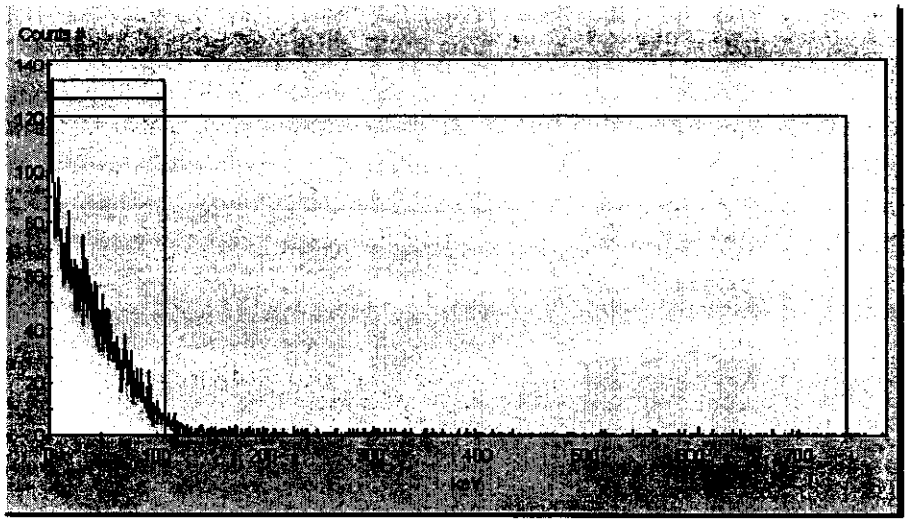
SpectraView Block Data



9	5	1	60.00	473754D-21	143.12	147	187.96	308.82		2.23	8:15:19	3
10/12/2011	7:43:37 PM			97.22								

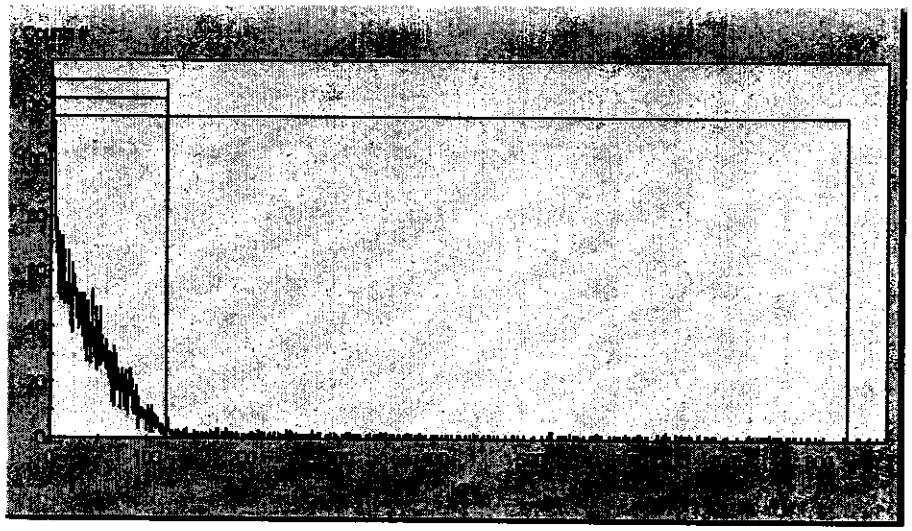
SpectraView Block Data

010124



10	5	1	60.00	473755-21	120.85	122	197.27	354.86		2.44	9:17:46	4
10/12/2011	8:46:06 PM			98.75								

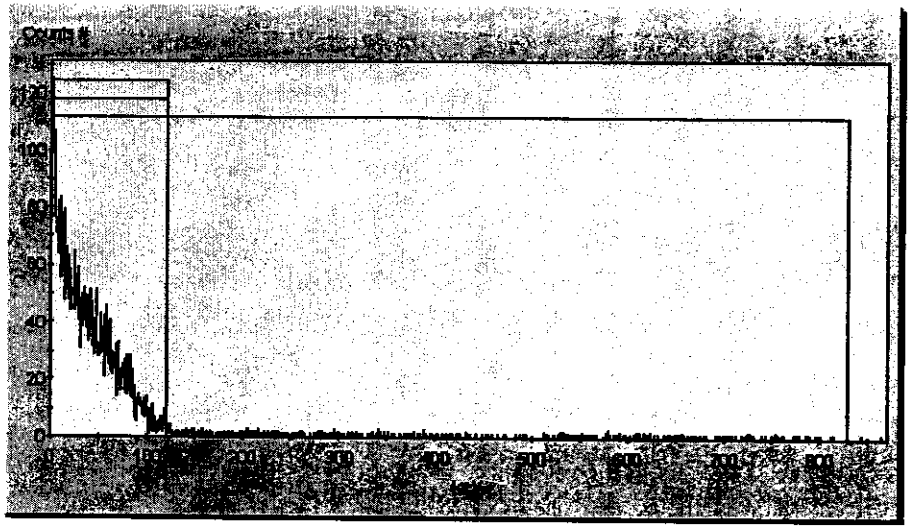
SpectraView Block Data



010125

11	5	1	60.00	473755D-21	127.92	130	195.64	354.99		2.37	10:20:12	3
10/12/2011	9:48:33 PM			98.75								

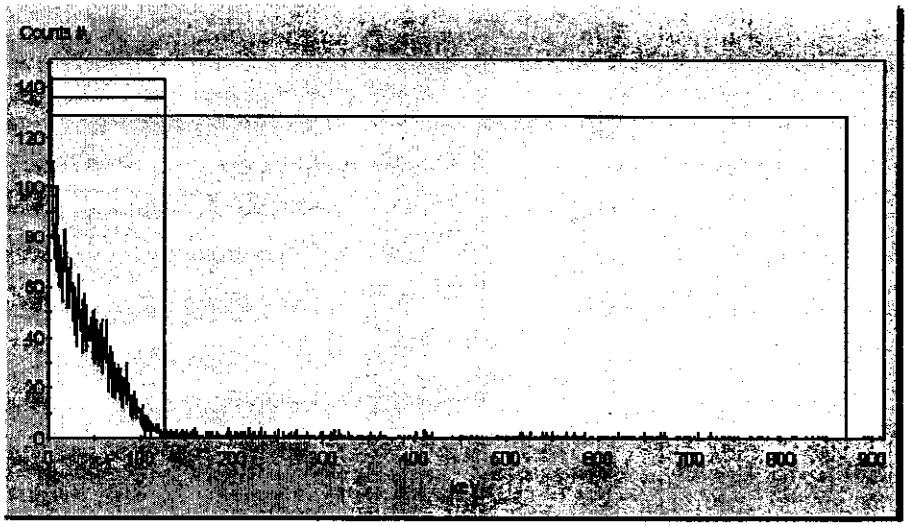
SpectraView Block Data



12	5	1	60.00	473756-21	142.95	144	187.34	377.23		2.23	11:22:38	3
10/12/2011	10:50:59 PM			98.96								

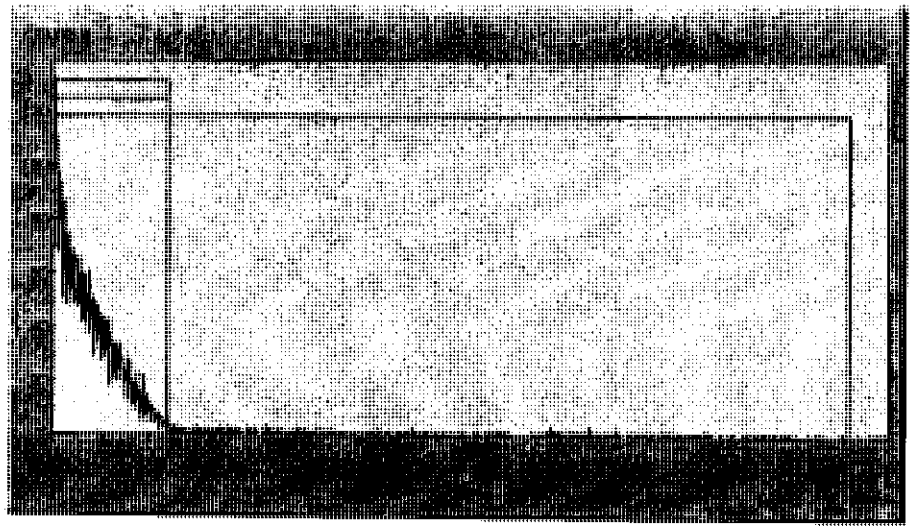
SpectraView Block Data

010126



13	5	2	60.00	473756D-21	140.70	143	192.19	352.64		2.25	12:25:08	3
10/12/2011	11:53:31 PM		98.70									

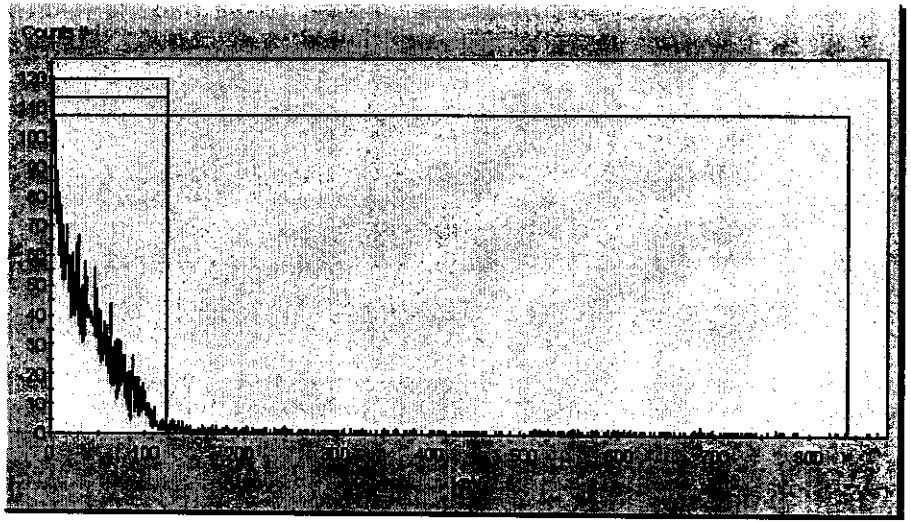
SpectraView Block Data



010127

14	5	2	60.00	473757-21	125.84	127	194.36	361.67		2.38	13:27:30	3
10/13/2011	12:55:55 AM			98.89								

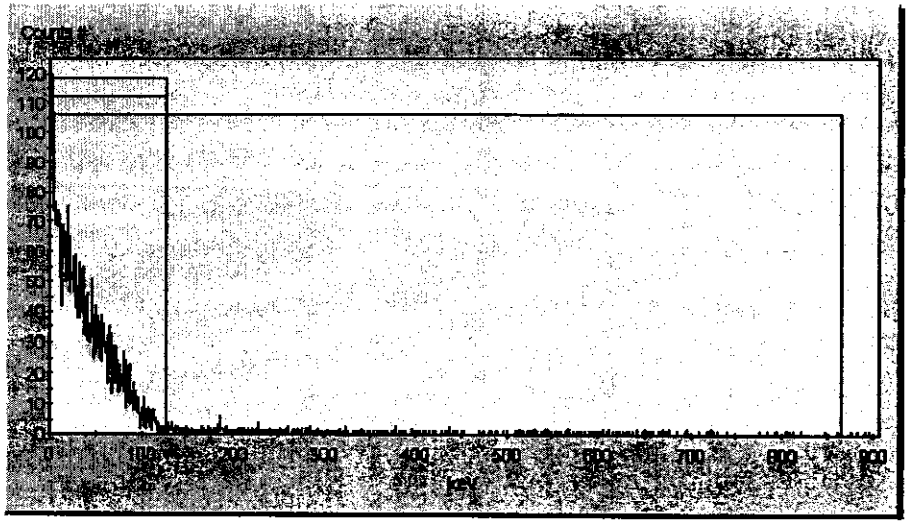
SpectraView Block Data



15	5	2	60.00	473757D-21	126.28	128	193.21	373.68		2.38	14:29:49	3
10/13/2011	1:58:17 AM			98.97								

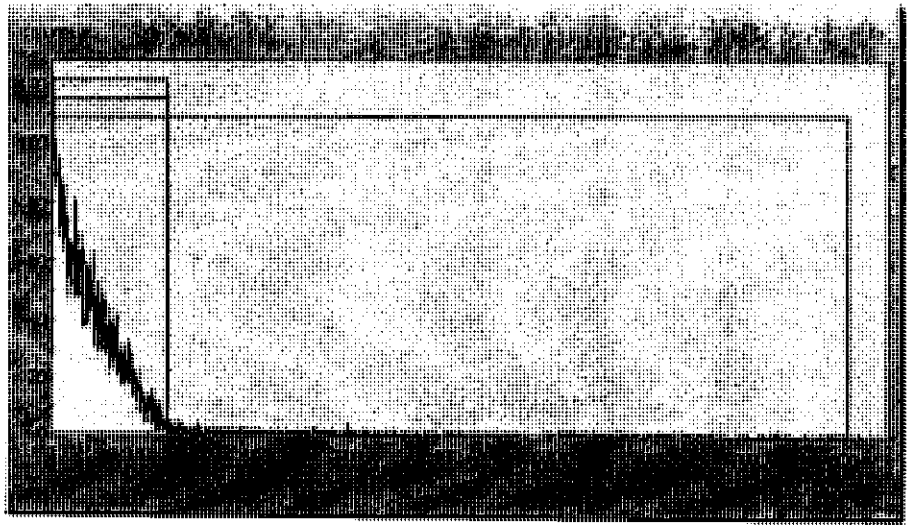
SpectraView Block Data

010128



16	5	2	60.00	473758-21	142.59	145	182.56	342.28		2.23	15:32:12	3
10/13/2011	3:00:36 AM		98.49									

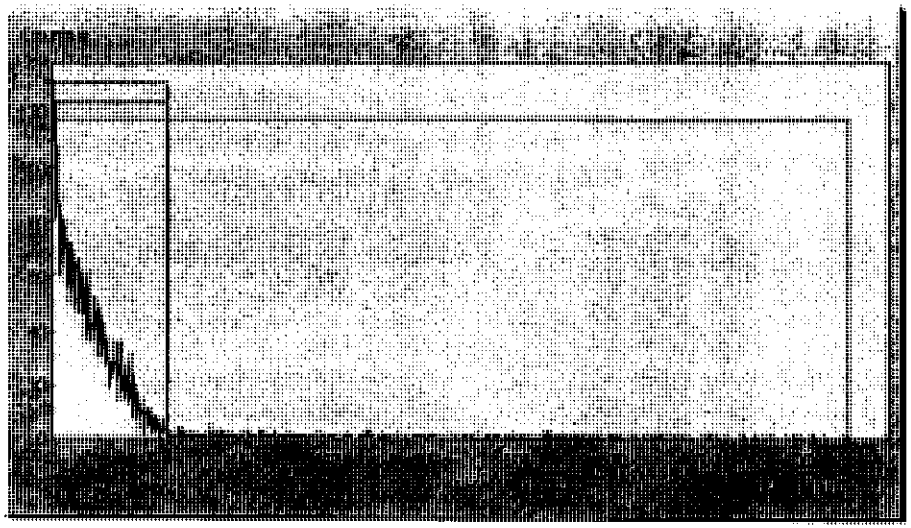
SpectraView Block Data



010129

17	5	2	60.00	473758D-21	146.04	148	186.77	369.42		2.20	16:34:26	3
10/13/2011	4:02:59 AM			98.99								

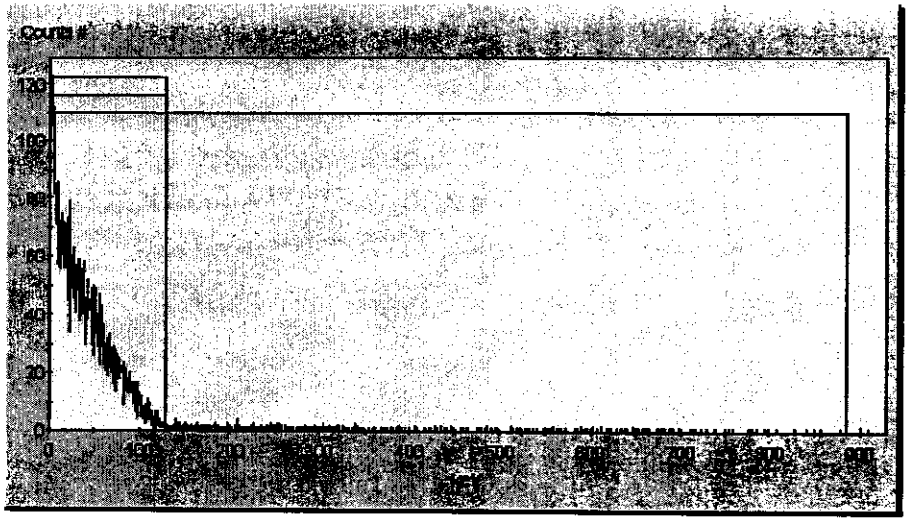
SpectraView Block Data



18	5	2	60.00	473768-21	137.88	139	183.13	385.75		2.27	17:36:38	3
10/13/2011	5:05:13 AM			98.92								

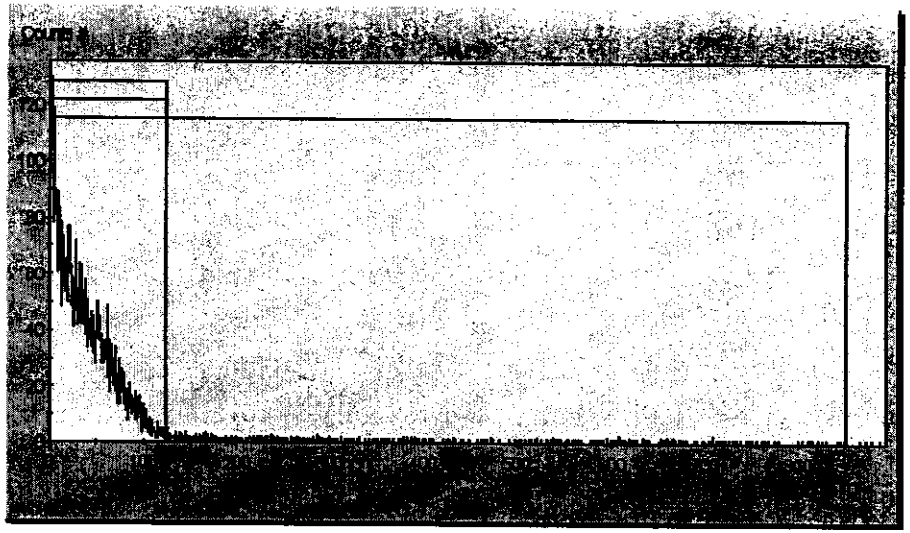
SpectraView Block Data

010130



19	5	2	60.00	473768D-21	137.37	139	188.67	367.58		2.27	18:38:41	3
10/13/2011	6:07:25 AM		99.00								

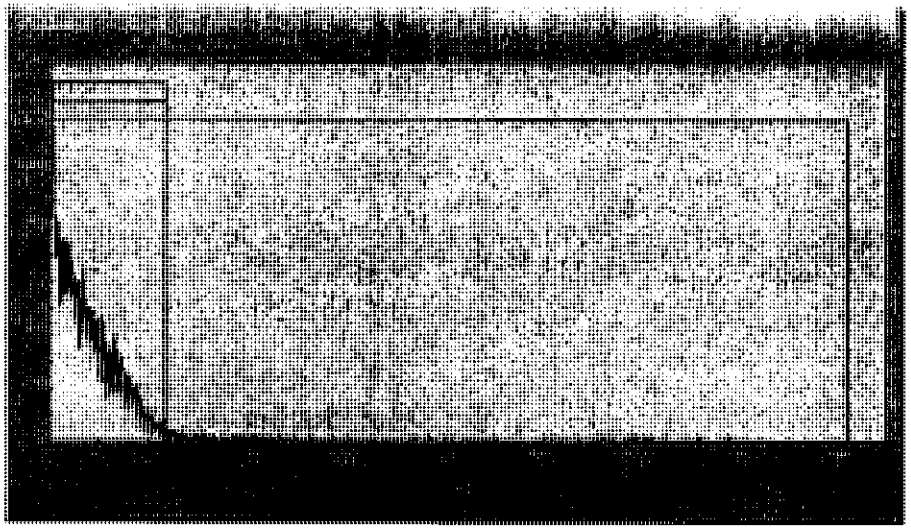
SpectraView Block Data



0101131

20	5	2	60.00	473769-21	138.13	140	191.03	345.40		2.27	19:40:47	3
10/13/2011	7:09:28 AM			98.55								

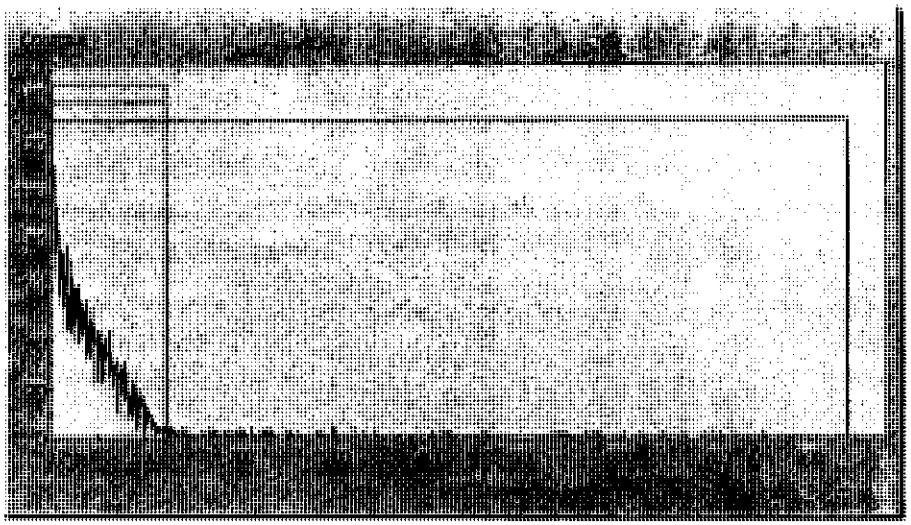
SpectraView Block Data



21	5	2	60.00	473769D-21	135.28	137	193.03	361.66		2.29	20:42:46	3
10/13/2011	8:11:35 AM			98.89								

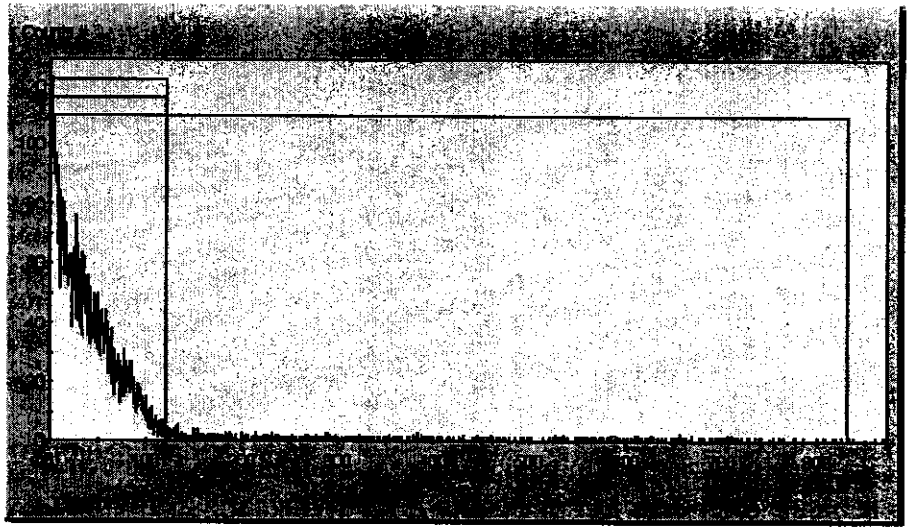
SpectraView Block Data

0101132



22	5	2	60.00	473770-21	140.94	143	192.69	356.25		2.24	21:44:38	3
10/13/2011	9:13:33 AM			98.77							

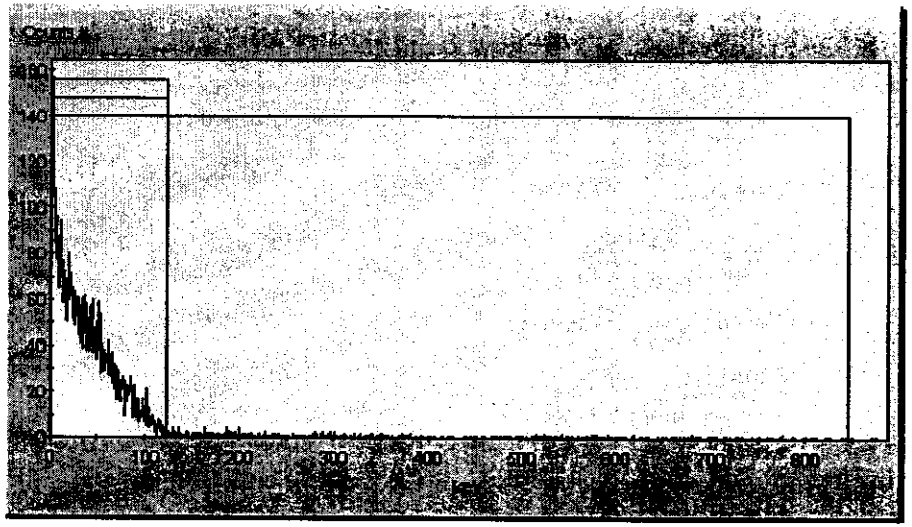
SpectraView Block Data



010133

23	5	2	60.00	473770D-21	146.57	148	182.22	364.42		2.20	22:46:42	3
10/13/2011	10:15:26 AM			98.94								

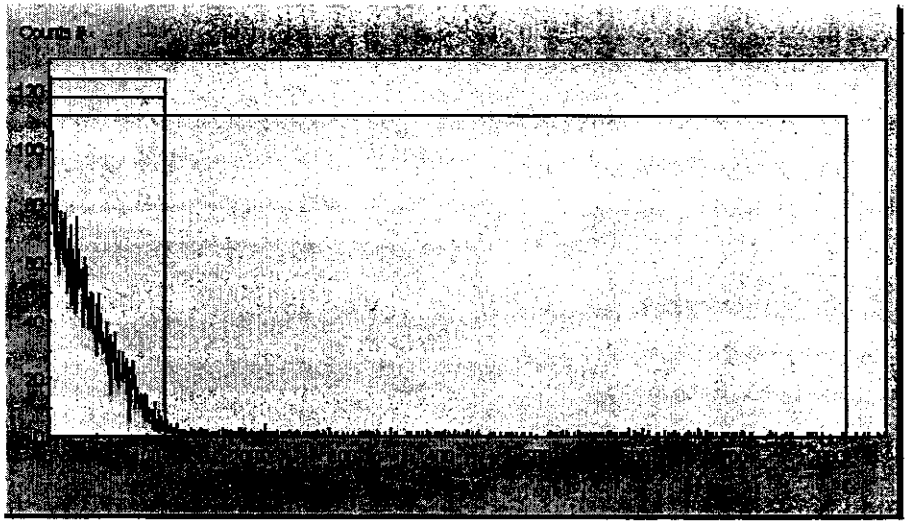
SpectraView Block Data



24	5	2	60.00	473771-21	136.76	139	190.37	347.80		2.28	23:48:30	3
10/13/2011	11:17:28 AM			98.60								

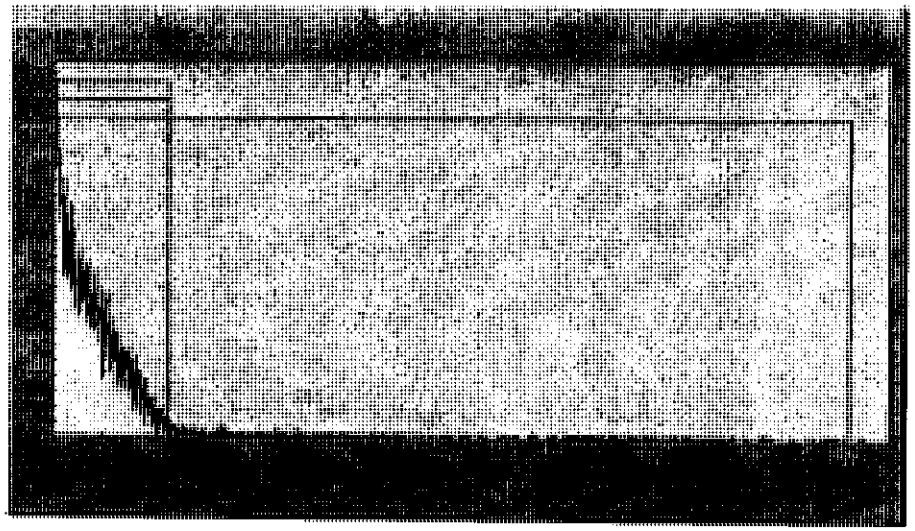
SpectraView Block Data

010134



25	5	7	60.00	473771D-21	133.70	136	191.76	342.17		2.31	24:50:30	3
10/13/2011	12:19:23 PM		98.49									

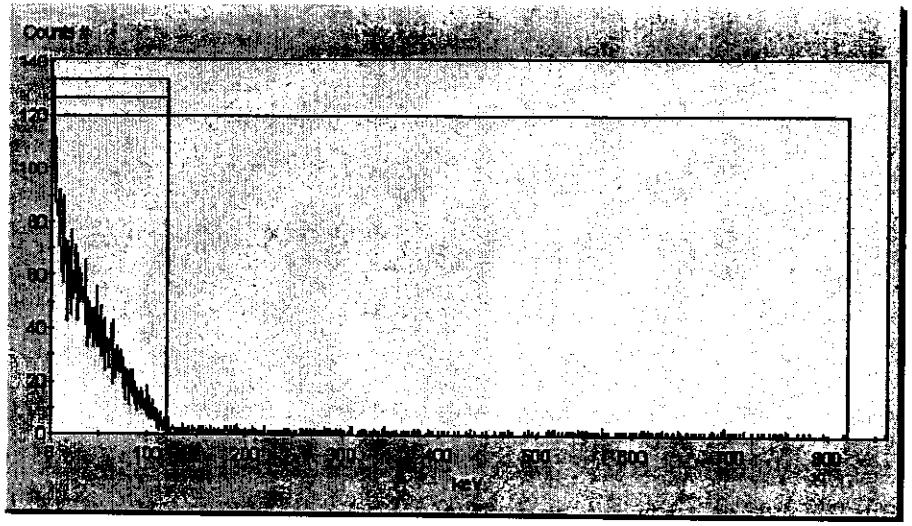
SpectraView Block Data



010135

26	5	7	60.00	473772-21	139.10	141	192.15	350.90		2.26	25:52:14	3
10/13/2011	1:21:17 PM			98.66								

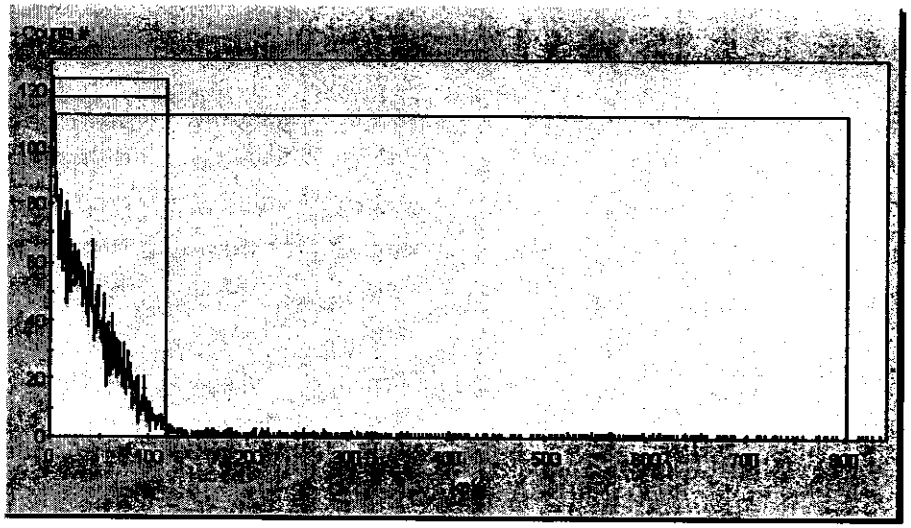
SpectraView Block Data



27	5	7	60.00	473772D-21	138.05	140	187.76	340.59		2.27	26:54:02	3
10/13/2011	2:23:02 PM			98.45								

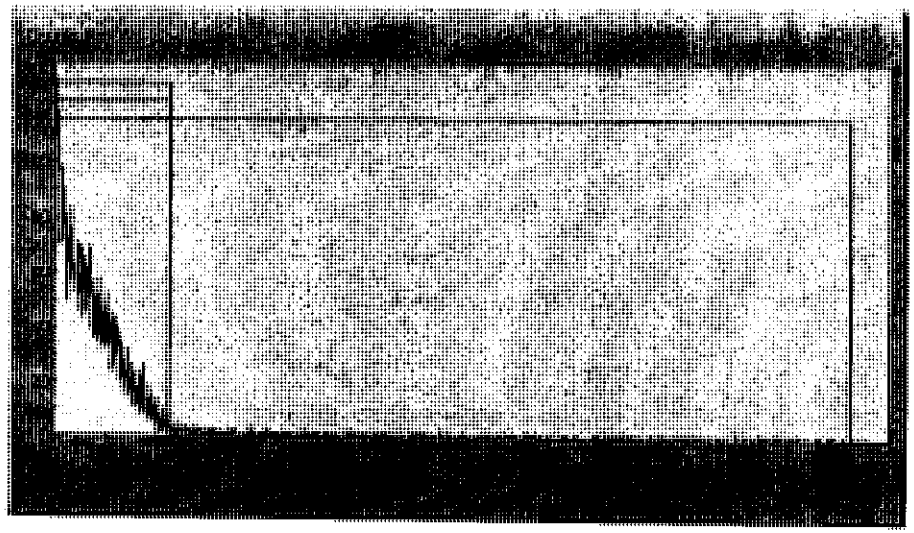
SpectraView Block Data

010136



28	5	7	60.00	473778-21	137.18	141	177.09	315.72		2.27	27:55:32	3
10/13/2011	3:24:48 PM			97.43								

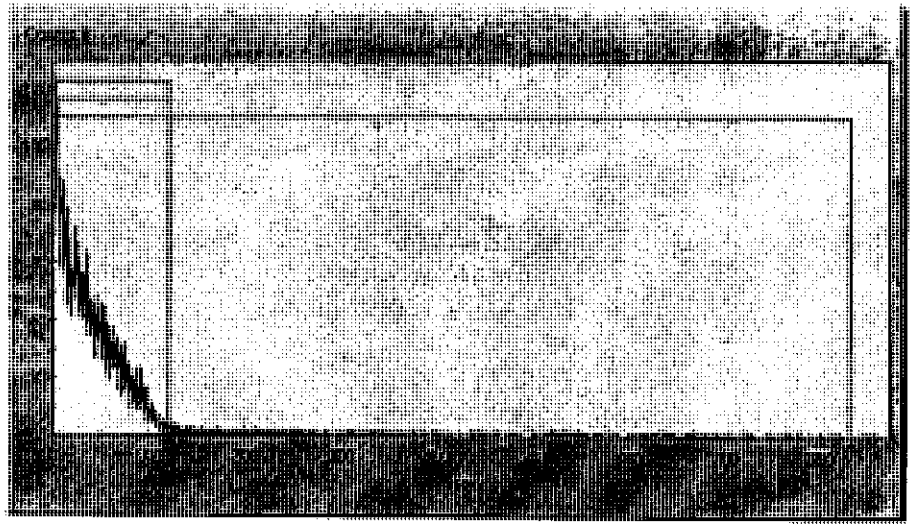
SpectraView Block Data



0101137

29	5	7	60.00	473778D-21	133.17	135	191.86	357.03		2.31	28:57:18	3
10/13/2011	4:26:18 PM			98.79								

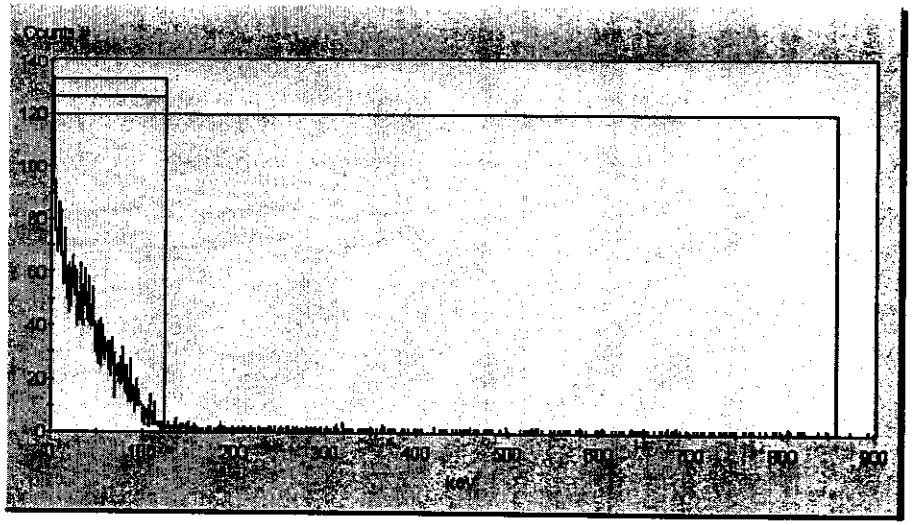
SpectraView Block Data



30	5	7	60.00	473045-21	136.65	138	190.59	371.31		2.28	29:59:00	3
10/13/2011	5:28:06 PM			98.98								

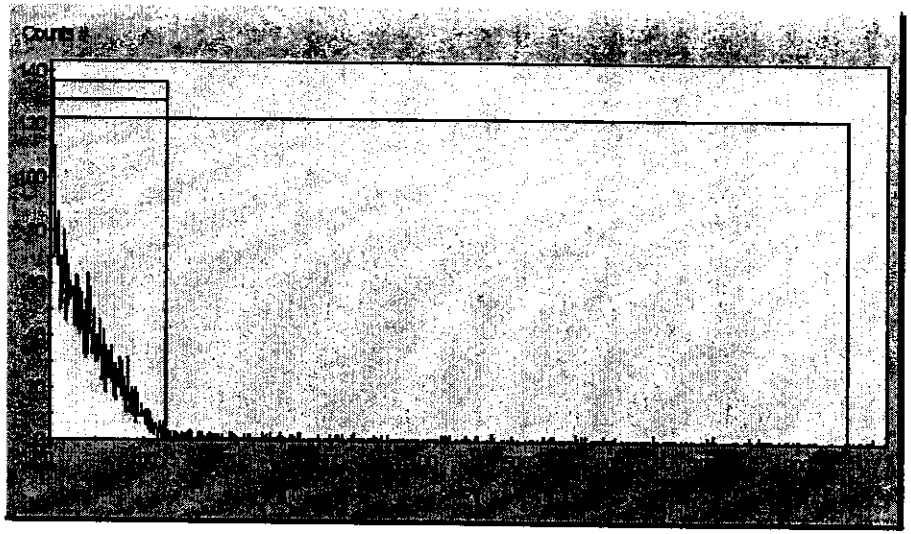
SpectraView Block Data

0101138



31	5	7	60.00	473045D-21	132.60	134	204.60	368.23		2.32	31:00:41	3
10/13/2011	6:29:47 PM			98.99								

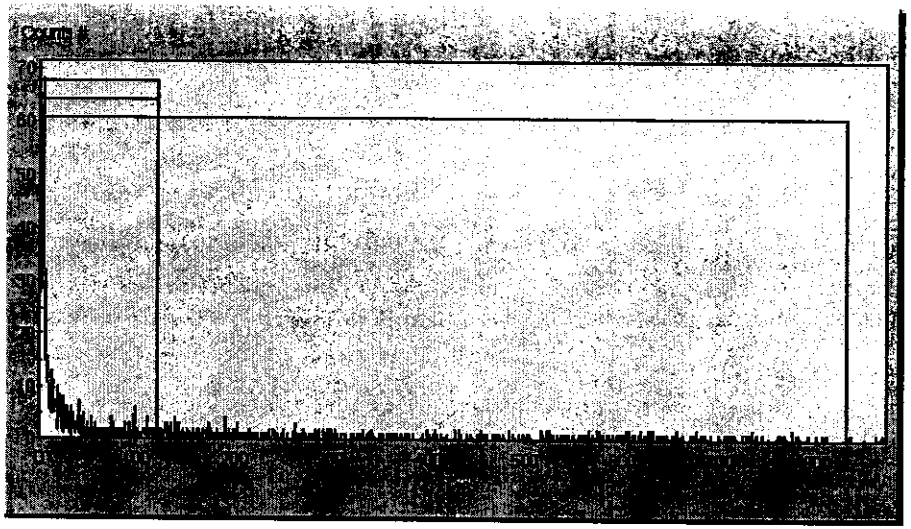
SpectraView Block Data



0101139

32	5	7	60.00	PBWK11JV2	14.24	14	442.50	355.45		8.77	32:02:11	17
10/13/2011	7:31:28 PM			98.76								

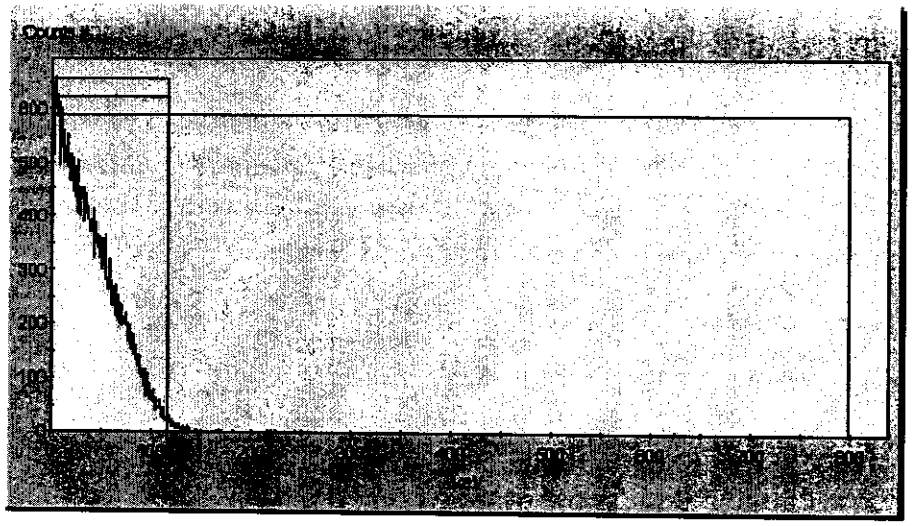
SpectraView Block Data



33	5	7	60.00	LCSWK11JV3	1105.28	1124	134.23	337.94		0.78	33:03:46	0
10/13/2011	8:32:58 PM			98.36								

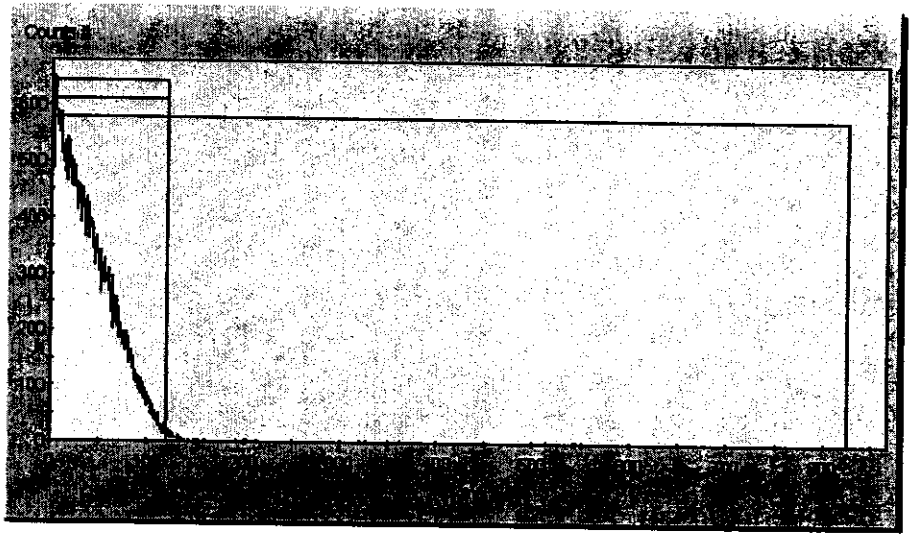
SpectraView Block Data

010140



34	5	7	60.00	LCSWK11JV4	1112.94	1127	137.10	353.16		0.78	34:05:26	0
10/13/2011	9:34:33 PM			98.71							

SpectraView Block Data



0101141

Tc99
Prep Logs

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010143

Book I.D. 11-0406-033 BOOK / PAGE: 12 00190

CLIENT(S): K FLOR B&W BRTSWOSTH (DAY #7 TC KD)
TASK ORDER(S): 110815-10, 110915-9 SDG(S): 473754
PROJECT NO(S): 16526.05.006
METHOD: TC99
TAP: 01.0411.049 REV. # 4
MATRIX: Water ✓ Soil Biota Solid Liquid TCLP Ext OTHER (KD) EXTRACT
INSTRUMENT: Gamma Alpha LSC ✓ GPC ICP/MS OTHER
ACID INORG #: HNO_3# ✓ 9313 HCl# H_2SO_4# $HClO_4$# HF# H_2O_2# ✓ 9093
Tracer(s): N/A * SPIKED W/0.5 mL TC 99, 038 RAD SOL 3
Oven/Hotplate/ Block ID: ✓ #6 Temperature (°C): 150°C

	SAMPLE ID							
1	PBLNJ30JV1	100mL	50mL	18	473045	100 mL	50mL
2	LCSWJ30JV1*			29	✓ 045DUP ✓	✓	✓
3	LCSWJ30JV2*			30	PBLWJ30JV2		
4	BLANK DAY #0			31	LCSWJ30JV3*		
5	BLANK DAY #7			32	LCSWJ30JV4* ✓		
6	473754 (DAY #7)				PIPETES: 5000 - L		
7	54 DUP				1000 - L		
8	55				200 - L		
9	55 DUP						
10	56						
11	56 DUP						
12	57						
13	57 DUP						
14	58						
15	58 DUP						
16	68						
17	68 DUP						
18	69						
19	69 DUP						
20	70						
21	70 DUP						
22	71						
23	71 DUP						
24	72						
25	72 DUP						
26	78						
27	78 DUP						

09/30/11

PREPARED BY: DATE: 09/30/11
REVIEWED BY: DATE: 10.4.11
LOCATION: C-765 DISPOSAL: FBP/WD RIFS D3 R5 MASTER/02/05/2014

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010144

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00192___

CLIENT(S): FLUOR B&W PORTSMOUTH (DAY #10 TC, KD)
TASK ORDER(S): 11085-10, 11091S-9 SDG(S): 473754, 473695
PROJECT NO(S): 16526.05.006
METHOD: TC 99
TAP: OT.0411.049 REV. #4
MATRIX: Water ✓ Soil ___ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER "KD EXTRACT"
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___
ACID INORG #: HNO_3# 9313 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓ 9093
Tracer(s): N/A * 0.5mL 5ppb TC 99 038 RAD SOL 3
Oven/Hotplate/Block ID: #6 Temperature (°C): 150°C

	SAMPLE ID	ALIQUOT	F.V. IN HNO_3		SAMPLE ID	ALIQUOT	F.V. IN HNO_3
1	PBW KO3 JV1	100mL	50mL	(17) 473545 (DAY #10)		100mL	50mL
2	LCSW KO3 JV1 *			(28) 045 Dup		↓	↓
3	LCSW KO3 JV2 *			(29) PBW KO3 JV2			
4	BLANK DAY 10			(30) LCSW KO3 JV3 *			
5	473754 (DAY #10)			(31) LCSW KO3 JV4 *		↓	✓
6	54 Dup						
7	55			PREFIXES: 5000-A			
8	55 Dup			1000-L			
9	56			100-L			
10	56 Dup						
11	57						
12	57 Dup						
13	58						
14	58 Dup						
15	68						
16	68 Dup						
17	69						
18	69 Dup						
19	70						
20	70 Dup						
21	71						
22	71 Dup.						
23	72						
24	72 Dup						
25	78						
26	78 Dup ✓		✓				

PREPARED BY: _____ DATE: 10/03/11
REVIEWED BY: _____ DATE: 10.4.11
LOCATION: _____ DISPOSAL: _____

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010145

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00193___

CLIENT(S): FLUOR B&W PORTSMOUTH (DAY #14 TC, KI)
TASK ORDER(S): 110825.10, 110915.9 SDG(S): 473754, 473045
PROJECT NO(S): 16526.05.006
METHOD: TC 99
TAP: 01-0411-049 REV. # 4
MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER (KI EXTRACT)
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___
ACID INORG #: HNO_3# ✓ 9313 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓ 989
Tracer(s): N/A * SPIKED W/ 0.5 mL TC 99 038 RAD SOL 3
Oven/Hotplate/Block ID: #6 Temperature (°C): 150° C

	SAMPLE ID						
1	DBWK04 JV1	100mL	50mL	(27)	473045 (DAY #14) 100mL		50mL
2	LCSW) K04 JV1 *			(28)	↓ 045 SD (VK)		
3	LCSW) K04 JV2 *			(29)	DBWK04 JV1 (04)		
4	BLANK DAY 14			LCSWK04 JV3 (30)	LCSWK04 JV3 * (NB)		
5	973754 (DAY #14)			(31)	LCSWK04 JV4 * ✓ (DJ) 10/04/11		
6	473754 DUP.			(RE) NW 10/04/11			
7	55				PIPETTES: 5000- M		
8	55 DUP.				1000- Z		
9	56				200- K		
10	56 DUP.						
11	57						
12	57 DUP.						
13	58						
14	58 DUP.						
15	68						
16	68 DUP.						
17	69						
18	69 DUP.						
19	70						
20	70 DUP.						
21	71						
22	71 DUP.						
23	72						
24	72 DUP.						
25	78						
26	78 DUP	✓	✓	✓	✓	✓	✓

PREPARED BY: _____ DATE: 10/04/11
REVIEWED BY: _____ DATE: 10.4.11
LOCATION: _____ DISPOSAL: _____

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010146

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00217___

CLIENT(S): FLUOR B&W PORTSMOUTH (DAY #21)
TASK ORDER(S): 110825-10, 110915-9 SDG(S): 473754, 473045
PROJECT NO(S): 16526.05.006
METHOD: Tc99
TAP: OP-0411-049 REV. # 4
MATRIX: Water___ Soil___ Biota___ Solid___ Liquid___ TCLP Ext___ OTHER ✓ (KD EXTRACT)
INSTRUMENT: Gamma___ Alpha___ LSC ✓ GPC___ ICP/MS___ OTHER
ACID INORG #: HNO_3# ✓9313 HCl#_____ H_2SO_4#_____ $HClO_4$#_____ HF#_____ H_2O_2# ✓909
Tracer(s): N/A * SPIKED W/ 0.5mL Tc 99 #38 RAD SOL 3
Oven/Hotplate/ Block ID: #6 Temperature (°C): 150°C

	SAMPLE ID	ALIQUOT WT.	FIL. WT.		SAMPLE ID	ALIQUOT	FIL. WT.
1	PBWKII TV 1	100mL	50mL	(DAY 21) 27	473045	100mL	50mL
2	LCSWKII TV 1*			28	473045 Dup.		
3	LCSWKII TV 2*			29	PBWKII TV 2		
4	BLANK DAY #21			30	LCSWKII TV 3*		
5	473754 (DAY #21)			31	LCSWKII TV 4*		
6	54 Dup.						
7	55						
8	55 Dup.			PIPETES: 5000-L, 1000-L, 200-L			
9	56						
10	56 Dup.						
11	57						
12	57 Dup.						
13	58						
14	58 Dup.						
15	68						
16	68 Dup.						
17	69						
18	69 Dup.						
A	70						
20	70 Dup.						
21	71						
22	71 Dup.						
23	72						
24	72 Dup.						
25	78						
26	78 Dup.						

PREPARED BY: _____ DATE: 10/11/11
REVIEWED BY: _____ DATE: 10.12.11
LOCATION: _____ DISPOSAL: ~~FBP/WD-RIFS-D3-R5-MASTER/02/05/2014~~

ICPMS Total U Data for Distribution Coefficient

10-13-11

10/13/11

473754 d7 For tot U

23416 ng/L x df 4 = 93664 ng/L = 93700 ng/L

Fluor
to#110825-10, 110915-9
16526.05.006
pg 15 00132 - 15 00140

Sample ID	Element	Result	Qual (C)	Qual (C)	Units	RL	%RSD	Recovery	Target	Analyst	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
icv	U-tot	7760			ng/L	40		101.2%	7670		40	7759.39784	7760	1	40	7759.39784	09/29/11	10:14 AM
icv	U233 IS	96.7			%R	0.5					0.5	96.67437	96.7	1	0.5	96.67437	09/29/11	10:14 AM
icb	U-tot	40.0	U		ng/L	40					40	3.69925	3.7	1	40	3.69925	09/29/11	10:16 AM
icb	U233 IS	97.8			%R	0.5					0.5	97.81156	97.8	1	0.5	97.81156	09/29/11	10:16 AM
critotU	U-tot	42.9			ng/L	40		107.3%	40.0		40	42.86335	42.9	1	40	42.86335	09/29/11	10:18 AM
critotU	U233 IS	96.2			%R	0.5					0.5	96.21157	96.2	1	0.5	96.21157	09/29/11	10:18 AM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0		40	36.63485	36.6	1	40	36.63485	09/29/11	10:21 AM
icsa	U233 IS	70.0			%R	0.5					0.5	69.97697	70	1	0.5	69.97897	09/29/11	10:21 AM
icsab	U-tot	21200			ng/L	40		103.9%	20400		40	21240.39408	21200	1	40	21240.39408	09/29/11	10:23 AM
icsab	U233 IS	72.1			%R	0.5					0.5	72.09436	72.1	1	0.5	72.09436	09/29/11	10:23 AM
zzz	U-tot	40.0	U		ng/L	40					40	13.09903	13.1	1	40	13.09903	09/29/11	10:25 AM
zzz	U233 IS	101			%R	0.5					0.5	101.20332	101	1	0.5	101.20332	09/29/11	10:25 AM
ccv	U-tot	7890			ng/L	40		102.9%	7670		40	7886.37483	7890	1	40	7886.37483	09/29/11	10:28 AM
ccv	U233 IS	98.4			%R	0.5					0.5	98.44627	98.4	1	0.5	98.44627	09/29/11	10:28 AM
ccb	U-tot	40.0	U		ng/L	40					40	3.62652	3.63	1	40	3.62652	09/29/11	10:30 AM
ccb	U233 IS	103			%R	0.5					0.5	103.29924	103	1	0.5	103.29924	09/29/11	10:30 AM
Blankd0	U-tot	103000			ng/L	160					6936	40	102745.529	103000	4	160	25686.38225	09/29/11	10:35 AM
Blankd0	U233 IS	96.0			%R	0.5					0.5	95.99999	96	4	0.5	95.99999	09/29/11	10:35 AM
Blankd7	U-tot	98900			ng/L	160					6675	40	98882.14972	98900	4	160	24720.53743	09/29/11	10:37 AM
Blankd7	U233 IS	94.5			%R	0.5					0.5	94.52564	94.5	4	0.5	94.52564	09/29/11	10:37 AM
473754d7	U-tot	93700	✓		ng/L	160					6323	40	93664.38048	93700	4	160	23416.09512	09/29/11	10:40 AM
473754d7	U233 IS	90.0			%R	0.5					0.5	89.96379	90	4	0.5	89.96379	09/29/11	10:40 AM
473754d7L	U-tot	94100			ng/L	800	-0.4%				6366	40	94130.267	94100	20	800	4706.51335	09/29/11	10:42 AM
473754d7L	U233 IS	95.0			%R	0.5					0.5	94.97521	95	20	0.5	94.97521	09/29/11	10:42 AM
473754d7D	U-tot	79600			ng/L	160	16.3%				5373	40	79593.31436	79600	4	160	19898.32859	09/29/11	10:44 AM
473754d7D	U233 IS	91.5			%R	0.5					0.5	91.52406	91.5	4	0.5	91.52406	09/29/11	10:44 AM
473754d7AS	U-tot	177000			ng/L	160		101.8%	81800		11937	40	176846.0235	177000	4	160	44211.50588	09/29/11	10:47 AM
473754d7AS	U233 IS	87.9			%R	0.5					0.5	87.87463	87.9	4	0.5	87.87463	09/29/11	10:47 AM
zzz	U-tot	40.0	U		ng/L	40					40	13.05783	13.1	1	40	13.05783	09/29/11	10:49 AM
zzz	U233 IS	93.7			%R	0.5					0.5	93.68599	93.7	1	0.5	93.68599	09/29/11	10:49 AM
473755d7	U-tot	71300			ng/L	160					4811	40	71270.66208	71300	4	160	17817.66552	09/29/11	10:51 AM
473755d7	U233 IS	93.2			%R	0.5					0.5	93.24301	93.2	2	0.5	93.24301	09/29/11	10:51 AM
zzz	U-tot	40.0	U		ng/L	40					40	11.53663	11.5	1	40	11.53663	09/29/11	10:54 AM
zzz	U233 IS	95.3			%R	0.5					0.5	95.30579	95.3	1	0.5	95.30579	09/29/11	10:54 AM
critotU	U-tot	44.6			ng/L	40		111.5%	40.0		40	44.6322	44.6	1	40	44.6322	09/29/11	10:56 AM
critotU	U233 IS	94.1			%R	0.5					0.5	94.05622	94.1	1	0.5	94.05622	09/29/11	10:56 AM
ccv	U-tot	7760			ng/L	40		101.2%	7670		40	7757.38607	7760	1	40	7757.38607	09/29/11	10:58 AM
ccv	U233 IS	93.7			%R	0.5					0.5	93.72565	93.7	1	0.5	93.72565	09/29/11	10:58 AM
ccb	U-tot	40.0	U		ng/L	40					40	5.19614	5.2	1	40	5.19614	09/29/11	11:00 AM
ccb	U233 IS	97.4			%R	0.5					0.5	97.36196	97.4	1	0.5	97.36196	09/29/11	11:00 AM
473755d7D	U-tot	71500			ng/L	160	0.3%				4826	40	71483.48728	71500	4	160	17870.87182	09/29/11	11:07 AM
473755d7D	U233 IS	91.2			%R	0.5					0.5	91.15382	91.2	2	0.5	91.15382	09/29/11	11:07 AM
473756d7	U-tot	45600			ng/L	80					3081	40	45638.2625	45600	2	80	22819.13125	09/29/11	11:10 AM
473756d7	U233 IS	88.3			%R	0.5					0.5	88.25148	88.3	2	0.5	88.25148	09/29/11	11:10 AM
473756d7D	U-tot	42900			ng/L	80	6.1%				2896	40	42905.50492	42900	2	80	21452.75246	09/29/11	11:12 AM

Note: Day 10 is actually Day 9 — See pg 15 00132 for details.

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Sample ID	Element	Result	Qual (Q)	Qual (Q)	Units	RL	%RPD	%Recovery	LL	UL
473756d7D	U233 IS	87.7			%R	0.5				
473757d7	U-tot	69100			ng/L	160				
473757d7	U233 IS	88.9			%R	0.5				
473757d7D	U-tot	96200		*	ng/L	160	32.8%			
473757d7D	U233 IS	90.9			%R	0.5				
473758d7	U-tot	24600			ng/L	40				
473758d7	U233 IS	83.3			%R	0.5				
473758d7D	U-tot	24100			ng/L	40	2.1%			
473758d7D	U233 IS	81.6			%R	0.5				
473768d7	U-tot	82100			ng/L	160				
473768d7	U233 IS	88.6			%R	0.5				
zzz	U-tot									
zzz	U233 IS									
critotU	U-tot	48.4			ng/L	40		121.0%	40.0	
critotU	U233 IS	90.7			%R	0.5				
ccv	U-tot	7720			ng/L	40		100.7%	7670	
ccv	U233 IS	91.9			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	93.1			%R	0.5				
473768d7D	U-tot	85600			ng/L	160	4.2%			
473768d7D	U233 IS	88.5			%R	0.5				
473769d7	U-tot	68900			ng/L	160				
473769d7	U233 IS	88.1			%R	0.5				
473769d7D	U-tot	74500			ng/L	160	7.8%			
473769d7D	U233 IS	88.6			%R	0.5				
473770d7	U-tot	80500			ng/L	160				
473770d7	U233 IS	89.4			%R	0.5				
473770d7D	U-tot	81800			ng/L	160	1.6%			
473770d7D	U233 IS	88.2			%R	0.5				
473771d7	U-tot	88500			ng/L	160				
473771d7	U233 IS	88.4			%R	0.5				
473771d7D	U-tot	89300			ng/L	160	0.9%			
473771d7D	U233 IS	89.7			%R	0.5				
473772d7	U-tot	81400			ng/L	160				
473772d7	U233 IS	88.6			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	87.3			%R	0.5				
critotU	U-tot	45.9			ng/L	40		114.8%	40.0	
critotU	U233 IS	92.0			%R	0.5				
ccv	U-tot	7720			ng/L	40		100.7%	7670	
ccv	U233 IS	91.0			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	87.7			%R	0.5				
473772d7D	U-tot	83300			ng/L	160	2.3%			
473772d7D	U233 IS	86.4			%R	0.5				

Record	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
	0.5	87.67629	87.7	2	0.5	87.67629	09/29/11	11:12 AM
4666	40	69109.23004	69100	4	160	17277.30751	09/29/11	11:14 AM
	0.5	88.93243	88.9	4	0.5	88.93243	09/29/11	11:14 AM
6495	40	96210.03888	96200	4	160	24052.50972	09/29/11	11:17 AM
	0.5	90.88937	90.9	4	0.5	90.88937	09/29/11	11:17 AM
1659	40	24575.38182	24600	1	40	24575.38182	09/29/11	11:19 AM
	0.5	83.25345	83.3	1	0.5	83.25345	09/29/11	11:19 AM
1624	40	24064.22462	24100	1	40	24064.22462	09/29/11	11:21 AM
	0.5	81.57426	81.6	1	0.5	81.57426	09/29/11	11:21 AM
5544	40	82129.67248	82100	4	160	20532.41812	09/29/11	11:24 AM
	0.5	86.64153	88.6	4	0.5	88.64153	09/29/11	11:24 AM
	40	595.85286	596	1	40	595.85286	09/29/11	11:26 AM
	0.5	1.40751	1.41	1	0.5	1.40751	09/29/11	11:26 AM
	40	48.42569	48.4	1	40	48.42569	09/29/11	11:29 AM
	0.5	90.70425	90.7	1	0.5	90.70425	09/29/11	11:29 AM
	40	7720.34805	7720	1	40	7720.34805	09/29/11	11:31 AM
	0.5	91.89429	91.9	1	0.5	91.89429	09/29/11	11:31 AM
	40	7.86153	7.86	1	40	7.86153	09/29/11	11:33 AM
	0.5	93.07773	93.1	1	0.5	93.07773	09/29/11	11:33 AM
5779	40	85607.03204	85600	4	160	21401.75801	09/29/11	11:36 AM
	0.5	88.52914	88.5	4	0.5	88.52914	09/29/11	11:36 AM
4653	40	68924.55828	68900	4	160	17231.13957	09/29/11	11:38 AM
	0.5	88.05313	88.1	4	0.5	88.05313	09/29/11	11:38 AM
5027	40	74465.16352	74500	4	160	18618.29088	09/29/11	11:40 AM
	0.5	88.59525	88.6	4	0.5	88.59525	09/29/11	11:40 AM
5438	40	80548.21548	80500	4	160	20137.05387	09/29/11	11:42 AM
	0.5	89.35555	89.4	4	0.5	89.35555	09/29/11	11:42 AM
5520	40	81768.37464	81800	4	160	20442.09366	09/29/11	11:45 AM
	0.5	88.22502	88.2	4	0.5	88.22502	09/29/11	11:45 AM
5973	40	88479.78748	88500	4	160	22119.94687	09/29/11	11:47 AM
	0.5	88.35725	88.4	4	0.5	88.35725	09/29/11	11:47 AM
6028	40	89298.34776	89300	4	160	22324.58694	09/29/11	11:49 AM
	0.5	89.68611	89.7	4	0.5	89.68611	09/29/11	11:49 AM
5492	40	81351.28492	81400	4	160	20337.82123	09/29/11	11:52 AM
	0.5	88.57542	88.6	4	0.5	88.57542	09/29/11	11:52 AM
	40	-0.74243	-0.742	1	40	-0.74243	09/29/11	11:54 AM
	0.5	87.25979	87.3	1	0.5	87.25979	09/29/11	11:54 AM
	40	45.89886	45.9	1	40	45.89886	09/29/11	11:56 AM
	0.5	91.98685	92	1	0.5	91.98685	09/29/11	11:56 AM
	40	7720.69748	7720	1	40	7720.69748	09/29/11	11:59 AM
	0.5	90.99515	91	1	0.5	90.99515	09/29/11	11:59 AM
	40	1.7975	1.8	1	40	1.7975	09/29/11	12:01 PM
	0.5	87.70936	87.7	1	0.5	87.70936	09/29/11	12:01 PM
5625	40	83326.59444	83300	4	160	20831.64861	09/29/11	12:12 PM
	0.5	86.40033	86.4	4	0.5	86.40033	09/29/11	12:12 PM

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Sample ID	Element	Result	Qual (C)	Qual (D)	Units	RL	%RPD	%Recovery	TIC	uncert.
473778d7	U-tot	72200			ng/L	160				4873
473778d7	U233 IS	87.6			%R	0.5				
473778d7D	U-tot	78300			ng/L	160	8.1%			5283
473778d7D	U233 IS	87.3			%R	0.5				
473045d7	U-tot	94300			ng/L	160				6363
473045d7	U233 IS	87.0			%R	0.5				
473045d7D	U-tot	93000			ng/L	160	1.4%			6281
473045d7D	U233 IS	85.8			%R	0.5				
Blankd10	U-tot	104000			ng/L	160				7034
Blankd10	U233 IS	86.8			%R	0.5				
473754d10	U-tot	92300			ng/L	160				6229
473754d10	U233 IS	80.8			%R	0.5				
473754d10L	U-tot	93100			ng/L	800	-0.9%			6294
473754d10L	U233 IS	84.7			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	86.1			%R	0.5				
critotU	U-tot	46.3			ng/L	40		115.8%	40.0	
critotU	U233 IS	88.6			%R	0.5				
ccv	U-tot	7830			ng/L	40		102.1%	7670	
ccv	U233 IS	86.8			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	85.6			%R	0.5				
473754d10D	U-tot	86900			ng/L	160	6.0%			5868
473754d10D	U233 IS	76.4			%R	0.5				
473754d10AS	U-tot	177000			ng/L	160		103.5%	81800	11952
473754d10AS	U233 IS	76.9			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	84.2			%R	0.5				
473755d10	U-tot	78300			ng/L	160				5286
473755d10	U233 IS	83.3			%R	0.5				
473755d10D	U-tot	74600			ng/L	160	4.8%			5037
473755d10D	U233 IS	86.2			%R	0.5				
473756d10	U-tot	40100			ng/L	80				2704
473756d10	U233 IS	83.4			%R	0.5				
473756d10D	U-tot	44900			ng/L	80	11.3%			3028
473756d10D	U233 IS	83.1			%R	0.5				
473757d10	U-tot	69400			ng/L	160				4687
473757d10	U233 IS	82.9			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	84.8			%R	0.5				
critotU	U-tot	43.6			ng/L	40		109.0%	40.0	
critotU	U233 IS	90.0			%R	0.5				
ccv	U-tot	7980			ng/L	40		104.0%	7670	
ccv	U233 IS	86.5			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				

rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
40	72185.99928	72200	4	160	18046.49982	09/29/11	12:15 PM
0.5	87.58373	87.6	4	0.5	87.58373	09/29/11	12:15 PM
40	78263.71004	78300	4	160	19565.92751	09/29/11	12:17 PM
0.5	87.30607	87.3	4	0.5	87.30607	09/29/11	12:17 PM
40	94263.95852	94300	4	160	23565.98963	09/29/11	12:19 PM
0.5	86.95567	87	4	0.5	86.95567	09/29/11	12:19 PM
40	93040.70848	93000	4	160	23260.17712	09/29/11	12:22 PM
0.5	85.83178	85.8	4	0.5	85.83178	09/29/11	12:22 PM
40	104193.6076	104000	4	160	26048.4019	09/29/11	12:24 PM
0.5	86.81684	86.8	4	0.5	86.81684	09/29/11	12:24 PM
40	92269.8866	92300	4	160	23067.47165	09/29/11	12:26 PM
0.5	80.76772	80.8	4	0.5	80.76772	09/29/11	12:26 PM
40	93051.0944	93100	20	800	4652.55472	09/29/11	12:29 PM
0.5	84.655	84.7	20	0.5	84.655	09/29/11	12:29 PM
40	-0.49033	-0.49	1	40	-0.49033	09/29/11	12:31 PM
0.5	86.07639	86.1	1	0.5	86.07639	09/29/11	12:31 PM
40	46.34068	46.3	1	40	46.34068	09/29/11	12:33 PM
0.5	88.59525	88.6	1	0.5	88.59525	09/29/11	12:33 PM
40	7828.34021	7830	1	40	7828.34021	09/29/11	12:36 PM
0.5	86.76395	86.8	1	0.5	86.76395	09/29/11	12:36 PM
40	-2.4769	-2.48	1	40	-2.4769	09/29/11	12:38 PM
0.5	85.61362	85.6	1	0.5	85.61362	09/29/11	12:38 PM
40	86921.43496	86900	4	160	21730.35874	09/29/11	12:40 PM
0.5	76.4376	76.4	4	0.5	76.4376	09/29/11	12:40 PM
40	177066.5446	177000	4	160	44266.63614	09/29/11	12:43 PM
0.5	76.90697	76.9	4	0.5	76.90697	09/29/11	12:43 PM
40	1.44955	1.45	1	40	1.44955	09/29/11	12:45 PM
0.5	84.179	84.2	1	0.5	84.179	09/29/11	12:45 PM
40	78304.95856	78300	4	160	19576.23964	09/29/11	12:47 PM
0.5	83.30634	83.3	4	0.5	83.30634	09/29/11	12:47 PM
40	74606.41064	74600	4	160	18651.60266	09/29/11	12:50 PM
0.5	86.19541	86.2	4	0.5	86.19541	09/29/11	12:50 PM
40	40057.8875	40100	2	80	20028.94375	09/29/11	12:52 PM
0.5	83.41874	83.4	2	0.5	83.41874	09/29/11	12:52 PM
40	44855.51428	44900	2	80	22427.75714	09/29/11	12:54 PM
0.5	83.08817	83.1	2	0.5	83.08817	09/29/11	12:54 PM
40	69423.37652	69400	4	160	17355.84413	09/29/11	12:56 PM
0.5	82.87663	82.9	4	0.5	82.87663	09/29/11	12:56 PM
40	2.17368	2.17	1	40	2.17368	09/29/11	12:59 PM
0.5	84.84672	84.8	1	0.5	84.84672	09/29/11	12:59 PM
40	43.6226	43.6	1	40	43.6226	09/29/11	1:01 PM
0.5	89.99023	90	1	0.5	89.99023	09/29/11	1:01 PM
40	7975.90452	7980	1	40	7975.90452	09/29/11	1:03 PM
0.5	86.47306	86.5	1	0.5	86.47306	09/29/11	1:03 PM
40	-0.65229	-0.652	1	40	-0.65229	09/29/11	1:06 PM

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Sample ID	Element	Result	Qual (Q)	Qual (Q)	Units	RL	%RPD	%Recovery	CL	Uncert	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
ccb	U233 IS	84.4			%R	0.5					0.5	84.44344	84.4	1	0.5	84.44344	09/29/11	1:06 PM
473757d10D	U-tot	61100			ng/L	160	12.7%			4126	40	61108.03476	61100	4	160	15277.00869	09/29/11	1:08 PM
473757d10D	U233 IS	84.7			%R	0.5					0.5	84.68144	84.7	4	0.5	84.68144	09/29/11	1:08 PM
473758d10	U-tot	23300			ng/L	40				1572	40	23288.13346	23300	1	40	23288.13346	09/29/11	1:10 PM
473758d10	U233 IS	77.4			%R	0.5					0.5	77.3565	77.4	1	0.5	77.3565	09/29/11	1:10 PM
473758d10D	U-tot	20400			ng/L	40	13.3%			1379	40	20432.27826	20400	1	40	20432.27826	09/29/11	1:13 PM
473758d10D	U233 IS	75.5			%R	0.5					0.5	75.49226	75.5	1	0.5	75.49226	09/29/11	1:13 PM
473768d10	U-tot	85100			ng/L	160				5746	40	85114.42876	85100	4	160	21278.60719	09/29/11	1:15 PM
473768d10	U233 IS	83.9			%R	0.5					0.5	83.92117	83.9	4	0.5	83.92117	09/29/11	1:15 PM
473768d10D	U-tot	78700			ng/L	160	7.8%			5310	40	78652.61756	78700	4	160	19663.15439	09/29/11	1:17 PM
473768d10D	U233 IS	85.2			%R	0.5					0.5	85.17728	85.2	4	0.5	85.17728	09/29/11	1:17 PM
473769d10	U-tot	74000			ng/L	160				4997	40	74017.78296	74000	4	160	18504.44574	09/29/11	1:20 PM
473769d10	U233 IS	83.8			%R	0.5					0.5	83.81539	83.8	4	0.5	83.81539	09/29/11	1:20 PM
473769d10D	U-tot	73700			ng/L	160	0.4%			4976	40	73712.89968	73700	4	160	18428.22492	09/29/11	1:22 PM
473769d10D	U233 IS	83.9			%R	0.5					0.5	83.8815	83.9	4	0.5	83.8815	09/29/11	1:22 PM
473770d10	U-tot	82200			ng/L	160				5550	40	82215.3572	82200	4	160	20553.8393	09/29/11	1:25 PM
473770d10	U233 IS	85.4			%R	0.5					0.5	85.38883	85.4	4	0.5	85.38883	09/29/11	1:25 PM
zzz	U-tot	40.0	U		ng/L	40					40	-1.72093	-1.72	1	40	-1.72093	09/29/11	1:27 PM
zzz	U233 IS	84.9			%R	0.5					0.5	84.93267	84.9	1	0.5	84.93267	09/29/11	1:27 PM
critotU	U-tot	48.0			ng/L	40		120.0%	40.0		40	48.04778	48	1	40	48.04778	09/29/11	1:29 PM
critotU	U233 IS	88.2			%R	0.5					0.5	88.22502	88.2	1	0.5	88.22502	09/29/11	1:29 PM
ccv	U-tot	7790			ng/L	40		101.6%	7670		40	7794.35924	7790	1	40	7794.35924	09/29/11	1:32 PM
ccv	U233 IS	87.4			%R	0.5					0.5	87.37218	87.4	1	0.5	87.37218	09/29/11	1:32 PM
ccb	U-tot	40.0	U		ng/L	40					40	-3.99169	-3.99	1	40	-3.99169	09/29/11	1:34 PM
ccb	U233 IS	84.0			%R	0.5					0.5	83.96744	84	1	0.5	83.96744	09/29/11	1:34 PM
473770d10D	U-tot	83100			ng/L	160	1.1%			5613	40	83149.27556	83100	4	160	20787.31889	09/29/11	1:36 PM
473770d10D	U233 IS	85.6			%R	0.5					0.5	85.64005	85.6	4	0.5	85.64005	09/29/11	1:36 PM
473771d10	U-tot	87500			ng/L	160				5909	40	87535.34668	87500	4	160	21883.83667	09/29/11	1:39 PM
473771d10	U233 IS	84.8			%R	0.5					0.5	84.80044	84.8	4	0.5	84.80044	09/29/11	1:39 PM
473771d10D	U-tot	86200			ng/L	160	1.5%			5816	40	86155.46616	86200	4	160	21538.86654	09/29/11	1:41 PM
473771d10D	U233 IS	86.2			%R	0.5					0.5	86.16234	86.2	4	0.5	86.16234	09/29/11	1:41 PM
473772d10	U-tot	81400			ng/L	160				5496	40	81415.73092	81400	4	160	20353.93273	09/29/11	1:43 PM
473772d10	U233 IS	84.1			%R	0.5					0.5	84.06	84.1	4	0.5	84.06	09/29/11	1:43 PM
473772d10D	U-tot	83000			ng/L	160	1.9%			5603	40	82997.20296	83000	4	160	20749.30074	09/29/11	1:46 PM
473772d10D	U233 IS	83.9			%R	0.5					0.5	83.90794	83.9	4	0.5	83.90794	09/29/11	1:46 PM
473778d10	U-tot	69700			ng/L	160				4704	40	69677.28636	69700	4	160	17419.32159	09/29/11	1:48 PM
473778d10	U233 IS	84.4			%R	0.5					0.5	84.37734	84.4	4	0.5	84.37734	09/29/11	1:48 PM
473778d10D	U-tot	71500			ng/L	160	2.5%			4828	40	71509.86	71500	4	160	17877.465	09/29/11	1:50 PM
473778d10D	U233 IS	86.8			%R	0.5					0.5	86.76395	86.8	4	0.5	86.76395	09/29/11	1:50 PM
473045d10	U-tot	91300			ng/L	160				6164	40	91306.87252	91300	4	160	22826.71813	09/29/11	1:53 PM
473045d10	U233 IS	85.5			%R	0.5					0.5	85.50784	85.5	4	0.5	85.50784	09/29/11	1:53 PM
zzz	U-tot	40.0	U		ng/L	40					40	1.46174	1.46	1	40	1.46174	09/29/11	1:55 PM
zzz	U233 IS	84.2			%R	0.5					0.5	84.22528	84.2	1	0.5	84.22528	09/29/11	1:55 PM
critotU	U-tot	45.1			ng/L	40		112.8%	40.0		40	45.13738	45.1	1	40	45.13738	09/29/11	1:57 PM
critotU	U233 IS	87.5			%R	0.5					0.5	87.48457	87.5	1	0.5	87.48457	09/29/11	1:57 PM

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Sample ID	Element	Result	Qual (S)	Qual (D)	Units	RL	%RPD	%Recovery	D	Weight
ccv	U-tot	7870			ng/L	40		102.6%	7670	
ccv	U233 IS	86.2			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	85.3			%R	0.5				
473045d10D	U-tot	95800			ng/L	160	4.8%			6464
473045d10D	U233 IS	84.8			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	88.1			%R	0.5				
critotU	U-tot	43.6			ng/L	40		109.0%	40.0	
critotU	U233 IS	90.2			%R	0.5				
ccv	U-tot	7830			ng/L	40		102.1%	7670	
ccv	U233 IS	89.3			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	90.3			%R	0.5				
icv	U-tot	8180			ng/L	40		106.6%	7670	
icv	U233 IS	101			%R	0.5				
icb	U-tot	40.0	U		ng/L	40				
icb	U233 IS	97.6			%R	0.5				
critotU	U-tot	42.5			ng/L	40		106.3%	40.0	
critotU	U233 IS	101			%R	0.5				
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	
icsa	U233 IS	73.2			%R	0.5				
icsab	U-tot	20900			ng/L	40		102.5%	20400	
icsab	U233 IS	72.9			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	100			%R	0.5				
ccv	U-tot	8140			ng/L	40		106.1%	7670	
ccv	U233 IS	100			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	101			%R	0.5				
Blankd14	U-tot	102000			ng/L	160				6871
Blankd14	U233 IS	99.1			%R	0.5				
473754d14	U-tot	92000			ng/L	160				6213
473754d14	U233 IS	89.8			%R	0.5				
473754d14L	U-tot	89000			ng/L	800	3.3%			6021
473754d14L	U233 IS	97.1			%R	0.5				
473754d14D	U-tot	84700			ng/L	160	8.3%			5717
473754d14D	U233 IS	92.8			%R	0.5				
473754d14AS	U-tot	171000			ng/L	160		96.6%	81800	11512
473754d14AS	U233 IS	92.7			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	99.0			%R	0.5				
473755d14	U-tot	72800			ng/L	80				4913
473755d14	U233 IS	91.3			%R	0.5				
473755d14D	U-tot	76200			ng/L	80	4.6%			5141

rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
40	7869.18965	7870	1	40	7869.18965	09/29/11	2:00 PM
0.5	86.16235	86.2	1	0.5	86.16235	09/29/11	2:00 PM
40	0.88349	0.883	1	40	0.88349	09/29/11	2:02 PM
0.5	85.28966	85.3	1	0.5	85.28966	09/29/11	2:02 PM
40	95753.57372	95800	4	160	23938.39343	09/29/11	2:04 PM
0.5	84.84672	84.8	4	0.5	84.84672	09/29/11	2:04 PM
40	3.02443	3.02	1	40	3.02443	09/29/11	2:07 PM
0.5	88.06635	88.1	1	0.5	88.06635	09/29/11	2:07 PM
40	43.56895	43.6	1	40	43.56895	09/29/11	2:09 PM
0.5	90.18196	90.2	1	0.5	90.18196	09/29/11	2:09 PM
40	7830.777	7830	1	40	7830.777	09/29/11	2:11 PM
0.5	89.32911	89.3	1	0.5	89.32911	09/29/11	2:11 PM
40	7.19884	7.2	1	40	7.19884	09/29/11	2:14 PM
0.5	90.34063	90.3	1	0.5	90.34063	09/29/11	2:14 PM
40	8176.59727	8180	1	40	8176.59727	10/10/11	12:33 PM
0.5	101.10931	101	1	0.5	101.10931	10/10/11	12:33 PM
40	1.21754	1.22	1	40	1.21754	10/10/11	12:35 PM
0.5	97.57971	97.6	1	0.5	97.57971	10/10/11	12:35 PM
40	42.45106	42.5	1	40	42.45106	10/10/11	12:37 PM
0.5	101.16361	101	1	0.5	101.16361	10/10/11	12:37 PM
40	28.22551	28.2	1	40	28.22551	10/10/11	12:40 PM
0.5	73.21546	73.2	1	0.5	73.21546	10/10/11	12:40 PM
40	20949.50055	20900	1	40	20949.50055	10/10/11	12:42 PM
0.5	72.88194	72.9	1	0.5	72.88194	10/10/11	12:42 PM
40	0.22254	0.223	1	40	0.22254	10/10/11	12:44 PM
0.5	99.95346	100	1	0.5	99.95346	10/10/11	12:44 PM
40	8142.27868	8140	1	40	8142.27868	10/10/11	12:47 PM
0.5	100.12412	100	1	0.5	100.12412	10/10/11	12:47 PM
40	0.33773	0.338	1	40	0.33773	10/10/11	12:49 PM
0.5	100.9464	101	1	0.5	100.9464	10/10/11	12:49 PM
40	101788.7274	102000	4	160	25447.18184	10/10/11	12:51 PM
0.5	99.09238	99.1	4	0.5	99.09238	10/10/11	12:51 PM
40	92031.95048	92000	4	160	23007.98762	10/10/11	12:53 PM
0.5	89.82256	89.8	4	0.5	89.82256	10/10/11	12:53 PM
40	89006.5414	89000	20	800	4450.32707	10/10/11	12:56 PM
0.5	97.12978	97.1	20	0.5	97.12978	10/10/11	12:56 PM
40	84694.56976	84700	4	160	21173.64244	10/10/11	12:58 PM
0.5	92.8323	92.8	4	0.5	92.8323	10/10/11	12:58 PM
40	170543.8178	171000	4	160	42635.95445	10/10/11	1:00 PM
0.5	92.74697	92.7	4	0.5	92.74697	10/10/11	1:00 PM
40	4.32817	4.33	1	40	4.32817	10/10/11	1:03 PM
0.5	98.96051	99	1	0.5	98.96051	10/10/11	1:03 PM
40	72783.69176	72800	2	80	36391.84588	10/10/11	1:05 PM
0.5	91.32742	91.3	2	0.5	91.32742	10/10/11	1:05 PM
40	76166.74838	76200	2	80	38083.37419	10/10/11	1:07 PM

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Sample ID	Element	Result	Flag	Flag	Flag	Units	RL	Error	Recovery	RPD
473755d14D	U233 IS	91.4				%R	0.5			
zzz	U-tot	40.0	U			ng/L	40			
zzz	U233 IS	94.0				%R	0.5			
critotU	U-tot	43.4				ng/L	40		108.5%	40.0
critotU	U233 IS	96.4				%R	0.5			
ccv	U-tot	8220				ng/L	40		107.2%	7670
ccv	U233 IS	93.9				%R	0.5			
ccb	U-tot	40.0	U			ng/L	40			
ccb	U233 IS	95.2				%R	0.5			
473756d14	U-tot	42600				ng/L	80			
473756d14	U233 IS	88.9				%R	0.5			
473756d14D	U-tot	43100				ng/L	80	1.2%		
473756d14D	U233 IS	88.9				%R	0.5			
473757d14	U-tot	41800				ng/L	160			
473757d14	U233 IS	90.7				%R	0.5			
473757d14D	U-tot	72600			*	ng/L	160	53.8%		
473757d14D	U233 IS	91.5				%R	0.5			
473758d14	U-tot	19800				ng/L	40			
473758d14	U233 IS	82.1				%R	0.5			
473758d14D	U-tot	20900				ng/L	40	5.4%		
473758d14D	U233 IS	82.5				%R	0.5			
473768d14	U-tot	85300				ng/L	160			
473768d14	U233 IS	89.5				%R	0.5			
473768d14D	U-tot	83100				ng/L	160	2.6%		
473768d14D	U233 IS	90.2				%R	0.5			
zzz	U-tot	40.0	U			ng/L	40			
zzz	U233 IS	88.9				%R	0.5			
critotU	U-tot	44.3				ng/L	40		110.8%	40.0
critotU	U233 IS	90.0				%R	0.5			
ccv	U-tot	8100				ng/L	40		105.6%	7670
ccv	U233 IS	91.1				%R	0.5			
ccb	U-tot	40.0	U			ng/L	40			
ccb	U233 IS	89.4				%R	0.5			
473769d14	U-tot	74300				ng/L	160			
473769d14	U233 IS	86.9				%R	0.5			
473769d14D	U-tot	71300				ng/L	160	4.1%		
473769d14D	U233 IS	88.7				%R	0.5			
473770d14	U-tot	83100				ng/L	160			
473770d14	U233 IS	88.3				%R	0.5			
473770d14D	U-tot	82900				ng/L	160	0.2%		
473770d14D	U233 IS	87.2				%R	0.5			
473771d14	U-tot	89700				ng/L	160			
473771d14	U233 IS	86.3				%R	0.5			
473771d14D	U-tot	90700				ng/L	160	1.1%		
473771d14D	U233 IS	86.0				%R	0.5			

	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
	0.5	91.37397	91.4	2	0.5	91.37397	10/10/11	1:07 PM
	40	4.85902	4.86	1	40	4.85902	10/10/11	1:10 PM
	0.5	93.95709	94	1	0.5	93.95709	10/10/11	1:10 PM
	40	43.41591	43.4	1	40	43.41591	10/10/11	1:12 PM
	0.5	96.4006	96.4	1	0.5	96.4006	10/10/11	1:12 PM
	40	8223.29223	8220	1	40	8223.29223	10/10/11	1:14 PM
	0.5	93.88727	93.9	1	0.5	93.88727	10/10/11	1:14 PM
	40	1.1173	1.12	1	40	1.1173	10/10/11	1:16 PM
	0.5	95.21375	95.2	1	0.5	95.21375	10/10/11	1:16 PM
2876	40	42607.43552	42600	2	80	21303.71776	10/10/11	1:19 PM
	0.5	88.94602	88.9	2	0.5	88.94602	10/10/11	1:19 PM
2913	40	43144.63094	43100	2	80	21572.31547	10/10/11	1:21 PM
	0.5	88.915	88.9	2	0.5	88.915	10/10/11	1:21 PM
2825	40	41831.952	41800	4	160	10457.988	10/10/11	1:23 PM
	0.5	90.73791	90.7	4	0.5	90.73791	10/10/11	1:23 PM
4904	40	72638.46348	72600	4	160	18159.81587	10/10/11	1:26 PM
	0.5	91.53687	91.5	4	0.5	91.53687	10/10/11	1:26 PM
1338	40	19821.14016	19800	1	40	19821.14016	10/10/11	1:28 PM
	0.5	82.05794	82.1	1	0.5	82.05794	10/10/11	1:28 PM
1410	40	20881.31564	20900	1	40	20881.31564	10/10/11	1:30 PM
	0.5	82.53886	82.5	1	0.5	82.53886	10/10/11	1:30 PM
5756	40	85270.29416	85300	4	160	21317.57354	10/10/11	1:33 PM
	0.5	89.52781	89.5	4	0.5	89.52781	10/10/11	1:33 PM
5613	40	83145.15628	83100	4	160	20786.28907	10/10/11	1:35 PM
	0.5	90.21041	90.2	4	0.5	90.21041	10/10/11	1:35 PM
	40	4.36274	4.36	1	40	4.36274	10/10/11	1:37 PM
	0.5	88.93826	88.9	1	0.5	88.93826	10/10/11	1:37 PM
	40	44.29347	44.3	1	40	44.29347	10/10/11	1:40 PM
	0.5	90.00873	90	1	0.5	90.00873	10/10/11	1:40 PM
	40	8098.54557	8100	1	40	8098.54557	10/10/11	1:42 PM
	0.5	91.06368	91.1	1	0.5	91.06368	10/10/11	1:42 PM
	40	1.41302	1.41	1	40	1.41302	10/10/11	1:44 PM
	0.5	89.37266	89.4	1	0.5	89.37266	10/10/11	1:44 PM
5014	40	74274.31512	74300	4	160	18568.57878	10/10/11	1:47 PM
	0.5	86.90594	86.9	4	0.5	86.90594	10/10/11	1:47 PM
4815	40	71320.99476	71300	4	160	17830.24869	10/10/11	1:49 PM
	0.5	88.6978	88.7	4	0.5	88.6978	10/10/11	1:49 PM
5611	40	83118.81564	83100	4	160	20779.70396	10/10/11	1:51 PM
	0.5	88.30219	88.3	4	0.5	88.30219	10/10/11	1:51 PM
5595	40	82886.63924	82900	4	160	20721.65981	10/10/11	1:53 PM
	0.5	87.19295	87.2	4	0.5	87.19295	10/10/11	1:53 PM
6053	40	89670.54808	89700	4	160	22417.63702	10/10/11	1:56 PM
	0.5	86.25437	86.3	4	0.5	86.25437	10/10/11	1:56 PM
6126	40	90744.21572	90700	4	160	22686.05393	10/10/11	1:58 PM
	0.5	86.03718	86	4	0.5	88.03718	10/10/11	1:58 PM

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Sample ID	Element	Result	Qual (Q)	Qual (Q)	Units	RL	%RPD	%Recovery	CV	Uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
473772d14	U-tot	79900			ng/L	160				5393	40	79892.66892	79900	4	160	19973.16723	10/10/11	2:00 PM
473772d14	U233 IS	86.6			%R	0.5					0.5	86.6267	86.6	4	0.5	86.6267	10/10/11	2:00 PM
473772d14D	U-tot	79600			ng/L	160	0.4%			5375	40	79619.94104	79600	4	160	19904.98526	10/10/11	2:03 PM
473772d14D	U233 IS	85.5			%R	0.5					0.5	85.46317	85.5	4	0.5	85.46317	10/10/11	2:03 PM
zzz	U-tot	40.0	U		ng/L	40					40	4.33788	4.34	1	40	4.33788	10/10/11	2:05 PM
zzz	U233 IS	86.3			%R	0.5					0.5	86.26214	86.3	1	0.5	86.26214	10/10/11	2:05 PM
critotU	U-tot	43.4			ng/L	40		108.5%	40.0		40	43.37483	43.4	1	40	43.37483	10/10/11	2:07 PM
critotU	U233 IS	87.5			%R	0.5					0.5	87.49547	87.5	1	0.5	87.49547	10/10/11	2:07 PM
ccv	U-tot	8050			ng/L	40		105.0%	7670		40	8051.5856	8050	1	40	8051.5856	10/10/11	2:10 PM
ccv	U233 IS	86.6			%R	0.5					0.5	86.5724	86.6	1	0.5	86.5724	10/10/11	2:10 PM
ccb	U-tot	40.0	U		ng/L	40					40	1.77497	1.77	1	40	1.77497	10/10/11	2:12 PM
ccb	U233 IS	85.0			%R	0.5					0.5	85.02103	85	1	0.5	85.02103	10/10/11	2:12 PM
473778d14	U-tot	75400			ng/L	160				5088	40	75369.0248	75400	4	160	18842.2562	10/10/11	2:14 PM
473778d14	U233 IS	83.4			%R	0.5					0.5	83.41537	83.4	4	0.5	83.41537	10/10/11	2:14 PM
473778d14D	U-tot	75800			ng/L	160	0.5%			5118	40	75816.4212	75800	4	160	18954.1053	10/10/11	2:16 PM
473778d14D	U233 IS	85.6			%R	0.5					0.5	85.57176	85.6	4	0.5	85.57176	10/10/11	2:16 PM
473045d14	U-tot	91300			ng/L	160				6162	40	91278.87392	91300	4	160	22819.71848	10/10/11	2:19 PM
473045d14	U233 IS	84.6			%R	0.5					0.5	84.55562	84.6	4	0.5	84.55562	10/10/11	2:19 PM
473045d14D	U-tot	93300			ng/L	160	2.2%			6300	40	93332.49264	93300	4	160	23333.12316	10/10/11	2:21 PM
473045d14D	U233 IS	82.4			%R	0.5					0.5	82.44578	82.4	4	0.5	82.44578	10/10/11	2:21 PM
zzz	U-tot	40.0	U		ng/L	40					40	4.19157	4.19	1	40	4.19157	10/10/11	2:23 PM
zzz	U233 IS	86.0			%R	0.5					0.5	86.03719	86	1	0.5	86.03719	10/10/11	2:23 PM
critotU	U-tot	40.3			ng/L	40		100.8%	40.0		40	40.26258	40.3	1	40	40.26258	10/10/11	2:26 PM
critotU	U233 IS	87.5			%R	0.5					0.5	87.54201	87.5	1	0.5	87.54201	10/10/11	2:26 PM
ccv	U-tot	8240			ng/L	40		107.4%	7670		40	8240.88864	8240	1	40	8240.88864	10/10/11	2:28 PM
ccv	U233 IS	84.2			%R	0.5					0.5	84.21432	84.2	1	0.5	84.21432	10/10/11	2:28 PM
ccb	U-tot	40.0	U		ng/L	40					40	1.56916	1.57	1	40	1.56916	10/10/11	2:30 PM
ccb	U233 IS	84.7			%R	0.5					0.5	84.73402	84.7	1	0.5	84.73402	10/10/11	2:30 PM
icv	U-tot	8260			ng/L	40		107.7%	7670		40	8259.18565	8260	1	40	8259.18565	10/10/11	6:00 PM
icv	U233 IS	105			%R	0.5					0.5	104.76913	105	1	0.5	104.76913	10/10/11	6:00 PM
icb	U-tot	40.0	U		ng/L	40					40	-2.20271	-2.2	1	40	-2.20271	10/10/11	6:02 PM
icb	U233 IS	103			%R	0.5					0.5	103.23399	103	1	0.5	103.23399	10/10/11	6:02 PM
critotU	U-tot	40.8			ng/L	40		102.0%	40.0		40	40.82792	40.8	1	40	40.82792	10/10/11	6:05 PM
critotU	U233 IS	104			%R	0.5					0.5	103.69454	104	1	0.5	103.69454	10/10/11	6:05 PM
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0		40	24.8757	24.9	1	40	24.8757	10/10/11	6:07 PM
icsa	U233 IS	82.8			%R	0.5					0.5	82.83793	82.8	1	0.5	82.83793	10/10/11	6:07 PM
icsab	U-tot	20900			ng/L	40		102.5%	20400		40	20947.29902	20900	1	40	20947.29902	10/10/11	6:09 PM
icsab	U233 IS	83.9			%R	0.5					0.5	83.94314	83.9	1	0.5	83.94314	10/10/11	6:09 PM
zzz	U-tot	40.0	U		ng/L	40					40	-4.02521	-4.03	1	40	-4.02521	10/10/11	6:12 PM
zzz	U233 IS	116			%R	0.5					0.5	116.38528	116	1	0.5	116.38528	10/10/11	6:12 PM
ccv	U-tot	8310			ng/L	40		108.3%	7670		40	8312.23935	8310	1	40	8312.23935	10/10/11	6:14 PM
ccv	U233 IS	113			%R	0.5					0.5	113.37629	113	1	0.5	113.37629	10/10/11	6:14 PM
ccb	U-tot	40.0	U		ng/L	40					40	4.47172	4.47	1	40	4.47172	10/10/11	6:16 PM
ccb	U233 IS	115			%R	0.5					0.5	114.66585	115	1	0.5	114.66585	10/10/11	6:16 PM
Blankd21	U-tot	93000			ng/L	160				6279	40	93011.85836	93000	4	160	23252.96459	10/10/11	6:19 PM

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Sample ID	Elegnent	Result	Qual (Q)	Qual (Q)	Units	RL	%RPD	%Recovery	RT
Blankd21	U233 IS	118			%R	0.5			
473754d21	U-tot	79500			ng/L	160			
473754d21	U233 IS	104			%R	0.5			
473754d21L	U-tot	78700			ng/L	800	1.0%		
473754d21L	U233 IS	110			%R	0.5			
473754d21D	U-tot	81500			ng/L	160	2.5%		
473754d21D	U233 IS	102			%R	0.5			
473754d21AS	U-tot	161000			ng/L	160		99.6%	81800
473754d21AS	U233 IS	103			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U233 IS	105			%R	0.5			
473755d21	U-tot	70700			ng/L	80			
473755d21	U233 IS	100			%R	0.5			
473755d21D	U-tot	78800			ng/L	80	10.8%		
473755d21D	U233 IS	97.0			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U233 IS	101			%R	0.5			
critotU	U-tot	42.4			ng/L	40		106.0%	40.0
critotU	U233 IS	103			%R	0.5			
ccv	U-tot	8240			ng/L	40		107.4%	7670
ccv	U233 IS	102			%R	0.5			
ccb	U-tot	40.0	U		ng/L	40			
ccb	U233 IS	98.8			%R	0.5			
473756d21	U-tot	42300			ng/L	80			
473756d21	U233 IS	96.4			%R	0.5			
473756d21D	U-tot	40000			ng/L	80	5.6%		
473756d21D	U233 IS	97.9			%R	0.5			
473757d21	U-tot	59800			ng/L	160			
473757d21	U233 IS	101			%R	0.5			
473757d21D	U-tot	72000			ng/L	160	18.5%		
473757d21D	U233 IS	98.3			%R	0.5			
473758d21	U-tot	20100			ng/L	40			
473758d21	U233 IS	92.1			%R	0.5			
473758d21D	U-tot	21700			ng/L	40	7.7%		
473758d21D	U233 IS	89.6			%R	0.5			
473768d21	U-tot	82300			ng/L	160			
473768d21	U233 IS	97.8			%R	0.5			
473768d21D	U-tot	85700			ng/L	160	4.0%		
473768d21D	U233 IS	95.4			%R	0.5			
zzz	U-tot	40.0	U		ng/L	40			
zzz	U233 IS	95.8			%R	0.5			
critotU	U-tot	46.1			ng/L	40		115.3%	40.0
critotU	U233 IS	98.9			%R	0.5			
ccv	U-tot	8140			ng/L	40		106.1%	7670
ccv	U233 IS	96.7			%R	0.5			

Area-1	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
	0.5	118.07401	118	4	0.5	118.07401	10/10/11	6:19 PM
5366	40	79490.46604	79500	4	160	19872.61651	10/10/11	6:21 PM
	0.5	103.80711	104	4	0.5	103.80711	10/10/11	6:21 PM
5325	40	78664.8798	78700	20	800	3933.24399	10/10/11	6:23 PM
	0.5	109.59975	110	20	0.5	109.59975	10/10/11	6:23 PM
5499	40	81454.04176	81500	4	160	20363.51044	10/10/11	6:26 PM
	0.5	102.05706	102	4	0.5	102.05706	10/10/11	6:26 PM
10890	40	161326.5182	161000	4	160	40331.62955	10/10/11	6:28 PM
	0.5	102.66088	103	4	0.5	102.66088	10/10/11	6:28 PM
	40	0.86025	0.86	1	40	0.86025	10/10/11	6:30 PM
	0.5	105.09662	105	1	0.5	105.09662	10/10/11	6:30 PM
4772	40	70691.5741	70700	2	80	35345.78705	10/10/11	6:33 PM
	0.5	100.0921	100	2	0.5	100.0921	10/10/11	6:33 PM
5317	40	78761.93262	78800	2	80	39380.96631	10/10/11	6:35 PM
	0.5	96.96048	97	2	0.5	96.96048	10/10/11	6:35 PM
	40	8.00987	8.01	1	40	8.00987	10/10/11	6:37 PM
	0.5	100.66521	101	1	0.5	100.66521	10/10/11	6:37 PM
	40	42.36556	42.4	1	40	42.36556	10/10/11	6:39 PM
	0.5	103.10095	103	1	0.5	103.10095	10/10/11	6:39 PM
	40	8238.70787	8240	1	40	8238.70787	10/10/11	6:42 PM
	0.5	101.62722	102	1	0.5	101.62722	10/10/11	6:42 PM
	40	5.41546	5.42	1	40	5.41546	10/10/11	6:44 PM
	0.5	98.76167	98.8	1	0.5	98.76167	10/10/11	6:44 PM
2857	40	42328.21608	42300	2	80	21164.10804	10/10/11	6:46 PM
	0.5	96.36691	96.4	2	0.5	96.36691	10/10/11	6:46 PM
2700	40	40002.60564	40000	2	80	20001.30282	10/10/11	6:49 PM
	0.5	97.89178	97.9	2	0.5	97.89178	10/10/11	6:49 PM
4040	40	59837.504	59800	4	160	14959.376	10/10/11	6:51 PM
	0.5	100.67545	101	4	0.5	100.67545	10/10/11	6:51 PM
4858	40	71964.2908	72000	4	160	17991.0727	10/10/11	6:53 PM
	0.5	98.2909	98.3	4	0.5	98.2909	10/10/11	6:53 PM
1354	40	20052.47382	20100	1	40	20052.47382	10/10/11	6:56 PM
	0.5	92.08914	92.1	1	0.5	92.08914	10/10/11	6:56 PM
1467	40	21730.50348	21700	1	40	21730.50348	10/10/11	6:58 PM
	0.5	89.64327	89.6	1	0.5	89.64327	10/10/11	6:58 PM
5555	40	82291.14764	82300	4	160	20572.78691	10/10/11	7:00 PM
	0.5	97.83037	97.8	4	0.5	97.83037	10/10/11	7:00 PM
5783	40	85662.9336	85700	4	160	21415.7334	10/10/11	7:03 PM
	0.5	95.36398	95.4	4	0.5	95.36398	10/10/11	7:03 PM
	40	8.77045	8.77	1	40	8.77045	10/10/11	7:05 PM
	0.5	95.82451	95.8	1	0.5	95.82451	10/10/11	7:05 PM
	40	46.06531	46.1	1	40	46.06531	10/10/11	7:07 PM
	0.5	98.86401	98.9	1	0.5	98.86401	10/10/11	7:07 PM
	40	8142.63454	8140	1	40	8142.63454	10/10/11	7:10 PM
	0.5	96.68417	96.7	1	0.5	96.68417	10/10/11	7:10 PM

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Sample ID	Element	Result	Qual (Q)	Qual (Q)	Units	RL	%RSD	%Recovery	EV	Lineal
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	95.5			%R	0.5				
473769d21	U-tot	72200			ng/L	160				4876
473769d21	U233 IS	93.6			%R	0.5				
473769d21D	U-tot	71300			ng/L	160	1.3%			4813
473769d21D	U233 IS	95.2			%R	0.5				
473770d21	U-tot	81800			ng/L	160				5525
473770d21	U233 IS	93.7			%R	0.5				
473770d21D	U-tot	87900			ng/L	160	7.2%			5936
473770d21D	U233 IS	92.5			%R	0.5				
473771d21	U-tot	89600			ng/L	160				6047
473771d21	U233 IS	94.2			%R	0.5				
473771d21D	U-tot	91100			ng/L	160	1.7%			6148
473771d21D	U233 IS	96.3			%R	0.5				
473772d21	U-tot	85900			ng/L	160				5802
473772d21	U233 IS	95.6			%R	0.5				
473772d21D	U-tot	84100			ng/L	160	2.1%			5675
473772d21D	U233 IS	97.1			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	95.9			%R	0.5				
critotU	U-tot	43.9			ng/L	40		109.8%	40.0	
critotU	U233 IS	94.0			%R	0.5				
ccv	U-tot	8290			ng/L	40		108.1%	7670	
ccv	U233 IS	96.7			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	95.8			%R	0.5				
icv	U-tot	8330			ng/L	40		108.6%	7670	
icv	U233 IS	101			%R	0.5				
icb	U-tot	40.0	U		ng/L	40				
icb	U233 IS	99.6			%R	0.5				
critotU	U-tot	51.1			ng/L	40		127.8%	40.0	
critotU	U233 IS	97.9			%R	0.5				
icsa	U-tot	40.0	U	#DIV/0!	ng/L	40		#DIV/0!	0	
icsa	U233 IS	91.9			%R	0.5				
icsab	U-tot	21300			ng/L	40		104.4%	20400	
icsab	U233 IS	95.3			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	104			%R	0.5				
ccv	U-tot	8330			ng/L	40		108.6%	7670	
ccv	U233 IS	102			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	102			%R	0.5				
473778d21	U-tot	76000			ng/L	160				5129
473778d21	U233 IS	102			%R	0.5				
473778d21D	U-tot	65300			ng/L	160	15.1%			4406

ri	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
40	4.15132	4.15	1	40	4.15132	10/10/11	7:12 PM
0.5	95.51749	95.5	1	0.5	95.51749	10/10/11	7:12 PM
40	72231.67732	72200	4	160	18057.91933	10/10/11	7:14 PM
0.5	93.61399	93.6	4	0.5	93.61399	10/10/11	7:14 PM
40	71287.0814	71300	4	160	17821.77035	10/10/11	7:16 PM
0.5	95.20024	95.2	4	0.5	95.20024	10/10/11	7:16 PM
40	81840.30792	81800	4	160	20460.07698	10/10/11	7:19 PM
0.5	93.67539	93.7	4	0.5	93.67539	10/10/11	7:19 PM
40	87934.94672	87900	4	160	21983.73668	10/10/11	7:21 PM
0.5	92.51896	92.5	4	0.5	92.51896	10/10/11	7:21 PM
40	69577.33188	89600	4	160	22394.33297	10/10/11	7:23 PM
0.5	94.24849	94.2	4	0.5	94.24849	10/10/11	7:23 PM
40	91071.4646	91100	4	160	22767.86615	10/10/11	7:26 PM
0.5	96.29528	96.3	4	0.5	96.29528	10/10/11	7:26 PM
40	85943.28056	85900	4	160	21485.82014	10/10/11	7:28 PM
0.5	95.6403	95.6	4	0.5	95.6403	10/10/11	7:28 PM
40	84065.973	84100	4	160	21016.49325	10/10/11	7:30 PM
0.5	97.12423	97.1	4	0.5	97.12423	10/10/11	7:30 PM
40	1.078	1.08	1	40	1.078	10/10/11	7:32 PM
0.5	95.88591	95.9	1	0.5	95.88591	10/10/11	7:32 PM
40	43.85249	43.9	1	40	43.85249	10/10/11	7:35 PM
0.5	94.01312	94	1	0.5	94.01312	10/10/11	7:35 PM
40	8289.64718	8290	1	40	8289.64718	10/10/11	7:37 PM
0.5	96.67393	96.7	1	0.5	96.67393	10/10/11	7:37 PM
40	-0.44859	-0.449	1	40	-0.44859	10/10/11	7:39 PM
0.5	95.83476	95.6	1	0.5	95.83476	10/10/11	7:39 PM
40	8332.87552	8330	1	40	8332.87552	10/11/11	7:24 PM
0.5	100.51874	101	1	0.5	100.51874	10/11/11	7:24 PM
40	5.16813	5.17	1	40	5.16813	10/11/11	7:26 PM
0.5	99.60281	99.6	1	0.5	99.60281	10/11/11	7:26 PM
40	51.06753	51.1	1	40	51.06753	10/11/11	7:29 PM
0.5	97.90876	97.9	1	0.5	97.90876	10/11/11	7:29 PM
40	30.04866	30	1	40	30.04866	10/11/11	7:31 PM
0.5	91.87026	91.9	1	0.5	91.87026	10/11/11	7:31 PM
40	21316.23121	21300	1	40	21316.23121	10/11/11	7:33 PM
0.5	95.29881	95.3	1	0.5	95.29881	10/11/11	7:33 PM
40	1.18359	1.16	1	40	1.18359	10/11/11	7:35 PM
0.5	104.00417	104	1	0.5	104.00417	10/11/11	7:35 PM
40	8327.70477	8330	1	40	8327.70477	10/11/11	7:38 PM
0.5	102.37492	102	1	0.5	102.37492	10/11/11	7:38 PM
40	6.13556	6.14	1	40	6.13556	10/11/11	7:40 PM
0.5	102.0588	102	1	0.5	102.0588	10/11/11	7:40 PM
40	75971.804	76000	4	160	18992.951	10/11/11	7:42 PM
0.5	101.98585	102	4	0.5	101.98585	10/11/11	7:42 PM
40	65259.27644	65300	4	160	16314.81911	10/11/11	7:45 PM

0101156

Fluor
to#110825-10, 110915-9
16526.05.006
pg 15 00132 - 15 00140

Sample ID	Element	Result	Qual (C)	Qual (G)	Units	RL	%RSD	%Recovery	RV	Instrument
473778d21D	U233 IS	99.1			%R	0.5				
473045d21	U-tot	94700			ng/L	160				6395
473045d21	U233 IS	97.9			%R	0.5				
473045d21D	U-tot	94400			ng/L	160	0.3%			6373
473045d21D	U233 IS	97.3			%R	0.5				
zzz	U-tot	40.0	U		ng/L	40				
zzz	U233 IS	99.2			%R	0.5				
critotU	U-tot	43.8			ng/L	40		109.5%	40.0	
critotU	U233 IS	99.3			%R	0.5				
ccv	U-tot	8280			ng/L	40		108.0%	7670	
ccv	U233 IS	100			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	99.6			%R	0.5				

rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
0.5	99.07595	99.1	4	0.5	99.07595	10/11/11	7:45 PM
40	94736.93892	94700	4	160	23684.23473	10/11/11	7:47 PM
0.5	97.89255	97.9	4	0.5	97.89255	10/11/11	7:47 PM
40	94414.65836	94400	4	160	23603.66459	10/11/11	7:49 PM
0.5	97.27654	97.3	4	0.5	97.27654	10/11/11	7:49 PM
40	7.48083	7.48	1	40	7.48083	10/11/11	7:52 PM
0.5	99.20564	99.2	1	0.5	99.20564	10/11/11	7:52 PM
40	43.82602	43.8	1	40	43.82602	10/11/11	7:54 PM
0.5	99.2867	99.3	1	0.5	99.2867	10/11/11	7:54 PM
40	8276.09652	8280	1	40	8276.09652	10/11/11	7:56 PM
0.5	100.29178	100	1	0.5	100.29178	10/11/11	7:56 PM
40	9.60991	9.61	1	40	9.60991	10/11/11	7:59 PM
0.5	99.62713	99.6	1	0.5	99.62713	10/11/11	7:59 PM

0101157

010158

SOUTHWEST RESEARCH INSTITUTE

☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Total Uranium

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/11
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's		TVs
S0	11-096-14	
STD. 1	11-091-04	44933 ng
I. STD	02-415-08	0.2 ppb
I. STD		

QC STD. ID's		
ICV/CCV	11-096-13	7666 ng/
UCL		
CRI	11-096-12	40 ng/L
ICSA	11-096-10	–
ICSAB	11-096-11	20,444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Fluor	110825-10 110915-9	9/29/11	S0	150132 – 150140

INSTRUMENT: DRCII FILENAME: 110929.wp

Analyst: N. Seiler Date: 9/29/11 ☐ CONVERTED (.DAT)

010159

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Thursday, September 29, 2011 09:11:15
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\Daily Performance Check.008
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

9-29-11
9/29/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	7898.9	7898.897	87.784	1.1
	In	114.9	26559.1	26559.074	188.800	0.7
	U	238.1	26931.8	26931.835	178.179	0.7
⌈>	Ce	139.9	30443.0	30443.022	136.312	0.4
⌊	CeO	155.9	1408.8	0.046	0.000	0.7
⌈>	Ba	137.9	252105.3	252105.258	917.596	0.4
⌊	Ba++	69.0	5540.4	0.022	0.000	0.9
	Bkgd	220.0	1.3	1.300	0.321	24.7
	Bkgd	8.5	55.8	55.767	2.775	5.0

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

10/13/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	6.0	445.0
Co	59	45	6.8	13830.5
In	115	45	7.3	24900.1

010160

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Thursday, September 29, 2011 09:11:15
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\Daily Performance Check.008
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

9-29-11
MSeiler 9/29/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2774	2031	0.698	
Mg	23.985	23.925	5671	2039	0.704	
Ar2	75.930	75.925	18313	2071	0.688	
In	114.904	114.975	27817	2097	0.691	
Ce	139.905	139.925	33899	2108	0.694	
Pb	207.977	208.025	50485	2150	0.715	
Th	232.038	232.075	56335	2167	0.702	
U	238.050	238.025	57800	2173	0.701	

0110161

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Thursday, September 29, 2011 10:09:32
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\S-0.009
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	13.287	0.000	
	U	235	9	6.662	0.000	
	U	238	167	7.853	0.000	
	U 232	232	22	16.389	0.000	
	U 236	236	5	32.733	0.000	
⌜	U-tot	238	191	7.115	0.000	
⌞>	U233	233	5044	1.652	0.000	
	U233 IS	233	5044	1.652	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.667				ng/L
	U	235	8.667				ng/L
	U	238	167.002				ng/L
	U 232	232	22.000				ng/L
	U 236	236	4.667				ng/L
⌜	U-tot	238	0.038				ng/L
⌞>	U233	233	5044.399				ng/L
	U233 IS	233	5044.399	**100.000**	1.65	1.7	%R

010162

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Thursday, September 29, 2011 10:11:52
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\S-1.010
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	25.877	0.000	
	U	235	7950	1.639	0.000	
	U	238	1103160	0.336	0.000	
	U 232	232	32	48.814	0.000	
	U 236	236	232	11.102	0.000	
⌜	U-tot	238	1111187	0.338	0.000	
⌞>	U233	233	4945	0.952	0.000	
	U233 IS	233	4945	0.952	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.000				ng/L
	U	235	7949.808				ng/L
	U	238	1103159.883				ng/L
	U 232	232	32.000				ng/L
	U 236	236	232.336				ng/L
⌜	U-tot	238	224.733	**44933.000**	277.88	0.6	ng/L
⌞>	U233	233	4944.678				ng/L
	U233 IS	233	4944.678	**98.023**	0.93	1.0	%R

010163

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Thursday, September 29, 2011 10:14:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\icv.011
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	36	64.096	0.000	
	U	235	1389	0.300	0.000	
	U	238	187917	0.321	0.000	
	U 232	232	38	75.906	0.000	
	U 236	236	141	17.984	0.000	
⌜	U-tot	238	189342	0.324	0.000	
⌞>	U233	233	4877	2.222	0.000	
	U233 IS	233	4877	2.222	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.333				ng/L
	U	235	1388.773				ng/L
	U	238	187916.675				ng/L
	U 232	232	38.000				ng/L
	U 236	236	141.001				ng/L
⌜	U-tot	238	38.840	**7759.398**	186.89	2.4	ng/L
⌞>	U233	233	4876.641				ng/L
	U233 IS	233	4876.641	**96.674**	2.15	2.2	%R

010164

Quantitative Analysis - Summary Report

Sample ID: Icb

Sample Date/Time: Thursday, September 29, 2011 10:16:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\icb.012
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	31	45.506	0.000	
	U	235	29	83.745	0.000	
	U	238	219	9.392	0.000	
	U 232	232	37	30.462	0.000	
	U 236	236	21	86.982	0.000	
⌜	U-tot	238	279	19.158	0.000	
⌞>	U233	233	4934	2.277	0.000	
	U233 IS	233	4934	2.277	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	31.000				ng/L
	U	235	28.667				ng/L
	U	238	219.336				ng/L
	U 232	232	37.333				ng/L
	U 236	236	21.333				ng/L
⌜	U-tot	238	0.056	**3.699**	1.93	52.3	ng/L
⌞>	U233	233	4934.006				ng/L
	U233 IS	233	4934.006	**97.812**	2.23	2.3	%R

010165

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 10:18:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.013
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	61.262	0.000	
	U	235	24	90.811	0.000	
	U	238	1177	2.578	0.000	
	U 232	232	24	72.289	0.000	
	U 236	236	19	84.254	0.000	
⌜	U-tot	238	1225	5.293	0.000	
⌞>	U233	233	4853	2.867	0.000	
	U233 IS	233	4853	2.867	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.333				ng/L
	U	235	24.000				ng/L
	U	238	1177.410				ng/L
	U 232	232	24.000				ng/L
	U 236	236	19.333				ng/L
⌜	U-tot	238	0.252	**42.863**	1.38	3.2	ng/L
⌞>	U233	233	4853.296				ng/L
	U233 IS	233	4853.296	**96.212**	2.76	2.9	%R

010166

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Thursday, September 29, 2011 10:21:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\icsa.014
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	48.949	0.000	
	U	235	45	12.925	0.000	
	U	238	720	1.198	0.000	
	U 232	232	284	8.865	0.000	
	U 236	236	5	80.000	0.000	
⌈	U-tot	238	780	2.750	0.000	
⌊>	U233	233	3530	0.794	0.000	
	U233 IS	233	3530	0.794	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	45.333				ng/L
	U	238	719.695				ng/L
	U 232	232	283.671				ng/L
	U 236	236	5.000				ng/L
⌈	U-tot	238	0.221	**36.635**	1.57	4.3	ng/L
⌊>	U233	233	3530.019				ng/L
	U233 IS	233	3530.019	**69.979**	0.56	0.8	%R

010167

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Thursday, September 29, 2011 10:23:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\icsab.015
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	4.824	0.000	
	U	235	2759	2.417	0.000	
	U	238	383553	0.355	0.000	
	U 232	232	270	4.783	0.000	
	U 236	236	5	10.825	0.000	
⌜	U-tot	238	386344	0.347	0.000	
⌞>	U233	233	3637	1.623	0.000	
	U233 IS	233	3637	1.623	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	31.667				ng/L
	U	235	2759.419				ng/L
	U	238	383553.117				ng/L
	U 232	232	269.671				ng/L
	U 236	236	5.333				ng/L
⌜	U-tot	238	106.254	**21240.394**	373.37	1.8	ng/L
⌞>	U233	233	3636.727				ng/L
	U233 IS	233	3636.727	**72.094**	1.17	1.6	%R

010168

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 10:25:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.016
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	8.921	0.000	
	U	235	37	9.745	0.000	
	U	238	444	7.154	0.000	
	U 232	232	49	20.582	0.000	
	U 236	236	36	5.556	0.000	
⌈	U-tot	238	528	5.779	0.000	
⌊>	U233	233	5105	0.844	0.000	
	U233 IS	233	5105	0.844	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.667				ng/L
	U	235	37.000				ng/L
	U	238	444.344				ng/L
	U 232	232	48.667				ng/L
	U 236	236	36.000				ng/L
⌈	U-tot	238	0.103	**13.099**	1.09	8.3	ng/L
⌊>	U233	233	5105.100				ng/L
	U233 IS	233	5105.100	**101.203**	0.85	0.8	%R

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 10:28:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.017
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Celibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	22	35.850	0.000	
	U	235	1450	3.997	0.000	
	U	238	194527	0.898	0.000	
	U 232	232	17	35.781	0.000	
	U 236	236	139	2.307	0.000	
⌈	U-tot	238	195998	0.891	0.000	
⌊>	U233	233	4966	1.631	0.000	
	U233 IS	233	4966	1.631	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	21.667				ng/L
	U	235	1449.782				ng/L
	U	238	194526.985				ng/L
	U 232	232	17.000				ng/L
	U 236	236	139.334				ng/L
⌈	U-tot	238	39.475	**7886.375**	148.93	1.9	ng/L
⌊>	U233	233	4966.023				ng/L
	U233 IS	233	4966.023	**98.446**	1.61	1.6	%R

010170

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 10:30:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.018
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	37.950	0.000	
	U	235	39	53.356	0.000	
	U	238	216	10.976	0.000	
	U 232	232	31	35.919	0.000	
	U 236	236	28	65.465	0.000	
⌈	U-tot	238	292	17.805	0.000	
⌊>	U233	233	5211	1.267	0.000	
	U233 IS	233	5211	1.267	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.667				ng/L
	U	235	39.000				ng/L
	U	238	215.669				ng/L
	U 232	232	30.667				ng/L
	U 236	236	28.000				ng/L
⌈	U-tot	238	0.056	**3.627**	1.90	52.4	ng/L
⌊>	U233	233	5210.826				ng/L
	U233 IS	233	5210.826	**103.299**	1.31	1.3	%R

010171

Quantitative Analysis - Summary Report

Sample ID: Blankd0 df4

Sample Date/Time: Thursday, September 29, 2011 10:35:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\Blankd0 df4.019
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	43	38.425	0.000	
	U	235	2135	2.210	0.000	
	U	238	619994	0.581	0.000	
	U 232	232	21	87.944	0.000	
	U 236	236	139	4.614	0.000	
⌈	U-tot	238	622172	0.587	0.000	
⌊>	U233	233	4843	0.837	0.000	
	U233 IS	233	4843	0.837	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.000				ng/L
	U	235	2134.584				ng/L
	U	238	619994.220				ng/L
	U 232	232	20.667				ng/L
	U 236	236	139.334				ng/L
⌈	U-tot	238	128.487	**25686.382**	328.03	1.3	ng/L
⌊>	U233	233	4842.623				ng/L
	U233 IS	233	4842.623	**96.000**	0.80	0.8	%R

010172

Quantitative Analysis - Summary Report

Sample ID: Blankd7 df4

Sample Date/Time: Thursday, September 29, 2011 10:37:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\Blankd7 df4.020
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	36	32.750	0.000	
	U	235	1956	0.563	0.000	
	U	238	587391	0.624	0.000	
	U 232	232	18	65.075	0.000	
	U 236	236	127	7.991	0.000	
⌜	U-tot	238	589383	0.623	0.000	
⌞>	U233	233	4768	2.804	0.000	
	U233 IS	233	4768	2.804	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.000				ng/L
	U	235	1955.877				ng/L
	U	238	587391.125				ng/L
	U 232	232	18.333				ng/L
	U 236	236	127.001				ng/L
⌜	U-tot	238	123.657	**24720.537**	548.30	2.2	ng/L
⌞>	U233	233	4768.251				ng/L
	U233 IS	233	4768.251	**94.526**	2.65	2.8	%R

010173

Quantitative Analysis - Summary Report

Sample ID: 473754d7 df4

Sample Date/Time: Thursday, September 29, 2011 10:40:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d7 df4.021
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dec
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	58.603	0.000	
	U	235	1870	2.600	0.000	
	U	238	529516	0.386	0.000	
	U 232	232	170	13.964	0.000	
	U 236	236	120	27.626	0.000	
⌜	U-tot	238	531419	0.397	0.000	
⌞>	U233	233	4538	2.275	0.000	
	U233 IS	233	4538	2.275	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.000				ng/L
	U	235	1869.526				ng/L
	U	238	529515.674				ng/L
	U 232	232	169.668				ng/L
	U 236	236	120.001				ng/L
⌜	U-tot	238	117.134	**23416.095**	435.22	1.9	ng/L
⌞>	U233	233	4538.133				ng/L
	U233 IS	233	4538.133	**89.964**	2.05	2.3	%R

010174

Quantitative Analysis - Summary Report

Sample ID: 473754d7L df20

Sample Date/Time: Thursday, September 29, 2011 10:42:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d7L df20.022
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	18	19.156	0.000	
	U	235	396	4.438	0.000	
	U	238	112521	1.101	0.000	
	U 232	232	47	12.372	0.000	
	U 236	236	22	26.647	0.000	
⌜	U-tot	238	112935	1.113	0.000	
⌞>	U233	233	4791	1.345	0.000	
	U233 IS	233	4791	1.345	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	18.333				ng/L
	U	235	395.675				ng/L
	U	238	112521.465				ng/L
	U 232	232	46.667				ng/L
	U 236	236	21.667				ng/L
⌜	U-tot	238	23.574	**4706.513**	32.53	0.7	ng/L
⌞>	U233	233	4790.929				ng/L
	U233 IS	233	4790.929	**94.975**	1.28	1.3	%R

010175

Quantitative Analysis - Summary Report

Sample ID: 473754d7D df4

Sample Date/Time: Thursday, September 29, 2011 10:44:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d7D df4.023
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	59	44.068	0.000	
	U	235	1614	2.506	0.000	
	U	238	457830	0.634	0.000	
	U 232	232	189	1.704	0.000	
	U 236	236	128	21.707	0.000	
⌜	U-tot	238	459503	0.644	0.000	
⌞>	U233	233	4617	1.815	0.000	
	U233 IS	233	4617	1.815	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	59.000				ng/L
	U	235	1614.143				ng/L
	U	238	457830.259				ng/L
	U 232	232	188.669				ng/L
	U 236	236	128.001				ng/L
⌜	U-tot	238	99.543	**19898.329**	255.82	1.3	ng/L
⌞>	U233	233	4616.839				ng/L
	U233 IS	233	4616.839	**91.524**	1.66	1.8	%R

010176

Quantitative Analysis - Summary Report

Sample ID: 473754d7AS df4

Sample Date/Time: Thursday, September 29, 2011 10:47:00
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d7AS df4.024
Tuning File: C:\Elandata\Tuning\Default.tun
Optimizetion File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20 uL of 1° natural uranium std (11-064-06, 075-Rad-5012) in 10 mL

TU = 20462 ng/L x df 4 = 81848 ng/L

9130111105

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	10.184	0.000	
	U	235	5134	0.626	0.000	
	U	238	974722	0.497	0.000	
	U 232	232	189	5.889	0.000	
	U 236	236	103	11.027	0.000	
⌈	U-tot	238	979901	0.496	0.000	
⌊>	U233	233	4433	2.372	0.000	
	U233 IS	233	4433	2.372	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	5133.783				ng/L
	U	238	974722.170				ng/L
	U 232	232	189.335				ng/L
	U 236	236	103.001				ng/L
⌈	U-tot	238	221.125	**44211.506**	824.88	1.9	ng/L
⌊>	U233	233	4432.748				ng/L
	U233 IS	233	4432.748	**87.875**	2.08	2.4	%R

010177

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 10:49:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.025
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	35	56.698	0.000	
	U	235	31	67.125	0.000	
	U	238	423	6.888	0.000	
	U 232	232	29	68.295	0.000	
	U 236	236	24	76.376	0.000	
⌜	U-tot	238	489	14.063	0.000	
⌞>	U233	233	4726	2.614	0.000	
	U233 IS	233	4726	2.614	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.667				ng/L
	U	235	31.000				ng/L
	U	238	423.010				ng/L
	U 232	232	29.333				ng/L
	U 236	236	24.000				ng/L
⌜	U-tot	238	0.103	**13.058**	2.43	18.6	ng/L
⌞>	U233	233	4725.895				ng/L
	U233 IS	233	4725.895	**93.686**	2.45	2.6	%R

010178

Quantitative Analysis - Summary Report

Sample ID: 473755d7 df2 4 (TE) 10/13/11

Sample Date/Time: Thursday, September 29, 2011 10:51:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473755d7 df2.026
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	49.339	0.000	
	U	235	1562	2.498	0.000	
	U	238	417526	0.508	0.000	
	U 232	232	1258	3.198	0.000	
	U 236	236	118	27.107	0.000	
⌜	U-tot	238	419143	0.512	0.000	
⌞>	U233	233	4704	1.838	0.000	
	U233 IS	233	4704	1.838	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.334				ng/L
	U	235	1561.801				ng/L
	U	238	417526.302				ng/L
	U 232	232	1257.754				ng/L
	U 236	236	117.667				ng/L
⌜	U-tot	238	89.138	**17817.666**	422.22	2.4	ng/L
⌞>	U233	233	4703.550				ng/L
	U233 IS	233	4703.550	**93.243**	1.71	1.8	%R

010179

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 10:54:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.027
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	68.243	0.000	
	U	235	40	73.816	0.000	
	U	238	383	9.553	0.000	
	U 232	232	81	29.189	0.000	
	U 236	236	34	81.688	0.000	
⌈	U-tot	238	461	19.754	0.000	
⌊>	U233	233	4808	2.600	0.000	
	U233 IS	233	4808	2.600	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.333				ng/L
	U	235	39.667				ng/L
	U	238	382.675				ng/L
	U 232	232	81.000				ng/L
	U 236	236	33.667				ng/L
⌈	U-tot	238	0.096	**11.537**	3.42	29.7	ng/L
⌊>	U233	233	4807.605				ng/L
	U233 IS	233	4807.605	**95.306**	2.48	2.6	%R

010180

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 10:56:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.028
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	43	45.359	0.000	
	U	235	42	45.886	0.000	
	U	238	1154	6.078	0.000	
	U 232	232	41	44.625	0.000	
	U 236	236	40	59.108	0.000	
⌈	U-tot	238	1239	8.799	0.000	
⌊>	U233	233	4745	1.121	0.000	
	U233 IS	233	4745	1.121	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.333				ng/L
	U	235	42.333				ng/L
	U	238	1153.740				ng/L
	U 232	232	40.667				ng/L
	U 236	236	40.000				ng/L
⌈	U-tot	238	0.261	**44.632**	4.12	9.2	ng/L
⌊>	U233	233	4744.571				ng/L
	U233 IS	233	4744.571	**94.056**	1.05	1.1	%R

010181

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 10:58:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.029
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	51.501	0.000	
	U	235	1352	6.616	0.000	
	U	238	182210	2.384	0.000	
	U 232	232	29	56.715	0.000	
	U 236	236	140	23.049	0.000	
⌈	U-tot	238	183601	2.413	0.000	
⌊>	U233	233	4728	1.415	0.000	
	U233 IS	233	4728	1.415	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.667				ng/L
	U	235	1352.101				ng/L
	U	238	182209.572				ng/L
	U 232	232	28.667				ng/L
	U 236	236	139.668				ng/L
⌈	U-tot	238	38.830	**7757.386**	78.79	1.0	ng/L
⌊>	U233	233	4727.896				ng/L
	U233 IS	233	4727.896	**93.726**	1.33	1.4	%R

0110182

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 11:00:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.030
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	63.518	0.000	
	U	235	41	65.722	0.000	
	U	238	228	19.860	0.000	
	U 232	232	39	79.487	0.000	
	U 236	236	39	81.931	0.000	
⌜	U-tot	238	314	31.283	0.000	
⌞>	U233	233	4911	0.454	0.000	
	U233 IS	233	4911	0.454	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	40.667				ng/L
	U	238	228.336				ng/L
	U 232	232	39.000				ng/L
	U 236	236	39.000				ng/L
⌜	U-tot	238	0.064	**5.196**	3.97	76.4	ng/L
⌞>	U233	233	4911.326				ng/L
	U233 IS	233	4911.326	**97.362**	0.44	0.5	%R

010183

Quantitative Analysis - Summary Report

Sample ID: 473755d7D df2 (TS) 10/13/11

Sample Date/Time: Thursday, September 29, 2011 11:07:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandate\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473755d7D df2.031
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	57	55.331	0.000	
	U	235	1506	5.611	0.000	
	U	238	409475	0.413	0.000	
	U 232	232	1390	1.191	0.000	
	U 236	236	123	33.576	0.000	
⌜	U-tot	238	411039	0.426	0.000	
⌞>	U233	233	4598	1.368	0.000	
	U233 IS	233	4598	1.368	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.334				ng/L
	U	235	1506.458				ng/L
	U	238	409474.816				ng/L
	U 232	232	1390.440				ng/L
	U 236	236	122.668				ng/L
⌜	U-tot	238	89.404	**17870.872**	276.78	1.5	ng/L
⌞>	U233	233	4598.163				ng/L
	U233 IS	233	4598.163	**91.154**	1.25	1.4	%R

010184

Quantitative Analysis - Summary Report

Sample ID: 473756d7 df2

Sample Date/Time: Thursday, September 29, 2011 11:10:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473756d7 df2.032
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	69	53.157	0.000	
	U	235	1908	2.061	0.000	
	U	238	505977	0.847	0.000	
	U 232	232	252	11.550	0.000	
	U 236	236	140	33.156	0.000	
⌜	U-tot	238	507954	0.858	0.000	
⌞>	U233	233	4452	2.699	0.000	
	U233 IS	233	4452	2.699	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.667				ng/L
	U	235	1907.867				ng/L
	U	238	505977.086				ng/L
	U 232	232	252.337				ng/L
	U 236	236	139.668				ng/L
⌜	U-tot	238	114.149	**22819.131**	546.21	2.4	ng/L
⌞>	U233	233	4451.757				ng/L
	U233 IS	233	4451.757	**88.251**	2.38	2.7	%R

010185

Quantitative Analysis - Summary Report

Sample ID: 473756d7D df2

Sample Date/Time: Thursday, September 29, 2011 11:12:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473756d7D df2.033
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	76	26.986	0.000	
	U	235	1817	1.709	0.000	
	U	238	472675	0.042	0.000	
	U 232	232	339	9.492	0.000	
	U 236	236	137	14.201	0.000	
⌜	U-tot	238	474568	0.046	0.000	
⌞>	U233	233	4423	1.396	0.000	
	U233 IS	233	4423	1.396	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	76.334				ng/L
	U	235	1817.182				ng/L
	U	238	472674.820				ng/L
	U 232	232	338.673				ng/L
	U 236	236	137.334				ng/L
⌜	U-tot	238	107.316	**21452.752**	301.29	1.4	ng/L
⌞>	U233	233	4422.742				ng/L
	U233 IS	233	4422.742	**87.676**	1.22	1.4	%R

010186

Quantitative Analysis - Summary Report

Sample ID: 473757d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:14:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473757d7 df4.034
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	65	52.948	0.000	
	U	235	1673	1.443	0.000	
	U	238	385965	0.217	0.000	
	U 232	232	231	24.804	0.000	
	U 236	236	106	32.853	0.000	
⌜	U-tot	238	387703	0.227	0.000	
⌞>	U233	233	4486	1.395	0.000	
	U233 IS	233	4486	1.395	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	64.667				ng/L
	U	235	1672.821				ng/L
	U	238	385965.354				ng/L
	U 232	232	231.003				ng/L
	U 236	236	106.334				ng/L
⌜	U-tot	238	86.436	**17277.308**	277.22	1.6	ng/L
⌞>	U233	233	4486.107				ng/L
	U233 IS	233	4486.107	**88.932**	1.24	1.4	%R

010187

Quantitative Analysis - Summary Report

Sample ID: 473757d7D df4

Sample Date/Time: Thursday, September 29, 2011 11:17:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473757d7D df4.035
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	39.626	0.000	
	U	235	2751	1.753	0.000	
	U	238	548727	0.590	0.000	
	U 232	232	199	19.778	0.000	
	U 236	236	120	20.733	0.000	
⌜	U-tot	238	551556	0.597	0.000	
⌞>	U233	233	4585	1.738	0.000	
	U233 IS	233	4585	1.738	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.000				ng/L
	U	235	2751.083				ng/L
	U	238	548727.462				ng/L
	U 232	232	199.002				ng/L
	U 236	236	120.001				ng/L
⌜	U-tot	238	120.316	**24052.510**	279.11	1.2	ng/L
⌞>	U233	233	4584.823				ng/L
	U233 IS	233	4584.823	**90.889**	1.58	1.7	%R

0110183

Quantitative Analysis - Summary Report

Sample ID: 473758d7

Sample Date/Time: Thursday, September 29, 2011 11:19:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473758d7.036
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	86	13.173	0.000	
	U	235	1978	3.760	0.000	
	U	238	514093	0.971	0.000	
	U 232	232	308	10.415	0.000	
	U 236	236	155	12.444	0.000	
⌜	U-tot	238	516157	0.965	0.000	
⌞>	U233	233	4200	1.769	0.000	
	U233 IS	233	4200	1.769	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	86.334				ng/L
	U	235	1978.215				ng/L
	U	238	514092.831				ng/L
	U 232	232	308.005				ng/L
	U 236	236	155.001				ng/L
⌜	U-tot	238	122.931	**24575.382**	496.19	2.0	ng/L
⌞>	U233	233	4199.637				ng/L
	U233 IS	233	4199.637	**83.253**	1.47	1.8	%R

010189

Quantitative Analysis - Summary Report

Sample ID: 473758d7D

Sample Date/Time: Thursday, September 29, 2011 11:21:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473758d7D.037
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	54.085	0.000	
	U	235	1883	2.214	0.000	
	U	238	493085	0.490	0.000	
	U 232	232	266	14.251	0.000	
	U 236	236	133	28.567	0.000	
⌜	U-tot	238	495031	0.497	0.000	
⌞>	U233	233	4115	2.906	0.000	
	U233 IS	233	4115	2.906	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.000				ng/L
	U	235	1882.862				ng/L
	U	238	493085.097				ng/L
	U 232	232	265.671				ng/L
	U 236	236	132.668				ng/L
⌜	U-tot	238	120.375	**24064.225**	766.85	3.2	ng/L
⌞>	U233	233	4114.932				ng/L
	U233 IS	233	4114.932	**81.574**	2.37	2.9	%R

010190

Quantitative Analysis - Summary Report

Sample ID: 473768d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:24:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473768d7 df4.038
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	99	42.652	0.000	
	U	235	1702	2.599	0.000	
	U	238	457370	0.417	0.000	
	U 232	232	205	20.904	0.000	
	U 236	236	155	36.927	0.000	
⌜	U-tot	238	459172	0.420	0.000	
⌞>	U233	233	4471	1.855	0.000	
	U233 IS	233	4471	1.855	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	99.001				ng/L
	U	235	1702.159				ng/L
	U	238	457370.464				ng/L
	U 232	232	205.336				ng/L
	U 236	236	155.001				ng/L
⌜	U-tot	238	102.714	**20532.418**	390.27	1.9	ng/L
⌞>	U233	233	4471.433				ng/L
	U233 IS	233	4471.433	**88.642**	1.64	1.9	%R

010191

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 11:26:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.039
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

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9/29/11 JS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	23.093	0.000	
	U	235	73	30.684	0.000	
	U	238	82	25.775	0.000	
	U 232	232	62	25.604	0.000	
	U 236	236	70	36.976	0.000	
⌈	U-tot	238	213	26.667	0.000	
⌊>	U233	233	71	28.275	0.000	
	U233 IS	233	71	28.275	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.667				ng/L
	U	235	73.334				ng/L
	U	238	82.334				ng/L
	U 232	232	62.000				ng/L
	U 236	236	70.334				ng/L
⌈	U-tot	238	3.018	**595.853**	17.94	3.0	ng/L
⌊>	U233	233	71.000				ng/L
	U233 IS	233	71.000	**1.408**	0.40	28.3	%R

010192

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 11:29:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.040
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	73.311	0.000	
	U	235	50	57.627	0.000	
	U	238	1187	2.929	0.000	
	U 232	232	43	89.376	0.000	
	U 236	236	34	91.084	0.000	
⌜	U-tot	238	1282	6.783	0.000	
⌞>	U233	233	4575	0.746	0.000	
	U233 IS	233	4575	0.746	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.333				ng/L
	U	235	50.334				ng/L
	U	238	1187.078				ng/L
	U 232	232	43.000				ng/L
	U 236	236	33.667				ng/L
⌜	U-tot	238	0.280	**48.426**	3.46	7.1	ng/L
⌞>	U233	233	4575.485				ng/L
	U233 IS	233	4575.485	**90.704**	0.68	0.7	%R

0110193

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 11:31:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.041
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	76	33.613	0.000	
	U	235	1340	0.621	0.000	
	U	238	177703	0.551	0.000	
	U 232	232	75	42.143	0.000	
	U 236	236	186	13.431	0.000	
⌜	U-tot	238	179119	0.528	0.000	
⌞>	U233	233	4636	1.037	0.000	
	U233 IS	233	4636	1.037	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	76.334				ng/L
	U	235	1340.432				ng/L
	U	238	177702.694				ng/L
	U 232	232	75.000				ng/L
	U 236	236	186.335				ng/L
⌜	U-tot	238	38.645	**7720.348**	118.76	1.5	ng/L
⌞>	U233	233	4635.515				ng/L
	U233 IS	233	4635.515	**91.894**	0.95	1.0	%R

010194

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 11:33:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.042
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	54.106	0.000	
	U	235	62	71.482	0.000	
	U	238	246	20.868	0.000	
	U 232	232	47	76.448	0.000	
	U 236	236	56	81.968	0.000	
⌜	U-tot	238	364	34.541	0.000	
⌞>	U233	233	4695	1.809	0.000	
	U233 IS	233	4695	1.809	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.334				ng/L
	U	235	62.334				ng/L
	U	238	246.337				ng/L
	U 232	232	47.000				ng/L
	U 236	236	56.000				ng/L
⌜	U-tot	238	0.077	**7.862**	5.13	65.3	ng/L
⌞>	U233	233	4695.212				ng/L
	U233 IS	233	4695.212	**93.078**	1.68	1.8	%R

010195

Quantitative Analysis - Summary Report

Sample ID: 473768d7D df4

Sample Date/Time: Thursday, September 29, 2011 11:36:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473768d7D df4.043
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	87	29.734	0.000	
	U	235	1783	2.449	0.000	
	U	238	476227	0.174	0.000	
	U 232	232	113	9.817	0.000	
	U 236	236	162	6.292	0.000	
⌜	U-tot	238	478097	0.167	0.000	
⌞>	U233	233	4466	0.661	0.000	
	U233 IS	233	4466	0.661	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	87.334				ng/L
	U	235	1782.842				ng/L
	U	238	476226.526				ng/L
	U 232	232	112.667				ng/L
	U 236	236	162.335				ng/L
⌜	U-tot	238	107.061	**21401.758**	121.55	0.6	ng/L
⌞>	U233	233	4465.763				ng/L
	U233 IS	233	4465.763	**88.529**	0.59	0.7	%R

0110196

Quantitative Analysis - Summary Report

Sample ID: 473769d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:38:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473769d7 df4.044
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	64.092	0.000	
	U	235	1394	5.499	0.000	
	U	238	381412	1.247	0.000	
	U 232	232	80	44.599	0.000	
	U 236	236	104	37.476	0.000	
⌜	U-tot	238	382868	1.262	0.000	
⌞>	U233	233	4442	0.843	0.000	
	U233 IS	233	4442	0.843	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.000				ng/L
	U	235	1393.774				ng/L
	U	238	381411.841				ng/L
	U 232	232	80.000				ng/L
	U 236	236	104.001				ng/L
⌜	U-tot	238	86.205	**17231.140**	323.78	1.9	ng/L
⌞>	U233	233	4441.752				ng/L
	U233 IS	233	4441.752	**88.053**	0.74	0.8	%R

010197

Quantitative Analysis - Summary Report

Sample ID: 473769d7D df4

Sample Date/Time: Thursday, September 29, 2011 11:40:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473769d7D df4.045
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	103	31.777	0.000	
	U	235	1567	4.628	0.000	
	U	238	414538	0.708	0.000	
	U 232	232	236	10.178	0.000	
	U 236	236	148	13.217	0.000	
⌈	U-tot	238	416208	0.729	0.000	
⌊>	U233	233	4469	0.966	0.000	
	U233 IS	233	4469	0.966	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	102.667				ng/L
	U	235	1567.469				ng/L
	U	238	414537.556				ng/L
	U 232	232	236.003				ng/L
	U 236	236	148.335				ng/L
⌈	U-tot	238	93.132	**18616.291**	56.98	0.3	ng/L
⌊>	U233	233	4469.098				ng/L
	U233 IS	233	4469.098	**88.595**	0.86	1.0	%R

010198

Quantitative Analysis - Summary Report

Sample ID: 473770d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:42:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473770d7 df4.046
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	74	16.713	0.000	
	U	235	1732	3.932	0.000	
	U	238	452172	0.728	0.000	
	U 232	232	245	5.534	0.000	
	U 236	236	144	10.261	0.000	
⌜	U-tot	238	453979	0.739	0.000	
⌞>	U233	233	4507	2.060	0.000	
	U233 IS	233	4507	2.060	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	74.334				ng/L
	U	235	1732.165				ng/L
	U	238	452172.103				ng/L
	U 232	232	245.337				ng/L
	U 236	236	143.668				ng/L
⌜	U-tot	238	100.736	**20137.054**	282.73	1.4	ng/L
⌞>	U233	233	4507.451				ng/L
	U233 IS	233	4507.451	**89.356**	1.84	2.1	%R

010199

Quantitative Analysis - Summary Report

Sample ID: 473770d7D df4

Sample Date/Time: Thursday, September 29, 2011 11:45:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473770d7D df4.047
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	40.951	0.000	
	U	235	1690	1.850	0.000	
	U	238	453368	0.151	0.000	
	U 232	232	158	8.180	0.000	
	U 236	236	100	19.670	0.000	
⌜	U-tot	238	455099	0.146	0.000	
⌞>	U233	233	4450	0.606	0.000	
	U233 IS	233	4450	0.606	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.667				ng/L
	U	235	1689.824				ng/L
	U	238	453368.166				ng/L
	U 232	232	157.668				ng/L
	U 236	236	99.667				ng/L
⌜	U-tot	238	102.262	**20442.094**	113.55	0.6	ng/L
⌞>	U233	233	4450.422				ng/L
	U233 IS	233	4450.422	**88.225**	0.53	0.6	%R

010200

Quantitative Analysis - Summary Report

Sample ID: 473771d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:47:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473771d7 df4.048
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	19.105	0.000	
	U	235	1865	3.679	0.000	
	U	238	491247	0.148	0.000	
	U 232	232	100	25.300	0.000	
	U 236	236	142	13.194	0.000	
⌜	U-tot	238	493172	0.156	0.000	
⌞>	U233	233	4457	0.758	0.000	
	U233 IS	233	4457	0.758	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.667				ng/L
	U	235	1864.858				ng/L
	U	238	491246.619				ng/L
	U 232	232	100.334				ng/L
	U 236	236	142.001				ng/L
⌜	U-tot	238	110.652	**22119.947**	135.30	0.6	ng/L
⌞>	U233	233	4457.092				ng/L
	U233 IS	233	4457.092	**88.357**	0.67	0.8	%R

010201

Quantitative Analysis - Summary Report

Sample ID: 473771d7D df4

Sample Date/Time: Thursday, September 29, 2011 11:49:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473771d7D df4.049
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	92	2.876	0.000	
	U	235	1874	4.754	0.000	
	U	238	503190	0.536	0.000	
	U 232	232	102	21.936	0.000	
	U 236	236	151	6.350	0.000	
⌜	U-tot	238	505155	0.529	0.000	
⌞>	U233	233	4524	1.308	0.000	
	U233 IS	233	4524	1.308	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	92.000				ng/L
	U	235	1873.527				ng/L
	U	238	503189.535				ng/L
	U 232	232	101.667				ng/L
	U 236	236	151.335				ng/L
⌜	U-tot	238	111.676	**22324.587**	403.99	1.8	ng/L
⌞>	U233	233	4524.126				ng/L
	U233 IS	233	4524.126	**89.686**	1.17	1.3	%R

010202

Quantitative Analysis - Summary Report

Sample ID: 473772d7 df4

Sample Date/Time: Thursday, September 29, 2011 11:52:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473772d7 df4.050
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	70	33.917	0.000	
	U	235	1675	3.870	0.000	
	U	238	452836	0.445	0.000	
	U 232	232	219	18.946	0.000	
	U 236	236	142	22.359	0.000	
⌜	U-tot	238	454582	0.430	0.000	
⌞>	U233	233	4468	0.355	0.000	
	U233 IS	233	4468	0.355	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	69.667				ng/L
	U	235	1675.488				ng/L
	U	238	452836.411				ng/L
	U 232	232	218.669				ng/L
	U 236	236	142.001				ng/L
⌜	U-tot	238	101.740	**20337.821**	123.70	0.6	ng/L
⌞>	U233	233	4468.098				ng/L
	U233 IS	233	4468.098	**88.575**	0.31	0.4	%R

010203

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 11:54:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.051
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	77.888	0.000	
	U	235	19	86.911	0.000	
	U	238	100	15.094	0.000	
	U 232	232	33	63.636	0.000	
	U 236	236	24	106.393	0.000	
⌈	U-tot	238	151	33.735	0.000	
⌊>	U233	233	4402	2.609	0.000	
	U233 IS	233	4402	2.609	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	31.667				ng/L
	U	235	19.333				ng/L
	U	238	100.334				ng/L
	U 232	232	33.000				ng/L
	U 236	236	24.000				ng/L
⌈	U-tot	238	0.034	**-0.742**	2.15	289.7	ng/L
⌊>	U233	233	4401.733				ng/L
	U233 IS	233	4401.733	**87.260**	2.28	2.6	%R

010204

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 11:56:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.052
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	97.329	0.000	
	U	235	51	84.899	0.000	
	U	238	1144	5.564	0.000	
	U 232	232	52	93.344	0.000	
	U 236	236	44	113.841	0.000	
⌜	U-tot	238	1242	12.239	0.000	
⌞>	U233	233	4640	1.531	0.000	
	U233 IS	233	4640	1.531	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.334				ng/L
	U	235	50.667				ng/L
	U	238	1144.072				ng/L
	U 232	232	52.000				ng/L
	U 236	236	44.000				ng/L
⌜	U-tot	238	0.267	**45.899**	5.84	12.7	ng/L
⌞>	U233	233	4640.184				ng/L
	U233 IS	233	4640.184	**91.987**	1.41	1.5	%R

010205

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 11:59:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.053
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	78	55.505	0.000	
	U	235	1322	3.349	0.000	
	U	238	175994	0.791	0.000	
	U 232	232	54	81.334	0.000	
	U 236	236	173	33.364	0.000	
⌈	U-tot	238	177394	0.762	0.000	
⌊>	U233	233	4590	0.681	0.000	
	U233 IS	233	4590	0.681	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.667				ng/L
	U	235	1322.430				ng/L
	U	238	175993.967				ng/L
	U 232	232	54.000				ng/L
	U 236	236	173.335				ng/L
⌈	U-tot	238	38.646	**7720.697**	13.59	0.2	ng/L
⌊>	U233	233	4590.159				ng/L
	U233 IS	233	4590.159	**90.995**	0.62	0.7	%R

010206

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 12:01:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.054
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	76.125	0.000	
	U	235	51	76.345	0.000	
	U	238	103	33.646	0.000	
	U 232	232	55	89.147	0.000	
	U 236	236	54	74.814	0.000	
⌈	U-tot	238	209	55.105	0.000	
⌊>	U233	233	4424	2.790	0.000	
	U233 IS	233	4424	2.790	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.000				ng/L
	U	235	51.000				ng/L
	U	238	103.001				ng/L
	U 232	232	55.000				ng/L
	U 236	236	54.334				ng/L
⌈	U-tot	238	0.047	**1.797**	5.09	283.2	ng/L
⌊>	U233	233	4424.410				ng/L
	U233 IS	233	4424.410	**87.709**	2.45	2.8	%R

010207

Quantitative Analysis - Summary Report

Sample ID: 473772d7D df4

Sample Date/Time: Thursday, September 29, 2011 12:12:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473772d7D df4.055
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	64.993	0.000	
	U	235	1670	2.567	0.000	
	U	238	452460	0.142	0.000	
	U 232	232	162	12.392	0.000	
	U 236	236	122	37.906	0.000	
⌜	U-tot	238	454184	0.158	0.000	
⌞>	U233	233	4358	0.345	0.000	
	U233 IS	233	4358	0.345	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.667				ng/L
	U	235	1669.820				ng/L
	U	238	452459.533				ng/L
	U 232	232	162.001				ng/L
	U 236	236	122.334				ng/L
⌜	U-tot	238	104.210	**20831.649**	45.87	0.2	ng/L
⌞>	U233	233	4358.378				ng/L
	U233 IS	233	4358.378	**86.400**	0.30	0.3	%R

010208

Quantitative Analysis - Summary Report

Sample ID: 473778d7 df4

Sample Date/Time: Thursday, September 29, 2011 12:15:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473778d7 df4.056
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	54.183	0.000	
	U	235	1442	2.778	0.000	
	U	238	397380	0.814	0.000	
	U 232	232	585	9.980	0.000	
	U 236	236	101	31.121	0.000	
⌈	U-tot	238	398875	0.826	0.000	
⌊>	U233	233	4418	0.603	0.000	
	U233 IS	233	4418	0.603	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	1442.448				ng/L
	U	238	397380.031				ng/L
	U 232	232	584.686				ng/L
	U 236	236	101.001				ng/L
⌈	U-tot	238	90.282	**18046.500**	87.07	0.5	ng/L
⌊>	U233	233	4418.073				ng/L
	U233 IS	233	4418.073	**87.584**	0.53	0.6	%R

010209

Quantitative Analysis - Summary Report

Sample ID: 473778d7D df4

Sample Date/Time: Thursday, September 29, 2011 12:17:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473778d7D df4.057
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	39.752	0.000	
	U	235	1577	3.091	0.000	
	U	238	429332	0.696	0.000	
	U 232	232	127	3.541	0.000	
	U 236	236	99	21.268	0.000	
⌜	U-tot	238	430960	0.703	0.000	
⌞>	U233	233	4404	1.673	0.000	
	U233 IS	233	4404	1.673	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.333				ng/L
	U	235	1577.470				ng/L
	U	238	429332.034				ng/L
	U 232	232	127.334				ng/L
	U 236	236	99.334				ng/L
⌜	U-tot	238	97.880	**19565.928**	460.70	2.4	ng/L
⌞>	U233	233	4404.067				ng/L
	U233 IS	233	4404.067	**87.306**	1.46	1.7	%R

010210

Quantitative Analysis - Summary Report

Sample ID: 473045d7 df4

Sample Date/Time: Thursday, September 29, 2011 12:19:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473045d7 df4.058
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	41.164	0.000	
	U	235	1937	1.175	0.000	
	U	238	515050	0.378	0.000	
	U 232	232	183	13.651	0.000	
	U 236	236	117	28.690	0.000	
⌈	U-tot	238	517035	0.382	0.000	
⌊>	U233	233	4386	1.086	0.000	
	U233 IS	233	4386	1.086	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	48.667				ng/L
	U	235	1936.540				ng/L
	U	238	515050.084				ng/L
	U 232	232	183.335				ng/L
	U 236	236	116.667				ng/L
⌈	U-tot	238	117.883	**23565.990**	309.32	1.3	ng/L
⌊>	U233	233	4386.391				ng/L
	U233 IS	233	4386.391	**86.956**	0.94	1.1	%R

010211

Quantitative Analysis - Summary Report

Sample ID: 473045d7D df4

Sample Date/Time: Thursday, September 29, 2011 12:22:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473045d7D df4.059
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	48	50.364	0.000	
	U	235	1961	2.719	0.000	
	U	238	501525	0.240	0.000	
	U 232	232	99	19.030	0.000	
	U 236	236	110	23.052	0.000	
⌜	U-tot	238	503534	0.247	0.000	
⌞>	U233	233	4330	2.612	0.000	
	U233 IS	233	4330	2.612	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.667				ng/L
	U	235	1960.878				ng/L
	U	238	501525.387				ng/L
	U 232	232	99.334				ng/L
	U 236	236	110.001				ng/L
⌜	U-tot	238	116.354	**23260.177**	649.73	2.8	ng/L
⌞>	U233	233	4329.698				ng/L
	U233 IS	233	4329.698	**85.832**	2.24	2.6	%R

010212

Quantitative Analysis - Summary Report

Sample ID: Blankd10 df4

Sample Date/Time: Thursday, September 29, 2011 12:24:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\Blankd10 df4.060
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	59	56.008	0.000	
	U	235	1921	1.745	0.000	
	U	238	568624	0.606	0.000	
	U 232	232	51	58.562	0.000	
	U 236	236	136	23.430	0.000	
⌜	U-tot	238	570604	0.615	0.000	
⌞>	U233	233	4379	0.951	0.000	
	U233 IS	233	4379	0.951	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	59.334				ng/L
	U	235	1920.536				ng/L
	U	238	568624.458				ng/L
	U 232	232	51.000				ng/L
	U 236	236	136.334				ng/L
⌜	U-tot	238	130.297	**26048.402**	162.56	0.6	ng/L
⌞>	U233	233	4379.388				ng/L
	U233 IS	233	4379.388	**86.817**	0.83	1.0	%R

010213

Quantitative Analysis - Summary Report

Sample ID: 473754d10 df4

Sample Date/Time: Thursday, September 29, 2011 12:26:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d10 df4.061
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	13.804	0.000	
	U	235	1640	1.743	0.000	
	U	238	468378	0.619	0.000	
	U 232	232	380	9.701	0.000	
	U 236	236	103	9.853	0.000	
⌜	U-tot	238	470062	0.618	0.000	
⌞>	U233	233	4074	1.332	0.000	
	U233 IS	233	4074	1.332	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.667				ng/L
	U	235	1640.148				ng/L
	U	238	468378.057				ng/L
	U 232	232	380.341				ng/L
	U 236	236	103.001				ng/L
⌜	U-tot	238	115.391	**23067.472**	393.29	1.7	ng/L
⌞>	U233	233	4074.246				ng/L
	U233 IS	233	4074.246	**80.768**	1.08	1.3	%R

010214

Quantitative Analysis - Summary Report

Sample ID: 473754d10L df20

Sample Date/Time: Thursday, September 29, 2011 12:29:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d10L df20.062
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	35	46.705	0.000	
	U	235	361	6.415	0.000	
	U	238	99111	0.492	0.000	
	U 232	232	101	24.013	0.000	
	U 236	236	38	33.721	0.000	
⌜	U-tot	238	99507	0.457	0.000	
⌞>	U233	233	4270	1.230	0.000	
	U233 IS	233	4270	1.230	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	35.333				ng/L
	U	235	361.341				ng/L
	U	238	99110.674				ng/L
	U 232	232	100.667				ng/L
	U 236	236	37.667				ng/L
⌜	U-tot	238	23.304	**4652.555**	45.74	1.0	ng/L
⌞>	U233	233	4270.336				ng/L
	U233 IS	233	4270.336	**84.655**	1.04	1.2	%R

010215

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 12:31:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.063
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	44.411	0.000	
	U	235	34	54.471	0.000	
	U	238	81	18.936	0.000	
	U 232	232	29	59.862	0.000	
	U 236	236	29	59.825	0.000	
⌜	U-tot	238	154	32.276	0.000	
⌞>	U233	233	4342	1.237	0.000	
	U233 IS	233	4342	1.237	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.667				ng/L
	U	235	34.000				ng/L
	U	238	80.667				ng/L
	U 232	232	29.333				ng/L
	U 236	236	29.000				ng/L
⌜	U-tot	238	0.035	**-0.490**	2.23	453.9	ng/L
⌞>	U233	233	4342.037				ng/L
	U233 IS	233	4342.037	**86.076**	1.06	1.2	%R

010216

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 12:33:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.064
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	67.756	0.000	
	U	235	52	67.891	0.000	
	U	238	1111	5.795	0.000	
	U 232	232	33	89.057	0.000	
	U 236	236	42	74.345	0.000	
⌜	U-tot	238	1205	8.732	0.000	
⌞>	U233	233	4469	1.777	0.000	
	U233 IS	233	4469	1.777	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.333				ng/L
	U	235	52.334				ng/L
	U	238	1111.068				ng/L
	U 232	232	32.667				ng/L
	U 236	236	42.000				ng/L
⌜	U-tot	238	0.270	**46.341**	4.89	10.6	ng/L
⌞>	U233	233	4469.098				ng/L
	U233 IS	233	4469.098	**88.595**	1.57	1.8	%R

010217

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 12:36:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.065
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	37.913	0.000	
	U	235	1299	2.002	0.000	
	U	238	170105	0.131	0.000	
	U 232	232	46	51.765	0.000	
	U 236	236	144	13.752	0.000	
⌜	U-tot	238	171458	0.134	0.000	
⌞>	U233	233	4377	1.869	0.000	
	U233 IS	233	4377	1.869	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.334				ng/L
	U	235	1299.093				ng/L
	U	238	170105.049				ng/L
	U 232	232	46.000				ng/L
	U 236	236	143.668				ng/L
⌜	U-tot	238	39.185	**7828.340**	155.27	2.0	ng/L
⌞>	U233	233	4376.720				ng/L
	U233 IS	233	4376.720	**86.764**	1.62	1.9	%R

010218

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 12:38:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.066
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	24	43.557	0.000	
	U	235	27	61.885	0.000	
	U	238	60	37.676	0.000	
	U 232	232	22	88.350	0.000	
	U 236	236	19	79.010	0.000	
⌈	U-tot	238	111	40.700	0.000	
⌊>	U233	233	4319	2.929	0.000	
	U233 IS	233	4319	2.929	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	24.333				ng/L
	U	235	26.667				ng/L
	U	238	60.000				ng/L
	U 232	232	22.333				ng/L
	U 236	236	19.333				ng/L
⌈	U-tot	238	0.026	**-2.477**	1.98	80.1	ng/L
⌊>	U233	233	4318.693				ng/L
	U233 IS	233	4318.693	**85.614**	2.51	2.9	%R

010219

Quantitative Analysis - Summary Report

Sample ID: 473754d10D df4

Sample Date/Time: Thursday, September 29, 2011 12:40:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d10D df4.067
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	81.627	0.000	
	U	235	1461	0.247	0.000	
	U	238	417524	0.740	0.000	
	U 232	232	480	32.935	0.000	
	U 236	236	103	29.464	0.000	
⌈	U-tot	238	419022	0.739	0.000	
⌊>	U233	233	3856	2.232	0.000	
	U233 IS	233	3856	2.232	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.667				ng/L
	U	235	1461.117				ng/L
	U	238	417523.693				ng/L
	U 232	232	480.014				ng/L
	U 236	236	103.001				ng/L
⌈	U-tot	238	108.704	**21730.359**	447.09	2.1	ng/L
⌊>	U233	233	3855.818				ng/L
	U233 IS	233	3855.818	**76.438**	1.71	2.2	%R

010220

Quantitative Analysis - Summary Report

Sample ID: 473754d10AS df4

Sample Date/Time: Thursday, September 29, 2011 12:43:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

spiked 20 uL of 1g natural uranium @ df 100 (11-064-06, 075-Rad-5012) in 10mL

TV = 20462 ng/L x df 4 = 81848 ng/L

9/30/11 NS

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473754d10AS df4.068
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	73	26.457	0.000	
	U	235	4537	4.091	0.000	
	U	238	854075	0.870	0.000	
	U 232	232	459	8.935	0.000	
	U 236	236	123	30.279	0.000	
⌈	U-tot	238	858685	0.888	0.000	
⌊>	U233	233	3879	2.407	0.000	
	U233 IS	233	3879	2.407	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	73.000				ng/L
	U	235	4536.800				ng/L
	U	238	854075.185				ng/L
	U 232	232	459.345				ng/L
	U 236	236	123.001				ng/L
⌈	U-tot	238	221.400	**44266.636**	793.86	1.8	ng/L
⌊>	U233	233	3879.495				ng/L
	U233 IS	233	3879.495	**76.907**	1.85	2.4	%R

Quantitative Analysis - Summary Report

010221

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 12:45:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.069
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	78.912	0.000	
	U	235	43	97.508	0.000	
	U	238	105	36.310	0.000	
	U 232	232	47	103.075	0.000	
	U 236	236	43	101.226	0.000	
⌈	U-tot	238	193	59.233	0.000	
⌊>	U233	233	4246	1.737	0.000	
	U233 IS	233	4246	1.737	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	43.334				ng/L
	U	238	104.667				ng/L
	U 232	232	47.334				ng/L
	U 236	236	42.667				ng/L
⌈	U-tot	238	0.045	**1.450**	5.20	358.7	ng/L
⌊>	U233	233	4246.325				ng/L
	U233 IS	233	4246.325	**84.179**	1.46	1.7	%R

010222

Quantitative Analysis - Summary Report

Sample ID: 473755d10 df4

Sample Date/Time: Thursday, September 29, 2011 12:47:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473755d10 df4.070
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	23.044	0.000	
	U	235	1544	1.231	0.000	
	U	238	409875	0.231	0.000	
	U 232	232	606	8.862	0.000	
	U 236	236	127	16.795	0.000	
⌈	U-tot	238	411482	0.232	0.000	
⌊>	U233	233	4202	1.369	0.000	
	U233 IS	233	4202	1.369	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.334				ng/L
	U	235	1544.465				ng/L
	U	238	409874.851				ng/L
	U 232	232	606.020				ng/L
	U 236	236	127.334				ng/L
⌈	U-tot	238	97.932	**19576.240**	306.48	1.6	ng/L
⌊>	U233	233	4202.304				ng/L
	U233 IS	233	4202.304	**83.306**	1.14	1.4	%R

010223

Quantitative Analysis - Summary Report

Sample ID: 473755d10D df4

Sample Date/Time: Thursday, September 29, 2011 12:50:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473755d10D df4.071
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	83	34.983	0.000	
	U	235	1554	2.092	0.000	
	U	238	403658	0.730	0.000	
	U 232	232	651	4.408	0.000	
	U 236	236	142	24.669	0.000	
⌜	U-tot	238	405295	0.739	0.000	
⌞>	U233	233	4348	4.210	0.000	
	U233 IS	233	4348	4.210	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	82.667				ng/L
	U	235	1554.133				ng/L
	U	238	403658.015				ng/L
	U 232	232	651.357				ng/L
	U 236	236	141.668				ng/L
⌜	U-tot	238	93.308	**18651.603**	679.70	3.6	ng/L
⌞>	U233	233	4348.041				ng/L
	U233 IS	233	4348.041	**86.195**	3.63	4.2	%R

010224

Quantitative Analysis - Summary Report

Sample ID: 473756d10 df2

Sample Date/Time: Thursday, September 29, 2011 12:52:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473756d10 df2.072
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	66	46.429	0.000	
	U	235	1648	3.552	0.000	
	U	238	419635	0.355	0.000	
	U 232	232	281	2.313	0.000	
	U 236	236	120	44.266	0.000	
⌜	U-tot	238	421349	0.347	0.000	
⌞>	U233	233	4208	3.254	0.000	
	U233 IS	233	4208	3.254	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.000				ng/L
	U	235	1647.816				ng/L
	U	238	419635.416				ng/L
	U 232	232	281.338				ng/L
	U 236	236	120.334				ng/L
⌜	U-tot	238	100.196	**20028.944**	597.19	3.0	ng/L
⌞>	U233	233	4207.974				ng/L
	U233 IS	233	4207.974	**83.419**	2.71	3.3	%R

010225

Quantitative Analysis - Summary Report

Sample ID: 473756d10D df2

Sample Date/Time: Thursday, September 29, 2011 12:54:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473756d10D df2.073
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	47.619	0.000	
	U	235	1764	2.584	0.000	
	U	238	468393	0.225	0.000	
	U 232	232	264	3.613	0.000	
	U 236	236	104	30.888	0.000	
⌜	U-tot	238	470201	0.232	0.000	
⌞>	U233	233	4191	1.040	0.000	
	U233 IS	233	4191	1.040	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.000				ng/L
	U	235	1764.171				ng/L
	U	238	468393.229				ng/L
	U 232	232	264.004				ng/L
	U 236	236	103.667				ng/L
⌜	U-tot	238	112.192	**22427.757**	185.75	0.8	ng/L
⌞>	U233	233	4191.299				ng/L
	U233 IS	233	4191.299	**83.088**	0.86	1.0	%R

010226

Quantitative Analysis - Summary Report

Sample ID: 473757d10 df4

Sample Date/Time: Thursday, September 29, 2011 12:56:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473757d10 df4.074
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	43	74.146	0.000	
	U	235	1472	1.502	0.000	
	U	238	361252	0.140	0.000	
	U 232	232	179	29.020	0.000	
	U 236	236	88	32.401	0.000	
⌈	U-tot	238	362767	0.141	0.000	
⌊>	U233	233	4181	3.182	0.000	
	U233 IS	233	4181	3.182	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.333				ng/L
	U	235	1472.119				ng/L
	U	238	361251.834				ng/L
	U 232	232	179.335				ng/L
	U 236	236	88.000				ng/L
⌈	U-tot	238	86.829	**17355.844**	520.45	3.0	ng/L
⌊>	U233	233	4180.628				ng/L
	U233 IS	233	4180.628	**82.877**	2.64	3.2	%R

0010227

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 12:59:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.075
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	44.096	0.000	
	U	235	47	72.235	0.000	
	U	238	108	26.759	0.000	
	U 232	232	53	68.574	0.000	
	U 236	236	39	75.861	0.000	
⌈	U-tot	238	209	41.373	0.000	
⌊>	U233	233	4280	1.318	0.000	
	U233 IS	233	4280	1.318	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.000				ng/L
	U	235	46.667				ng/L
	U	238	108.334				ng/L
	U 232	232	52.667				ng/L
	U 236	236	39.333				ng/L
⌈	U-tot	238	0.049	**2.174**	4.03	185.2	ng/L
⌊>	U233	233	4280.007				ng/L
	U233 IS	233	4280.007	**84.847**	1.12	1.3	%R

010228

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 13:01:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.076
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	60.091	0.000	
	U	235	46	64.760	0.000	
	U	238	1075	5.421	0.000	
	U 232	232	35	84.921	0.000	
	U 236	236	41	76.596	0.000	
⌜	U-tot	238	1163	9.582	0.000	
⌞>	U233	233	4539	0.680	0.000	
	U233 IS	233	4539	0.680	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.000				ng/L
	U	235	46.333				ng/L
	U	238	1075.397				ng/L
	U 232	232	35.333				ng/L
	U 236	236	41.333				ng/L
⌜	U-tot	238	0.256	**43.623**	4.62	10.6	ng/L
⌞>	U233	233	4539.466				ng/L
	U233 IS	233	4539.466	**89.990**	0.61	0.7	%R

010229

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 13:03:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.077
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	45.474	0.000	
	U	235	1266	3.527	0.000	
	U	238	172813	0.559	0.000	
	U 232	232	41	79.969	0.000	
	U 236	236	132	17.850	0.000	
⌈	U-tot	238	174126	0.584	0.000	
⌊>	U233	233	4362	1.531	0.000	
	U233 IS	233	4362	1.531	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.667				ng/L
	U	235	1266.422				ng/L
	U	238	172813.109				ng/L
	U 232	232	41.000				ng/L
	U 236	236	131.668				ng/L
⌈	U-tot	238	39.923	**7975.905**	86.35	1.1	ng/L
⌊>	U233	233	4362.046				ng/L
	U233 IS	233	4362.046	**86.473**	1.32	1.5	%R

010230

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 13:06:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.078
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	48.984	0.000	
	U	235	36	55.486	0.000	
	U	238	71	27.195	0.000	
	U 232	232	28	61.587	0.000	
	U 236	236	37	63.326	0.000	
⌜	U-tot	238	148	38.513	0.000	
⌞>	U233	233	4260	0.342	0.000	
	U233 IS	233	4260	0.342	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.333				ng/L
	U	235	36.000				ng/L
	U	238	71.334				ng/L
	U 232	232	27.667				ng/L
	U 236	236	37.000				ng/L
⌜	U-tot	238	0.035	**-0.652**	2.66	407.4	ng/L
⌞>	U233	233	4259.664				ng/L
	U233 IS	233	4259.664	**84.443**	0.29	0.3	%R

010231

Quantitative Analysis - Summary Report

Sample ID: 473757d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:08:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473757d10D df4.079
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	25.471	0.000	
	U	235	1319	0.263	0.000	
	U	238	325098	0.526	0.000	
	U 232	232	120	0.833	0.000	
	U 236	236	64	10.098	0.000	
⌜	U-tot	238	326440	0.523	0.000	
⌞>	U233	233	4272	1.523	0.000	
	U233 IS	233	4272	1.523	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.667				ng/L
	U	235	1319.096				ng/L
	U	238	325098.210				ng/L
	U 232	232	120.001				ng/L
	U 236	236	63.667				ng/L
⌜	U-tot	238	76.433	**15277.009**	271.64	1.8	ng/L
⌞>	U233	233	4271.670				ng/L
	U233 IS	233	4271.670	**84.681**	1.29	1.5	%R

010232

Quantitative Analysis - Summary Report

Sample ID: 473758d10

Sample Date/Time: Thursday, September 29, 2011 13:10:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473758d10 .080
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	51.256	0.000	
	U	235	1705	5.884	0.000	
	U	238	452805	2.038	0.000	
	U 232	232	192	19.792	0.000	
	U 236	236	98	23.470	0.000	
⌜	U-tot	238	454554	2.057	0.000	
⌞>	U233	233	3902	1.435	0.000	
	U233 IS	233	3902	1.435	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	1704.827				ng/L
	U	238	452804.647				ng/L
	U 232	232	192.002				ng/L
	U 236	236	98.001				ng/L
⌜	U-tot	238	116.494	**23288.133**	450.90	1.9	ng/L
⌞>	U233	233	3902.171				ng/L
	U233 IS	233	3902.171	**77.356**	1.11	1.4	%R

010233

Quantitative Analysis - Summary Report

Sample ID: 473758d10D

Sample Date/Time: Thursday, September 29, 2011 13:13:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473758d10D.081
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	36.261	0.000	
	U	235	1535	4.194	0.000	
	U	238	387610	1.499	0.000	
	U 232	232	210	28.528	0.000	
	U 236	236	97	36.329	0.000	
⌜	U-tot	238	389190	1.513	0.000	
⌞>	U233	233	3808	2.184	0.000	
	U233 IS	233	3808	2.184	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.667				ng/L
	U	235	1535.130				ng/L
	U	238	387610.307				ng/L
	U 232	232	210.003				ng/L
	U 236	236	97.334				ng/L
⌜	U-tot	238	102.213	**20432.278**	233.99	1.1	ng/L
⌞>	U233	233	3808.131				ng/L
	U233 IS	233	3808.131	**75.492**	1.65	2.2	%R

010234

Quantitative Analysis - Summary Report

Sample ID: 473768d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:15:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473768d10 df4.082
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	73	23.690	0.000	
	U	235	1608	2.116	0.000	
	U	238	448933	0.933	0.000	
	U 232	232	74	29.328	0.000	
	U 236	236	133	6.683	0.000	
⌜	U-tot	238	450613	0.927	0.000	
⌞>	U233	233	4233	0.253	0.000	
	U233 IS	233	4233	0.253	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	72.667				ng/L
	U	235	1607.809				ng/L
	U	238	448932.554				ng/L
	U 232	232	74.000				ng/L
	U 236	236	133.001				ng/L
⌜	U-tot	238	106.445	**21278.607**	209.80	1.0	ng/L
⌞>	U233	233	4233.319				ng/L
	U233 IS	233	4233.319	**83.921**	0.21	0.3	%R

010235

Quantitative Analysis - Summary Report

Sample ID: 473768d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:17:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473768d10D df4.083
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	65	25.186	0.000	
	U	235	1521	4.597	0.000	
	U	238	420971	0.638	0.000	
	U 232	232	131	66.311	0.000	
	U 236	236	126	10.133	0.000	
⌜	U-tot	238	422557	0.648	0.000	
⌞>	U233	233	4297	2.136	0.000	
	U233 IS	233	4297	2.136	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	65.000				ng/L
	U	235	1521.127				ng/L
	U	238	420970.922				ng/L
	U 232	232	131.335				ng/L
	U 236	236	126.001				ng/L
⌜	U-tot	238	98.367	**19663.154**	310.31	1.6	ng/L
⌞>	U233	233	4296.682				ng/L
	U233 IS	233	4296.682	**85.177**	1.82	2.1	%R

010236

Quantitative Analysis - Summary Report

Sample ID: 473769d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:20:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473769d10 df4.084
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	25.258	0.000	
	U	235	1442	3.255	0.000	
	U	238	389871	0.412	0.000	
	U 232	232	114	23.878	0.000	
	U 236	236	102	26.853	0.000	
⌜	U-tot	238	391355	0.419	0.000	
⌞>	U233	233	4228	1.034	0.000	
	U233 IS	233	4228	1.034	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	42.333				ng/L
	U	235	1441.781				ng/L
	U	238	389871.233				ng/L
	U 232	232	114.001				ng/L
	U 236	236	101.667				ng/L
⌜	U-tot	238	92.572	**18504.446**	267.77	1.4	ng/L
⌞>	U233	233	4227.983				ng/L
	U233 IS	233	4227.983	**83.815**	0.87	1.0	%R

Quantitative Analysis - Summary Report

Sample ID: 473769d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:22:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473769d10D df4.085
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	44.600	0.000	
	U	235	1448	1.800	0.000	
	U	238	388564	0.929	0.000	
	U 232	232	73	14.453	0.000	
	U 236	236	89	19.610	0.000	
⌈	U-tot	238	390054	0.934	0.000	
⌊>	U233	233	4231	0.970	0.000	
	U233 IS	233	4231	0.970	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.667				ng/L
	U	235	1448.115				ng/L
	U	238	388564.388				ng/L
	U 232	232	73.334				ng/L
	U 236	236	88.667				ng/L
⌈	U-tot	238	92.191	**18428.225**	302.60	1.6	ng/L
⌊>	U233	233	4231.318				ng/L
	U233 IS	233	4231.318	**83.882**	0.81	1.0	%R

010238

Quantitative Analysis - Summary Report

Sample ID: 473770d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:25:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473770d10 df4.086
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	36	56.495	0.000	
	U	235	1692	2.085	0.000	
	U	238	441139	0.751	0.000	
	U 232	232	107	11.341	0.000	
	U 236	236	102	17.075	0.000	
⌜	U-tot	238	442867	0.760	0.000	
⌞>	U233	233	4307	0.845	0.000	
	U233 IS	233	4307	0.845	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.333				ng/L
	U	235	1691.824				ng/L
	U	238	441139.039				ng/L
	U 232	232	106.667				ng/L
	U 236	236	102.334				ng/L
⌜	U-tot	238	102.821	**20553.839**	213.74	1.0	ng/L
⌞>	U233	233	4307.354				ng/L
	U233 IS	233	4307.354	**85.389**	0.72	0.8	%R

010239

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 13:27:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.087
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	73.532	0.000	
	U	235	19	124.604	0.000	
	U	238	79	52.109	0.000	
	U 232	232	26	94.582	0.000	
	U 236	236	15	106.233	0.000	
⌜	U-tot	238	127	67.933	0.000	
⌞>	U233	233	4284	2.582	0.000	
	U233 IS	233	4284	2.582	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.667				ng/L
	U	235	19.333				ng/L
	U	238	78.667				ng/L
	U 232	232	26.333				ng/L
	U 236	236	15.333				ng/L
⌜	U-tot	238	0.029	**-1.721**	3.85	223.8	ng/L
⌞>	U233	233	4284.343				ng/L
	U233 IS	233	4284.343	**84.933**	2.19	2.6	%R

010240

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 13:29:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.088
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	26.687	0.000	
	U	235	60	22.048	0.000	
	U	238	1129	2.737	0.000	
	U 232	232	49	12.245	0.000	
	U 236	236	45	24.762	0.000	
⌜	U-tot	238	1238	4.594	0.000	
⌞>	U233	233	4450	0.715	0.000	
	U233 IS	233	4450	0.715	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.000				ng/L
	U	235	60.000				ng/L
	U	238	1128.737				ng/L
	U 232	232	49.000				ng/L
	U 236	236	44.667				ng/L
⌜	U-tot	238	0.278	**48.048**	2.90	6.0	ng/L
⌞>	U233	233	4450.422				ng/L
	U233 IS	233	4450.422	**88.225**	0.63	0.7	%R

010241

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 13:32:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.089
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	13.798	0.000	
	U	235	1255	1.641	0.000	
	U	238	170586	0.676	0.000	
	U 232	232	33	38.762	0.000	
	U 236	236	134	9.935	0.000	
⌜	U-tot	238	171890	0.675	0.000	
⌞>	U233	233	4407	2.284	0.000	
	U233 IS	233	4407	2.284	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.333				ng/L
	U	235	1255.420				ng/L
	U	238	170585.641				ng/L
	U 232	232	32.667				ng/L
	U 236	236	133.668				ng/L
⌜	U-tot	238	39.015	**7794.359**	196.19	2.5	ng/L
⌞>	U233	233	4407.402				ng/L
	U233 IS	233	4407.402	**87.372**	2.00	2.3	%R

010242

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 13:34:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.090
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	24.691	0.000	
	U	235	7	79.540	0.000	
	U	238	54	6.544	0.000	
	U 232	232	9	34.442	0.000	
	U 236	236	6	119.556	0.000	
⌜	U-tot	238	76	3.947	0.000	
⌞>	U233	233	4236	0.674	0.000	
	U233 IS	233	4236	0.674	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	7.000				ng/L
	U	238	53.667				ng/L
	U 232	232	9.333				ng/L
	U 236	236	6.333				ng/L
⌜	U-tot	238	0.018	**-3.992**	0.16	4.1	ng/L
⌞>	U233	233	4235.653				ng/L
	U233 IS	233	4235.653	**83.967**	0.57	0.7	%R

010243

Quantitative Analysis - Summary Report

Sample ID: 473770d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:36:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473770d10D df4.091
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	56	56.441	0.000	
	U	235	1673	4.306	0.000	
	U	238	447439	0.711	0.000	
	U 232	232	82	35.155	0.000	
	U 236	236	110	32.321	0.000	
⌜	U-tot	238	449167	0.723	0.000	
⌞>	U233	233	4320	1.391	0.000	
	U233 IS	233	4320	1.391	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	56.000				ng/L
	U	235	1672.821				ng/L
	U	238	447438.619				ng/L
	U 232	232	82.000				ng/L
	U 236	236	110.001				ng/L
⌜	U-tot	238	103.988	**20787.319**	353.11	1.7	ng/L
⌞>	U233	233	4320.026				ng/L
	U233 IS	233	4320.026	**85.640**	1.19	1.4	%R

010244

Quantitative Analysis - Summary Report

Sample ID: 473771d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:39:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473771d10 df4.092
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	35	52.594	0.000	
	U	235	1725	0.659	0.000	
	U	238	466446	0.613	0.000	
	U 232	232	111	44.829	0.000	
	U 236	236	89	25.924	0.000	
⌜	U-tot	238	468207	0.613	0.000	
⌞>	U233	233	4278	1.806	0.000	
	U233 IS	233	4278	1.806	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	35.333				ng/L
	U	235	1725.497				ng/L
	U	238	466446.438				ng/L
	U 232	232	111.001				ng/L
	U 236	236	89.334				ng/L
⌜	U-tot	238	109.472	**21883.837**	310.84	1.4	ng/L
⌞>	U233	233	4277.673				ng/L
	U233 IS	233	4277.673	**84.800**	1.53	1.8	%R

010245

Quantitative Analysis - Summary Report

Sample ID: 473771d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:41:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473771d10D df4.093
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	38.172	0.000	
	U	235	1770	1.474	0.000	
	U	238	466477	1.356	0.000	
	U 232	232	74	50.437	0.000	
	U 236	236	100	16.127	0.000	
⌜	U-tot	238	468280	1.358	0.000	
⌞>	U233	233	4346	1.814	0.000	
	U233 IS	233	4346	1.814	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	32.333				ng/L
	U	235	1769.839				ng/L
	U	238	466477.381				ng/L
	U 232	232	74.000				ng/L
	U 236	236	99.667				ng/L
⌜	U-tot	238	107.746	**21538.867**	108.42	0.5	ng/L
⌞>	U233	233	4346.372				ng/L
	U233 IS	233	4346.372	**86.162**	1.56	1.8	%R

010246

Quantitative Analysis - Summary Report

Sample ID: 473772d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:43:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473772d10 df4.094
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	62.291	0.000	
	U	235	1555	2.037	0.000	
	U	238	430116	0.621	0.000	
	U 232	232	186	16.405	0.000	
	U 236	236	105	24.634	0.000	
⌈	U-tot	238	431720	0.632	0.000	
⌊>	U233	233	4240	1.420	0.000	
	U233 IS	233	4240	1.420	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.334				ng/L
	U	235	1554.800				ng/L
	U	238	430115.746				ng/L
	U 232	232	186.002				ng/L
	U 236	236	105.001				ng/L
⌈	U-tot	238	101.821	**20353.933**	175.28	0.9	ng/L
⌊>	U233	233	4240.322				ng/L
	U233 IS	233	4240.322	**84.060**	1.19	1.4	%R

010247

Quantitative Analysis - Summary Report

Sample ID: 473772d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:46:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473772d10D df4.095
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	34.242	0.000	
	U	235	1605	3.420	0.000	
	U	238	437698	1.211	0.000	
	U 232	232	132	16.921	0.000	
	U 236	236	114	13.245	0.000	
⌜	U-tot	238	439351	1.222	0.000	
⌞>	U233	233	4233	0.580	0.000	
	U233 IS	233	4233	0.580	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.000				ng/L
	U	235	1605.475				ng/L
	U	238	437698.145				ng/L
	U 232	232	131.668				ng/L
	U 236	236	114.334				ng/L
⌜	U-tot	238	103.798	**20749.301**	150.33	0.7	ng/L
⌞>	U233	233	4232.652				ng/L
	U233 IS	233	4232.652	**83.908**	0.49	0.6	%R

010248

Quantitative Analysis - Summary Report

Sample ID: 473778d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:48:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473778d10 df4.096
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	57	36.967	0.000	
	U	235	1357	1.438	0.000	
	U	238	369366	0.437	0.000	
	U 232	232	253	3.834	0.000	
	U 236	236	101	16.926	0.000	
⌜	U-tot	238	370780	0.431	0.000	
⌞>	U233	233	4256	2.212	0.000	
	U233 IS	233	4256	2.212	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.000				ng/L
	U	235	1356.768				ng/L
	U	238	369366.421				ng/L
	U 232	232	253.337				ng/L
	U 236	236	100.667				ng/L
⌜	U-tot	238	87.146	**17419.322**	454.50	2.6	ng/L
⌞>	U233	233	4256.330				ng/L
	U233 IS	233	4256.330	**84.377**	1.87	2.2	%R

010249

Quantitative Analysis - Summary Report

Sample ID: 473778d10D df4

Sample Date/Time: Thursday, September 29, 2011 13:50:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473778d10D df4.097
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	60	13.229	0.000	
	U	235	1401	1.426	0.000	
	U	238	389821	0.121	0.000	
	U 232	232	172	19.318	0.000	
	U 236	236	117	0.990	0.000	
⌜	U-tot	238	391283	0.118	0.000	
⌞>	U233	233	4377	2.503	0.000	
	U233 IS	233	4377	2.503	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.000				ng/L
	U	235	1401.108				ng/L
	U	238	389821.416				ng/L
	U 232	232	172.335				ng/L
	U 236	236	116.667				ng/L
⌜	U-tot	238	89.437	**17877.465**	433.82	2.4	ng/L
⌞>	U233	233	4376.720				ng/L
	U233 IS	233	4376.720	**86.764**	2.17	2.5	%R

010250

Quantitative Analysis - Summary Report

Sample ID: 473045d10 df4

Sample Date/Time: Thursday, September 29, 2011 13:53:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473045d10 df4.098
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	29.572	0.000	
	U	235	1946	2.642	0.000	
	U	238	490393	0.702	0.000	
	U 232	232	289	7.583	0.000	
	U 236	236	97	18.557	0.000	
⌈	U-tot	238	492380	0.709	0.000	
⌊>	U233	233	4313	2.431	0.000	
	U233 IS	233	4313	2.431	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.000				ng/L
	U	235	1945.875				ng/L
	U	238	490392.701				ng/L
	U 232	232	289.338				ng/L
	U 236	236	97.001				ng/L
⌈	U-tot	238	114.187	**22826.718**	434.89	1.9	ng/L
⌊>	U233	233	4313.357				ng/L
	U233 IS	233	4313.357	**85.508**	2.08	2.4	%R

010251

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 13:55:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.099
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	33.479	0.000	
	U	235	45	44.005	0.000	
	U	238	104	28.848	0.000	
	U 232	232	43	41.560	0.000	
	U 236	236	41	47.307	0.000	
⌜	U-tot	238	192	32.162	0.000	
⌞>	U233	233	4249	0.554	0.000	
	U233 IS	233	4249	0.554	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.000				ng/L
	U	235	44.667				ng/L
	U	238	103.667				ng/L
	U 232	232	43.333				ng/L
	U 236	236	41.333				ng/L
⌜	U-tot	238	0.045	**1.462**	2.86	195.9	ng/L
⌞>	U233	233	4248.659				ng/L
	U233 IS	233	4248.659	**84.225**	0.47	0.6	%R

010252

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 13:57:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.100
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	68.200	0.000	
	U	235	48	57.980	0.000	
	U	238	1079	4.959	0.000	
	U 232	232	39	61.979	0.000	
	U 236	236	40	83.217	0.000	
⌜	U-tot	238	1164	8.998	0.000	
⌞>	U233	233	4413	1.089	0.000	
	U233 IS	233	4413	1.089	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.667				ng/L
	U	235	48.333				ng/L
	U	238	1079.064				ng/L
	U 232	232	38.667				ng/L
	U 236	236	40.000				ng/L
⌜	U-tot	238	0.264	**45.137**	4.19	9.3	ng/L
⌞>	U233	233	4413.071				ng/L
	U233 IS	233	4413.071	**87.485**	0.95	1.1	%R

010253

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 14:00:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.101
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	53.583	0.000	
	U	235	1274	3.808	0.000	
	U	238	169733	0.729	0.000	
	U 232	232	32	52.608	0.000	
	U 236	236	144	17.503	0.000	
⌜	U-tot	238	171060	0.755	0.000	
⌞>	U233	233	4346	3.487	0.000	
	U233 IS	233	4346	3.487	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.334				ng/L
	U	235	1274.423				ng/L
	U	238	169732.909				ng/L
	U 232	232	32.333				ng/L
	U 236	236	143.668				ng/L
⌜	U-tot	238	39.389	**7869.190**	284.28	3.6	ng/L
⌞>	U233	233	4346.373				ng/L
	U233 IS	233	4346.373	**86.162**	3.00	3.5	%R

010254

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 14:02:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.102
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	26.593	0.000	
	U	235	43	32.558	0.000	
	U	238	94	18.911	0.000	
	U 232	232	38	27.850	0.000	
	U 236	236	43	20.812	0.000	
⌈	U-tot	238	182	21.974	0.000	
⌊>	U233	233	4302	0.985	0.000	
	U233 IS	233	4302	0.985	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.333				ng/L
	U	235	43.000				ng/L
	U	238	94.000				ng/L
	U 232	232	38.000				ng/L
	U 236	236	43.333				ng/L
⌈	U-tot	238	0.042	**0.883**	1.78	201.8	ng/L
⌊>	U233	233	4302.351				ng/L
	U233 IS	233	4302.351	**85.290**	0.84	1.0	%R

010255

Quantitative Analysis - Summary Report

Sample ID: 473045d10D df4

Sample Date/Time: Thursday, September 29, 2011 14:04:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\473045d10D df4.103
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	57	72.992	0.000	
	U	235	1975	1.772	0.000	
	U	238	510357	0.190	0.000	
	U 232	232	602	4.271	0.000	
	U 236	236	128	40.237	0.000	
⌜	U-tot	238	512389	0.197	0.000	
⌞>	U233	233	4280	1.904	0.000	
	U233 IS	233	4280	1.904	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.000				ng/L
	U	235	1974.881				ng/L
	U	238	510356.753				ng/L
	U 232	232	601.687				ng/L
	U 236	236	128.334				ng/L
⌜	U-tot	238	119.746	**23938.393**	458.67	1.9	ng/L
⌞>	U233	233	4280.008				ng/L
	U233 IS	233	4280.008	**84.847**	1.62	1.9	%R

010256

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, September 29, 2011 14:07:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\zzz.104
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	8.628	0.000	
	U	235	58	21.682	0.000	
	U	238	120	7.765	0.000	
	U 232	232	47	21.141	0.000	
	U 236	236	45	27.756	0.000	
⌈	U-tot	238	236	11.181	0.000	
⌊>	U233	233	4442	1.212	0.000	
	U233 IS	233	4442	1.212	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.334				ng/L
	U	235	57.667				ng/L
	U	238	119.667				ng/L
	U 232	232	46.667				ng/L
	U 236	236	45.000				ng/L
⌈	U-tot	238	0.053	**3.024**	1.13	37.4	ng/L
⌊>	U233	233	4442.419				ng/L
	U233 IS	233	4442.419	**88.066**	1.07	1.2	%R

010257

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, September 29, 2011 14:09:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\critotU.105
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	43.973	0.000	
	U	235	40	36.802	0.000	
	U	238	1085	2.094	0.000	
	U 232	232	31	50.496	0.000	
	U 236	236	26	60.901	0.000	
⌈	U-tot	238	1163	2.232	0.000	
⌊>	U233	233	4549	2.370	0.000	
	U233 IS	233	4549	2.370	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.667				ng/L
	U	235	40.333				ng/L
	U	238	1085.398				ng/L
	U 232	232	31.333				ng/L
	U 236	236	25.667				ng/L
⌈	U-tot	238	0.256	**43.569**	1.05	2.4	ng/L
⌊>	U233	233	4549.138				ng/L
	U233 IS	233	4549.138	**90.182**	2.14	2.4	%R

010258

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, September 29, 2011 14:11:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccv.106
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	74	72.973	0.000	
	U	235	1359	1.987	0.000	
	U	238	175152	1.032	0.000	
	U 232	232	59	82.179	0.000	
	U 236	236	183	24.668	0.000	
⌜	U-tot	238	176586	1.045	0.000	
⌞>	U233	233	4506	2.343	0.000	
	U233 IS	233	4506	2.343	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	74.334				ng/L
	U	235	1359.435				ng/L
	U	238	175151.986				ng/L
	U 232	232	58.667				ng/L
	U 236	236	182.669				ng/L
⌜	U-tot	238	39.197	**7830.777**	121.75	1.6	ng/L
⌞>	U233	233	4506.117				ng/L
	U233 IS	233	4506.117	**89.329**	2.09	2.3	%R

010259

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, September 29, 2011 14:14:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 sep 3\ccb.107
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	100	27.645	0.000	
	U	235	86	17.957	0.000	
	U	238	150	15.591	0.000	
	U 232	232	86	34.014	0.000	
	U 236	236	101	15.174	0.000	
⌜	U-tot	238	337	12.760	0.000	
⌞>	U233	233	4557	0.768	0.000	
	U233 IS	233	4557	0.768	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	100.334				ng/L
	U	235	86.334				ng/L
	U	238	150.335				ng/L
	U 232	232	86.334				ng/L
	U 236	236	100.667				ng/L
⌜	U-tot	238	0.074	**7.199**	1.78	24.8	ng/L
⌞>	U233	233	4557.142				ng/L
	U233 IS	233	4557.142	**90.341**	0.69	0.8	%R

010260

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☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Utot

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's **TVs**

S0	11-095-07	
STD. 1	11-091-04	44933 ng/L
I. STD	02-415-08	0.2ppb
I. STD		

QC STD. ID's

ICV/CCV	11-097-05	7666 ng/L
UCL		
CRI	11-097-06	40 ng/L
ICSA	11-097-03	—
ICSAB	11-097-04	20444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526-05-006	Fluor	110825-10 110915-9	10/10/11	~~liquid~~ (RE) JR 10/13/11 SO	15 00132- 15 00140

INSTRUMENT: DRCII FILENAME: 111010.rep

Analyst: M. Seeley Date: 10/10/11 ☐ CONVERTED (.DAT)

010261

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Monday, October 10, 2011 08:39:24
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Daily Performance Check.885
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

MSeiler 10/10/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	6820.2	6820.158	68.693	1.0
	In	114.9	26373.8	26373.803	198.238	0.8
	U	238.1	26592.2	26592.238	188.632	0.7
⌈>	Ce	139.9	26000.8	26000.796	73.209	0.3
⌊	CeO	155.9	1274.1	0.049	0.001	2.4
⌈>	Ba	137.9	213310.2	213310.180	1776.561	0.8
⌊	Ba++	69.0	5247.9	0.025	0.000	0.9
	Bkgd	220.0	3.0	3.000	1.034	34.5
	Bkgd	8.5	44.9	44.867	2.523	5.6

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

10/13/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	4.5	533.0
Co	59	45	5.0	15970.0
In	115	45	5.8	26132.5

010262

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Monday, October 10, 2011 08:39:24
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Daily Performance Check.885
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

MSeiler
10/10/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2760	2035	0.713	
Mg	23.985	23.925	5650	2046	0.687	
Ar2	75.930	75.925	18319	2079	0.694	
In	114.904	114.925	27802	2108	0.690	
Ce	139.905	139.875	33887	2117	0.697	
Pb	207.977	208.025	50482	2157	0.705	
Th	232.038	232.075	56335	2176	0.699	
U	238.050	238.025	57798	2184	0.696	

010263

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Monday, October 10, 2011 12:28:32
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Procassing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\S-0.896
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	24.037	0.000	
	U	235	13	33.530	0.000	
	U	238	29	5.973	0.000	
	U 232	232	16	25.490	0.000	
	U 236	236	8	32.825	0.000	
⌈	U-tot	238	57	12.281	0.000	
⌊>	U233	233	4299	2.026	0.000	
	U233 IS	233	4299	2.026	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.000				ng/L
	U	235	13.000				ng/L
	U	238	29.000				ng/L
	U 232	232	16.333				ng/L
	U 236	236	7.667				ng/L
⌈	U-tot	238	0.013				ng/L
⌊>	U233	233	4299.017				ng/L
	U233 IS	233	4299.017	**100.000**	2.03	2.0	%R

010264

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Monday, October 10, 2011 12:30:50
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\S-1.897
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	8.838	0.000	
	U	235	7161	2.475	0.000	
	U	238	986798	0.846	0.000	
	U 232	232	10	15.802	0.000	
	U 236	236	219	8.134	0.000	
⌜	U-tot	238	994022	0.850	0.000	
⌞>	U233	233	4445	1.372	0.000	
	U233 IS	233	4445	1.372	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.000				ng/L
	U	235	7161.154				ng/L
	U	238	986798.097				ng/L
	U 232	232	9.667				ng/L
	U 236	236	218.669				ng/L
⌜	U-tot	238	223.654	**44933.000**	407.69	0.9	ng/L
⌞>	U233	233	4444.753				ng/L
	U233 IS	233	4444.753	**103.390**	1.42	1.4	%R

010265

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Monday, October 10, 2011 12:33:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icv.898
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	24.662	0.000	
	U	235	1344	3.200	0.000	
	U	238	175547	0.486	0.000	
	U 232	232	16	24.166	0.000	
	U 236	236	133	12.393	0.000	
⌈	U-tot	238	176920	0.506	0.000	
⌊>	U233	233	4347	1.935	0.000	
	U233 IS	233	4347	1.935	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	29.333				ng/L
	U	235	1344.099				ng/L
	U	238	175546.734				ng/L
	U 232	232	15.667				ng/L
	U 236	236	132.668				ng/L
⌈	U-tot	238	40.710	**8176.597**	121.92	1.5	ng/L
⌊>	U233	233	4346.706				ng/L
	U233 IS	233	4346.706	**101.109**	1.96	1.9	%R

010266

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Monday, October 10, 2011 12:35:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icb.899
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	20	15.534	0.000	
	U	235	10	5.587	0.000	
	U	238	51	21.209	0.000	
	U 232	232	17	46.632	0.000	
	U 236	236	11	13.478	0.000	
⌈	U-tot	238	81	14.238	0.000	
⌊>	U233	233	4195	0.321	0.000	
	U233 IS	233	4195	0.321	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	19.667				ng/L
	U	235	10.333				ng/L
	U	238	51.000				ng/L
	U 232	232	17.333				ng/L
	U 236	236	11.333				ng/L
⌈	U-tot	238	0.019	**1.218**	0.55	45.1	ng/L
⌊>	U233	233	4194.968				ng/L
	U233 IS	233	4194.968	**97.580**	0.31	0.3	%R

010267

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 12:37:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.900
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	19	13.482	0.000	
	U	235	20	30.000	0.000	
	U	238	938	1.879	0.000	
	U 232	232	15	17.638	0.000	
	U 236	236	9	38.490	0.000	
⌈	U-tot	238	976	1.301	0.000	
⌊>	U233	233	4349	2.212	0.000	
	U233 IS	233	4349	2.212	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	18.667				ng/L
	U	235	20.000				ng/L
	U	238	937.715				ng/L
	U 232	232	15.000				ng/L
	U 236	236	9.000				ng/L
⌈	U-tot	238	0.225	**42.451**	0.41	1.0	ng/L
⌊>	U233	233	4349.040				ng/L
	U233 IS	233	4349.040	**101.164**	2.24	2.2	%R

010268

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Monday, October 10, 2011 12:40:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icsa.901
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	20.000	0.000	
	U	235	31	7.531	0.000	
	U	238	438	8.208	0.000	
	U 232	232	266	5.535	0.000	
	U 236	236	7	31.225	0.000	
⌜	U-tot	238	483	7.690	0.000	
⌞>	U233	233	3148	1.796	0.000	
	U233 IS	233	3148	1.796	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.000				ng/L
	U	235	30.667				ng/L
	U	238	437.677				ng/L
	U 232	232	266.337				ng/L
	U 236	236	6.667				ng/L
⌜	U-tot	238	0.154	**28.226**	2.90	10.3	ng/L
⌞>	U233	233	3147.545				ng/L
	U233 IS	233	3147.545	**73.215**	1.31	1.8	%R

010269

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Monday, October 10, 2011 12:42:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icsab.902
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	13.622	0.000	
	U	235	2372	1.193	0.000	
	U	238	324315	0.352	0.000	
	U 232	232	246	4.502	0.000	
	U 236	236	10	10.000	0.000	
⌈	U-tot	238	326718	0.357	0.000	
⌊>	U233	233	3133	1.171	0.000	
	U233 IS	233	3133	1.171	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	32.000				ng/L
	U	235	2371.643				ng/L
	U	238	324314.563				ng/L
	U 232	232	245.670				ng/L
	U 236	236	10.000				ng/L
⌈	U-tot	238	104.283	**20949.501**	194.47	0.9	ng/L
⌊>	U233	233	3133.207				ng/L
	U233 IS	233	3133.207	**72.882**	0.85	1.2	%R

010270

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 12:44:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.903
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	8.813	0.000	
	U	235	13	22.790	0.000	
	U	238	32	3.646	0.000	
	U 232	232	18	3.149	0.000	
	U 236	236	8	54.486	0.000	
⌈	U-tot	238	62	3.376	0.000	
⌊>	U233	233	4297	2.270	0.000	
	U233 IS	233	4297	2.270	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.333				ng/L
	U	235	12.667				ng/L
	U	238	31.667				ng/L
	U 232	232	18.333				ng/L
	U 236	236	8.000				ng/L
⌈	U-tot	238	0.014	**0.223**	0.11	47.7	ng/L
⌊>	U233	233	4297.016				ng/L
	U233 IS	233	4297.016	**99.953**	2.27	2.3	%R

010271

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 12:47:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.904
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	3.363	0.000	
	U	235	1264	3.332	0.000	
	U	238	173116	0.502	0.000	
	U 232	232	15	10.415	0.000	
	U 236	236	118	5.557	0.000	
⌈	U-tot	238	174415	0.522	0.000	
⌊>	U233	233	4304	2.559	0.000	
	U233 IS	233	4304	2.559	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.333				ng/L
	U	235	1264.421				ng/L
	U	238	173116.120				ng/L
	U 232	232	14.667				ng/L
	U 236	236	118.001				ng/L
⌈	U-tot	238	40.539	**8142.279**	221.09	2.7	ng/L
⌊>	U233	233	4304.353				ng/L
	U233 IS	233	4304.353	**100.124**	2.56	2.6	%R

010272

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 12:49:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.905
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	50.258	0.000	
	U	235	13	27.735	0.000	
	U	238	37	23.406	0.000	
	U 232	232	11	5.413	0.000	
	U 236	236	10	22.349	0.000	
⌜	U-tot	238	65	26.304	0.000	
⌞>	U233	233	4340	1.042	0.000	
	U233 IS	233	4340	1.042	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	14.667				ng/L
	U	235	13.000				ng/L
	U	238	37.000				ng/L
	U 232	232	10.667				ng/L
	U 236	236	10.333				ng/L
⌜	U-tot	238	0.015	**0.338**	0.82	242.6	ng/L
⌞>	U233	233	4339.702				ng/L
	U233 IS	233	4339.702	**100.946**	1.05	1.0	%R

010273

Quantitative Analysis - Summary Report

Sample ID: Blankd14 df4

Sample Date/Time: Monday, October 10, 2011 12:51:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Blankd14 df4.906
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	33	10.497	0.000	
	U	235	1781	0.816	0.000	
	U	238	537782	0.964	0.000	
	U 232	232	20	52.915	0.000	
	U 236	236	114	10.435	0.000	
⌜	U-tot	238	539597	0.963	0.000	
⌞>	U233	233	4260	0.729	0.000	
	U233 IS	233	4260	0.729	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	33.000				ng/L
	U	235	1781.174				ng/L
	U	238	537782.485				ng/L
	U 232	232	20.000				ng/L
	U 236	236	114.334				ng/L
⌜	U-tot	238	126.669	**25447.182**	274.67	1.1	ng/L
⌞>	U233	233	4259.998				ng/L
	U233 IS	233	4259.998	**99.092**	0.72	0.7	%R

010274

Quantitative Analysis - Summary Report

Sample ID: 473754d14 df4

Sample Date/Time: Monday, October 10, 2011 12:53:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d14 df4.907
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	33	8.017	0.000	
	U	235	1541	1.007	0.000	
	U	238	440669	0.631	0.000	
	U 232	232	681	5.822	0.000	
	U 236	236	97	10.964	0.000	
⌈	U-tot	238	442243	0.628	0.000	
⌊>	U233	233	3861	0.807	0.000	
	U233 IS	233	3861	0.807	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	33.000				ng/L
	U	235	1541.131				ng/L
	U	238	440668.582				ng/L
	U 232	232	680.692				ng/L
	U 236	236	96.667				ng/L
⌈	U-tot	238	114.529	**23007.988**	133.56	0.6	ng/L
⌊>	U233	233	3861.487				ng/L
	U233 IS	233	3861.487	**89.823**	0.72	0.8	%R

010275

Quantitative Analysis - Summary Report

Sample ID: 473754d14L df20

Sample Date/Time: Monday, October 10, 2011 12:56:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Procassing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d14L df20.908
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	18	31.492	0.000	
	U	235	342	2.489	0.000	
	U	238	92178	0.343	0.000	
	U 232	232	161	10.642	0.000	
	U 236	236	33	24.804	0.000	
⌜	U-tot	238	92538	0.346	0.000	
⌞>	U233	233	4176	0.984	0.000	
	U233 IS	233	4176	0.984	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	18.333				ng/L
	U	235	341.673				ng/L
	U	238	92178.306				ng/L
	U 232	232	160.668				ng/L
	U 236	236	33.000				ng/L
⌜	U-tot	238	22.163	**4450.327**	58.70	1.3	ng/L
⌞>	U233	233	4175.625				ng/L
	U233 IS	233	4175.625	**97.130**	0.96	1.0	%R

010276

Quantitative Analysis - Summary Report

Sample ID: 473754d14D df4

Sample Date/Time: Monday, October 10, 2011 12:58:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d14D df4.909
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	22	25.420	0.000	
	U	235	1502	4.449	0.000	
	U	238	419096	0.474	0.000	
	U 232	232	392	5.159	0.000	
	U 236	236	86	6.429	0.000	
⌜	U-tot	238	420620	0.458	0.000	
⌞>	U233	233	3991	0.982	0.000	
	U233 IS	233	3991	0.982	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	21.667				ng/L
	U	235	1502.124				ng/L
	U	238	419095.749				ng/L
	U 232	232	392.008				ng/L
	U 236	236	85.667				ng/L
⌜	U-tot	238	105.399	**21173.642**	110.40	0.5	ng/L
⌞>	U233	233	3990.876				ng/L
	U233 IS	233	3990.876	**92.832**	0.91	1.0	%R

010277

Quantitative Analysis - Summary Report

Sample ID: 473754d14AS df4

Sample Date/Time: Monday, October 10, 2011 13:00:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d14AS df4.910
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20 uL of 1° natural uranium @ df100 (11-064-06)(075-Rad-5012) in 10mL

TU = 20462 ng/L x df 4 = 81,848 ng/L

10/13/11 DS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	43	8.737	0.000	
	U	235	4554	0.768	0.000	
	U	238	841545	0.308	0.000	
	U 232	232	713	1.853	0.000	
	U 236	236	91	17.165	0.000	
⌈	U-tot	238	846142	0.302	0.000	
⌊>	U233	233	3987	0.861	0.000	
	U233 IS	233	3987	0.861	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.333				ng/L
	U	235	4553.807				ng/L
	U	238	841545.018				ng/L
	U 232	232	712.695				ng/L
	U 236	236	91.000				ng/L
⌈	U-tot	238	212.221	**42635.954**	252.07	0.6	ng/L
⌊>	U233	233	3987.208				ng/L
	U233 IS	233	3987.208	**92.747**	0.80	0.9	%R

010278

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 13:03:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DetaSet\11 Oct\zzz.911
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Celibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	25	2.279	0.000	
	U	235	12	50.000	0.000	
	U	238	111	10.931	0.000	
	U 232	232	54	7.055	0.000	
	U 236	236	15	22.904	0.000	
⌈	U-tot	238	148	11.723	0.000	
⌊>	U233	233	4254	1.737	0.000	
	U233 IS	233	4254	1.737	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	25.333				ng/L
	U	235	12.000				ng/L
	U	238	110.667				ng/L
	U 232	232	53.667				ng/L
	U 236	236	15.333				ng/L
⌈	U-tot	238	0.035	**4.328**	0.82	18.9	ng/L
⌊>	U233	233	4254.329				ng/L
	U233 IS	233	4254.329	**98.961**	1.72	1.7	%R

0110279

Quantitative Analysis - Summary Report

Sample ID: 473755d14 df2

Sample Date/Time: Monday, October 10, 2011 13:05:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473755d14 df2.912
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	18.028	0.000	
	U	235	2674	0.804	0.000	
	U	238	708489	0.743	0.000	
	U 232	232	1545	7.437	0.000	
	U 236	236	121	7.106	0.000	
⌜	U-tot	238	711202	0.743	0.000	
⌞>	U233	233	3926	0.166	0.000	
	U233 IS	233	3926	0.166	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.000				ng/L
	U	235	2673.726				ng/L
	U	238	708488.734				ng/L
	U 232	232	1545.132				ng/L
	U 236	236	121.334				ng/L
⌜	U-tot	238	181.143	**36391.846**	241.61	0.7	ng/L
⌞>	U233	233	3926.181				ng/L
	U233 IS	233	3926.181	**91.327**	0.15	0.2	%R

010280

Quantitative Analysis - Summary Report

Sample ID: 473755d14D df2

Sample Date/Time: Monday, October 10, 2011 13:07:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473755d14D df2.913
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	8.882	0.000	
	U	235	2817	2.058	0.000	
	U	238	741679	0.206	0.000	
	U 232	232	3751	2.145	0.000	
	U 236	236	131	3.775	0.000	
⌜	U-tot	238	744535	0.213	0.000	
⌞>	U233	233	3928	1.429	0.000	
	U233 IS	233	3928	1.429	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.000				ng/L
	U	235	2817.437				ng/L
	U	238	741678.756				ng/L
	U 232	232	3750.774				ng/L
	U 236	236	130.668				ng/L
⌜	U-tot	238	189.562	**38083.374**	539.14	1.4	ng/L
⌞>	U233	233	3928.182				ng/L
	U233 IS	233	3928.182	**91.374**	1.31	1.4	%R

010281

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 13:10:00
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.914
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	11	54.933	0.000	
	U	235	12	20.405	0.000	
	U	238	128	8.119	0.000	
	U 232	232	398	2.765	0.000	
	U 236	236	4	25.000	0.000	
⌈	U-tot	238	151	4.776	0.000	
⌊>	U233	233	4039	2.698	0.000	
	U233 IS	233	4039	2.698	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	10.667				ng/L
	U	235	12.333				ng/L
	U	238	128.001				ng/L
	U 232	232	398.342				ng/L
	U 236	236	4.000				ng/L
⌈	U-tot	238	0.037	**4.859**	0.55	11.3	ng/L
⌊>	U233	233	4039.231				ng/L
	U233 IS	233	4039.231	**93.957**	2.53	2.7	%R

010282

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 13:12:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.915
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	12	53.986	0.000	
	U	235	16	6.250	0.000	
	U	238	922	2.694	0.000	
	U 232	232	112	7.616	0.000	
	U 236	236	3	91.652	0.000	
⌈	U-tot	238	950	2.842	0.000	
⌊>	U233	233	4144	1.438	0.000	
	U233 IS	233	4144	1.438	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	12.333				ng/L
	U	235	16.000				ng/L
	U	238	921.713				ng/L
	U 232	232	111.667				ng/L
	U 236	236	3.333				ng/L
⌈	U-tot	238	0.229	**43.416**	1.97	4.5	ng/L
⌊>	U233	233	4144.278				ng/L
	U233 IS	233	4144.278	**96.401**	1.39	1.4	%R

010283

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 13:14:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.916
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	22	12.026	0.000	
	U	235	1229	2.054	0.000	
	U	238	163994	0.412	0.000	
	U 232	232	96	2.612	0.000	
	U 236	236	115	12.634	0.000	
⌜	U-tot	238	165245	0.405	0.000	
⌞>	U233	233	4036	0.919	0.000	
	U233 IS	233	4036	0.919	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.000				ng/L
	U	235	1229.083				ng/L
	U	238	163993.965				ng/L
	U 232	232	96.334				ng/L
	U 236	236	115.334				ng/L
⌜	U-tot	238	40.942	**8223.292**	67.24	0.8	ng/L
⌞>	U233	233	4036.229				ng/L
	U233 IS	233	4036.229	**93.887**	0.86	0.9	%R

010284

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 13:16:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.917
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	20.830	0.000	
	U	235	12	43.142	0.000	
	U	238	51	11.565	0.000	
	U 232	232	50	25.060	0.000	
	U 236	236	12	25.000	0.000	
⌜	U-tot	238	77	12.791	0.000	
⌞>	U233	233	4093	1.124	0.000	
	U233 IS	233	4093	1.124	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	14.667				ng/L
	U	235	11.667				ng/L
	U	238	50.667				ng/L
	U 232	232	50.000				ng/L
	U 236	236	12.000				ng/L
⌜	U-tot	238	0.019	**1.117**	0.47	42.5	ng/L
⌞>	U233	233	4093.255				ng/L
	U233 IS	233	4093.255	**95.214**	1.07	1.1	%R

010285

Quantitative Analysis - Summary Report

Sample ID: 473756d14 df2

Sample Date/Time: Monday, October 10, 2011 13:19:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473756d14 df2.918
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	27	16.144	0.000	
	U	235	1562	3.206	0.000	
	U	238	403863	0.845	0.000	
	U 232	232	232	2.827	0.000	
	U 236	236	81	2.138	0.000	
⌈	U-tot	238	405452	0.854	0.000	
⌊>	U233	233	3824	1.345	0.000	
	U233 IS	233	3824	1.345	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	27.000				ng/L
	U	235	1562.468				ng/L
	U	238	403862.574				ng/L
	U 232	232	232.003				ng/L
	U 236	236	81.000				ng/L
⌈	U-tot	238	106.046	**21303.718**	336.80	1.6	ng/L
⌊>	U233	233	3823.804				ng/L
	U233 IS	233	3823.804	**88.946**	1.20	1.3	%R

010286

Quantitative Analysis - Summary Report

Sample ID: 473756d14D df2

Sample Date/Time: Monday, October 10, 2011 13:21:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473756d14D df2.919
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	25	6.928	0.000	
	U	235	1567	1.013	0.000	
	U	238	408781	0.566	0.000	
	U 232	232	221	2.135	0.000	
	U 236	236	85	8.296	0.000	
⌜	U-tot	238	410374	0.560	0.000	
⌞>	U233	233	3822	2.135	0.000	
	U233 IS	233	3822	2.135	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	25.000				ng/L
	U	235	1567.135				ng/L
	U	238	408781.383				ng/L
	U 232	232	221.336				ng/L
	U 236	236	84.667				ng/L
⌜	U-tot	238	107.383	**21572.315**	355.29	1.6	ng/L
⌞>	U233	233	3822.470				ng/L
	U233 IS	233	3822.470	**88.915**	1.90	2.1	%R

010287

Quantitative Analysis - Summary Report

Sample ID: 473757d14 df4

Sample Date/Time: Monday, October 10, 2011 13:23:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473757d14 df4.920
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	24.037	0.000	
	U	235	916	2.527	0.000	
	U	238	201929	0.145	0.000	
	U 232	232	157	14.363	0.000	
	U 236	236	35	38.633	0.000	
⌈	U-tot	238	202860	0.155	0.000	
⌊>	U233	233	3901	4.263	0.000	
	U233 IS	233	3901	4.263	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.000				ng/L
	U	235	916.380				ng/L
	U	238	201928.672				ng/L
	U 232	232	156.668				ng/L
	U 236	236	35.333				ng/L
⌈	U-tot	238	52.065	**10457.988**	428.65	4.1	ng/L
⌊>	U233	233	3900.838				ng/L
	U233 IS	233	3900.838	**90.738**	3.87	4.3	%R

010288

Quantitative Analysis - Summary Report

Sample ID: 473757d14D df4

Sample Date/Time: Monday, October 10, 2011 13:26:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473757d14D df4.921
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	31	20.964	0.000	
	U	235	1574	1.498	0.000	
	U	238	354092	0.499	0.000	
	U 232	232	385	2.565	0.000	
	U 236	236	64	5.459	0.000	
⌜	U-tot	238	355696	0.498	0.000	
⌞>	U233	233	3935	1.479	0.000	
	U233 IS	233	3935	1.479	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	30.667				ng/L
	U	235	1574.136				ng/L
	U	238	354091.658				ng/L
	U 232	232	384.675				ng/L
	U 236	236	64.334				ng/L
⌜	U-tot	238	90.397	**18159.616**	177.28	1.0	ng/L
⌞>	U233	233	3935.185				ng/L
	U233 IS	233	3935.185	**91.537**	1.35	1.5	%R

010289

Quantitative Analysis - Summary Report

Sample ID: 473758d14

Sample Date/Time: Monday, October 10, 2011 13:28:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473758d14.922
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	25	26.993	0.000	
	U	235	1375	2.333	0.000	
	U	238	346524	0.771	0.000	
	U 232	232	234	4.287	0.000	
	U 236	236	69	5.797	0.000	
⌈	U-tot	238	347923	0.774	0.000	
⌊>	U233	233	3528	2.409	0.000	
	U233 IS	233	3528	2.409	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	24.667				ng/L
	U	235	1375.104				ng/L
	U	238	346523.726				ng/L
	U 232	232	233.670				ng/L
	U 236	236	69.000				ng/L
⌈	U-tot	238	98.667	**19821.140**	529.26	2.7	ng/L
⌊>	U233	233	3527.685				ng/L
	U233 IS	233	3527.685	**82.058**	1.98	2.4	%R

010290

Quantitative Analysis - Summary Report

Sample ID: 473758d14D

Sample Date/Time: Monday, October 10, 2011 13:30:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473758d14D.923
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	27	21.323	0.000	
	U	235	1418	2.205	0.000	
	U	238	367315	0.359	0.000	
	U 232	232	358	7.007	0.000	
	U 236	236	76	5.263	0.000	
⌜	U-tot	238	368760	0.367	0.000	
⌞>	U233	233	3548	1.741	0.000	
	U233 IS	233	3548	1.741	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.667				ng/L
	U	235	1417.777				ng/L
	U	238	367315.068				ng/L
	U 232	232	358.340				ng/L
	U 236	236	76.000				ng/L
⌜	U-tot	238	103.944	**20881.316**	354.17	1.7	ng/L
⌞>	U233	233	3548.359				ng/L
	U233 IS	233	3548.359	**82.539**	1.44	1.7	%R

010291

Quantitative Analysis - Summary Report

Sample ID: 473768d14 df4

Sample Date/Time: Monday, October 10, 2011 13:33:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473768d14 df4.924
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	27	13.354	0.000	
	U	235	1471	3.426	0.000	
	U	238	406591	1.002	0.000	
	U 232	232	263	2.806	0.000	
	U 236	236	88	15.033	0.000	
⌈	U-tot	238	408089	0.993	0.000	
⌊>	U233	233	3849	3.468	0.000	
	U233 IS	233	3849	3.468	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	27.000				ng/L
	U	235	1471.119				ng/L
	U	238	406591.085				ng/L
	U 232	232	262.670				ng/L
	U 236	236	88.000				ng/L
⌈	U-tot	238	106.115	**21317.574**	770.43	3.6	ng/L
⌊>	U233	233	3848.815				ng/L
	U233 IS	233	3848.815	**89.528**	3.11	3.5	%R

010292

Quantitative Analysis - Summary Report

Sample ID: 473768d14D df4

Sample Date/Time: Monday, October 10, 2011 13:35:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473768d14D df4.925
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	15.494	0.000	
	U	235	1450	3.416	0.000	
	U	238	399725	0.586	0.000	
	U 232	232	128	6.984	0.000	
	U 236	236	85	12.027	0.000	
⌈	U-tot	238	401197	0.584	0.000	
⌊>	U233	233	3878	1.996	0.000	
	U233 IS	233	3878	1.996	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.667				ng/L
	U	235	1449.782				ng/L
	U	238	399724.702				ng/L
	U 232	232	128.334				ng/L
	U 236	236	85.334				ng/L
⌈	U-tot	238	103.471	**20786.289**	315.43	1.5	ng/L
⌊>	U233	233	3878.161				ng/L
	U233 IS	233	3878.161	**90.210**	1.80	2.0	%R

010293

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 13:37:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.926
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	21.917	0.000	
	U	235	11	10.189	0.000	
	U	238	108	13.179	0.000	
	U 232	232	30	5.149	0.000	
	U 236	236	7	39.365	0.000	
⌈	U-tot	238	134	11.598	0.000	
⌊>	U233	233	3823	0.247	0.000	
	U233 IS	233	3823	0.247	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	14.667				ng/L
	U	235	11.333				ng/L
	U	238	107.667				ng/L
	U 232	232	29.667				ng/L
	U 236	236	7.333				ng/L
⌈	U-tot	238	0.035	**4.363**	0.82	18.7	ng/L
⌊>	U233	233	3823.471				ng/L
	U233 IS	233	3823.471	**88.938**	0.22	0.2	%R

010294

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 13:40:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.927
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	13	38.944	0.000	
	U	235	15	40.000	0.000	
	U	238	877	5.079	0.000	
	U 232	232	21	45.426	0.000	
	U 236	236	12	30.697	0.000	
⌈	U-tot	238	904	5.413	0.000	
⌊>	U233	233	3869	0.336	0.000	
	U233 IS	233	3869	0.336	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	12.667				ng/L
	U	235	15.000				ng/L
	U	238	876.709				ng/L
	U 232	232	21.000				ng/L
	U 236	236	12.333				ng/L
⌈	U-tot	238	0.234	**44.293**	2.46	5.6	ng/L
⌊>	U233	233	3869.490				ng/L
	U233 IS	233	3869.490	**90.009**	0.30	0.3	%R

010295

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 13:42:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.928
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	19.114	0.000	
	U	235	1168	2.411	0.000	
	U	238	156654	0.585	0.000	
	U 232	232	19	5.263	0.000	
	U 236	236	103	7.517	0.000	
⌜	U-tot	238	157848	0.572	0.000	
⌞>	U233	233	3915	0.402	0.000	
	U233 IS	233	3915	0.402	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.333				ng/L
	U	235	1167.742				ng/L
	U	238	156653.891				ng/L
	U 232	232	19.000				ng/L
	U 236	236	103.334				ng/L
⌜	U-tot	238	40.321	**8098.546**	77.65	1.0	ng/L
⌞>	U233	233	3914.843				ng/L
	U233 IS	233	3914.843	**91.064**	0.37	0.4	%R

010296

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 13:44:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.929
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	14	29.572	0.000	
	U	235	15	17.638	0.000	
	U	238	49	14.237	0.000	
	U 232	232	21	0.000	0.000	
	U 236	236	13	15.385	0.000	
⌜	U-tot	238	78	11.395	0.000	
⌞>	U233	233	3842	2.659	0.000	
	U233 IS	233	3842	2.659	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	13.667				ng/L
	U	235	15.000				ng/L
	U	238	49.333				ng/L
	U 232	232	21.000				ng/L
	U 236	236	13.000				ng/L
⌜	U-tot	238	0.020	**1.413**	0.38	27.1	ng/L
⌞>	U233	233	3842.145				ng/L
	U233 IS	233	3842.145	**89.373**	2.38	2.7	%R

010297

Quantitative Analysis - Summary Report

Sample ID: 473769d14 df4

Sample Date/Time: Monday, October 10, 2011 13:47:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473769d14 df4.930
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	24	25.345	0.000	
	U	235	1266	2.362	0.000	
	U	238	344033	0.886	0.000	
	U 232	232	150	9.598	0.000	
	U 236	236	74	8.108	0.000	
⌈	U-tot	238	345323	0.877	0.000	
⌊>	U233	233	3736	0.821	0.000	
	U233 IS	233	3736	0.821	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	24.000				ng/L
	U	235	1266.422				ng/L
	U	238	344032.823				ng/L
	U 232	232	149.668				ng/L
	U 236	236	74.000				ng/L
⌈	U-tot	238	92.433	**18568.579**	222.63	1.2	ng/L
⌊>	U233	233	3736.101				ng/L
	U233 IS	233	3736.101	**86.906**	0.71	0.8	%R

010298

Quantitative Analysis - Summary Report

Sample ID: 473769d14D df4

Sample Date/Time: Monday, October 10, 2011 13:49:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473769d14D df4.931
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	2.192	0.000	
	U	235	1248	1.564	0.000	
	U	238	337131	0.704	0.000	
	U 232	232	97	3.303	0.000	
	U 236	236	63	16.798	0.000	
⌜	U-tot	238	338405	0.706	0.000	
⌞>	U233	233	3813	1.681	0.000	
	U233 IS	233	3813	1.681	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.333				ng/L
	U	235	1248.086				ng/L
	U	238	337130.531				ng/L
	U 232	232	97.334				ng/L
	U 236	236	63.000				ng/L
⌜	U-tot	238	88.758	**17830.249**	208.60	1.2	ng/L
⌞>	U233	233	3813.133				ng/L
	U233 IS	233	3813.133	**88.698**	1.49	1.7	%R

010299

Quantitative Analysis - Summary Report

Sample ID: 473770d14 df4

Sample Date/Time: Monday, October 10, 2011 13:51:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473770d14 df4.932
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	37.706	0.000	
	U	235	1468	2.657	0.000	
	U	238	391149	1.125	0.000	
	U 232	232	153	4.627	0.000	
	U 236	236	69	16.753	0.000	
⌈	U-tot	238	392646	1.125	0.000	
⌊>	U233	233	3796	1.569	0.000	
	U233 IS	233	3796	1.569	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	29.333				ng/L
	U	235	1467.785				ng/L
	U	238	391148.631				ng/L
	U 232	232	153.335				ng/L
	U 236	236	68.667				ng/L
⌈	U-tot	238	103.438	**20779.704**	100.17	0.5	ng/L
⌊>	U233	233	3796.126				ng/L
	U233 IS	233	3796.126	**88.302**	1.39	1.6	%R

010300

Quantitative Analysis - Summary Report

Sample ID: 473770d14D df4

Sample Date/Time: Monday, October 10, 2011 13:53:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473770d14D df4.933
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	25	19.868	0.000	
	U	235	1428	1.095	0.000	
	U	238	385164	1.345	0.000	
	U 232	232	106	8.159	0.000	
	U 236	236	73	7.510	0.000	
⌜	U-tot	238	386617	1.334	0.000	
⌞>	U233	233	3748	1.106	0.000	
	U233 IS	233	3748	1.106	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	25.333				ng/L
	U	235	1427.779				ng/L
	U	238	385163.983				ng/L
	U 232	232	105.667				ng/L
	U 236	236	73.334				ng/L
⌜	U-tot	238	103.149	**20721.660**	358.46	1.7	ng/L
⌞>	U233	233	3748.439				ng/L
	U233 IS	233	3748.439	**87.193**	0.96	1.1	%R

010301

Quantitative Analysis - Summary Report

Sample ID: 473771d14 df4

Sample Date/Time: Monday, October 10, 2011 13:56:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473771d14 df4.934
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	19.487	0.000	
	U	235	1588	4.370	0.000	
	U	238	412162	0.518	0.000	
	U 232	232	76	5.295	0.000	
	U 236	236	76	10.589	0.000	
⌜	U-tot	238	413776	0.500	0.000	
⌞>	U233	233	3708	0.661	0.000	
	U233 IS	233	3708	0.661	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.333				ng/L
	U	235	1588.139				ng/L
	U	238	412161.979				ng/L
	U 232	232	76.334				ng/L
	U 236	236	76.334				ng/L
⌜	U-tot	238	111.591	**22417.637**	176.44	0.8	ng/L
⌞>	U233	233	3708.089				ng/L
	U233 IS	233	3708.089	**86.254**	0.57	0.7	%R

010302

Quantitative Analysis - Summary Report

Sample ID: 473771d14D df4

Sample Date/Time: Monday, October 10, 2011 13:58:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473771d14D df4.935
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	18	22.876	0.000	
	U	235	1580	3.185	0.000	
	U	238	415882	0.669	0.000	
	U 232	232	173	3.856	0.000	
	U 236	236	77	13.195	0.000	
⌜	U-tot	238	417480	0.655	0.000	
⌞>	U233	233	3699	2.507	0.000	
	U233 IS	233	3699	2.507	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.667				ng/L
	U	235	1580.471				ng/L
	U	238	415882.234				ng/L
	U 232	232	172.668				ng/L
	U 236	236	76.667				ng/L
⌜	U-tot	238	112.926	**22686.054**	681.56	3.0	ng/L
⌞>	U233	233	3698.753				ng/L
	U233 IS	233	3698.753	**86.037**	2.16	2.5	%R

010303

Quantitative Analysis - Summary Report

Sample ID: 473772d14 df4

Sample Date/Time: Monday, October 10, 2011 14:00:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473772d14 df4.936
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	22	7.873	0.000	
	U	235	1386	2.434	0.000	
	U	238	368675	0.857	0.000	
	U 232	232	414	4.903	0.000	
	U 236	236	68	8.139	0.000	
⌜	U-tot	238	370083	0.861	0.000	
⌞>	U233	233	3724	2.770	0.000	
	U233 IS	233	3724	2.770	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.000				ng/L
	U	235	1385.772				ng/L
	U	238	368674.766				ng/L
	U 232	232	414.009				ng/L
	U 236	236	67.667				ng/L
⌜	U-tot	238	99.424	**19973.167**	556.25	2.8	ng/L
⌞>	U233	233	3724.096				ng/L
	U233 IS	233	3724.096	**86.627**	2.40	2.8	%R

010304

Quantitative Analysis - Summary Report

Sample ID: 473772d14D df4

Sample Date/Time: Monday, October 10, 2011 14:03:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473772d14D df4.937
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	27	3.704	0.000	
	U	235	1340	3.454	0.000	
	U	238	362670	0.984	0.000	
	U 232	232	277	2.922	0.000	
	U 236	236	62	5.815	0.000	
⌜	U-tot	238	364037	0.992	0.000	
⌞>	U233	233	3674	0.316	0.000	
	U233 IS	233	3674	0.316	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	27.000				ng/L
	U	235	1339.765				ng/L
	U	238	362669.745				ng/L
	U 232	232	276.671				ng/L
	U 236	236	62.000				ng/L
⌜	U-tot	238	99.085	**19904.985**	244.21	1.2	ng/L
⌞>	U233	233	3674.076				ng/L
	U233 IS	233	3674.076	**85.463**	0.27	0.3	%R

010305

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 14:05:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.938
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	13.576	0.000	
	U	235	13	45.826	0.000	
	U	238	100	5.489	0.000	
	U 232	232	34	11.771	0.000	
	U 236	236	12	30.102	0.000	
⌈	U-tot	238	129	3.552	0.000	
⌊>	U233	233	3708	4.145	0.000	
	U233 IS	233	3708	4.145	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	13.333				ng/L
	U	238	100.334				ng/L
	U 232	232	34.333				ng/L
	U 236	236	11.667				ng/L
⌈	U-tot	238	0.035	**4.338**	0.44	10.1	ng/L
⌊>	U233	233	3708.424				ng/L
	U233 IS	233	3708.424	**86.262**	3.58	4.1	%R

010306

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 14:07:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.939
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	5.882	0.000	
	U	235	18	31.175	0.000	
	U	238	827	2.869	0.000	
	U 232	232	20	10.000	0.000	
	U 236	236	10	31.109	0.000	
⌜	U-tot	238	861	2.523	0.000	
⌞>	U233	233	3761	1.972	0.000	
	U233 IS	233	3761	1.972	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.000				ng/L
	U	235	17.667				ng/L
	U	238	826.704				ng/L
	U 232	232	20.000				ng/L
	U 236	236	10.333				ng/L
⌜	U-tot	238	0.229	**43.375**	2.06	4.8	ng/L
⌞>	U233	233	3761.445				ng/L
	U233 IS	233	3761.445	**87.495**	1.73	2.0	%R

010307

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 14:10:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.940
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	20	46.483	0.000	
	U	235	1095	3.247	0.000	
	U	238	148071	0.555	0.000	
	U 232	232	22	27.273	0.000	
	U 236	236	97	12.918	0.000	
⌜	U-tot	238	149186	0.538	0.000	
⌞>	U233	233	3722	0.885	0.000	
	U233 IS	233	3722	0.885	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	20.333				ng/L
	U	235	1095.066				ng/L
	U	238	148070.823				ng/L
	U 232	232	22.000				ng/L
	U 236	236	97.001				ng/L
⌜	U-tot	238	40.088	**8051.586**	102.79	1.3	ng/L
⌞>	U233	233	3721.762				ng/L
	U233 IS	233	3721.762	**86.572**	0.77	0.9	%R

010308

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 14:12:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.941
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	14	14.286	0.000	
	U	235	12	24.771	0.000	
	U	238	54	15.325	0.000	
	U 232	232	14	8.056	0.000	
	U 236	236	10	31.109	0.000	
⌈	U-tot	238	81	7.970	0.000	
⌊>	U233	233	3655	1.633	0.000	
	U233 IS	233	3655	1.633	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	14.000				ng/L
	U	235	12.333				ng/L
	U	238	54.333				ng/L
	U 232	232	14.333				ng/L
	U 236	236	10.333				ng/L
⌈	U-tot	238	0.022	**1.775**	0.39	21.8	ng/L
⌊>	U233	233	3655.068				ng/L
	U233 IS	233	3655.068	**85.021**	1.39	1.6	%R

010309

Quantitative Analysis - Summary Report

Sample ID: 473778d14 df4

Sample Date/Time: Monday, October 10, 2011 14:14:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473778d14 df4.942
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	24	8.796	0.000	
	U	235	1236	2.058	0.000	
	U	238	335088	0.480	0.000	
	U 232	232	334	0.299	0.000	
	U 236	236	66	12.309	0.000	
⌜	U-tot	238	336347	0.477	0.000	
⌞>	U233	233	3586	0.698	0.000	
	U233 IS	233	3586	0.698	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.667				ng/L
	U	235	1235.751				ng/L
	U	238	335087.950				ng/L
	U 232	232	334.006				ng/L
	U 236	236	65.667				ng/L
⌜	U-tot	238	93.795	**18842.256**	92.99	0.5	ng/L
⌞>	U233	233	3586.040				ng/L
	U233 IS	233	3586.040	**83.415**	0.58	0.7	%R

010310

Quantitative Analysis - Summary Report

Sample ID: 473778d14D df4

Sample Date/Time: Monday, October 10, 2011 14:16:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473778d14D df4.943
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	35.589	0.000	
	U	235	1246	2.805	0.000	
	U	238	345820	0.855	0.000	
	U 232	232	153	2.300	0.000	
	U 236	236	70	10.671	0.000	
⌈	U-tot	238	347089	0.848	0.000	
⌊>	U233	233	3679	0.590	0.000	
	U233 IS	233	3679	0.590	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.000				ng/L
	U	235	1246.419				ng/L
	U	238	345819.720				ng/L
	U 232	232	152.668				ng/L
	U 236	236	70.334				ng/L
⌈	U-tot	238	94.352	**18954.105**	186.49	1.0	ng/L
⌊>	U233	233	3678.744				ng/L
	U233 IS	233	3678.744	**85.572**	0.51	0.6	%R

010311

Quantitative Analysis - Summary Report

Sample ID: 473045d14 df4

Sample Date/Time: Monday, October 10, 2011 14:19:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473045d14 df4.944
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	32.413	0.000	
	U	235	1622	2.728	0.000	
	U	238	411260	0.814	0.000	
	U 232	232	189	2.496	0.000	
	U 236	236	82	16.490	0.000	
⌜	U-tot	238	412911	0.813	0.000	
⌞>	U233	233	3635	0.900	0.000	
	U233 IS	233	3635	0.900	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.667				ng/L
	U	235	1621.811				ng/L
	U	238	411260.039				ng/L
	U 232	232	189.335				ng/L
	U 236	236	82.334				ng/L
⌜	U-tot	238	113.592	**22819.718**	30.88	0.1	ng/L
⌞>	U233	233	3635.060				ng/L
	U233 IS	233	3635.060	**84.556**	0.76	0.9	%R

010312

Quantitative Analysis - Summary Report

Sample ID: 473045d14D df4

Sample Date/Time: Monday, October 10, 2011 14:21:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473045d14D df4.945
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	19.985	0.000	
	U	235	1584	1.786	0.000	
	U	238	409971	0.436	0.000	
	U 232	232	131	5.375	0.000	
	U 236	236	70	13.438	0.000	
⌜	U-tot	238	411582	0.428	0.000	
⌞>	U233	233	3544	1.607	0.000	
	U233 IS	233	3544	1.607	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.000				ng/L
	U	235	1584.471				ng/L
	U	238	409971.477				ng/L
	U 232	232	130.668				ng/L
	U 236	236	70.334				ng/L
⌜	U-tot	238	116.147	**23333.123**	454.36	1.9	ng/L
⌞>	U233	233	3544.358				ng/L
	U233 IS	233	3544.358	**82.446**	1.32	1.6	%R

010313

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 14:23:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.946
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	13	8.660	0.000	
	U	235	11	39.031	0.000	
	U	238	102	0.980	0.000	
	U 232	232	31	4.875	0.000	
	U 236	236	9	29.397	0.000	
⌈	U-tot	238	126	4.124	0.000	
⌊>	U233	233	3699	3.787	0.000	
	U233 IS	233	3699	3.787	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	13.333				ng/L
	U	235	10.667				ng/L
	U	238	102.001				ng/L
	U 232	232	31.333				ng/L
	U 236	236	9.000				ng/L
⌈	U-tot	238	0.034	**4.192**	0.44	10.5	ng/L
⌊>	U233	233	3698.753				ng/L
	U233 IS	233	3698.753	**86.037**	3.26	3.8	%R

010314

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 14:26:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.947
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	13.576	0.000	
	U	235	13	51.051	0.000	
	U	238	775	2.489	0.000	
	U 232	232	22	44.851	0.000	
	U 236	236	6	48.238	0.000	
⌜	U-tot	238	804	2.154	0.000	
⌞>	U233	233	3763	0.189	0.000	
	U233 IS	233	3763	0.189	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	13.333				ng/L
	U	238	775.366				ng/L
	U 232	232	22.333				ng/L
	U 236	236	6.333				ng/L
⌜	U-tot	238	0.214	**40.263**	0.91	2.3	ng/L
⌞>	U233	233	3763.446				ng/L
	U233 IS	233	3763.446	**87.542**	0.17	0.2	%R

010315

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 14:28:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.948
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	35.660	0.000	
	U	235	1070	2.618	0.000	
	U	238	147433	0.673	0.000	
	U 232	232	25	4.681	0.000	
	U 236	236	99	13.594	0.000	
⌜	U-tot	238	148526	0.673	0.000	
⌞>	U233	233	3620	1.711	0.000	
	U233 IS	233	3620	1.711	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.667				ng/L
	U	235	1070.396				ng/L
	U	238	147433.264				ng/L
	U 232	232	24.667				ng/L
	U 236	236	99.334				ng/L
⌜	U-tot	238	41.030	**8240.889**	86.35	1.0	ng/L
⌞>	U233	233	3620.388				ng/L
	U233 IS	233	3620.388	**84.214**	1.44	1.7	%R

0010316

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 14:30:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.949
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	11.547	0.000	
	U	235	9	50.634	0.000	
	U	238	52	7.723	0.000	
	U 232	232	19	57.282	0.000	
	U 236	236	7	31.225	0.000	
⌈	U-tot	238	77	11.093	0.000	
⌊>	U233	233	3643	0.831	0.000	
	U233 IS	233	3643	0.831	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.000				ng/L
	U	235	9.333				ng/L
	U	238	52.333				ng/L
	U 232	232	18.667				ng/L
	U 236	236	6.667				ng/L
⌈	U-tot	238	0.021	**1.569**	0.49	31.5	ng/L
⌊>	U233	233	3642.730				ng/L
	U233 IS	233	3642.730	**84.734**	0.70	0.8	%R

010317

SOUTHWEST RESEARCH INSTITUTE

☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Utot

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's		TVs
S0	11-097-07	
STD. 1	11-091-04	44933 ng/L
I. STD	02-415-08	0.2ppb
I. STD		

QC STD. ID's

ICV/CCV	11-097-05	7666 ng/L
UCL		
CRI	11-097-06	40 ng/L
ICSA	11-097-03	—
ICSAB	11-097-04	20,444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Fluor	10/10/11	110915-9 110825-10	~~liquid~~ (R2) 10/13/11 SO	15 00132- 150140

↑ switched 10/10/11 JS

INSTRUMENT: DRCII

FILENAME: 111010a.rep

Analyst: M. Seiler Date: 10 / 11 / 11

☐ CONVERTED (.DAT)

010318

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Monday, October 10, 2011 08:39:24
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Daily Performance Check.885
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

M Seiler 10/10/14

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	6820.2	6820.158	68.693	1.0
	In	114.9	26373.8	26373.803	198.238	0.8
	U	238.1	26592.2	26592.238	188.632	0.7
⌈>	Ce	139.9	26000.8	26000.796	73.209	0.3
⌊	CeO	155.9	1274.1	0.049	0.001	2.4
⌈>	Ba	137.9	213310.2	213310.180	1776.561	0.8
⌊	Ba++	69.0	5247.9	0.025	0.000	0.9
	Bkgd	220.0	3.0	3.000	1.034	34.5
	Bkgd	8.5	44.9	44.867	2.523	5.6

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

10/13/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	4.5	533.0
Co	59	45	5.0	15970.0
In	115	45	5.8	26132.5

010319

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Monday, October 10, 2011 08:39:24
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Daily Performance Check.885
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

M Seiler
10/10/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2760	2035	0.713	
Mg	23.985	23.925	5650	2046	0.687	
Ar2	75.930	75.925	18319	2079	0.694	
In	114.904	114.925	27802	2108	0.690	
Ce	139.905	139.875	33887	2117	0.697	
Pb	207.977	208.025	50482	2157	0.705	
Th	232.038	232.075	56335	2176	0.699	
U	238.050	238.025	57798	2184	0.696	

010320

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Monday, October 10, 2011 17:56:01
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\S-0.994
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	12.004	0.000	
	U	235	30	23.333	0.000	
	U	238	45	13.333	0.000	
	U 232	232	24	15.023	0.000	
	U 236	236	28	26.490	0.000	
⌈	U-tot	238	109	9.753	0.000	
⌊>	U233	233	3258	2.478	0.000	
	U233 IS	233	3258	2.478	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	33.667				ng/L
	U	235	30.000				ng/L
	U	238	45.000				ng/L
	U 232	232	24.000				ng/L
	U 236	236	28.333				ng/L
⌈	U-tot	238	0.033				ng/L
⌊>	U233	233	3258.251				ng/L
	U233 IS	233	3258.251	**100.000**	2.48	2.5	%R

010321

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Monday, October 10, 2011 17:58:19
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\S-1.995
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	16.109	0.000	
	U	235	5511	1.076	0.000	
	U	238	754323	0.619	0.000	
	U 232	232	16	59.465	0.000	
	U 236	236	158	7.514	0.000	
⌜	U-tot	238	759898	0.608	0.000	
⌞>	U233	233	3456	0.845	0.000	
	U233 IS	233	3456	0.845	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.000				ng/L
	U	235	5511.337				ng/L
	U	238	754323.256				ng/L
	U 232	232	16.333				ng/L
	U 236	236	157.668				ng/L
⌜	U-tot	238	219.867	**44933.000**	441.90	1.0	ng/L
⌞>	U233	233	3456.324				ng/L
	U233 IS	233	3456.324	**106.079**	0.90	0.8	%R

010322

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Monday, October 10, 2011 18:00:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icv.996
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	45.952	0.000	
	U	235	1000	3.110	0.000	
	U	238	137017	1.005	0.000	
	U 232	232	11	9.091	0.000	
	U 236	236	78	5.588	0.000	
⌈	U-tot	238	138034	1.013	0.000	
⌊>	U233	233	3414	1.022	0.000	
	U233 IS	233	3414	1.022	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.333				ng/L
	U	235	1000.055				ng/L
	U	238	137017.233				ng/L
	U 232	232	11.000				ng/L
	U 236	236	78.000				ng/L
⌈	U-tot	238	40.441	**8259.186**	163.98	2.0	ng/L
⌊>	U233	233	3413.641				ng/L
	U233 IS	233	3413.641	**104.769**	1.07	1.0	%R

010323

Quantitative Analysis - Summary Report

Sample ID: lcb

Sample Date/Time: Monday, October 10, 2011 18:02:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandate\DataSet\11 Oct\lcb.997
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	10	56.705	0.000	
	U	235	8	7.531	0.000	
	U	238	58	20.975	0.000	
	U 232	232	5	87.178	0.000	
	U 236	236	4	87.670	0.000	
⌜	U-tot	238	76	11.242	0.000	
⌞>	U233	233	3364	1.083	0.000	
	U233 IS	233	3364	1.083	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	10.333				ng/L
	U	235	7.667				ng/L
	U	238	58.000				ng/L
	U 232	232	5.000				ng/L
	U 236	236	3.667				ng/L
⌜	U-tot	238	0.023	**-2.203**	0.47	21.4	ng/L
⌞>	U233	233	3363.622				ng/L
	U233 IS	233	3363.622	**103.234**	1.12	1.1	%R

Quantitative Analysis - Summary Report

010324

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 18:05:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.998
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	52.071	0.000	
	U	235	22	27.649	0.000	
	U	238	749	2.804	0.000	
	U 232	232	16	59.621	0.000	
	U 236	236	11	80.802	0.000	
⌜	U-tot	238	787	3.249	0.000	
⌞>	U233	233	3379	2.235	0.000	
	U233 IS	233	3379	2.235	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.333				ng/L
	U	235	22.000				ng/L
	U	238	749.031				ng/L
	U 232	232	16.000				ng/L
	U 236	236	11.000				ng/L
⌜	U-tot	238	0.233	**40.828**	1.75	4.3	ng/L
⌞>	U233	233	3378.628				ng/L
	U233 IS	233	3378.628	**103.695**	2.32	2.2	%R

010325

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Monday, October 10, 2011 18:07:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icsa.999
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	20	7.512	0.000	
	U	235	29	29.047	0.000	
	U	238	370	5.419	0.000	
	U 232	232	252	7.502	0.000	
	U 236	236	13	15.613	0.000	
⌜	U-tot	238	419	6.375	0.000	
⌞>	U233	233	2699	2.084	0.000	
	U233 IS	233	2699	2.084	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	20.333				ng/L
	U	235	28.667				ng/L
	U	238	369.674				ng/L
	U 232	232	252.337				ng/L
	U 236	236	13.333				ng/L
⌜	U-tot	238	0.155	**24.876**	1.59	6.4	ng/L
⌞>	U233	233	2699.067				ng/L
	U233 IS	233	2699.067	**82.838**	1.73	2.1	%R

0010326

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Monday, October 10, 2011 18:09:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\icsab.1000
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	10.631	0.000	
	U	235	2051	2.377	0.000	
	U	238	278305	1.387	0.000	
	U 232	232	235	4.908	0.000	
	U 236	236	32	32.924	0.000	
⌜	U-tot	238	280397	1.392	0.000	
⌞>	U233	233	2735	0.659	0.000	
	U233 IS	233	2735	0.659	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.000				ng/L
	U	235	2051.231				ng/L
	U	238	278304.572				ng/L
	U 232	232	235.003				ng/L
	U 236	236	32.000				ng/L
⌜	U-tot	238	102.517	**20947.299**	220.94	1.1	ng/L
⌞>	U233	233	2735.078				ng/L
	U233 IS	233	2735.078	**83.943**	0.55	0.7	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 18:12:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.1001
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	13	7.692	0.000	
	U	235	8	49.960	0.000	
	U	238	30	39.743	0.000	
	U 232	232	15	25.813	0.000	
	U 236	236	8	92.538	0.000	
⌜	U-tot	238	52	30.130	0.000	
⌞>	U233	233	3792	1.335	0.000	
	U233 IS	233	3792	1.335	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	13.000				ng/L
	U	235	8.333				ng/L
	U	238	30.333				ng/L
	U 232	232	14.667				ng/L
	U 236	236	7.667				ng/L
⌜	U-tot	238	0.014	**-4.025**	0.88	21.8	ng/L
⌞>	U233	233	3792.124				ng/L
	U233 IS	233	3792.124	**116.385**	1.55	1.3	%R

010328

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 18:14:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.1002
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	44.530	0.000	
	U	235	1150	2.045	0.000	
	U	238	149114	1.466	0.000	
	U 232	232	57	48.848	0.000	
	U 236	236	148	15.507	0.000	
⌜	U-tot	238	150327	1.421	0.000	
⌞>	U233	233	3694	1.638	0.000	
	U233 IS	233	3694	1.638	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.000				ng/L
	U	235	1150.073				ng/L
	U	238	149114.150				ng/L
	U 232	232	57.334				ng/L
	U 236	236	147.668				ng/L
⌜	U-tot	238	40.701	**8312.239**	171.04	2.1	ng/L
⌞>	U233	233	3694.084				ng/L
	U233 IS	233	3694.084	**113.376**	1.86	1.6	%R

010329

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 18:16:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.1003
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	54.883	0.000	
	U	235	58	52.607	0.000	
	U	238	86	46.931	0.000	
	U 232	232	52	49.206	0.000	
	U 236	236	57	27.850	0.000	
⌜	U-tot	238	206	48.563	0.000	
⌞>	U233	233	3736	1.410	0.000	
	U233 IS	233	3736	1.410	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.334				ng/L
	U	235	58.000				ng/L
	U	238	86.000				ng/L
	U 232	232	51.667				ng/L
	U 236	236	57.000				ng/L
⌜	U-tot	238	0.055	**4.472**	5.44	121.7	ng/L
⌞>	U233	233	3736.101				ng/L
	U233 IS	233	3736.101	**114.666**	1.62	1.4	%R

010330

Quantitative Analysis - Summary Report

Sample ID: Blankd21 df4

Sample Date/Time: Monday, October 10, 2011 18:19:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\Blankd21 df4.1004
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	64	58.983	0.000	
	U	235	1533	2.615	0.000	
	U	238	436184	1.108	0.000	
	U 232	232	62	70.784	0.000	
	U 236	236	126	28.317	0.000	
⌜	U-tot	238	437781	1.094	0.000	
⌞>	U233	233	3847	0.572	0.000	
	U233 IS	233	3847	0.572	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	64.000				ng/L
	U	235	1532.796				ng/L
	U	238	436184.437				ng/L
	U 232	232	61.667				ng/L
	U 236	236	126.001				ng/L
⌜	U-tot	238	113.798	**23252.965**	324.37	1.4	ng/L
⌞>	U233	233	3847.147				ng/L
	U233 IS	233	3847.147	**118.074**	0.68	0.6	%R

010331

Quantitative Analysis - Summary Report

Sample ID: 473754d21 df4

Sample Date/Time: Monday, October 10, 2011 18:21:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d21 df4.1005
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	59.642	0.000	
	U	235	1184	7.240	0.000	
	U	238	327664	1.140	0.000	
	U 232	232	651	23.539	0.000	
	U 236	236	97	21.006	0.000	
⌜	U-tot	238	328888	1.139	0.000	
⌞>	U233	233	3382	2.040	0.000	
	U233 IS	233	3382	2.040	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.333				ng/L
	U	235	1184.411				ng/L
	U	238	327664.299				ng/L
	U 232	232	650.691				ng/L
	U 236	236	96.667				ng/L
⌜	U-tot	238	97.260	**19872.617**	388.23	2.0	ng/L
⌞>	U233	233	3382.296				ng/L
	U233 IS	233	3382.296	**103.807**	2.12	2.0	%R

010332

Quantitative Analysis - Summary Report

Sample ID: 473754d21L df20

Sample Date/Time: Monday, October 10, 2011 18:23:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d21L df20.1006
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	28	26.724	0.000	
	U	235	265	3.301	0.000	
	U	238	68536	1.207	0.000	
	U 232	232	215	70.928	0.000	
	U 236	236	35	11.658	0.000	
⌜	U-tot	238	68829	1.206	0.000	
⌞>	U233	233	3571	1.617	0.000	
	U233 IS	233	3571	1.617	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.333				ng/L
	U	235	264.671				ng/L
	U	238	68536.403				ng/L
	U 232	232	215.337				ng/L
	U 236	236	34.667				ng/L
⌜	U-tot	238	19.277	**3933.244**	60.73	1.5	ng/L
⌞>	U233	233	3571.035				ng/L
	U233 IS	233	3571.035	**109.600**	1.77	1.6	%R

Quantitative Analysis - Summary Report

010333

Sample ID: 473754d21D df4

Sample Date/Time: Monday, October 10, 2011 18:26:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d21D df4.1007
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	78	24.959	0.000	
	U	235	1197	5.331	0.000	
	U	238	330123	0.197	0.000	
	U 232	232	152	23.453	0.000	
	U 236	236	119	12.193	0.000	
⌜	U-tot	238	331398	0.221	0.000	
⌞>	U233	233	3325	0.331	0.000	
	U233 IS	233	3325	0.331	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	78.000				ng/L
	U	235	1196.746				ng/L
	U	238	330123.093				ng/L
	U 232	232	152.335				ng/L
	U 236	236	118.667				ng/L
⌜	U-tot	238	99.661	**20363.510**	98.79	0.5	ng/L
⌞>	U233	233	3325.275				ng/L
	U233 IS	233	3325.275	**102.057**	0.34	0.3	%R

010334

Quantitative Analysis - Summary Report

Sample ID: 473754d21AS df4

Sample Date/Time: Monday, October 10, 2011 18:28:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473754d21AS df4.1008
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20uL of 1° natural uranium @ df100 (11-064-06, 075-Rad-Sol 2) in 10mL

TU= 20462 ng/L x df 4 = 81,848 ng/L

10/13/11 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	74	41.630	0.000	
	U	235	3688	3.149	0.000	
	U	238	656348	0.955	0.000	
	U 232	232	525	9.954	0.000	
	U 236	236	106	36.147	0.000	
⌈	U-tot	238	660110	0.963	0.000	
⌊>	U233	233	3345	1.425	0.000	
	U233 IS	233	3345	1.425	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	74.000				ng/L
	U	235	3688.415				ng/L
	U	238	656348.046				ng/L
	U 232	232	525.015				ng/L
	U 236	236	106.334				ng/L
⌈	U-tot	238	197.355	**40331.630**	224.73	0.6	ng/L
⌊>	U233	233	3344.949				ng/L
	U233 IS	233	3344.949	**102.661**	1.46	1.4	%R

010335

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 18:30:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.1009
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	21	28.352	0.000	
	U	235	21	21.819	0.000	
	U	238	87	6.902	0.000	
	U 232	232	25	25.378	0.000	
	U 236	236	19	21.535	0.000	
⌜	U-tot	238	129	8.839	0.000	
⌞>	U233	233	3424	0.687	0.000	
	U233 IS	233	3424	0.687	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	20.667				ng/L
	U	235	20.667				ng/L
	U	238	87.334				ng/L
	U 232	232	25.333				ng/L
	U 236	236	19.333				ng/L
⌜	U-tot	238	0.038	**0.860**	0.64	75.0	ng/L
⌞>	U233	233	3424.311				ng/L
	U233 IS	233	3424.311	**105.097**	0.72	0.7	%R

010336

Quantitative Analysis - Summary Report

Sample ID: 473755d21 df2

Sample Date/Time: Monday, October 10, 2011 18:33:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473755d21 df2.1010
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	52.897	0.000	
	U	235	2141	0.774	0.000	
	U	238	561866	1.787	0.000	
	U 232	232	549	13.133	0.000	
	U 236	236	141	34.390	0.000	
⌜	U-tot	238	564070	1.772	0.000	
⌞>	U233	233	3261	1.520	0.000	
	U233 IS	233	3261	1.520	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.334				ng/L
	U	235	2140.919				ng/L
	U	238	561865.678				ng/L
	U 232	232	549.350				ng/L
	U 236	236	141.335				ng/L
⌜	U-tot	238	172.962	**35345.787**	342.92	1.0	ng/L
⌞>	U233	233	3261.252				ng/L
	U233 IS	233	3261.252	**100.092**	1.52	1.5	%R

010337

Quantitative Analysis - Summary Report

Sample ID: 473755d21D df2

Sample Date/Time: Monday, October 10, 2011 18:35:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473755d21D df2.1011
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	90	51.047	0.000	
	U	235	2329	0.996	0.000	
	U	238	606385	1.717	0.000	
	U 232	232	667	40.400	0.000	
	U 236	236	163	16.336	0.000	
⌜	U-tot	238	608804	1.699	0.000	
⌞>	U233	233	3159	0.708	0.000	
	U233 IS	233	3159	0.708	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	90.334				ng/L
	U	235	2328.965				ng/L
	U	238	606384.864				ng/L
	U 232	232	667.360				ng/L
	U 236	236	163.001				ng/L
⌜	U-tot	238	192.704	**39380.966**	528.31	1.3	ng/L
⌞>	U233	233	3159.216				ng/L
	U233 IS	233	3159.216	**96.960**	0.69	0.7	%R

010338

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 18:37:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.1012
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	75.240	0.000	
	U	235	50	62.097	0.000	
	U	238	150	20.849	0.000	
	U 232	232	86	28.648	0.000	
	U 236	236	50	61.544	0.000	
⌜	U-tot	238	237	37.978	0.000	
⌞>	U233	233	3280	1.206	0.000	
	U233 IS	233	3280	1.206	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.000				ng/L
	U	235	50.000				ng/L
	U	238	150.335				ng/L
	U 232	232	86.000				ng/L
	U 236	236	49.667				ng/L
⌜	U-tot	238	0.073	**8.010**	5.75	71.8	ng/L
⌞>	U233	233	3279.925				ng/L
	U233 IS	233	3279.925	**100.665**	1.21	1.2	%R

010339

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 18:39:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.1013
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	27	32.919	0.000	
	U	235	35	30.526	0.000	
	U	238	746	1.954	0.000	
	U 232	232	36	13.007	0.000	
	U 236	236	22	39.253	0.000	
⌈	U-tot	238	808	2.803	0.000	
⌊>	U233	233	3359	2.381	0.000	
	U233 IS	233	3359	2.381	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	27.000				ng/L
	U	235	35.333				ng/L
	U	238	745.697				ng/L
	U 232	232	36.333				ng/L
	U 236	236	21.667				ng/L
⌈	U-tot	238	0.241	**42.366**	1.81	4.3	ng/L
⌊>	U233	233	3359.287				ng/L
	U233 IS	233	3359.287	**103.101**	2.45	2.4	%R

010340

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 18:42:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.1014
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	56.696	0.000	
	U	235	1008	0.922	0.000	
	U	238	132520	1.551	0.000	
	U 232	232	41	39.252	0.000	
	U 236	236	106	16.564	0.000	
⌜	U-tot	238	133566	1.530	0.000	
⌞>	U233	233	3311	1.284	0.000	
	U233 IS	233	3311	1.284	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.333				ng/L
	U	235	1008.389				ng/L
	U	238	132519.710				ng/L
	U 232	232	41.000				ng/L
	U 236	236	105.667				ng/L
⌜	U-tot	238	40.341	**8238.708**	159.70	1.9	ng/L
⌞>	U233	233	3311.270				ng/L
	U233 IS	233	3311.270	**101.627**	1.30	1.3	%R

010341

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 18:44:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.1015
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	42.225	0.000	
	U	235	53	49.057	0.000	
	U	238	85	37.249	0.000	
	U 232	232	50	51.934	0.000	
	U 236	236	59	50.177	0.000	
⌈	U-tot	238	193	41.860	0.000	
⌊>	U233	233	3218	0.764	0.000	
	U233 IS	233	3218	0.764	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.334				ng/L
	U	235	53.000				ng/L
	U	238	85.334				ng/L
	U 232	232	49.667				ng/L
	U 236	236	59.334				ng/L
⌈	U-tot	238	0.060	**5.415**	5.12	94.5	ng/L
⌊>	U233	233	3217.903				ng/L
	U233 IS	233	3217.903	**98.762**	0.75	0.8	%R

010342

Quantitative Analysis - Summary Report

Sample ID: 473756d21 df2

Sample Date/Time: Monday, October 10, 2011 18:46:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473756d21 df2.1016
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	19.009	0.000	
	U	235	1260	2.670	0.000	
	U	238	323924	0.533	0.000	
	U 232	232	91	12.452	0.000	
	U 236	236	73	23.408	0.000	
⌜	U-tot	238	325216	0.520	0.000	
⌞>	U233	233	3140	0.731	0.000	
	U233 IS	233	3140	0.731	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	32.000				ng/L
	U	235	1260.421				ng/L
	U	238	323923.717				ng/L
	U 232	232	91.334				ng/L
	U 236	236	72.667				ng/L
⌜	U-tot	238	103.578	**21164.108**	121.05	0.6	ng/L
⌞>	U233	233	3139.875				ng/L
	U233 IS	233	3139.875	**96.367**	0.70	0.7	%R

010343

Quantitative Analysis - Summary Report

Sample ID: 473756d21D df2

Sample Date/Time: Monday, October 10, 2011 18:49:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473756d21D df2.1017
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	25	24.437	0.000	
	U	235	1191	3.240	0.000	
	U	238	310985	0.402	0.000	
	U 232	232	83	4.889	0.000	
	U 236	236	59	3.390	0.000	
⌜	U-tot	238	312202	0.388	0.000	
⌞>	U233	233	3190	1.140	0.000	
	U233 IS	233	3190	1.140	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	24.667				ng/L
	U	235	1191.411				ng/L
	U	238	310985.428				ng/L
	U 232	232	82.667				ng/L
	U 236	236	59.000				ng/L
⌜	U-tot	238	97.889	**20001.303**	195.21	1.0	ng/L
⌞>	U233	233	3189.559				ng/L
	U233 IS	233	3189.559	**97.892**	1.12	1.1	%R

010344

Quantitative Analysis - Summary Report

Sample ID: 473757d21 df4

Sample Date/Time: Monday, October 10, 2011 18:51:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473757d21 df4.1018
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	57.187	0.000	
	U	235	1055	1.576	0.000	
	U	238	239029	1.021	0.000	
	U 232	232	130	8.668	0.000	
	U 236	236	75	54.455	0.000	
⌜	U-tot	238	240138	1.008	0.000	
⌞>	U233	233	3280	1.402	0.000	
	U233 IS	233	3280	1.402	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.667				ng/L
	U	235	1054.728				ng/L
	U	238	239028.505				ng/L
	U 232	232	129.668				ng/L
	U 236	236	75.000				ng/L
⌜	U-tot	238	73.222	**14959.376**	337.58	2.3	ng/L
⌞>	U233	233	3280.258				ng/L
	U233 IS	233	3280.258	**100.675**	1.41	1.4	%R

010345

Quantitative Analysis - Summary Report

Sample ID: 473757d21D df4

Sample Date/Time: Monday, October 10, 2011 18:53:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473757d21D df4.1019
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	13.147	0.000	
	U	235	1222	1.748	0.000	
	U	238	280730	0.788	0.000	
	U 232	232	78	12.627	0.000	
	U 236	236	61	14.754	0.000	
⌈	U-tot	238	281984	0.776	0.000	
⌊>	U233	233	3203	0.720	0.000	
	U233 IS	233	3203	0.720	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	31.667				ng/L
	U	235	1222.416				ng/L
	U	238	280729.770				ng/L
	U 232	232	78.000				ng/L
	U 236	236	61.000				ng/L
⌈	U-tot	238	88.054	**17991.073**	235.90	1.3	ng/L
⌊>	U233	233	3202.564				ng/L
	U233 IS	233	3202.564	**98.291**	0.71	0.7	%R

010346

Quantitative Analysis - Summary Report

Sample ID: 473758d21

Sample Date/Time: Monday, October 10, 2011 18:56:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473758d21.1020
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	51	45.031	0.000	
	U	235	1187	2.045	0.000	
	U	238	293226	0.231	0.000	
	U 232	232	128	11.142	0.000	
	U 236	236	91	16.410	0.000	
⌈	U-tot	238	294464	0.215	0.000	
⌊>	U233	233	3000	0.328	0.000	
	U233 IS	233	3000	0.328	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	51.333				ng/L
	U	235	1187.078				ng/L
	U	238	293225.596				ng/L
	U 232	232	127.668				ng/L
	U 236	236	91.000				ng/L
⌈	U-tot	238	98.140	**20052.474**	102.91	0.5	ng/L
⌊>	U233	233	3000.495				ng/L
	U233 IS	233	3000.495	**92.089**	0.30	0.3	%R

010347

Quantitative Analysis - Summary Report

Sample ID: 473758d21D

Sample Date/Time: Monday, October 10, 2011 18:58:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473758d21D.1021
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	66	21.374	0.000	
	U	235	1251	5.062	0.000	
	U	238	309262	0.674	0.000	
	U 232	232	117	29.834	0.000	
	U 236	236	97	15.928	0.000	
⌜	U-tot	238	310579	0.693	0.000	
⌞>	U233	233	2921	1.843	0.000	
	U233 IS	233	2921	1.843	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.000				ng/L
	U	235	1251.086				ng/L
	U	238	309261.521				ng/L
	U 232	232	117.334				ng/L
	U 236	236	97.334				ng/L
⌜	U-tot	238	106.349	**21730.503**	274.73	1.3	ng/L
⌞>	U233	233	2920.803				ng/L
	U233 IS	233	2920.803	**89.643**	1.65	1.8	%R

010348

Quantitative Analysis - Summary Report

Sample ID: 473768d21 df4

Sample Date/Time: Monday, October 10, 2011 19:00:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\totel u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473768d21 df4.1022
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibretion File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	74.919	0.000	
	U	235	1194	1.984	0.000	
	U	238	319705	0.838	0.000	
	U 232	232	58	45.561	0.000	
	U 236	236	79	30.406	0.000	
⌜	U-tot	238	320937	0.822	0.000	
⌞>	U233	233	3188	0.694	0.000	
	U233 IS	233	3188	0.694	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.667				ng/L
	U	235	1194.412				ng/L
	U	238	319705.065				ng/L
	U 232	232	58.334				ng/L
	U 236	236	79.000				ng/L
⌜	U-tot	238	100.685	**20572.787**	136.79	0.7	ng/L
⌞>	U233	233	3187.559				ng/L
	U233 IS	233	3187.559	**97.830**	0.68	0.7	%R

010349

Quantitative Analysis - Summary Report

Sample ID: 473768d21D df4

Sample Date/Time: Monday, October 10, 2011 19:03:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Procassing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473768d21D df4.1023
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	52.109	0.000	
	U	235	1206	2.086	0.000	
	U	238	324404	1.317	0.000	
	U 232	232	88	31.051	0.000	
	U 236	236	121	22.701	0.000	
⌈	U-tot	238	325672	1.296	0.000	
⌊>	U233	233	3107	0.616	0.000	
	U233 IS	233	3107	0.616	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.667				ng/L
	U	235	1205.747				ng/L
	U	238	324403.579				ng/L
	U 232	232	88.334				ng/L
	U 236	236	120.667				ng/L
⌈	U-tot	238	104.809	**21415.733**	147.03	0.7	ng/L
⌊>	U233	233	3107.198				ng/L
	U233 IS	233	3107.198	**95.364**	0.59	0.6	%R

010350

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 19:05:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.1024
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	64.838	0.000	
	U	235	41	65.989	0.000	
	U	238	146	30.149	0.000	
	U 232	232	36	62.793	0.000	
	U 236	236	43	79.081	0.000	
⌈	U-tot	238	237	41.327	0.000	
⌊>	U233	233	3122	1.760	0.000	
	U233 IS	233	3122	1.760	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.000				ng/L
	U	235	41.000				ng/L
	U	238	146.335				ng/L
	U 232	232	36.000				ng/L
	U 236	236	43.333				ng/L
⌈	U-tot	238	0.076	**8.770**	6.54	74.6	ng/L
⌊>	U233	233	3122.203				ng/L
	U233 IS	233	3122.203	**95.825**	1.69	1.8	%R

010351

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 19:07:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.1025
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	104.442	0.000	
	U	235	48	93.007	0.000	
	U	238	747	6.145	0.000	
	U 232	232	34	118.088	0.000	
	U 236	236	40	110.584	0.000	
⌈	U-tot	238	834	14.709	0.000	
⌊>	U233	233	3221	1.772	0.000	
	U233 IS	233	3221	1.772	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.667				ng/L
	U	235	48.000				ng/L
	U	238	746.697				ng/L
	U 232	232	34.000				ng/L
	U 236	236	40.333				ng/L
⌈	U-tot	238	0.259	**46.065**	7.12	15.5	ng/L
⌊>	U233	233	3221.237				ng/L
	U233 IS	233	3221.237	**98.864**	1.75	1.8	%R

010352

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 19:10:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.1026
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	70.358	0.000	
	U	235	933	3.075	0.000	
	U	238	124592	1.817	0.000	
	U 232	232	29	69.225	0.000	
	U 236	236	106	19.957	0.000	
⌈	U-tot	238	125571	1.785	0.000	
⌊>	U233	233	3150	2.077	0.000	
	U233 IS	233	3150	2.077	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.333				ng/L
	U	235	933.048				ng/L
	U	238	124592.487				ng/L
	U 232	232	29.333				ng/L
	U 236	236	106.334				ng/L
⌈	U-tot	238	39.871	**8142.635**	205.53	2.5	ng/L
⌊>	U233	233	3150.213				ng/L
	U233 IS	233	3150.213	**96.684**	2.01	2.1	%R

Quantitative Analysis - Summary Report

010353

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 19:12:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.1027
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	67.003	0.000	
	U	235	41	55.332	0.000	
	U	238	86	36.745	0.000	
	U 232	232	36	42.920	0.000	
	U 236	236	45	67.535	0.000	
⌜	U-tot	238	167	47.548	0.000	
⌞>	U233	233	3112	1.101	0.000	
	U233 IS	233	3112	1.101	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.333				ng/L
	U	235	40.667				ng/L
	U	238	86.334				ng/L
	U 232	232	35.667				ng/L
	U 236	236	45.333				ng/L
⌜	U-tot	238	0.054	**4.151**	5.13	123.7	ng/L
⌞>	U233	233	3112.199				ng/L
	U233 IS	233	3112.199	**95.517**	1.05	1.1	%R

010354

Quantitative Analysis - Summary Report

Sample ID: 473769d21 df4

Sample Date/Time: Monday, October 10, 2011 19:14:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473769d21 df4.1028
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	21	32.218	0.000	
	U	235	979	2.349	0.000	
	U	238	268479	0.814	0.000	
	U 232	232	43	5.413	0.000	
	U 236	236	52	25.374	0.000	
⌜	U-tot	238	269479	0.815	0.000	
⌞>	U233	233	3050	2.761	0.000	
	U233 IS	233	3050	2.761	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	20.667				ng/L
	U	235	979.053				ng/L
	U	238	268479.274				ng/L
	U 232	232	42.667				ng/L
	U 236	236	52.333				ng/L
⌜	U-tot	238	88.381	**18057.919**	366.21	2.0	ng/L
⌞>	U233	233	3050.179				ng/L
	U233 IS	233	3050.179	**93.614**	2.58	2.8	%R

010355

Quantitative Analysis - Summary Report

Sample ID: 473769d21D df4

Sample Date/Time: Monday, October 10, 2011 19:16:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473769d21D df4.1029
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	51	83.466	0.000	
	U	235	1022	3.071	0.000	
	U	238	269422	0.894	0.000	
	U 232	232	56	65.465	0.000	
	U 236	236	81	41.289	0.000	
⌈	U-tot	238	270496	0.885	0.000	
⌊>	U233	233	3102	1.559	0.000	
	U233 IS	233	3102	1.559	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	51.000				ng/L
	U	235	1022.391				ng/L
	U	238	269422.267				ng/L
	U 232	232	56.000				ng/L
	U 236	236	80.667				ng/L
⌈	U-tot	238	87.226	**17821.770**	427.42	2.4	ng/L
⌊>	U233	233	3101.863				ng/L
	U233 IS	233	3101.863	**95.200**	1.48	1.6	%R

010356

Quantitative Analysis - Summary Report

Sample ID: 473770d21 df4

Sample Date/Time: Monday, October 10, 2011 19:19:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473770d21 df4.1030
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	24	37.062	0.000	
	U	235	1147	1.134	0.000	
	U	238	304345	0.477	0.000	
	U 232	232	49	29.228	0.000	
	U 236	236	63	17.464	0.000	
⌜	U-tot	238	305517	0.481	0.000	
⌞>	U233	233	3052	2.123	0.000	
	U233 IS	233	3052	2.123	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	24.333				ng/L
	U	235	1147.406				ng/L
	U	238	304344.957				ng/L
	U 232	232	48.667				ng/L
	U 236	236	63.334				ng/L
⌜	U-tot	238	100.134	**20460.077**	521.11	2.5	ng/L
⌞>	U233	233	3052.179				ng/L
	U233 IS	233	3052.179	**93.675**	1.99	2.1	%R

010357

Quantitative Analysis - Summary Report

Sample ID: 473770d21D df4

Sample Date/Time: Monday, October 10, 2011 19:21:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473770d21D df4.1031
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	46.791	0.000	
	U	235	1187	5.882	0.000	
	U	238	323086	1.642	0.000	
	U 232	232	76	13.761	0.000	
	U 236	236	59	6.811	0.000	
⌈	U-tot	238	324300	1.655	0.000	
⌊>	U233	233	3014	1.510	0.000	
	U233 IS	233	3014	1.510	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.000				ng/L
	U	235	1187.411				ng/L
	U	238	323086.234				ng/L
	U 232	232	76.334				ng/L
	U 236	236	59.334				ng/L
⌈	U-tot	238	107.588	**21983.737**	363.68	1.7	ng/L
⌊>	U233	233	3014.500				ng/L
	U233 IS	233	3014.500	**92.519**	1.40	1.5	%R

010358

Quantitative Analysis - Summary Report

Sample ID: 473771d21 df4

Sample Date/Time: Monday, October 10, 2011 19:23:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473771d21 df4.1032
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	36.559	0.000	
	U	235	1323	3.100	0.000	
	U	238	335080	0.502	0.000	
	U 232	232	61	37.492	0.000	
	U 236	236	67	21.160	0.000	
⌜	U-tot	238	336441	0.504	0.000	
⌞>	U233	233	3071	2.475	0.000	
	U233 IS	233	3071	2.475	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.000				ng/L
	U	235	1323.430				ng/L
	U	238	335079.661				ng/L
	U 232	232	60.667				ng/L
	U 236	236	67.000				ng/L
⌜	U-tot	238	109.597	**22394.333**	471.03	2.1	ng/L
⌞>	U233	233	3070.852				ng/L
	U233 IS	233	3070.852	**94.248**	2.33	2.5	%R

010359

Quantitative Analysis - Summary Report

Sample ID: 473771d21D df4

Sample Date/Time: Monday, October 10, 2011 19:26:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473771d21D df4.1033
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	15.031	0.000	
	U	235	1360	4.282	0.000	
	U	238	348072	0.328	0.000	
	U 232	232	66	43.704	0.000	
	U 236	236	108	15.826	0.000	
⌈	U-tot	238	349490	0.338	0.000	
⌊>	U233	233	3138	2.172	0.000	
	U233 IS	233	3138	2.172	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.000				ng/L
	U	235	1360.102				ng/L
	U	238	348072.366				ng/L
	U 232	232	66.000				ng/L
	U 236	236	107.667				ng/L
⌈	U-tot	238	111.425	**22767.866**	493.74	2.2	ng/L
⌊>	U233	233	3137.542				ng/L
	U233 IS	233	3137.542	**96.295**	2.09	2.2	%R

Quantitative Analysis - Summary Report

010360

Sample ID: 473772d21 df4

Sample Date/Time: Monday, October 10, 2011 19:28:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473772d21 df4.1034
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	30	62.406	0.000	
	U	235	1223	2.646	0.000	
	U	238	326328	1.350	0.000	
	U 232	232	212	35.449	0.000	
	U 236	236	75	15.377	0.000	
⌜	U-tot	238	327581	1.344	0.000	
⌞>	U233	233	3116	1.960	0.000	
	U233 IS	233	3116	1.960	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	30.333				ng/L
	U	235	1222.749				ng/L
	U	238	326328.023				ng/L
	U 232	232	212.336				ng/L
	U 236	236	75.000				ng/L
⌜	U-tot	238	105.152	**21485.820**	554.50	2.6	ng/L
⌞>	U233	233	3116.201				ng/L
	U233 IS	233	3116.201	**95.640**	1.87	2.0	%R

010361

Quantitative Analysis - Summary Report

Sample ID: 473772d21D df4

Sample Date/Time: Monday, October 10, 2011 19:30:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandate\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\473772d21D df4.1035
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	25.252	0.000	
	U	235	1190	1.244	0.000	
	U	238	324220	0.363	0.000	
	U 232	232	56	33.238	0.000	
	U 236	236	77	21.207	0.000	
⌜	U-tot	238	325450	0.359	0.000	
⌞>	U233	233	3165	1.470	0.000	
	U233 IS	233	3165	1.470	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.667				ng/L
	U	235	1190.078				ng/L
	U	238	324220.291				ng/L
	U 232	232	55.667				ng/L
	U 236	236	76.667				ng/L
⌜	U-tot	238	102.856	**21016.493**	292.04	1.4	ng/L
⌞>	U233	233	3164.551				ng/L
	U233 IS	233	3164.551	**97.124**	1.43	1.5	%R

010362

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Monday, October 10, 2011 19:32:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\zzz.1036
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	10.415	0.000	
	U	235	7	8.660	0.000	
	U	238	99	5.545	0.000	
	U 232	232	12	26.186	0.000	
	U 236	236	9	29.038	0.000	
⌈	U-tot	238	121	2.910	0.000	
⌊>	U233	233	3124	0.737	0.000	
	U233 IS	233	3124	0.737	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	14.667				ng/L
	U	235	6.667				ng/L
	U	238	99.334				ng/L
	U 232	232	11.667				ng/L
	U 236	236	8.667				ng/L
⌈	U-tot	238	0.039	**1.078**	0.29	26.7	ng/L
⌊>	U233	233	3124.203				ng/L
	U233 IS	233	3124.203	**95.886**	0.71	0.7	%R

010363

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Monday, October 10, 2011 19:35:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\critotU.1037
Tuning File: C:\Elandata\Tuning\default.tun
Optimization Fila: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	30	76.376	0.000	
	U	235	26	34.036	0.000	
	U	238	702	2.002	0.000	
	U 232	232	22	73.152	0.000	
	U 236	236	29	88.548	0.000	
⌈	U-tot	238	758	3.319	0.000	
⌊>	U233	233	3063	4.188	0.000	
	U233 IS	233	3063	4.188	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	30.000				ng/L
	U	235	26.333				ng/L
	U	238	701.694				ng/L
	U 232	232	22.000				ng/L
	U 236	236	28.667				ng/L
⌈	U-tot	238	0.248	**43.852**	3.46	7.9	ng/L
⌊>	U233	233	3063.183				ng/L
	U233 IS	233	3063.183	**94.013**	3.94	4.2	%R

010364

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Monday, October 10, 2011 19:37:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccv.1038
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	20	15.534	0.000	
	U	235	944	4.799	0.000	
	U	238	126881	0.359	0.000	
	U 232	232	9	17.625	0.000	
	U 236	236	81	2.138	0.000	
⌈	U-tot	238	127844	0.324	0.000	
⌊>	U233	233	3150	1.255	0.000	
	U233 IS	233	3150	1.255	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	19.667				ng/L
	U	235	944.049				ng/L
	U	238	126880.633				ng/L
	U 232	232	8.667				ng/L
	U 236	236	81.000				ng/L
⌈	U-tot	238	40.590	**8289.647**	77.32	0.9	ng/L
⌊>	U233	233	3149.879				ng/L
	U233 IS	233	3149.879	**96.674**	1.21	1.3	%R

010365

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Monday, October 10, 2011 19:39:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct\ccb.1039
Tuning File: C:\Elandata\Tuning\default.tun
Optimization File: C:\Elandata\Optimize\default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	18	47.656	0.000	
	U	235	19	15.802	0.000	
	U	238	60	21.550	0.000	
	U 232	232	18	32.680	0.000	
	U 236	236	16	31.250	0.000	
⌈	U-tot	238	97	21.608	0.000	
⌊>	U233	233	3123	4.372	0.000	
	U233 IS	233	3123	4.372	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	18.333				ng/L
	U	235	19.333				ng/L
	U	238	59.667				ng/L
	U 232	232	17.667				ng/L
	U 236	236	16.000				ng/L
⌈	U-tot	238	0.031	**-0.449**	1.30	290.2	ng/L
⌊>	U233	233	3122.537				ng/L
	U233 IS	233	3122.537	**95.835**	4.19	4.4	%R

010366

SOUTHWEST RESEARCH INSTITUTE

☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Total Uranium

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's **TVs**

S0	11-097-07	
STD. 1	11-091-04	44933 ng/L
I. STD	02-415-08	0.2ppb
I. STD		

QC STD. ID's

ICV/CCV	11-097-05	7666 ng/L
UCL		
CRI	11-097-06	40 ng/L
ICSA	11-097-03	–
ICSAB	11-097-04	20444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Exxon	110825-10 110915-9	10/11/11	SO	15 00132 – 15 00140

INSTRUMENT: DRCII

FILENAME: 111011d.rep
(EE) NS 10/12/11

Analyst: M. Seiler Date: 10/12/11

☐ CONVERTED (.DAT)

010367

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Tuesday, October 11, 2011 10:03:47
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\Daily Performance Check.008
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

10/11/11

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	6972.8	6972.807	57.604	0.8
	In	114.9	22587.2	22587.159	93.891	0.4
	U	238.1	23356.8	23356.834	130.209	0.6
⌈>	Ce	139.9	23560.2	23560.157	110.693	0.5
⌊	CeO	155.9	1315.3	0.056	0.001	2.2
⌈>	Ba	137.9	194987.9	194987.893	1195.255	0.6
⌊	Ba++	69.0	4292.6	0.022	0.000	0.8
	Bkgd	220.0	0.7	0.667	0.264	39.5
	Bkgd	8.5	8.0	8.000	0.913	11.4

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

10/13/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	4.5	437.0
Co	59	45	5.5	13226.6
In	115	45	6.3	21520.4

010368

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Tuesday, October 11, 2011 10:03:47
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\Daily Performance Check.008
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

N Seiler
10/11/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2758	2023	0.696	
Mg	23.985	24.025	5697	2031	0.690	
Ar2	75.930	75.875	18311	2066	0.689	
In	114.904	114.975	27808	2091	0.692	
Ce	139.905	139.875	33903	2103	0.705	
Pb	207.977	207.925	50466	2143	0.714	
Th	232.038	232.075	56344	2159	0.699	
U	238.050	238.025	57796	2172	0.693	

010369

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Tuesday, October 11, 2011 19:19:51
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\S-0.123
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	5.882	0.000	
	U	235	9	30.929	0.000	
	U	238	21	12.599	0.000	
	U 232	232	6	73.471	0.000	
	U 236	236	7	41.660	0.000	
⌈	U-tot	238	47	13.417	0.000	
⌊>	U233	233	4114	3.655	0.000	
	U233 IS	233	4114	3.655	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.000				ng/L
	U	235	9.333				ng/L
	U	238	21.000				ng/L
	U 232	232	5.667				ng/L
	U 236	236	7.333				ng/L
⌈	U-tot	238	0.012				ng/L
⌊>	U233	233	4114.265				ng/L
	U233 IS	233	4114.265	**100.000**	3.66	3.7	%R

010370

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Tuesday, October 11, 2011 19:22:09
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\S-1.124
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	9.355	0.000	
	U	235	6597	0.673	0.000	
	U	238	851418	1.284	0.000	
	U 232	232	12	12.385	0.000	
	U 236	236	178	7.368	0.000	
⌈	U-tot	238	858092	1.279	0.000	
⌊>	U233	233	4235	1.487	0.000	
	U233 IS	233	4235	1.487	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.334				ng/L
	U	235	6596.726				ng/L
	U	238	851417.809				ng/L
	U 232	232	12.333				ng/L
	U 236	236	178.002				ng/L
⌈	U-tot	238	202.627	**44933.000**	334.24	0.7	ng/L
⌊>	U233	233	4234.986				ng/L
	U233 IS	233	4234.986	**102.934**	1.53	1.5	%R

010371

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Tuesday, October 11, 2011 19:24:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\icv.125
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	26	10.176	0.000	
	U	235	1215	2.678	0.000	
	U	238	154181	1.958	0.000	
	U 232	232	10	30.000	0.000	
	U 236	236	123	8.327	0.000	
⌜	U-tot	238	155422	1.921	0.000	
⌞>	U233	233	4136	0.937	0.000	
	U233 IS	233	4136	0.937	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	26.000				ng/L
	U	235	1214.748				ng/L
	U	238	154181.115				ng/L
	U 232	232	10.000				ng/L
	U 236	236	122.667				ng/L
⌜	U-tot	238	37.587	**8332.876**	223.81	2.7	ng/L
⌞>	U233	233	4135.607				ng/L
	U233 IS	233	4135.607	**100.519**	0.94	0.9	%R

010372

Quantitative Analysis - Summary Report

Sample ID: lcb

Sample Date/Time: Tuesday, October 11, 2011 19:26:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\lcb.126
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	41.177	0.000	
	U	235	13	19.868	0.000	
	U	238	113	10.206	0.000	
	U 232	232	13	33.530	0.000	
	U 236	236	18	13.072	0.000	
⌜	U-tot	238	143	9.413	0.000	
⌞>	U233	233	4098	0.456	0.000	
	U233 IS	233	4098	0.456	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.000				ng/L
	U	235	12.667				ng/L
	U	238	113.001				ng/L
	U 232	232	13.000				ng/L
	U 236	236	17.667				ng/L
⌜	U-tot	238	0.035	**5.168**	0.74	14.3	ng/L
⌞>	U233	233	4097.923				ng/L
	U233 IS	233	4097.923	**99.603**	0.45	0.5	%R

010373

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, October 11, 2011 19:29:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\critotU.127
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	49.938	0.000	
	U	235	46	41.196	0.000	
	U	238	873	3.498	0.000	
	U 232	232	39	48.126	0.000	
	U 236	236	48	54.645	0.000	
⌜	U-tot	238	973	7.504	0.000	
⌞>	U233	233	4028	1.999	0.000	
	U233 IS	233	4028	1.999	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	53.334				ng/L
	U	235	46.333				ng/L
	U	238	873.375				ng/L
	U 232	232	39.333				ng/L
	U 236	236	48.000				ng/L
⌜	U-tot	238	0.242	**51.068**	4.82	9.4	ng/L
⌞>	U233	233	4028.226				ng/L
	U233 IS	233	4028.226	**97.909**	1.96	2.0	%R

010374

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Tuesday, October 11, 2011 19:31:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\icsa.128
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	21	28.641	0.000	
	U	235	40	38.115	0.000	
	U	238	493	6.298	0.000	
	U 232	232	295	5.261	0.000	
	U 236	236	17	6.928	0.000	
⌈	U-tot	238	555	5.973	0.000	
⌊>	U233	233	3780	2.626	0.000	
	U233 IS	233	3780	2.626	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	21.333				ng/L
	U	235	40.333				ng/L
	U	238	493.347				ng/L
	U 232	232	294.671				ng/L
	U 236	236	16.667				ng/L
⌈	U-tot	238	0.147	**30.049**	2.59	8.6	ng/L
⌊>	U233	233	3779.786				ng/L
	U233 IS	233	3779.786	**91.870**	2.41	2.6	%R

010375

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Tuesday, October 11, 2011 19:33:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\icsab.129
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	36.977	0.000	
	U	235	2852	4.174	0.000	
	U	238	374021	0.432	0.000	
	U 232	232	275	12.719	0.000	
	U 236	236	28	106.020	0.000	
⌈	U-tot	238	376920	0.413	0.000	
⌊>	U233	233	3921	0.246	0.000	
	U233 IS	233	3921	0.246	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.333				ng/L
	U	235	2851.781				ng/L
	U	238	374020.704				ng/L
	U 232	232	274.671				ng/L
	U 236	236	28.333				ng/L
⌈	U-tot	238	96.133	**21316.231**	97.12	0.5	ng/L
⌊>	U233	233	3920.845				ng/L
	U233 IS	233	3920.845	**95.299**	0.23	0.2	%R

010376

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, October 11, 2011 19:35:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\zzz.130
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	18.750	0.000	
	U	235	10	58.823	0.000	
	U	238	46	7.580	0.000	
	U 232	232	11	30.987	0.000	
	U 236	236	5	20.000	0.000	
⌜	U-tot	238	72	8.674	0.000	
⌞>	U233	233	4279	1.998	0.000	
	U233 IS	233	4279	1.998	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.000				ng/L
	U	235	9.667				ng/L
	U	238	46.333				ng/L
	U 232	232	11.333				ng/L
	U 236	236	5.000				ng/L
⌜	U-tot	238	0.017	**1.184**	0.40	33.9	ng/L
⌞>	U233	233	4279.007				ng/L
	U233 IS	233	4279.007	**104.004**	2.08	2.0	%R

010377

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, October 11, 2011 19:38:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\ccv.131
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	21	14.321	0.000	
	U	235	1195	2.014	0.000	
	U	238	156995	0.950	0.000	
	U 232	232	7	28.386	0.000	
	U 236	236	121	11.481	0.000	
⌜	U-tot	238	158212	0.956	0.000	
⌞>	U233	233	4212	0.373	0.000	
	U233 IS	233	4212	0.373	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	21.333				ng/L
	U	235	1195.079				ng/L
	U	238	156995.424				ng/L
	U 232	232	7.333				ng/L
	U 236	236	121.001				ng/L
⌜	U-tot	238	37.564	**8327.705**	108.97	1.3	ng/L
⌞>	U233	233	4211.976				ng/L
	U233 IS	233	4211.976	**102.375**	0.38	0.4	%R

Quantitative Analysis - Summary Report

010378

Sample ID: ccb

Sample Date/Time: Tuesday, October 11, 2011 19:40:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\ccb.132
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	74.678	0.000	
	U	235	40	79.969	0.000	
	U	238	76	55.263	0.000	
	U 232	232	37	86.613	0.000	
	U 236	236	42	69.820	0.000	
⌜	U-tot	238	165	66.841	0.000	
⌞>	U233	233	4199	1.193	0.000	
	U233 IS	233	4199	1.193	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.000				ng/L
	U	235	40.333				ng/L
	U	238	76.000				ng/L
	U 232	232	37.000				ng/L
	U 236	236	41.667				ng/L
⌜	U-tot	238	0.039	**6.136**	5.75	93.8	ng/L
⌞>	U233	233	4198.970				ng/L
	U233 IS	233	4198.970	**102.059**	1.22	1.2	%R

010379

Quantitative Analysis - Summary Report

Sample ID: 473778d21 df4

Sample Date/Time: Tuesday, October 11, 2011 19:42:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\473778d21 df4.133
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	58.236	0.000	
	U	235	1373	3.284	0.000	
	U	238	357965	0.717	0.000	
	U 232	232	247	6.099	0.000	
	U 236	236	107	34.580	0.000	
⌜	U-tot	238	359390	0.701	0.000	
⌞>	U233	233	4196	0.974	0.000	
	U233 IS	233	4196	0.974	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	51.667				ng/L
	U	235	1372.770				ng/L
	U	238	357965.479				ng/L
	U 232	232	246.670				ng/L
	U 236	236	107.001				ng/L
⌜	U-tot	238	85.656	**18992.951**	216.50	1.1	ng/L
⌞>	U233	233	4195.968				ng/L
	U233 IS	233	4195.968	**101.986**	0.99	1.0	%R

Quantitative Analysis - Summary Report

010380

Sample ID: 473778d21D df4

Sample Date/Time: Tuesday, October 11, 2011 19:45:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\473778d21D df4.134
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	77.837	0.000	
	U	235	1157	1.811	0.000	
	U	238	298704	0.527	0.000	
	U 232	232	94	13.287	0.000	
	U 236	236	91	33.252	0.000	
⌈	U-tot	238	299900	0.516	0.000	
⌊>	U233	233	4076	1.460	0.000	
	U233 IS	233	4076	1.460	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.333				ng/L
	U	235	1157.074				ng/L
	U	238	298703.752				ng/L
	U 232	232	94.000				ng/L
	U 236	236	91.334				ng/L
⌈	U-tot	238	73.580	**16314.819**	168.08	1.0	ng/L
⌊>	U233	233	4076.247				ng/L
	U233 IS	233	4076.247	**99.076**	1.45	1.5	%R

010381

Quantitative Analysis - Summary Report

Sample ID: 473045d21 df4

Sample Date/Time: Tuesday, October 11, 2011 19:47:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\473045d21 df4.135
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	64	50.640	0.000	
	U	235	1795	0.827	0.000	
	U	238	428324	1.261	0.000	
	U 232	232	90	50.565	0.000	
	U 236	236	130	28.216	0.000	
⌈	U-tot	238	430183	1.253	0.000	
⌊>	U233	233	4028	1.323	0.000	
	U233 IS	233	4028	1.323	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	64.334				ng/L
	U	235	1794.844				ng/L
	U	238	428324.148				ng/L
	U 232	232	90.001				ng/L
	U 236	236	130.334				ng/L
⌈	U-tot	238	106.811	**23684.235**	20.89	0.1	ng/L
⌊>	U233	233	4027.559				ng/L
	U233 IS	233	4027.559	**97.893**	1.30	1.3	%R

Quantitative Analysis - Summary Report

Sample ID: 473045d21D df4

Sample Date/Time: Tuesday, October 11, 2011 19:49:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\473045d21D df4.136
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	25.086	0.000	
	U	235	1751	1.324	0.000	
	U	238	424113	1.396	0.000	
	U 232	232	68	11.945	0.000	
	U 236	236	75	4.092	0.000	
⌈	U-tot	238	425886	1.386	0.000	
⌊>	U233	233	4002	2.631	0.000	
	U233 IS	233	4002	2.631	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	22.667				ng/L
	U	235	1750.502				ng/L
	U	238	424112.628				ng/L
	U 232	232	67.667				ng/L
	U 236	236	74.667				ng/L
⌈	U-tot	238	106.447	**23603.665**	514.12	2.2	ng/L
⌊>	U233	233	4002.215				ng/L
	U233 IS	233	4002.215	**97.277**	2.56	2.6	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Tuesday, October 11, 2011 19:52:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\zzz.137
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	89.856	0.000	
	U	235	28	111.404	0.000	
	U	238	120	24.432	0.000	
	U 232	232	35	76.825	0.000	
	U 236	236	30	118.714	0.000	
⌈	U-tot	238	186	50.207	0.000	
⌊>	U233	233	4082	1.832	0.000	
	U233 IS	233	4082	1.832	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.333				ng/L
	U	235	28.000				ng/L
	U	238	120.334				ng/L
	U 232	232	35.000				ng/L
	U 236	236	29.667				ng/L
⌈	U-tot	238	0.045	**7.481**	4.85	64.8	ng/L
⌊>	U233	233	4081.583				ng/L
	U233 IS	233	4081.583	**99.206**	1.82	1.8	%R

010384

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Tuesday, October 11, 2011 19:54:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\critotU.138
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	12.010	0.000	
	U	235	15	35.277	0.000	
	U	238	822	5.953	0.000	
	U 232	232	11	35.493	0.000	
	U 236	236	13	33.819	0.000	
⌜	U-tot	238	855	6.377	0.000	
⌞>	U233	233	4085	1.524	0.000	
	U233 IS	233	4085	1.524	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.333				ng/L
	U	235	15.000				ng/L
	U	238	822.371				ng/L
	U 232	232	10.667				ng/L
	U 236	236	13.333				ng/L
⌜	U-tot	238	0.209	**43.826**	2.27	5.2	ng/L
⌞>	U233	233	4084.918				ng/L
	U233 IS	233	4084.918	**99.287**	1.51	1.5	%R

010385

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Tuesday, October 11, 2011 19:56:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\ccv.139
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	74.762	0.000	
	U	235	1205	5.645	0.000	
	U	238	152776	0.486	0.000	
	U 232	232	38	81.108	0.000	
	U 236	236	136	29.215	0.000	
⌈	U-tot	238	154033	0.514	0.000	
⌊>	U233	233	4126	0.583	0.000	
	U233 IS	233	4126	0.583	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	1205.080				ng/L
	U	238	152775.713				ng/L
	U 232	232	37.667				ng/L
	U 236	236	136.334				ng/L
⌈	U-tot	238	37.331	**8276.097**	65.89	0.8	ng/L
⌊>	U233	233	4126.270				ng/L
	U233 IS	233	4126.270	**100.292**	0.58	0.6	%R

010386

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Tuesday, October 11, 2011 19:59:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 1\ccb.140
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	6.797	0.000	
	U	235	57	25.416	0.000	
	U	238	115	13.828	0.000	
	U 232	232	51	2.976	0.000	
	U 236	236	57	14.990	0.000	
⌈	U-tot	238	224	14.113	0.000	
⌊>	U233	233	4099	2.028	0.000	
	U233 IS	233	4099	2.028	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	51.667				ng/L
	U	235	57.334				ng/L
	U	238	115.334				ng/L
	U 232	232	51.333				ng/L
	U 236	236	57.000				ng/L
⌈	U-tot	238	0.055	**9.610**	1.95	20.2	ng/L
⌊>	U233	233	4098.924				ng/L
	U233 IS	233	4098.924	**99.627**	2.02	2.0	%R

Fluor-B&W Portsmouth, LLC
FXP02234L04

010387

Standard Logs and Certificates of Analysis

010388

ERA

A Waters Company

Certificate of Analysis

Lot No. S147-779

PotableWatR™ pH

Catalog No. 779
Issue Date: January 19, 2009
Revision Date: Original

Certification

Parameter	Certified Value [1] (s.u.)	Uncertainty [2]	QC PALs™ [3] (s.u.)	PT PALs™ [4] (s.u.)
pH	7.52	1.0%	7.43 - 7.61	7.32 - 7.72

Analytical Verification

Parameter	Round Robin Data [5] Mean (s.u.)	Round Robin Data [5] Recovery (%)	n	NIST Traceability SRM Number	NIST Traceability Recovery (%)
pH	7.52	100%	118	SRM 187e	100%

Please see footnotes on back

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/19/09
DATE EXPIRED: 02/01/2012
DATE OPENED: 07/01/10 JGM
INORG: 8325 PO: TR 3/10/11 JGM RB PE

010389

ERA

A Waters Company

1. The **Certified Value** is the actual "made-to" concentration confirmed by ERA analytical verification.

2. The stated **Uncertainty** is the total propagated uncertainty at the 95% confidence interval. The uncertainty is based on the preparation and internal analytical verification of the product by ERA, times a coverage factor which is equal to the student t factor at a 95% confidence interval at n-1 degrees of freedom.

3. The **QC Performance Acceptance Limits (QC PALs™)** are based on actual historical data collected in ERA's Proficiency Testing program. The **QC PALs™** reflect any inherent biases in the methods used to establish the limits and closely approximate a 95% confidence interval of the performance that experienced laboratories should achieve using accepted environmental methods. Use the **QC PALs™** to realistically evaluate your performance against your peers.

4. The **PT Performance Acceptance Limits (PT PALs™)** are calculated using the regression equations and fixed acceptance criteria specified in the NELAC proficiency testing requirements. Use the **PT PALs™** when analyzing this QC standard alongside USEPA and NELAC compliant PT standards. Please note that many PT study acceptance limits are concentration dependent (some non-linearity) and, therefore, the acceptance limits of this QC standard and any PT standard may differ relative to their difference in concentrations.

5. The **Analytical Verification** data include the mean value, percent recovery and number of data points reported by the laboratories in our Proficiency Testing study compared to the Certified Values. In addition, where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed.

Traceability Recovery (%) = [(% recovery certified standard)/(% recovery NIST SRM)]*100

The traceability data shown were compiled by analyzing the ERA standards or their associated stock solutions against the applicable NIST SRMs.

6. This standard **expires 2/2012.** The certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or email to info@eraqc.com.

Certifying Officer: Tom Widera

010390

BOOK / PAGE 03 0038 Book I.D: 10-0406-017

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard : 034RadSOL3

Vendor(s) : NIST

Radionuclide(s) : Tc99

Source I.D. : SRM4288a
034RadSOL1

Dilution : Secondary

Procedure :

20mL of 034RadSOL1 was diluted to a final volume of 200mL with 2.5% nitric acid (Inorg #9052, exp: 11/2013).

$\frac{20mL}{200mL} \times 9993.1\ pCi/mL = 999.31\ pCi/mL$

WAN 07/07/11

Final Activity :	999.31 pCi/mL	Reference Date :	08/27/2004
Date Prepared :	07/07/11	Certification Date :	07/08/11
Prepared By :	WAN	Re-Certification Date :	07/08/12
Reviewed By :		Date:	07/11/11

FRM-059 (Rev 1/Apr 10)

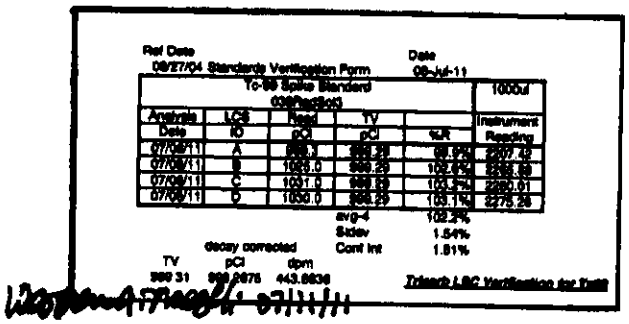
010391

BOOK / PAGE 03 0039 Book I.D: 10-0406-017

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard Verification(s) :



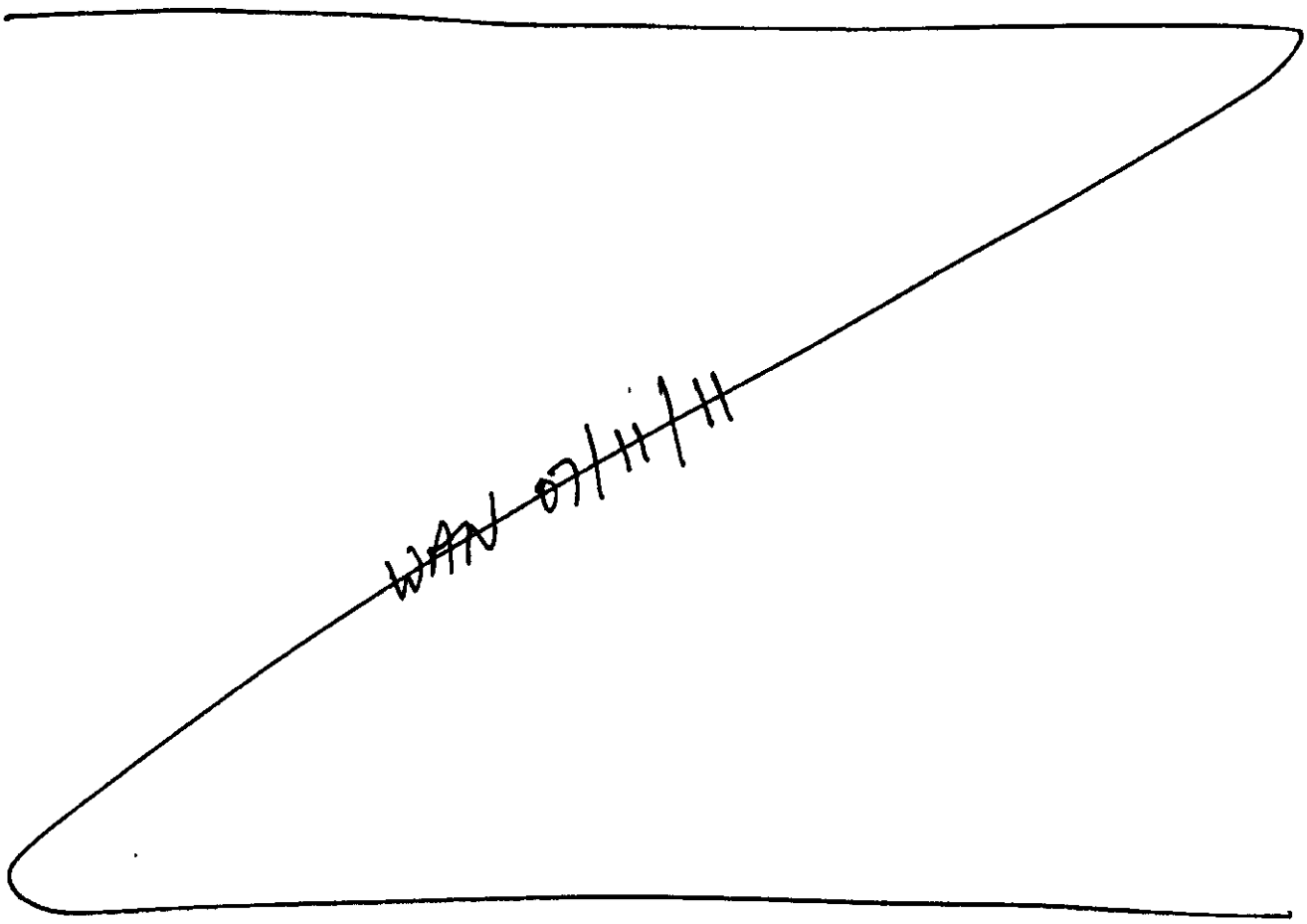
Ref Date
09/27/04 Standards Verification Form
Date
09-Jul-11

Tc-99 Spike Standard
1000ul

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
07/09/11	A	1008.0	986.29	98.9%	2207.49
07/09/11	B	1003.0	986.29	102.4%	2282.59
07/09/11	C	1007.0	986.29	100.7%	2280.01
07/09/11	D	1050.0	986.29	106.1%	2376.26
			avg-4	102.2%	
			Stdev	1.54%	
			Cont Int	1.81%	

decay corrected
TV 986.31 pCi 986.2875 dpm 443.8638

Triangle LSC Verification for Tritium



010392

for 034-Rad-Soil 01 035

Calculations: 32.61 KBq/g — 09/01/1996
3.261x10⁴ KBq/g = 3.261x10⁴Bq/g x27 =
Dilution = 8.80470e⁵pCi/g x 1.135g / 1 Unit
= 9993.3pCi/g 9/1/1996
= 9993.1pCi/g 8/27/2004

Final activity after dilution: 9993.1pCi/g **Reference Date:** 8/27/04
- 9993pCi/g Sig Sig2

Comments: Date Correction Decay
Tc-99 T½ = 2.111e⁵y
- 0.5^((8/27/04 − 9/1/1996)/(2.111e⁵ * 365.25))
= 0.999974 (Decay Correction factor)
= 0.999974 x 9993.3pCi/g

Date Prepared: 8/27/04 **Expires:** 9/01/2006

Prepared By: T. Ghia

secondary recert 038RadSol3 07/06/11

Reviewed By: [signature] **Date:** 8-27-2004

secondary recert 012RadSol3 05/20/10 [signature] 06/07/11

Ref Date 08/27/04 Standards Verification Form Date 06-Jan-10

Tc-99 Spike Standard 034-Rad-Sol1 100uL

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
01/06/10	A	978.78	999.29	97.9%	2172.90
01/06/10	B	1000.09	999.29	100.1%	2220.20
01/06/10	C	1004.62	999.29	100.5%	2230.25
01/06/10	D	1002.15	999.29	100.3%	2224.76
			avg-4	99.7%	
			Stdev	1.19%	
			Conf Int	1.17%	

TV 999.31 decay corrected 999.2924 2218.429 Trisarb LSC Verification for Tc99

[signature] 01/13/10

Ref Date 08/27/04 Standards Verification Form Date 06-Jun-11

Tc-99 Spike Standard 034RadSol1 200ul

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
06/06/11	A	2006.65	1998.58	100.4%	4454.76
06/06/11	B	2007.50	1998.58	100.4%	4456.64
06/06/11	C	2025.68	1998.58	101.4%	4496.94
06/06/11	D	2007.93	1998.58	100.5%	4457.60
			avg-4	100.7%	
			Stdev	0.46%	
			Conf Int	0.45%	

decay corrected
TV 9993.10 pCi 9992.878 dpm 4436.836 Trisarb LSC Verification for Tc99

010393

01 034

Southwest Research Institute
San Antonio, TX 78288-0510

Radioactive Standards Logbook

Solution# 034-Red-Soil

Radionuclide: Tc-99

Vendor name: N.S.+
SRM# 4288A
Primary Solution# Inorg # 3082

Dilution#

~~Porcedure~~
Procedure:

1) Weighed 6.135g of Tc-99 Inorg #3082 into 125ml Nalgene
2) Added ~50 ml $Di:H_2O$ followed by 10mls Conc HNO_3 (c+)
3) Diluted to ~~F.V~~ Tot 8/27/04, Final weigh 105.1g w/ $Di:H_2O$.

Note: 10% HNO_3 in $Di:H_2O$ = 105g

010394

National Institute of Standards & Technology

Certificate

Standard Reference Material 4288A
Technetium-99 Radioactivity Standard

DATE RECEIVED: 9/25/01
DATE EXPIRED:
DATE OPENED:
INITIAL:
PO:

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1996 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

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Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

*Notes and references are on pages 5 and 6.

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PROPERTIES OF SRM 4288A
(Certified values are shown in bold type)

Source identification number	**NIST SRM 4288A**		
Physical Properties:			
Source description	**Liquid in flame-sealed NIST borosilicate-glass ampoule**		
Ampoule specifications	**Body outside diameter** **(16.5 ± 0.5) mm** **Wall Thickness** **(0.60 ± 0.04) mm** **Barium content** **Less than 2.5%** **Lead-oxide content** **Less than 0.02%** **Other heavy elements** **Trace quantities**		
Solution density	**(0.996 ± 0.002) g·mL^{-1} at 21 °C [b]***		
Solution mass	**(4.996 ± 0.002) g [b]**		
Chemical Properties:			
Solution composition	**Chemical Formula**	**Concentration (mol·L^{-1})**	**Mass Fraction (g·g^{-1})**
	H_2O	**55**	**1.00**
	KOH	**0.001**	**0.00006**
	$K^{99}TcO_4$	**0.0005**	**0.0001**
Radiological Properties:			
Radionuclide	**Technetium-99**		
Reference time	**1200 EST, 1 September 1996**		
Massic activity of the solution [c]	**32.61 kBq·g^{-1}**		
Relative expanded uncertainty (k=2)	**1.14% [d] [e]**		
Photon-emitting impurities	**None detected [f]**		
Half lives used in the decay corrections	**Cobalt-60: (5.2714 ± 0.0005) a [g]** **Technetium-99: (2.111 ± 0.012) × 10^5 a [g]**		
Measuring instrument	**NIST 4πβ(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.**		

***Notes and references are on pages 5 and 6.**

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EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [b]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [j]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [l]
Extrapolated massic liquid-scintillation count rate of the Tc-99 solution, corrected for background, Co-60 tracer count rate, and decay.	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	0.10	1.0	0.10
Half life of Co-60 Half life of Tc-99	Standard uncertainty of the half life (A)	0.01 [k] 0.6 [k]	0.01 [m] 0.000005	0.0001 0.000003
Decay scheme data	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.40	1.0	0.40
Calibration of the Co-60 tracer solution using the 4πβ(LS)-γ-anticoincidence counting system	Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live time [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.00004	0.004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.57
Coverage Factor, k				x 2.
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.14

*Notes and references are on pages 5 and 6.

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NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	<0.1		(Not detectable)

[b] The stated uncertainty is two times the standard uncertainty.

[c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a standard uncertainty, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| \cdot u(x_i)$, called a component of combined standard uncertainty of y.

The combined standard uncertainty of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U, the expanded uncertainty of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] Estimated limits of detection for photon-emitting impurities are:
2×10^{-4} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 20 and 85 keV,
2×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 93 and 503 keV,
1×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 519 and 1457 keV, and
5×10^{-6} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 1465 and 3250 keV.

[g] The stated uncertainty is the standard uncertainty. See reference [5].

[h] Relative standard uncertainty of the input quantity x_i.

[i] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[j] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[k] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{(\text{response per Bq of impurity})/(\text{response per Bq of Tc-99})\} \cdot \{(\text{Bq of impurity})/(\text{Bq of Tc-99})\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a mass activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

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SOUTHWEST RESEARCH INSTITUTE

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Chemistry and Chemical Engineering Division
Department of Analytical and Environmental Chemistry

November 23, 2011

Fluor-B&W Portsmouth LLC
3930 U.S. Route 23 South
Bldg. X-1000
Piketon, OH 45661

Attn: Gerald Fulkerson

Subject:	Client ID:	FXP02234L04
	SwRI Project Number:	16526.05.00X
	SDG:	474212
	SwRI Task Order Number:	110830-12, 110831-5, 110901-7, 110902-3, 111122-15
	SwRI Sample Receipt Number:	45547, 45562, 45570, 45578, 45654
	Samples Received:	08.30.11, 08.31.11, 09.01.11, 09.02.11, 9.15.11, 10.06.11
	Fraction:	Various Analyses

Dear Mr. Fulkerson:

Please find the enclosed results for the sixteen (16) samples received on the above referenced date. Should you have any questions, please feel free to contact me at 210-522-3242.

Sincerely,

Radonna Spies
Group Leader

APPROVED:

Michael J. Dammann
Director

RS: aa
Encl

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

NARRATIVE

000002

Client: Fluor-B&W Portsmouth LLC
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

INORGANICS ANALYSIS

The Distribution Coefficients (K_d) for Tc-99 and Total Uranium (U) were determined using the following modification to ASTM C1733.

The contact solution was be prepared by spiking the client provided Tc-99 contaminated groundwater, which had been filtered through a Whatman #1810-125 acid treated TCLP filter, at 100 ppb Uranium. (Tc-99 groundwaters 749-WPW-06, 749-WPW-07, 749-WPW-08 were used). Only the minimum volume needed for the sample batch was prepared. Samples were weighted in duplicate for 5 time points (Day 7, Day 10, Day 14, Day 21 and Day X). The method specifies a 1:25 soil to contact solution test ratio; therefore, 200 mL of contact solution was added to 8 g of soil in a 250-mL Nalgene bottle. Samples were tumbled using the TCLP tumbler for 12-hours a day. For each time point, a 200 mL of the contact solution was added to an empty Nalgene and processed alongside the sample as a time point "Blank" for each Day n.

At each time point, the sample duplicates and time point "Blank" were filtered using a Whatman #1810-125 acid treated TCLP filter. The filtrate was preserved with nitric acid and stored for analysis. After the 4th time point (Day 21), all samples and "Blanks" were submitted for Tc-99 and total uranium analysis.

To calculate Kd in C1733, the following equation is used:

$$K_d = \frac{\frac{(C_s \, x \, V) - (C_f x \, V)}{m}}{C_f}$$

Where:
Cs = Starting Concentration of analyte of interest in contact solution
Cf = Final Concentration of analyte of interest in contact solution
V = Total Volume of contact liquid (mL)
m = Dry Mass of Solid (g)

For the purposes of this modified analysis at multiple time points, the concentrations of all "Blanks" analyzed were averaged and used as the starting concentration of the contact solution. The samples were not dried prior to the sample analysis; therefore, a percent solids was performed, and the results are reported on a dry weight basis. Therefore, following equation was used:

$$K_d = \frac{\frac{(C_{avg\ blk} x \, V) - (C_{day\ x} \, x \, V)}{m \, x \, \%\ soilds}}{C_{day\ x}}$$

Where:

Client: Fluor-B&W Portsmouth LLC
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

$C_{avg\ blk}$ = average "Blank" concentration which represents the starting concentration of analyte of interest in contact solution
$C_{day\ x}$ = concentration of analyte of interest in contact solution at time point x
V = total volume of contact liquid (mL)
m = weight of Solid (g)

In addition to the K_d values, the propagated uncertainties were also calculated. The K_d values and the uncertainties for the sample duplicates were averaged for each time point. By evaluating these values, it was established when the Tc-99 and U sorption equilibrium had been reached. It was determined that all of the Tc-99 had reached equilibrium by Day 21. For the U, five samples were questionable whether or not equilibrium was reached by Day 21; therefore, Day X was analyzed for samples: SwRI ID# 474213, 474214, 474221, 474222 and 474340 on Day 32.

The final K_d value reported is an average of all K_d time points values once equilibrium was achieved. With the exception of the five samples with questionable U equilibrium, it appeared that equilibrium was reached by the first time point (Day 7) for all samples. Therefore, the final K_d and uncertainties values are the averages of Days 7-21. After evaluating the Kd values of Day X, it was determined that they did not statistically differ enough or did not trend in the correct direction compared to Day 7-21; therefore, the final K_d and uncertainties values are the averages of Days 7-X.

Per the method, "Often solid phase samples contain grains greater than 2mm in diameter. Since it is often assumed that these gravelsized grains have little or no sorption capacity, the Kd can be corrected to account for the presence of gravel. Kd values are determined as above on samples that have been sieved to remove gravel. The average gravel (greater than 2 mm) mass percentage of the material to be analyzed for Kd must be known or determined on a large mass (1 kg or more) to get representative percentage. The Kd that was determined on the <2 mm fraction is reduced by the mass fraction of gravel according to:"

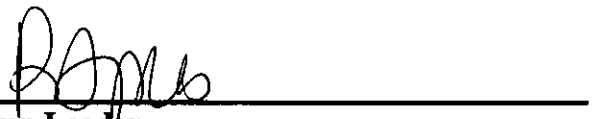
$$K_{d\ corrected} = K_{<2,mm}(1 - f)$$

Where:
f = decimal mass fraction of gravel in the total sample.

SwRI #474213 contained 2.78%, 474214 contained 9.20% and 474401 contained 22.5% of large rocks that were removed from the sample prior to testing. The K_d value determined was then corrected for the mass fraction of gravelsized grains.

Client: Fluor-B&W Portsmouth LLC
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."



Group Leader

11/22/11

Date

Client: Fluor B&W Portsmouth
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

RADIOLOGICAL ANALYSIS

The sample SDG 474212 consisted of thirteen soil samples received for radiological analysis. The soil samples for radiological analysis were reported on an "as received" basis. The recommended sample holding time of six months was met.

The samples were analyzed for the following:

Matrix	Analysis	Method
Soil	^{99}Technetium	Liquid Scintillation Spectroscopy

^{99}Technetium

A 100ml aliquot of each sample fraction was analyzed for ^{99}Technetium. The sample aliquots were digested at 80°C for 4 hours with nitric acid and then one additional hour with hydrogen peroxide. The aliquots were then brought to a final volume of 50ml and then chemically separated using resins. A preparation blank and two laboratory control samples were analyzed with each sample batch. Each sample fraction was analyzed in duplicate.

For all liquid scintillation analysis, the daily instrument performance checks were within the running statistical control limits.

For ^{99}Tc analysis, the ^{99}Tc was separated from the digestion using chemical separation resins. After chemical separation, the resin containing the ^{99}Tc was placed into a liquid scintillation vial and 15 ml of scintillation cocktail was added. The samples were counted on a liquid scintillation counter programmed to count only the ^{99}Tc region of interest. The liquid scintillation counter ^{99}Tc program was standardized using ^{99}Tc as the radioisotope to establish a specific efficiency quench curve. A total of four preparation blanks and eight laboratory control samples were analyzed with the sample batches. All of the results for the preparation blanks were less than 1.65 times the TPU, the MDA, and the RL. The results for all of the laboratory control samples were within the recovery control limits of 75-125%. Each sample fraction was analyzed in duplicate and the sample duplicate evaluation ratio was less than three for all duplicates. A matrix spike and matrix spike duplicate were not performed with any of the analyses.

Client: Fluor B&W Portsmouth
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Warren A. Naegeli
Research Scientist

11/21/11
Date

000007

Client: Fluor – B&W Portsmouth LLC
SDG: 474212
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 110830-12, 110831-5, 110901-7, 110902-3

TOTAL URANIUM ANALYSIS

The acidified leachates were analyzed directly (no digestion was required) for total uranium by ICP-MS. All instrument QC criteria were met. The percent recoveries for the initial and continuing calibration verifications were within 90-110%. Total uranium was not detected above SwRI's reporting limit in the initial and continuing calibration blanks. The low level, CRI standard recoveries were within 50-150%. The percent recoveries for the interference check sample ICSABs were within 80-120%. The internal standard recoveries were within 80-120% for the ICV/CCV/ICB/CCBs and within 30-120% for all samples.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Signature

Group Leader

11/21/11

Date

000008

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

SAMPLE RECEIPT, TASK ORDER & CHAIN OF CUSTODY

Sample Receipt

Sample Receipt Number: 45547

Southwest Research Institute

VTSR: 08/30/11

Time: 09:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 08/30/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #s:
875591109682
874541430814
874541430755
874541430803
875591109454

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Aug 30 2011 3:15PM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
474203	231A-01G-04	08/19/11	WG	1	
474204	749-WPW-04	08/19/11	WG	1	
474205	WDSB01-04-12.0	08/27/11	SO	1	
474206	WDSB01-04-19.5	08/27/11	SO	1	
474207	WDSB01-04-2.0	08/26/11	SO	1	
474208	WDSB01-04-24.5	08/27/11	SO	1	
474209	WDSB01-04-4.5	08/26/11	SO	1	
474210	WDSB07-04-12.0	08/25/11	SO	1	
474211	WDSB07-04-4.5	08/25/11	SO	1	
474212	WDSB07-07-12.0	08/25/11	SO	1	
474213	WDSB07-07-2.0	08/25/11	SO	1	
474214	WDSB07-07-4.5	08/25/11	SO	1	
474215	WDSB07-09-12.0	08/25/11	SO	1	
474216	WDSB07-09-2.0	08/25/11	SO	1	
474217	WDSB07-09-4.5	08/25/11	SO	1	
474218	WDSB07-15-4.5	08/25/11	WQ	3	
474219	WDSB09-04-2.0	08/25/11	SO	1	
474220	WDSB09-04-4.5	08/25/11	SO	1	
474221	WDSB09-07-2.0	08/25/11	SO	1	
474222	WDSB09-07-4.5	08/25/11	SO	1	
474223	WDSB09-09-2.0	08/25/11	SO	1	
474224	WDSB09-09-4.5	08/25/11	SO	1	
474225	WDSB09-15-4.5	08/25/11	WQ	3	
474226	WDSB09-28-19.5	08/25/11	WQ	3	

Containers: 30 **Samples: 24**

Client: Fluor-B&W Ports
SR#: 45547
FRM-002

Sample Receipt

Sample Receipt Number: 45547

Southwest Research Institute

VTSR: 08/30/11

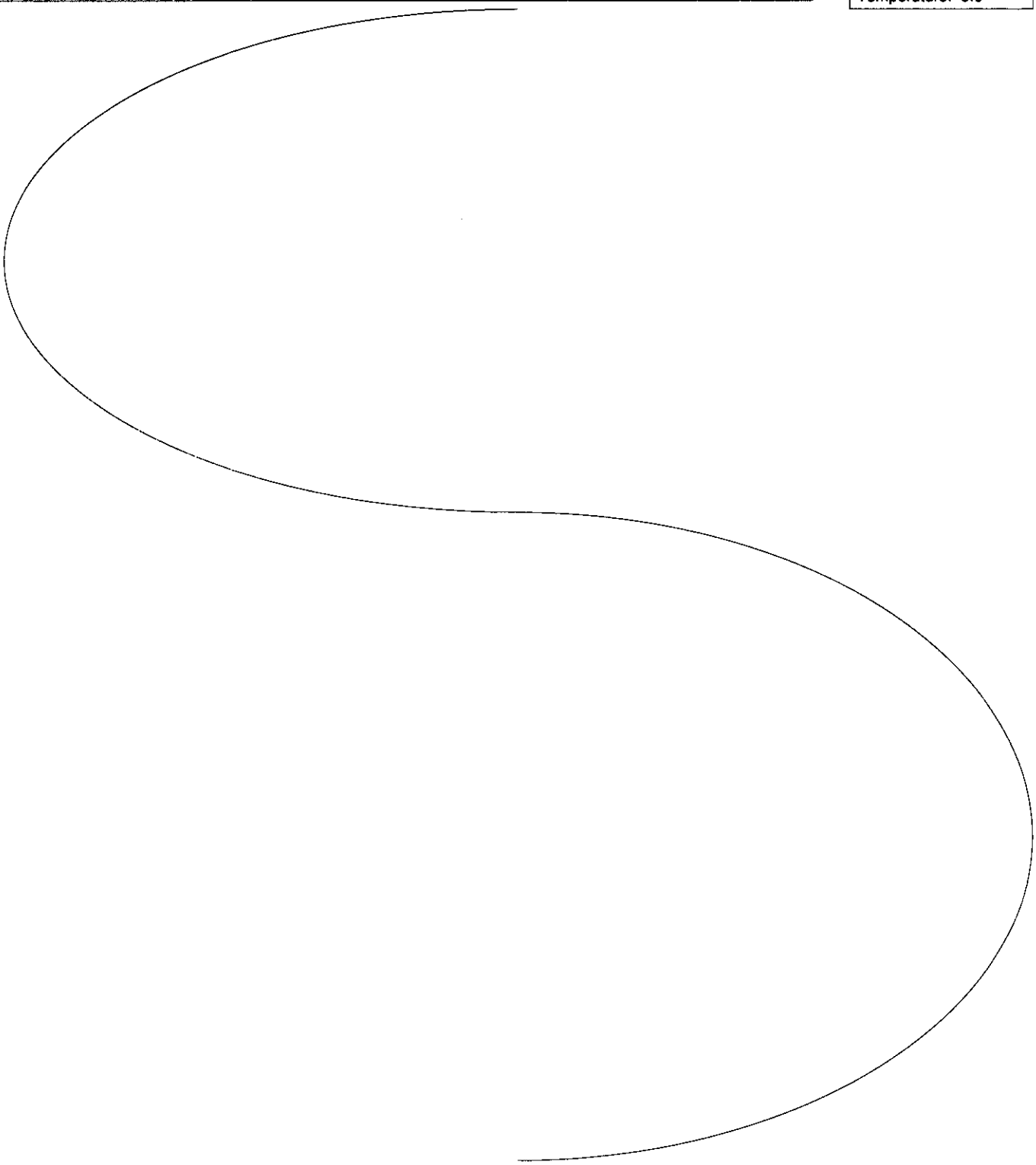
Time: 09:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 08/30/11

These documents are associated with this receipt: 108385[COC for SRR 45547], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0



Client: Fluor-B&W Ports

SR#: 4554

FRM-002

Southwest Research Institute

Laboratory Task Order

TO #: 110830-12 Revision: 5

000011

SDG: 474212
VTSR: 08/30/11
CASE: FXP02234L04

SRR #'s: 45547
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 474212. SDG IS CLOSED.

28-day TAT HARDCOPY.
FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 10/07/11.

24 overall SO/WQ samples (30 containers) received on 08/30/11 for SOW FXP02234L04.
OUT of the 24 samples, only the 5 SOIL samples for DISTRIBUTION COEFFICIENT and the 2 WATER Tc99/U SPIKES are listed in this task order.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 08/31/11: Task Order revised to indicate additional samples received on 08/31/11, which have been grouped with SDG 474212, located in Task Order # 110831-5, SRR 45562.
REVISION 2, DRmz 09/1/11: Task Order revised to indicate additional samples received on 09/01/11, which have been grouped with SDG 474212, located in Task Order # 110901-7, SRR 45570. SDG is still OPEN.
REVISION 3, DRmz 09/2/11: Task Order revised to indicate additional samples received on 09/02/11, which have been grouped with SDG 474212, located in Task Order # 110902-3, SRR 45578. SDG is CLOSED.
REVISION 4, DRmz 09/9/11: Task Order revised to indicate additional samples received on 09/9/11, which are the U containing spikes needed for the SOIL samples in SDG 474212, located in Task Order # 110909-10, SRR 45608. Due dates updated. SDG is CLOSED.
REVISION 5, DRmz 11/22/11: Task Order revised to remove samples 474203 and 474204, which those ground water spiked samples do not pertain to this SDG.

Documents Related to this task order: 106365[COC for SRR 45547], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
474212		1	SO	WDSB07-07-12.0	25 Aug 11	21 Feb 12
474213		1	SO	WDSB07-07-2.0	25 Aug 11	21 Feb 12
474214		1	SO	WDSB07-07-4.5	25 Aug 11	21 Feb 12
474221		1	SO	WDSB09-07-2.0	25 Aug 11	21 Feb 12
474222		1	SO	WDSB09-07-4.5	25 Aug 11	21 Feb 12

000012

Southwest Research Institute

Laboratory Task Order

TO #: 110830-12 Revision: 5

SDG: 474212
VTSR: 08/30/11
CASE: FXP02234L04

SRR #'s: 45547
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Test: ICPMS-SWRI-ISO_U Holding: 180 days from ASTM_C1733
Section: METALS **ICPMS SwRI Method Isotopic Uranium** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474212		1	SO	WDSB07-07-12.0	07 Nov 11	05 May 12
474213		1	SO	WDSB07-07-2.0	07 Nov 11	05 May 12
474214		1	SO	WDSB07-07-4.5	07 Nov 11	05 May 12
474221		1	SO	WDSB09-07-2.0	07 Nov 11	05 May 12
474222		1	SO	WDSB09-07-4.5	07 Nov 11	05 May 12

Test: LSC-TC99_SWRI Holding: 180 days from ASTM_C1733
Section: RADCHEM **Technetium-99 by liquid scintillation counting** Cnt: 5

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474212		1	SO	WDSB07-07-12.0	07 Nov 11	05 May 12
474213		1	SO	WDSB07-07-2.0	07 Nov 11	05 May 12
474214		1	SO	WDSB07-07-4.5	07 Nov 11	05 May 12
474221		1	SO	WDSB09-07-2.0	07 Nov 11	05 May 12
474222		1	SO	WDSB09-07-4.5	07 Nov 11	05 May 12

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC77LL**

Page: 1 for OSDC77LL
Date: 08/31/2011 01:51 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB25-28-4.5	OSDC77	SS	WQ	RIN	1	L	HDPE	3	31-AUG-2011	745		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	01-SEP-2011	OSDC	OSDC77LL	DEG C		FXP02234L04

Relinquished by: Stacy Clegg	Date(mm/dd/yyyy): 9-1-11	Time: 0830	Received by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 0830
Relinquished by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 1700	Received by: Fedex	Date(mm/dd/yyyy): 9-1-11	Time: 1700
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/2/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 9/2/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

LOE

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/02/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45578
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 22.0 °C / #027

000013

006573

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC97LL**

Page: 1 for OSDC97LL
Date: 09/01/2011 07:05 AM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/02/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45578
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 22.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDMW03B-04-12.0	OSDC97	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	1500		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDMW03B-04-2.0	OSDC97	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	1410		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDMW03B-04-4.5	OSDC97	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	1420		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	01-SEP-2011	OSDC	OSDC97LL	DEG C		FXP02234L04

Relinquished by: Stacy Claggett	Date(mm/dd/yyyy): 9-1-11	Time: 0830	Received by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 0830
Relinquished by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 1700	Received by: Fedex	Date(mm/dd/yyyy): 9-1-11	Time: 1700
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/2/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 9/2/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

000014

106573

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC76LL**

Page: 1 for OSDC76LL
Date: 08/31/2011 01:01 PM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/02/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45578
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 22.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preservative	Remarks
WDSB25-04-2.0	OSDC76	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	725		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB25-04-4.5	OSDC76	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	735		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB25-07-2.0	OSDC76	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	725		Distribution Coefficient	DEG4C	
WDSB25-07-4.5	OSDC76	SS	SO	REG	8	OZ	AGLS	1	31-AUG-2011	735		Distribution Coefficient	DEG4C	
WDSB25-09-2.0	OSDC76	SS	SO	REG	4	OZ	AGLS	1	31-AUG-2011	725		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB25-09-4.5	OSDC76	SS	SO	REG	4	OZ	AGLS	1	31-AUG-2011	735		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	01-SEP-2011	OSDC	OSDC76LL	DEG C		FXP02234L04

Relinquished by: Stacy Clayton	Date(mm/dd/yyyy): 9-1-11	Time: 0830	Received by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 0830
Relinquished by: AWS	Date(mm/dd/yyyy): 9-1-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 9-1-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/2/11	Time: 0830	Received by:	Date(mm/dd/yyyy): 9/2/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

000015

LOC

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC76LL**

Page: 2 for OSDC76LL
Date: 08/31/2011 01:01 PM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/02/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45578
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 22.0 °C / #027

000016

000017

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45578

Airbill: 875591109616

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
09/02/11	08:30:00	OSDC97LL	WDMW03B-04-12.0	None	474396	YES	Intact
09/02/11	08:30:00	OSDC97LL	WDMW03B-04-2.0	None	474397	YES	Intact
09/02/11	08:30:00	OSDC97LL	WDMW03B-04-4.5	None	474398	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-04-2.0	None	474399	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-04-4.5	None	474400	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-07-2.0	None	474401	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-07-4.5	None	474402	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-09-2.0	None	474403	YES	Intact
09/02/11	08:30:00	OSDC76LL	WDSB25-09-4.5	None	474404	YES	Intact
09/02/11	08:30:00	OSDC77LL	WDSB25-28-4.5	None	474405	YES	Intact

PofisouthFluor-B&W
WO: 45578
FRM-217

SAMPLE LOG-IN SHEET

000018

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DINO ROMAN	Log-in Date: 09/02/2011
Received By (Signature)	

Case Number: FXP02234L04	Sample Delivery Group No.	SAS Number

Remarks: 16526.05.00X

1.	Custody Seal(s)	Present/Absent* Intact/Broken
2.	Custody Seal Nos.	_____ _____
3.	Chain-of Custody Records	Present/Absent*
4.	Traffic Reports or Packing Lists	Present/Absent*
5.	Airbill	Airbill/Sticker Present/Absent*
6.	Airbill No.	875591109616
7.	Sample Tags	Present/Absent*
	Sample Tag Numbers	Listed/Not listed on Chain of Custody
8.	Sample Condition	Intact/Broken*/ Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*
11.	Date Received at Lab	09/02/2011
12.	Time Received	08:30:00

EPA Sample #	Corresponding: Sample Tag #	Corresponding: Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDMW03B-04-12.0	None	474396	Intact
WDMW03B-04-2.0	None	474397	Intact
WDMW03B-04-4.5	None	474398	Intact
WDSB25-04-2.0	None	474399	Intact
WDSB25-04-4.5	None	474400	Intact
WDSB25-07-2.0	None	474401	Intact
WDSB25-07-4.5	None	474402	Intact
WDSB25-09-2.0	None	474403	Intact
WDSB25-09-4.5	None	474404	Intact
WDSB25-28-4.5	None	474405	Intact

Sample Transfer		
Fraction	Fraction	
Area #	Area #	
By: DINO ROMAN	By	
On: 09/02/2011	On	

* Contact SMO and attach record of resolution

Reviewed By: 9.7.11	Logbook No.: Sample Receipt (45578)
Date	Logbook Page No.: √7739 SEC 2 of 3

Sample Receipt

Sample Receipt Number: 45562

Southwest Research Institute

VTSR: 08/31/11

Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: SDouglas
Creation Date: 08/31/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #:8775591109671

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** SDouglas Aug 31 2011 8:25AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
474300	WDSB29-07-12.0	08/29/11	SO	1	
474301	WDSB29-07-2.0	08/29/11	SO	1	
474302	WDSB29-07-4.5	08/29/11	SO	1	
474303	WDSB29-09-12.0	08/29/11	SO	1	
474304	WDSB29-09-2.0	08/29/11	SO	1	
474305	WDSB29-09-4.5	08/29/11	SO	1	

Containers: 6 **Samples: 6**

These documents are associated with this receipt: 106466[COC for SRR 45562], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 026
Temperature: 3.0

Page Printed: 23 Nov 2011 9:12:42

Client: Fluor-B&W Ports
SR#: 45562
FRM-002

000020

Southwest Research Institute

Laboratory Task Order

TO #: 110831-5 Revision: 3

SDG: 474212
VTSR: 08/31/11
CASE: FXP02234L04

SRR #'s: 45562
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 474212. SDG IS CLOSED.

GROUPED _ With samples in SDG 474212, located in Task Order # 110830-12, SRR 45547.

28-day TAT.
DATA/HARDCOPY IS DUE TO THE CLIENT ON 10/7/11.

6 overall SO samples (6 containers) received on 08/31/11 for SOW FXP02234L04.
OUT of the 6 samples, only the 3 SOIL samples for DISTRIBUTION COEFFICIENT are listed in this task order.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 09/1/11: Task Order revised to indicate additional samples received on 09/01/11, which have been grouped with SDG 474212, located in Task Order # 110901-7, SRR 45570. SDG is still OPEN.
REVISION 2, DRmz 09/2/11: Task Order revised to indicate additional samples received on 09/02/11, which have been grouped with SDG 474212, located in Task Order # 110902-3, SRR 45578. SDG is CLOSED.
REVISION 3, DRmz 09/9/11: Task Order revised to indicate additional samples received on 09/9/11, which are the U containing spikes needed for the SOIL samples in SDG 474212, located in Task Order # 110909-10, SRR 45608. Due dates updated. SDG is CLOSED.

Documents Related to this task order: 106466[COC for SRR 45562], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM — **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
474300		1	SO	WDSB29-07-12.0	29 Aug 11	25 Feb 12
474301		1	SO	WDSB29-07-2.0	29 Aug 11	25 Feb 12
474302		1	SO	WDSB29-07-4.5	29 Aug 11	25 Feb 12

Test: ICPMS-SWRI-ISO_U Holding: 180 days from ASTM_C1733
Section: METALS — **ICPMS SwRI Method Isotopic Uranium** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474300		1	SO	WDSB29-07-12.0	07 Nov 11	05 May 12

Southwest Research Institute

Laboratory Task Order

TO #: 110831-5 Revision: 3

000021

SDG: 474212
VTSR: 08/31/11
CASE: FXP02234L04

SRR #'s: 45562
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474301		1	SO	WDSB29-07-2.0	07 Nov 11	05 May 12
474302		1	SO	WDSB29-07-4.5	07 Nov 11	05 May 12

Test: LSC-TC99_SWRI
Section: RADCHEM

Holding: 180 days from ASTM_C1733
Technetium-99 by liquid scintillation counting

Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474300		1	SO	WDSB29-07-12.0	07 Nov 11	05 May 12
474301		1	SO	WDSB29-07-2.0	07 Nov 11	05 May 12
474302		1	SO	WDSB29-07-4.5	07 Nov 11	05 May 12

106542

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC71LL**

Page: 1 for OSDC71LL
Date: 08/30/2011 03:18 PM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/01/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45570
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB22-04-12.0	OSDC71	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	1005		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB22-04-19.5	OSDC71	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	1045		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB22-04-2.0	OSDC71	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	915		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB22-04-4.5	OSDC71	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	920		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	31-AUG-2011	OSDC	OSDC71LL	DEG C		FXP02234L04

Relinquished by: Stacy Glasgow	Date(mm/dd/yyyy): 8-31-11	Time: 0830	Received by: AMS	Date(mm/dd/yyyy): 83111	Time: 0833
Relinquished by: AMS	Date(mm/dd/yyyy): 83111	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 83111	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/1/11	Time: 0845	Received by:	Date(mm/dd/yyyy): 9/1/11	Time: 0945
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

000022

106542

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC71LL**

Page: 2 for OSDC71LL
Date: 08/30/2011 03:18 PM

LA

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/01/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45570
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000023

1000542

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC88LL**

Page: 1 for OSDC88LL
Date: 08/31/2011 07:16 AM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/01/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45570
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB31-04-2.0	OSDC88	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	730		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB31-04-4.5	OSDC88	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	745		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB31-07-2.0	OSDC88	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	730		Distribution Coefficient	DEG4C	
WDSB31-07-4.5	OSDC88	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	745		Distribution Coefficient	DEG4C	
WDSB31-09-2.0	OSDC88	SS	SO	REG	4	OZ	AGLS	1	30-AUG-2011	730		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB31-09-4.5	OSDC88	SS	SO	REG	4	OZ	AGLS	1	30-AUG-2011	745		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB31-22-4.5	OSDC88	SS	SO	REG	8	OZ	AGLS	1	30-AUG-2011	745		Distribution Coefficient	DEG4C	
WDSB31-23-4.5	OSDC88	SS	SO	REG	4	OZ	AGLS	1	30-AUG-2011	745		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	31-AUG-2011	OSDC	OSDC88LL	DEG C		FXP02234L04

Relinquished by: Stacy Wiggins	Date(mm/dd/yyyy): 8-31-11	Time: 0830	Received by: [illegible]	Date(mm/dd/yyyy): 83111	Time: 0830	
Relinquished by: [illegible]	Date(mm/dd/yyyy): 83111	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 83111	Time: 1200	

000024 LDC

106542

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC88LL**

Page: 2 for OSDC88LL
Date: 08/31/2011 07:16 AM

Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/1/11	Time: 0845	Received by:	Date(mm/dd/yyyy): 9/1/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

LDC

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/01/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45570
Case: FXP02234L04
Sample(s) Received intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000025

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45570

Airbill: 875591109638

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
09/01/11	08:45:00	OSDC71LL	WDSB22-04-12.0	None	474334	YES	Intact
09/01/11	08:45:00	OSDC71LL	WDSB22-04-19.5	None	474335	YES	Intact
09/01/11	08:45:00	OSDC71LL	WDSB22-04-2.0	None	474336	YES	Intact
09/01/11	08:45:00	OSDC71LL	WDSB22-04-4.5	None	474337	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-04-2.0	None	474338	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-04-4.5	None	474339	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-07-2.0	None	474340	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-07-4.5	None	474341	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-09-2.0	None	474342	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-09-4.5	None	474343	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-22-4.5	None	474344	YES	Intact
09/01/11	08:45:00	OSDC88LL	WDSB31-23-4.5	None	474345	YES	Intact

Pollsmouth Labor-B&W
WO: 45570
FRM-217

000027

SAMPLE LOG-IN SHEET

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): DINO ROMAN	Log-in Date: 09/01/2011
Received By (Signature):	

Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1.	Custody Seal(s)	(Present)/Absent* (Intact)/Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	(Present)/Absent*
4.	Traffic Reports or Packing Lists	Present/(Absent)*
5.	Airbill	Airbill/Sticker (Present)/Absent*
6.	Airbill No.	875591109638
7.	Sample Tags	Present/(Absent)*
	Sample Tag Numbers	Listed/(Not listed on Chain of Custody)
8.	Sample Condition	(Intact)/Broken*/Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	(Yes)/No*
11.	Date Received at Lab	09/01/2011
12.	Time Received	08:45:00

EPA Sample #	Corresponding: Sample Tag #	Corresponding: Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB22-04-12.0	None	474334	Intact
WDSB22-04-19.5	None	474335	Intact
WDSB22-04-2.0	None	474336	Intact
WDSB22-04-4.5	None	474337	Intact
WDSB31-04-2.0	None	474338	Intact
WDSB31-04-4.5	None	474339	Intact
WDSB31-07-2.0	None	474340	Intact
WDSB31-07-4.5	None	474341	Intact
WDSB31-09-2.0	None	474342	Intact
WDSB31-09-4.5	None	474343	Intact
WDSB31-22-4.5	None	474344	Intact
WDSB31-23-4.5	None	474345	Intact

Sample Transfer		
Fraction: Trans	Fraction	
Area #: RL3	Area #	
By: DINO ROMAN	By	
On: 09/01/2011	On	

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45570)
Date: 9.7.11	Logbook Page No.: ✓7738 SGC 1 of 3

Sample Receipt

Sample Receipt Number: 45570

Southwest Research Institute

VTSR: 09/01/11

Time: 08:45:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged In by: DRoman
Creation Date: 09/01/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #875591109638

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Sep 1 2011 10:16AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
474334	WDSB22-04-12.0	08/30/11	SO	1	
474335	WDSB22-04-19.5	08/30/11	SO	1	
474336	WDSB22-04-2.0	08/30/11	SO	1	
474337	WDSB22-04-4.5	08/30/11	SO	1	
474338	WDSB31-04-2.0	08/30/11	SO	1	
474339	WDSB31-04-4.5	08/30/11	SO	1	
474340	WDSB31-07-2.0	08/30/11	SO	1	
474341	WDSB31-07-4.5	08/30/11	SO	1	
474342	WDSB31-09-2.0	08/30/11	SO	1	
474343	WDSB31-09-4.5	08/30/11	SO	1	
474344	WDSB31-22-4.5	08/30/11	SO	1	
474345	WDSB31-23-4.5	08/30/11	SO	1	
Containers: 12				**Samples: 12**	

These documents are associated with this receipt: 106542[COC for SRR 45570], 100762[FXP02234L04], 106706[TOR #TR004], 107762[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports
SR#: 45570
FRM-002

000029

Southwest Research Institute

Laboratory Task Order

TO #: 110901-7 Revision: 2

SDG: 474212
VTSR: 09/01/11
CASE: FXP02234L04

SRR #'s: 45570
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 474212. SDG IS CLOSED.

GROUPED _ With samples in SDG 474212, located in Task Order # 110830-12, SRR 45547; Task Order # 110831-5, SRR 45562.

28-day TAT.
DATA/HARDCOPY IS DUE TO THE CLIENT ON 10/7/11.

12 overall SO samples (12 containers) received on 09/01/11 for SOW FXP02234L04.
OUT of the 12 samples, only the 3 SOIL samples for DISTRIBUTION COEFFICIENT are listed in this task order.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 09/2/11: Task Order revised to indicate additional samples received on 09/02/11, which have been grouped with SDG 474212, located in Task Order # 110902-3, SRR 45578. SDG is CLOSED.
REVISION 2, DRmz 09/9/11: Task Order revised to indicate additional samples received on 09/9/11, which are the U containing spikes needed for the SOIL samples in SDG 474212, located in Task Order # 110909-10, SRR 45608. Due dates updated. SDG is CLOSED.

Documents Related to this task order: 106542[COC for SRR 45570], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
474340		1	SO	WDSB31-07-2.0	30 Aug 11	26 Feb 12
474341		1	SO	WDSB31-07-4.5	30 Aug 11	26 Feb 12
474344		1	SO	WDSB31-22-4.5	30 Aug 11	26 Feb 12

Test: ICPMS-SWRI-ISO_U Holding: 180 days from ASTM_C1733
Section: METALS **ICPMS SwRI Method Isotopic Uranium** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474340		1	SO	WDSB31-07-2.0	07 Nov 11	05 May 12

Southwest Research Institute

Laboratory Task Order

TO #: 110901-7 Revision: 2

SDG: 474212
VTSR: 09/01/11
CASE: FXP02234L04

SRR #'s: 45570
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474341		1	SO	WDSB31-07-4.5	07 Nov 11	05 May 12
474344		1	SO	WDSB31-22-4.5	07 Nov 11	05 May 12

Test: LSC-TC99_SWRI Holding: 180 days from ASTM_C1733
Section: RADCHEM **Technetium-99 by liquid scintillation counting** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474340		1	SO	WDSB31-07-2.0	07 Nov 11	05 May 12
474341		1	SO	WDSB31-07-4.5	07 Nov 11	05 May 12
474344		1	SO	WDSB31-22-4.5	07 Nov 11	05 May 12

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC84LL**

Page: 1 for OSDC84LL
Date: 08/29/2011 05:01 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB29-07-12.0	OSDC84	SS	SO	REG	8	OZ	AGLS	1	29-AUG-2011	910		Distribution Coefficient	DEG4C	
WDSB29-07-2.0	OSDC84	SS	SO	REG	8	OZ	AGLS	1	29-AUG-2011	805		Distribution Coefficient	DEG4C	
WDSB29-07-4.5	OSDC84	SS	SO	REG	8	OZ	AGLS	1	29-AUG-2011	810		Distribution Coefficient	DEG4C	
WDSB29-09-12.0	OSDC84	SS	SO	REG	4	OZ	AGLS	1	29-AUG-2011	910		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB29-09-2.0	OSDC84	SS	SO	REG	4	OZ	AGLS	1	29-AUG-2011	805		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB29-09-4.5	OSDC84	SS	SO	REG	4	OZ	AGLS	1	29-AUG-2011	810		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	30-AUG-2011	OSDC	OSDC84LL	DEG C		FXP02234L04

Relinquished by: Stacy Clough	Date(mm/dd/yyyy): 8.30.11	Time: 0830	Received by: MWS	Date(mm/dd/yyyy): 83011	Time: 0830
Relinquished by: MWS	Date(mm/dd/yyyy): 83011	Time: 1700	Received by: FedEx	Date(mm/dd/yyyy): 8.30.11	Time: 1700
Relinquished by: FedEx	Date(mm/dd/yyyy): 8/31/11	Time: 0830	Received by: [illegible]	Date(mm/dd/yyyy): 8/31/11	Time: 0830
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/31/11 0830
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45562
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #026

000031

000032

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45562

Airbill: 8775591109671

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
08/31/11	08:30:00	OSDC84LL	WDSB29-07-12.0	N/A	474300	YES	Intact
08/31/11	08:30:00	OSDC84LL	WDSB29-07-2.0	N/A	474301	YES	Intact
08/31/11	08:30:00	OSDC84LL	WDSB29-07-4.5	N/A	474302	YES	Intact
08/31/11	08:30:00	OSDC84LL	WDSB29-09-12.0	N/A	474303	YES	Intact
08/31/11	08:30:00	OSDC84LL	WDSB29-09-2.0	N/A	474304	YES	Intact
08/31/11	08:30:00	OSDC84LL	WDSB29-09-4.5	N/A	474305	YES	Intact

PofismothFlwGr-B&W
WO: 45562
FRM-217

SAMPLE LOG-IN SHEET

000033

Lab Name: Southwest Research Institute	Page 1 of 1
Received By (Print Name): STEVEN DOUGLAS	Log-in Date: 08/31/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1. Custody Seal(s)	Present/Absent* Intact/Broken	
2. Custody Seal Nos.	N/A	
3. Chain-of Custody Records	Present/Absent*	
4. Traffic Reports or Packing Lists	Present/Absent*	
5. Airbill	Airbill/Sticker Present/Absent*	
6. Airbill No.	8775591109671	
7. Sample Tags	Present/Absent*	
Sample Tag Numbers	Listed/Not listed on Chain of Custody	
8. Sample Condition	Intact/Broken*/Leaking	
9. Cooler Temperature	3.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	Yes/No*	
11. Date Received at Lab	08/31/2011	
12. Time Received	08:30:00	

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB29-07-12.0	N/A	474300	Intact
WDSB29-07-2.0	N/A	474301	Intact
WDSB29-07-4.5	N/A	474302	Intact
WDSB29-09-12.0	N/A	474303	Intact
WDSB29-09-2.0	N/A	474304	Intact
WDSB29-09-4.5	N/A	474305	Intact

Sample Transfer	
Fraction: INORG	Fraction:
Area #: R13	Area #:
By: STEVEN DOUGLAS	By:
On: 08/31/2011	On:

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45562)
Date: 9.1.11	Logbook Page No.: ✓7737 SEC 2 of 3

Sample Receipt

Sample Receipt Number: 45578

Southwest Research Institute

VTSR: 09/02/11

Time: 08:30:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 09/02/11

Notes

Samples were received intact 3.0 °C (blue & wet ice)
Fed Ex Tracking #875591109616

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Sep 2 2011 9:27AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
474396	WDMW03B-04-12.0	08/31/11	SO	1	
474397	WDMW03B-04-2.0	08/31/11	SO	1	
474398	WDMW03B-04-4.5	08/31/11	SO	1	
474399	WDSB25-04-2.0	08/31/11	SO	1	
474400	WDSB25-04-4.5	08/31/11	SO	1	
474401	WDSB25-07-2.0	08/31/11	SO	1	
474402	WDSB25-07-4.5	08/31/11	SO	1	
474403	WDSB25-09-2.0	08/31/11	SO	1	
474404	WDSB25-09-4.5	08/31/11	SO	1	
474405	WDSB25-28-4.5	08/31/11	WQ	3	
Containers: 12				**Samples: 10**	

These documents are associated with this receipt: 106573[COC for SRR 45578], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Client: Fluor-B&W Ports
SR#: 45578
FRM-002

Southwest Research Institute

Laboratory Task Order

TO #: 110902-3 Revision: 2

000035

SDG: 474212
VTSR: 09/02/11
CASE: FXP02234L04

SRR #'s: 45578
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 474212. SDG IS CLOSED.

GROUPED _ With samples in SDG 474212, located in Task Order # 110830-12, SRR 45547; Task Order # 110831-5, SRR 45562; Task Order # 110901-7, SRR 45570.

28-day TAT.
DATA/HARDCOPY IS DUE TO THE CLIENT ON 10/7/11.

10 overall SO/WQ samples (12 containers) received on 09/02/11 for SOW FXP02234L04.
OUT of the 10 samples, only the 2 SOIL samples for DISTRIBUTION COEFFICIENT are listed in this task order.

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.
****
Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661
REVISION 1, DRmz 09/9/11: Task Order revised to indicate additional samples received on 09/9/11, which are the U containing spikes needed for the SOIL samples in SDG 474212, located in Task Order # 110909-10, SRR 45608. Due dates updated. SDG is CLOSED.
REVISION 2, DRmz 10/17/11: Task Order revised to remove Alpha-U and replaced with ICPMS U.

Documents Related to this task order: 106573[COC for SRR 45578], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
474401		1	SO	WDSB25-07-2.0	31 Aug 11	27 Feb 12
474402		1	SO	WDSB25-07-4.5	31 Aug 11	27 Feb 12

Test: ICPMS-SWRI-ISO_U Holding: 180 days from CED
Section: METALS **ICPMS SwRI Method Isotopic Uranium** Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
474401		1	SO	WDSB25-07-2.0	31 Aug 11	27 Feb 12
474402		1	SO	WDSB25-07-4.5	31 Aug 11	27 Feb 12

Southwest Research Institute

Laboratory Task Order

TO #: 110902-3 Revision: 2

SDG: 474212
VTSR: 09/02/11
CASE: FXP02234L04

SRR #'s: 45578
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 10/05/11
To QA: 10/05/11
To Client: 10/06/11

Test: LSC-TC99_SWRI
Section: RADCHEM

Holding: 180 days from ASTM_C1733

Cnt: 2

System ID	Type	Cont	Matrix	Customer ID	N/A	Method Date
474401		1	SO	WDSB25-07-2.0	07 Nov 11	05 May 12
474402		1	SO	WDSB25-07-4.5	07 Nov 11	05 May 12

1003605

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)
Project: **OSDC** SOW: **FXP02234L04**
Lab Chain of Custody (LCOC) Number: **OSDC41LL**

Page: 1 for OSDC41LL
Date: 08/29/2011 07:31 AM

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB01-04-12.0	OSDC41	SS	SO	REG	8	OZ	AGLS	1	27-AUG-2011	810		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB01-04-19.5	OSDC41	SS	SO	REG	8	OZ	AGLS	1	27-AUG-2011	900		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB01-04-2.0	OSDC41	SS	SO	REG	8	OZ	AGLS	1	26-AUG-2011	1520		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB01-04-24.5	OSDC41	SS	SO	REG	8	OZ	AGLS	1	27-AUG-2011	916		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB01-04-4.5	OSDC41	SS	SO	REG	8	OZ	AGLS	1	26-AUG-2011	1530		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC41LL	DEG C		FXP02234L04

Relinquished by: Stacy Clagett	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Sandi Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930

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Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC41LL**

Page: 2 for OSDC41LL
Date: 08/29/2011 07:31 AM

Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

LOC-

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

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1080365

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC116LL**

Page: 1 for OSDC116LL
Date: 08/25/2011 04:49 PM

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB09-15-4.5 ✓	OSDC116	SS	WQ	FB	1	L	HDPE	3	25-AUG-2011 ✓	1130 ✓		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3 •	
WDSB09-28-19.5 ✓	OSDC116	SS	WQ	RIN	1	L	HDPE	3	25-AUG-2011 ✓	1330 ✓		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3 •	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC116LL	DEG C		FXP02234L04

Relinquished by: Stacy Claggett	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

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Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC115LL**

Page: 1 for OSDC115LL
Date: 08/25/2011 04:49 PM

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB09-04-2.0	OSDC115	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1132		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB09-04-4.5	OSDC115	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1135		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB09-07-2.0	OSDC115	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1132		Distribution Coefficient	DEG4C	
WDSB09-07-4.5	OSDC115	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1135		Distribution Coefficient	DEG4C	
WDSB09-09-2.0	OSDC115	SS	SO	REG	4	OZ	AGLS	1	25-AUG-2011	1132		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB09-09-4.5	OSDC115	SS	SO	REG	4	OZ	AGLS	1	25-AUG-2011	1135		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC115LL	DEG C		FXP02234L04

Relinquished by: Stacy Clayton	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Randy J. Kennedy	Date(mm/dd/yyyy): 8.29.11	Time: 0910
Relinquished by: Randy J. Kennedy	Date(mm/dd/yyyy): 8.29.11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8.29.11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

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Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC115LL**

Page: 2 for OSDC115LL
Date: 08/25/2011 04:49 PM

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000041

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC112LL**

Page: 1 for OSDC112LL
Date: 08/29/2011 07:02 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB07-15-4.5	OSDC112	SS	WQ	FB	1	L	HDPE	3	25-AUG-2011	1500		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	HNO3*	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC112LL	DEG C		FXP02234L04

Relinquished by: Stacy Clough	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: FedEx	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: FedEx	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

1003365

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC111LL**

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AUG 30 2011

Page: 1 for OSDC111LL
Date: 08/29/2011 06:54 AM

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDSB07-04-12.0	OSDC111	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1550		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB07-04-4.5	OSDC111	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1505		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	
WDSB07-07-12.0	OSDC111	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1550		Distribution Coefficient	DEG4C	
WDSB07-07-2.0	OSDC111	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1450		Distribution Coefficient	DEG4C	
WDSB07-07-4.5	OSDC111	SS	SO	REG	8	OZ	AGLS	1	25-AUG-2011	1505		Distribution Coefficient	DEG4C	
WDSB07-09-12.0	OSDC111	SS	SO	REG	4	OZ	AGLS	1	25-AUG-2011	1550		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB07-09-2.0	OSDC111	SS	SO	REG	4	OZ	AGLS	1	25-AUG-2011	1450		Cation-Exchange Capacity (SW846-9081)	DEG4C	
WDSB07-09-4.5	OSDC111	SS	SO	REG	4	OZ	AGLS	1	25-AUG-2011	1505		Cation-Exchange Capacity (SW846-9081)	DEG4C	

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC111LL	DEG C		FXP02234L04

Relinquished by: Stacy Claggett	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 1200

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Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC111LL**

Page: 2 for OSDC111LL
Date: 08/29/2011 06:54 AM

Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

LOE

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000044

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC128LL**

Page: 1 for OSDC128LL
Date: 08/24/2011 07:02 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
231A-01G-04	OSDC128	5UA	WG	REG	2.5	GAL	CUBI	1	19-AUG-2011	822		Distribution Coefficient	None	WATER CONTAINING URANIUM TO RUN Kd Distribution Coefficient

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC128LL	DEG C		FXP02234L04

Relinquished by: Stacy Claggett	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Randy J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000045

1003365

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC126LL**

Page: 1 for OSDC126LL
Date: 08/24/2011 07:01 AM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-04	OSDC126	X-749	WG	REG	2.5	GAL	CUBI	1	19-AUG-2011	920		Distribution Coefficient	None	Water containing TC99 to run Kd Distribution Coefficient

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	29-AUG-2011	OSDC	OSDC126LL	DEG C		FXP02234L04

Relinquished by: Stacy Coggin	Date(mm/dd/yyyy): 8-29-11	Time: 0910	Received by: Emily J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 0910
Relinquished by: Emily J. Kennedy	Date(mm/dd/yyyy): 8-29-11	Time: 1200	Received by: FedEx	Date(mm/dd/yyyy): 8-29-11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 8/30/11	Time: 0930	Received by:	Date(mm/dd/yyyy): 8/30/11	Time: 0930
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

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Client: Fuor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 08/30/11 0930
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45547
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000046

000047

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45547

Airbill: SEE SRR NOTES

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
08/30/11	09:30:00	OSDC128LL	231A-01G-04	None	474203	YES	Intact
08/30/11	09:30:00	OSDC126LL	749-WPW-04	None	474204	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-12.0	None	474205	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-19.5	None	474206	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-2.0	None	474207	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-24.5	None	474208	YES	Intact
08/30/11	09:30:00	OSDC41LL	WDSB01-04-4.5	None	474209	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-04-12.0	None	474210	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-04-4.5	None	474211	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-12.0	None	474212	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-2.0	None	474213	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-07-4.5	None	474214	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-12.0	None	474215	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-2.0	None	474216	YES	Intact
08/30/11	09:30:00	OSDC111LL	WDSB07-09-4.5	None	474217	YES	Intact
08/30/11	09:30:00	OSDC112LL	WDSB07-15-4.5	None	474218	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-04-2.0	None	474219	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-04-4.5	None	474220	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-07-2.0	None	474221	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-07-4.5	None	474222	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-09-2.0	None	474223	YES	Intact
08/30/11	09:30:00	OSDC115LL	WDSB09-09-4.5	None	474224	YES	Intact
08/30/11	09:30:00	OSDC116LL	WDSB09-15-4.5	None	474225	YES	Intact
08/30/11	09:30:00	OSDC116LL	WDSB09-28-19.5	None	474226	YES	Intact

PoCisenuthFluGr-BaW
WO: 45547
FRM-217

SAMPLE LOG-IN SHEET

000048

Lab Name: Southwest Research Institute	Page 1 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/30/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: N/A
Remarks: 16526.05.00X	SAS Number: N/A

1. Custody Seal(s)	Present/Absent* (Intact)/Broken	
2. Custody Seal Nos.	N/A	
3. Chain-of Custody Records	(Present)/Absent*	
4. Traffic Reports or Packing Lists	Present/(Absent)*	
5. Airbill	Airbill/Sticker (Present)/Absent*	
6. Airbill No.	SEE SRR NOTES	
7. Sample Tags	Present/(Absent)*	
Sample Tag Numbers	Listed/(Not) listed on Chain of Custody	
8. Sample Condition	(Intact)/Broken*/ Leaking	
9. Cooler Temperature	3.0C	
10. Does Information on custody records, traffic reports, and sample tags agree?	(Yes)/No*	
11. Date Received at Lab	08/30/2011	
12. Time Received	09:30:00	

Sample Transfer	
Fraction: Inorg	Fraction:
Area #: RL3	Area #:
By: DINO ROMAN	By:
On: 08/30/2011	On:

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
231A-01G-04	None	474203	Intact
749-WPW-04	None	474204	Intact
WDSB01-04-12.0	None	474205	Intact
WDSB01-04-19.5	None	474206	Intact
WDSB01-04-2.0	None	474207	Intact
WDSB01-04-24.5	None	474208	Intact
WDSB01-04-4.5	None	474209	Intact
WDSB07-04-12.0	None	474210	Intact
WDSB07-04-4.5	None	474211	Intact
WDSB07-07-12.0	None	474212	Intact
WDSB07-07-2.0	None	474213	Intact
WDSB07-07-4.5	None	474214	Intact
WDSB07-09-12.0	None	474215	Intact
WDSB07-09-2.0	None	474216	Intact
WDSB07-09-4.5	None	474217	Intact
WDSB07-15-4.5	None	474218	Intact
WDSB09-04-2.0	None	474219	Intact
WDSB09-04-4.5	None	474220	Intact
WDSB09-07-2.0	None	474221	Intact
WDSB09-07-4.5	None	474222	Intact
WDSB09-09-2.0	None	474223	Intact
WDSB09-09-4.5	None	474224	Intact
WDSB09-15-4.5	None	474225	Intact

* Contact SMO and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45547)
Date: 10.31.11	Logbook Page No.: ✓ 7736 SEC 2, 3 of 6

SAMPLE LOG-IN SHEET

000049

Lab Name: Southwest Research Institute	Page 2 of 2
Received By (Print Name): DINO ROMAN	Log-in Date: 08/30/2011
Received By (Signature):	
Case Number: FXP02234L04	Sample Delivery Group No.: MA
Remarks: 16526.05.00X	SAS Number: MA

1.	Custody Seal(s)	(Present)/Absent* (Intact)/Broken
2.	Custody Seal Nos.	MA
3.	Chain-of Custody Records	(Present)/Absent*
4.	Traffic Reports or Packing Lists	Present/(Absent)*
5.	Airbill	Airbill/Sticker (Present)/Absent*
6.	Airbill No.	SEE SRR NOTES
7.	Sample Tags	Present/(Absent)*
	Sample Tag Numbers	Listed/(Not listed on Chain of Custody)
8.	Sample Condition	(Intact)/Broken*/Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	(Yes)/No*
11.	Date Received at Lab	08/30/2011
12.	Time Received	09:30:00

EPA Sample #	Corresponding: Sample Tag #	Corresponding: Assigned Lab #	Remarks: Condition of Sample Shipment, etc
WDSB09-28-19.5	None	474226	Intact

Sample Transfer		
Fraction	Thers	Fraction
Area #	RB	Area #
By	DINO ROMAN	By
On	08/30/2011	On

* Contact SM and attach record of resolution

Reviewed By:	Logbook No.: Sample Receipt (45547)
Date: 8.31.11	Logbook Page No.: 7736 SEC 2, 3 of 6

000050

Sample Receipt

Southwest Research Institute | Sample Receipt Number: 45654 | VTSR: 09/15/11 | Time: 08:45:00

Project: 16526.05.00X
Case #: FXP02234L04
Client: Fluor-B&W Portsmouth LLC

Revision: 1

This Receipt was Revised Sep 23 2011 8:42AM

Manager: DAMMANN, MIKE
Logged in by: DRoman
Creation Date: 09/14/11

Notes

Samples were received intact 3.0°C (blue & wet ice)
Fed Ex Tracking #s:
874541430218
874541430207
874541430229

Parameters: Analysis/located on Task Order.

See chain-of-custody as part of the SRR system for more information.

Phases:
001 - admin
006 - metals
007 - drg
*** DRoman Sep 15 2011 10:29AM ***
Rev. 1
Revised matrix from SO to BR
*** DRoman Sep 23 2011 8:42AM ***

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

System ID	Customer ID	CED	Matrix	Containers	Special Reqs.
475063	749-WPW-05	09/13/11	WG	1	
475064	749-WPW-06	09/13/11	WG	1	
475065	749-WPW-07	09/13/11	WG	1	
475066	WDMW04B-33-BE01	09/13/11	BR	1	
475067	WDMW04B-33-BE10	09/13/11	BR	1	
475068	WDMW04B-33-CU01	09/13/11	BR	1	
475069	WDMW04B-33-CU10	09/13/11	BR	1	
475070	WDMW04B-33-SU01	09/13/11	BR	1	
475071	WDMW04B-33-SU10	09/13/11	BR	1	
Containers: 9				**Samples: 9**	

These documents are associated with this receipt: 107011[COC for SRR 45654], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Thermometer: 027
Temperature: 3.0

Page Printed: 23 Nov 2011 9:15:25

Client: Fluor-B&W Ports
SR#: 45654
FRM-002

Southwest Research Institute

Laboratory Task Order

TO #: 111122-15 Revision: 0

000051

SDG: 474212
VTSR: 09/15/11, 10/06/11
CASE: FXP02234L04

SRR #'s: 45654, 45808
Client(s): Fluor-B&W Portsmouth LLC

Project(s): 16526.05.00X
Manager(s): DAMMANN, MIKE
To PM: 11/23/11
To QA: 11/23/11
To Client: 11/28/11

Instructions

FLUOR-B&W PORTSMOUTH LLC. SOW FXP02234L04. Project OSDC
SDG is 474212. SDG IS CLOSED.

GROUPED _ With SOIL samples in SDG 474212, located in Task Order # 110830-12, 110831-5, 110901-7, 110902-3.

FINAL DATA/HARDCOPY IS DUE TO THE CLIENT ON 11/29/11.

Groundwater Spiked sample 749-WPW-06 / 475064 was received on 09/15/11, located in SRR # 45654
Groundwater Spiked sample 749-WPW-07 / 475065 was received on 09/15/11, located in SRR # 45654
Groundwater Spiked sample 749-WPW-08 / 476734, Container No. 1 was received on 10/06/11, located in SRR # 45808

This task order was created with the sole purpose of listing/recording the actual ground water Tc99 spiked samples used with the Soil samples under SDG 474212 for DISTRIBUTION COEFFICIENT (Kd).

see SOW for full compound list, CRDLs and RLs:
ASTM C1733 Distribution Coefficients
Tc-99 LSC - Technetium-99 (to support ASTM C1733; see summary)
Total U by ICP-MS (to support ASTM C1733; see summary)

EDD REQUIRED. FORMS PLUS RAW DATA PACKAGE REQUIRED.

PROJECT DESCRIPTION _ Change Order #3 _ Characterization to Support Siting of On-Site Disposal Facility
ELECTRONIC DATA DELIVERABLE _ Electronic Deliverable (AMSED) uploaded into PEMS via the internet plus CD.
QC REQUIREMENTS _ Per ICPT BOA/QSAS and method requirements.
SMO representative is Jim Applegate James.Applegate@fbports.com; 740.897.4081
Additional contact is Gerald Fulkerson 740 897 2588, Gerald.Fulkerson@fbports.com.

****

Report ORIGINAL & CD Results to:
FLUOR-B&W PORTSMOUTH LLC.
Attn: Gerald Fulkerson 740-897-2588
3930 U.S. Route 23 South
Building X-1000
Piketon, Ohio 45661

Documents Related to this task order: 107011[COC for SRR 45654], 108229[COC for SRR 45808], 100762[FXP02234L04], 106706[TOR #TR004], 107782[TOR #TR004 revised]

Deliverables –> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: ASTM_C1733 Holding: 180 days from CED
Section: WETCHEM **ASTM C1733 - 10 Method for Distribution Coefficients of Inorganic Species by the Batch Method** Cnt: 3

System ID	Type	Cont	Matrix	Customer ID	CED	Method Date
475064	Tc99spk	1	WG	749-WPW-06	13 Sep 11	11 Mar 12
475065	Tc99spk	1	WG	749-WPW-07	13 Sep 11	11 Mar 12
476734	Tc99spk	1	WG	749-WPW-08	04 Oct 11	01 Apr 12

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC135LL**

Page: 1 for OSDC135LL
Date: 09/13/2011 05:19 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-05	OSDC135	X-749	WG	REG	2.5	GAL	CUBI	1	13-SEP-2011	1353		Distribution Coefficient	None	WATER CONTAINING TC-99 TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	14-SEP-2011	X749	OSDC135LL	DEG C		FXP02234L04

Relinquished by: Stacy Cloyd	Date(mm/dd/yyyy): 9-14-11	Time: 0830	Received by: AMS	Date(mm/dd/yyyy): 9/14/11	Time: 0830
Relinquished by: AMS	Date(mm/dd/yyyy): 9/14/11	Time: 1200	Received by: Fedex	Date(mm/dd/yyyy): 9/14/11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/15/11	Time: 0845	Received by:	Date(mm/dd/yyyy): 9/15/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

KI

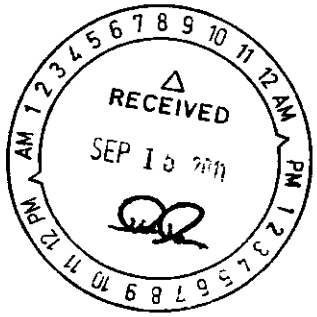
Client: Fluor B&W Portsmouth
SwRI Project #18526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000052

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)
Project: **OSDC** SOW: **FXP02234L04**
Lab Chain of Custody (LCOC) Number: **OSDC102LL**



Page: 1 for OSDC102LL
Date: 09/13/2011 05:16 PM

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
WDMW04B-33-BE01	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	1425		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	BEREA
WDMW04B-33-BE10	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	1445		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	BEREA Cont rectd broken; sample contained in original zip lock bag.
WDMW04B-33-CU01	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	930		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	CUYAHOGA Cont. rectd broken; sample contained in original zip lock bag.
WDMW04B-33-CU10	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	1010		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	CUYAHOGA
WDMW04B-33-SU01	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	1205		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	SUNBURY
WDMW04B-33-SU10	OSDC102	BEDRC	SO	REG	1	L	AGLS	1	13-SEP-2011	1350		GAB/TC99;TU/IsoU(U233,34,35,36,38);Th-228,30,32;Am241;Np237;Pu-238,39/40;Cs-137	None	SUNBURY

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	14-SEP-2011	OSDC	OSDC102LL	DEG C		FXP02234L04

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)
Project: **OSDC** SOW: **FXP02234L04**
Lab Chain of Custody (LCOC) Number: **OSDC102LL**

Page: 2 for OSDC102LL
Date: 09/13/2011 05:16 PM

Relinquished by: Stacy Clapsaddle	Date(mm/dd/yyyy): 9-14-11	Time: 0830	Received by: [illegible] FedEx	Date(mm/dd/yyyy): 9/14/11	Time: 0830
Relinquished by: [illegible]	Date(mm/dd/yyyy): 9/14/11	Time: 1200	Received by: [illegible]	Date(mm/dd/yyyy): 9/14/11	Time: 1200
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/15/11	Time: 0845	Received by: [illegible]	Date(mm/dd/yyyy): 9/15/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:
Comments:					

LR

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000054

107704

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC137LL**

Page: 1 for OSDC137LL
Date: 09/13/2011 05:05 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-06	OSDC137	X-749	WG	REG	2.5	GAL	CUBI	1	13-SEP-2011	1411		Distribution Coefficient	None	WATER CONTAINING TC-99 TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	14-SEP-2011	X749	OSDC137LL	DEG C		FXP02234L04

Relinquished by: Stacy Clayton	Date(mm/dd/yyyy): 9-14-11	Time: 0830	Received by: AWS	Date(mm/dd/yyyy): 9/14/11	Time: 0830
Relinquished by: AWS	Date(mm/dd/yyyy): 9/14/11	Time: 1200	Received by: FedEx	Date(mm/dd/yyyy): 9/14/11	Time: 1200
Relinquished by: FedEx	Date(mm/dd/yyyy): 9/15/11	Time: 0845	Received by:	Date(mm/dd/yyyy): 9/15/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:	Date(mm/dd/yyyy):	Time:

Comments:

R2

Client: Fluor B&W Portsmouth
SwRI Project #16526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000055

107041

Project Environmental Measurements System (PEMS)

Laboratory Lab Chain Of Custody (LCOC)

Project: **OSDC** SOW: **FXP02234L04**

Lab Chain of Custody (LCOC) Number: **OSDC139LL**

Page: 1 for OSDC139LL
Date: 09/13/2011 05:05 PM

Sample ID	Sample Log	Task	Matrix	Smpl Type	Sample Container Vol	Unit	Type	Qty	Sample Date	Smpl Time	Associate Sample ID	Param Anly Group	Preser-vative	Remarks
749-WPW-07	OSDC139	X-749	WG	REG	2.5	GAL	CUBI	1	13-SEP-2011	1427		Distribution Coefficient	None	WATER CONTAINING TC-99 TO RUN Kd

Laboratory:	Date Submitted To Lab:	Ship Container No:	SSG ID:	Cooler Temperature:	Airbill No:	SOW
SWRI - Southwest Research Institute, San Antonio, TX	14-SEP-2011	X749	OSDC139LL	DEG C		FXP02234L04

Relinquished by: Stacy Sturgeon	Date(mm/dd/yyyy): 9-14-11	Time: 0830	Received by:		Date(mm/dd/yyyy): 9/14/11	Time: 0830
Relinquished by: Fed Ex	Date(mm/dd/yyyy): 9/14/11	Time: 1200	Received by: Fedex		Date(mm/dd/yyyy): 9/14/11	Time: 1200
Relinquished by:	Date(mm/dd/yyyy): 9/15/11	Time: 0845	Received by:		Date(mm/dd/yyyy): 9/15/11	Time: 0845
Relinquished by:	Date(mm/dd/yyyy):	Time:	Received by:		Date(mm/dd/yyyy):	Time:

Comments:

RT

Client: Fluor B&W Portsmouth
SwRI Project #18526.05.00X
VTSR: 09/15/11 0845
Battery Check: Y
Cooler/Container Wipe: <100 cpm
Total cpm-mR/h (samples): <100 cpm / 0 mR/h
(see Radioactive Material Receiving Form for more information

SwRI SRR #45654
Case: FXP02234L04
Sample(s) Received Intact
Background Check: <100 cpm
Temp.: 3.0 °C / #027

000056

000057

Southwest Research Institute

Traffic Report

Sample Custodian Signature: _____

Project: 16526.05-00X

Case: FXP02234L04 / SDG: _____

Sample Receipt: 45654

Airbill: SEE SRR NOTES

1. Custody Seal — Present
2. Chain of Custody — Present
3. Sample Tags — Not Present
   Sample Tag Numbers — Not on COC
4. SMO Forms — Not Present

Date Received	Time Received	COC Record	SMO Sample #	Corresponding		Traffic Rpt, Tags, COC Agree	Sample Condition
				Sample Tag #	SwRI #		
09/15/11	08:45:00	OSDC135LL	749-WPW-05	None	475063	YES	Intact
09/15/11	08:45:00	OSDC137LL	749-WPW-06	None	475064	YES	Intact
09/15/11	08:45:00	OSDC139LL	749-WPW-07	None	475065	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-BE01	None	475066	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-BE10	None	475067	YES	Broken
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-CU01	None	475068	YES	Broken
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-CU10	None	475069	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-SU01	None	475070	YES	Intact
09/15/11	08:45:00	OSDC102LL	WDMW04B-33-SU10	None	475071	YES	Intact

Pacific Southwest Lab-B&W
WO: 45654
FRM-217

SAMPLE LOG-IN SHEET

Lab Name: Southwest Research Institute

Page 1 of 1

Received By (Print Name): DINO ROMAN

Log-in Date: 09/14/2011

Received By (Signature):

Case Number: FXP02234L04

Sample Delivery Group No.: N/A

SAS Number: NA

Remarks: 16526.05.00X

1.	Custody Seal(s)	(Present) / Absent* (Intact) / Broken
2.	Custody Seal Nos.	N/A
3.	Chain-of Custody Records	(Present) / Absent*
4.	Traffic Reports or Packing Lists	Present / (Absent)
5.	Airbill	Airbill/Sticker (Present) / Absent*
6.	Airbill No.	SEE SRR NOTES
7.	Sample Tags	Present / (Absent)
	Sample Tag Numbers	Listed / (Not listed on Chain of Custody)
8.	Sample Condition	(Intact) / Broken* / Leaking
9.	Cooler Temperature	3.0C
10.	Does Information on custody records, traffic reports, and sample tags agree?	(Yes) / No*
11.	Date Received at Lab	09/15/2011
12.	Time Received	08:45:00

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc
749-WPW-05	None	475063	Intact
749-WPW-06	None	475064	Intact
749-WPW-07	None	475065	Intact
WDMW04B-33-BE01	None	475066	Intact
WDMW04B-33-BE10	None	475067	Broken
WDMW04B-33-CU01	None	475068	Broken
WDMW04B-33-CU10	None	475069	Intact
WDMW04B-33-SU01	None	475070	Intact
WDMW04B-33-SU10	None	475071	Intact

Sample Transfer

Fraction: Trans	Fraction
Area #: RFI	Area #
By: DINO ROMAN	By
On: 09/15/2011	On

* Contact SMO and attach record of resolution

Reviewed By: [signature]

Date: 09.16.11

Logbook No.: Sample Receipt (45654)

Logbook Page No.: 7752 SEC 7 OF 7 1995

000059

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

ITEM RECEIPT

Record of Sample Discrepancy

000060

Discrepancy Entry	1802
Sample Receipt	45654
Sample(s)	various
Project	16526.05.00X
Client	Fluor B&W Portsmouth
Manager	DAMMANN, MIKE
Initiator	ROMAN, DINO

ROMAN, DINO Sep 15 2011 3:53:24:920PM	- The containers for following samples were received broken, sample was contained in original ziplock bag: WDMW04B-33-BE10 WDMW04B-33-CU01
RAMIREZ, DANNY Sep 19 2011 9:25:59:193PM	Item listed in Task Order 110915-7. Email also sent to client.
New Information	

Home

ver (03/04/2002)

000061

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

pH TABLE

106573
000062

SwRI

pH Preservation Report

Sample Receipt Report 45578

Project: 16526.05.00X

Case: FXP02234L04

Customer: Fluor-B&W Portsmouth LLC

Received: Sep 2 2011 8:30AM

pH Adjuster:

Adjusted:

SwRI #	Customer's ID	pH
474396 1/1	WDMW03B-04-12.0	Login
Container ID	Adjustment	Final
474397 1/1	WDMW03B-04-2.0	Login
Container ID	Adjustment	Final
474398 1/1	WDMW03B-04-4.5	Login
Container ID	Adjustment	Final
474399 1/1	WDSB25-04-2.0	Login
Container ID	Adjustment	Final
474400 1/1	WDSB25-04-4.5	Login
Container ID	Adjustment	Final
474401 1/1	WDSB25-07-2.0	Login
Container ID	Adjustment	Final
474402 1/1	WDSB25-07-4.5	Login
Container ID	Adjustment	Final
474403 1/1	WDSB25-09-2.0	Login
Container ID	Adjustment	Final
474404 1/1	WDSB25-09-4.5	Login
Container ID	Adjustment	Final
474405 1/3	WDSB25-28-4.5	Login <2
Container ID	Adjustment	Final
474405 2/3	WDSB25-28-4.5	Login <2
Container ID	Adjustment	Final
474405 3/3	WDSB25-28-4.5	Login <2
Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final

SwRI #	Customer's ID	pH
		Login
Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final

1006365

000063

SwRI

pH Preservation Report

Sample Receipt Report 45547

Project: 16526.05.00X

Case: FXP02234L04

Customer: Fluor-B&W Portsmouth LLC

Received: Aug 30 2011 9:30AM

pH Adjuster:

Adjusted:

SwRI #	Customer's ID	pH
474203 1/1	231A-01G-04	Login
Container ID	Adjustment	Final
474204 1/1	749-WPW-04	Login
Container ID	Adjustment	Final
474205 1/1	WDSB01-04-12.0	Login
Container ID	Adjustment	Final
474206 1/1	WDSB01-04-19.5	Login
Container ID	Adjustment	Final
474207 1/1	WDSB01-04-2.0	Login
Container ID	Adjustment	Final
474208 1/1	WDSB01-04-24.5	Login
Container ID	Adjustment	Final
474209 1/1	WDSB01-04-4.5	Login
Container ID	Adjustment	Final
474210 1/1	WDSB07-04-12.0	Login
Container ID	Adjustment	Final
474211 1/1	WDSB07-04-4.5	Login
Container ID	Adjustment	Final
474212 1/1	WDSB07-07-12.0	Login
Container ID	Adjustment	Final
474213 1/1	WDSB07-07-2.0	Login
Container ID	Adjustment	Final
474214 1/1	WDSB07-07-4.5	Login
Container ID	Adjustment	Final
474215 1/1	WDSB07-09-12.0	Login
Container ID	Adjustment	Final
474216 1/1	WDSB07-09-2.0	Login
Container ID	Adjustment	Final
474217 1/1	WDSB07-09-4.5	Login
Container ID	Adjustment	Final
474218 1/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474218 2/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474218 3/3	WDSB07-15-4.5	Login <2
Container ID	Adjustment	Final
474219 1/1	WDSB09-04-2.0	Login
Container ID	Adjustment	Final

SwRI #	Customer's ID	pH
474220 1/1	WDSB09-04-4.5	Login
Container ID	Adjustment	Final
474221 1/1	WDSB09-07-2.0	Login
Container ID	Adjustment	Final
474222 1/1	WDSB09-07-4.5	Login
Container ID	Adjustment	Final
474223 1/1	WDSB09-09-2.0	Login
Container ID	Adjustment	Final
474224 1/1	WDSB09-09-4.5	Login
Container ID	Adjustment	Final
474225 1/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474225 2/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474225 3/3	WDSB09-15-4.5	Login <2
Container ID	Adjustment	Final
474226 1/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
474226 2/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
474226 3/3	WDSB09-28-19.5	Login <2
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
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Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final
		Login
Container ID	Adjustment	Final

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

VARIOUS ANALYSIS

010002

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

SAMPLE DATA

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

SOW: FXP02234L04

Date Received: 08/30/11, 08/31/11, 09/01/11, 09/02/11

SRR #: 45547, 45562, 45570, 45578

Task Order #: 110830-12, 110831-5, 110901-7, 110902-3

Method: ASTM C1733

		Tc99		Total Uranium	
Sample ID	Lab System ID	K_d Results (mL/g)	Uncertainty	K_d Results (mL/g)	Uncertainty
Prep Blank	Blank	0.204	0.903	0.028	0.99
WDSB07-07-12.0	474212	3.88	0.713	2.34	0.758
WDSB07-07-2.0	474213	3.36	0.702	12.7	1.00
WDSB07-07-4.5	474214	4.01	0.722	61.5	2.33
WDSB09-07-2.0	474221	4.20	0.708	27.8	1.28
WDSB09-07-4.5	474222	4.31	0.713	44.5	1.69
WDSB29-07-12.0	474300	4.59	0.725	4.20	0.799
WDSB29-07-2.0	474301	4.25	0.715	7.77	0.878
WDSB29-07-4.5	474302	4.51	0.720	7.44	0.871
WDSB31-07-2.0	474340	5.93	0.754	687	17.5
WDSB31-07-4.5	474341	3.57	0.708	14.0	1.05
WDSB31-22-4.5	474344	3.64	0.706	27.2	1.36
WDSB25-07-2.0	474401	3.08	0.718	11.8	1.08
WDSB25-07-4.5	474402	4.62	0.723	58.5	2.07

This report may not be reproduced except in its entirety without the written approval of SwRI.

010004

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Fluor-B&W Portsmouth LLC
TASK ORDER: 110830-12, 110831-5, 110901-7, 110902-3, 111122-15
SRR: 45547, 45562, 45570, 45578, 45654
CASE: FXP02234L04
VTSR: 08.30.11, 08.31.11, 09.01.11, 09.02.11, 09.15.11, 10.06.11
PROJECT#: 16526.05.00X

RAW DATA

Sample Note

010006

GROUNDWATER SAMPLES USED			
Sample ID	Lab System ID	Date Received	SRR #
749-WPW-06	475064	09/15/11	45654
749-WPW-07	475065	09/15/11	45654
749-WPW-08	476734	10/06/11	45808

Distribution Coefficient Tabulation

TC-99 - Kd Values

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21		Report Kd (pooled)		
			K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	
Blank			-0.20	1.78	0.54	1.83	-0.07	1.79	0.54	1.83	**0.204**	**0.903**	
474212			3.39	1.99	3.82	2.00	3.62	2.01	3.79	2.01			
474212D			3.39	1.99	3.94	2.02	4.63	2.07	4.44	2.04	**3.88**	**0.713**	Day 7-21
474212-AVG			3.39	1.41	3.88	1.42	4.13	1.44	4.12	1.43			
474213			2.98	1.96	2.61	1.93	3.09	1.95	3.47	1.98	3.46		
474213D			4.16	2.03	4.16	2.03	3.34	1.98	3.90	2.01	**3.36***	**0.702**	Day 7-21
474213-AVG			3.57	1.41	3.38	1.40	3.21	1.39	3.68	1.41			
474214			4.47	2.05	3.77	2.00	4.18	2.04	4.00	2.01	4.42		
474214D			4.28	2.03	4.45	2.05	5.29	2.09	4.89	2.07	**4.01***	**0.722**	Day 7-21
474214-AVG			4.37	1.44	4.11	1.43	4.74	1.46	4.44	1.44			
474221			4.46	2.01	4.61	2.02	3.90	1.99	4.64	2.03			
474221D			3.47	1.96	3.97	1.98	4.07	2.00	4.48	2.02	**4.20**	**0.708**	Day 7-21
474221-AVG			3.96	1.41	4.29	1.41	3.98	1.41	4.56	1.43			
474222			3.07	1.95	4.45	2.03	4.92	2.05	4.49	2.03			
474222D			2.78	1.93	4.66	2.04	5.43	2.08	4.69	2.03	**4.31**	**0.713**	Day 7-21
474222-AVG			2.92	1.37	4.55	1.44	5.17	1.46	4.59	1.43			
474300			4.03	2.02	4.40	2.04	4.52	2.05	5.30	2.08			
474300D			3.89	2.00	4.44	2.04	4.70	2.05	5.43	2.10	**4.59**	**0.725**	Day 7-21
474300-AVG			3.96	1.42	4.42	1.44	4.61	1.45	5.37	1.48			
474301			4.38	2.02	3.75	2.00	4.45	2.03	4.17	2.02			
474301D			3.95	2.00	4.16	2.02	4.24	2.02	4.85	2.05	**4.25**	**0.715**	Day 7-21
474301-AVG			4.17	1.42	3.96	1.42	4.35	1.43	4.51	1.44			
474302			4.49	2.04	4.85	2.06	4.70	2.06	4.77	2.05			
474302D			4.32	2.03	4.31	2.02	4.32	2.03	4.35	2.02	**4.51**	**0.720**	Day 7-21
474302-AVG			4.40	1.44	4.58	1.44	4.51	1.44	4.56	1.44			
474340			5.45	2.10	4.86	2.08	6.55	2.17	6.65	2.17			
474340D			5.10	2.08	5.34	2.11	5.70	2.11	7.79	2.25	**5.93**	**0.754**	Day 7-21
474340-AVG			5.27	1.48	5.10	1.48	6.13	1.51	7.22	1.56			
474341			3.53	2.00	2.56	1.94	3.18	1.98	4.48	2.05			
474341D			3.44	2.00	3.87	2.02	3.34	1.99	4.18	2.04	**3.57**	**0.708**	Day 7-21
474341-AVG			3.48	1.41	3.22	1.40	3.26	1.40	4.33	1.45			
474344			3.31	1.98	3.78	2.01	3.65	2.00	4.07	2.03			
474344D			3.49	1.99	3.45	1.99	3.76	2.00	3.58	1.99	**3.64**	**0.706**	Day 7-21
474344-AVG			3.40	1.40	3.62	1.41	3.70	1.42	3.83	1.42			
474401			4.35	2.05	3.95	2.03	3.54	2.01	3.85	2.02	3.97		
474401D			3.72	2.02	3.17	1.98	4.18	2.04	5.01	2.10	**3.08***	**0.718**	Day 7-21
474401-AVG			4.04	1.44	3.56	1.42	3.86	1.43	4.43	1.46			
474402			3.54	1.98	4.23	2.02	4.63	2.04	5.18	2.09			
474402D			3.71	2.00	5.04	2.07	4.97	2.07	5.67	2.10	**4.62**	**0.723**	Day 7-21
474402-AVG			3.63	1.41	4.64	1.45	4.80	1.45	5.42	1.48			

*** Report. Sample contained a rocks, which were removed for testing. Kd was corrected according to the method Kd x (*100-%gravel)/100**

$$Kd = \frac{200\,(C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids}$$

$C_{day\ x}$

Sample calc
474212
Day 7

$200\,(759-676)/(8.0167 \times 0.904) = 3.39$

676

11/22/11

010008

Fluor 16526.05.006
110830-12,110831-5,110901-7,110902-3

Total U - Kd Values

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21		Day X		Report Kd (pooled)		
			K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	K_d, mL/g	*Uncert*	
Blank			-0.29	1.97	-0.05	1.99	0.50	2.02	-0.05	1.98	-0.05	1.98	**0.028**	**0.99**	
474212			1.79	2.11	2.52	2.16	3.01	2.19	2.22	2.13					
474212D			1.95	2.12	1.85	2.11	3.11	2.19	2.27	2.14			**2.34**	**0.758**	Day 7-21
474212-AVG			1.87	1.49	2.19	1.51	3.06	1.55	2.25	1.51					
474213			9.54	2.61	12.1	2.78	12.6	2.82	19.4	3.27	14.4	2.94	13.0		
474213D			10.3	2.66	11.4	2.73	12.5	2.80	15.3	2.99	12.9	2.83	**12.7***	**1.00**	Day 7-X
474213-AVG			9.95	1.86	11.7	1.95	12.5	1.99	17.4	2.21	13.6	2.04			
474214			55.5	5.73	67.1	6.57	66.4	6.47	88.5	8.05	68.2	6.63	67.8		
474214D			61.2	6.17	62.4	6.22	68.1	6.63	71.9	6.88	68.3	6.63	**61.5***	**2.33**	Day 7-X
474214-AVG			58.4	4.21	64.8	4.52	67.3	4.63	80.2	5.29	68.2	4.69			
474221			25.5	3.51	29.5	3.76	27.0	3.59	31.2	3.85	24.3	3.43			
474221D			26.8	3.59	27.1	3.61	24.8	3.45	33.0	3.95	28.5	3.68	**27.8**	**1.28**	Day 7-X
474221-AVG			26.2	2.51	28.3	2.61	25.9	2.49	32.1	2.76	26.4	2.52			
474222			27.5	3.66	25.2	3.52	70.9	6.35	40.4	4.45	56.8	5.50			
474222D			30.3	3.83	51.5	5.14	37.1	4.25	61.2	5.75	43.9	4.68	**44.5**	**1.69**	Day 7-X
474222-AVG			28.9	2.65	38.4	3.11	54.0	3.82	50.8	3.64	50.4	3.61			
474300			4.24	2.26	3.54	2.22	4.31	2.27	4.54	2.28					
474300D			4.57	2.29	4.10	2.25	3.50	2.21	4.83	2.30			**4.20**	**0.799**	Day 7-21
474300-AVG			4.41	1.61	3.82	1.58	3.91	1.58	4.68	1.62					
474301			6.42	2.40	10.47	2.65	5.98	2.37	7.21	2.44					
474301D			7.86	2.49	10.40	2.65	7.30	2.45	6.51	2.40			**7.77**	**0.878**	Day 7-21
474301-AVG			7.14	1.73	10.43	1.87	6.64	1.70	6.86	1.71					
474302			8.25	2.51	7.34	2.46	7.31	2.45	8.53	2.53					
474302D			6.65	2.41	8.47	2.53	5.53	2.34	7.41	2.46			**7.44**	**0.871**	Day 7-21
474302-AVG			7.45	1.74	7.91	1.76	6.42	1.69	7.97	1.77					
474340			439	32.0	708	48	947	66.7	740	52.5	801	56.6			
474340D			459	33.2	565	40.3	678	48.4	750	53.1	788	55.7	**687**	**17.5**	Day 7-X
474340-AVG			449	23.0	636	31.4	812	41.2	745	37.3	794	39.7			
474341			13.8	2.95	13.6	2.94	13.7	2.94	17.0	3.19					
474341D			14.6	3.01	12.8	2.89	13.0	2.90	13.6	2.94			**14.0**	**1.05**	Day 7-21
474341-AVG			14.2	2.11	13.2	2.06	13.4	2.06	15.3	2.17					
474344			23.6	3.60	27.9	3.89	28.1	3.90	28.6	3.93					
474344D			27.2	3.85	30.3	4.06	27.9	3.90	23.6	3.60			**27.2**	**1.36**	Day 7-21
474344-AVG			25.4	2.63	29.1	2.81	28.0	2.76	26.1	2.66					
474401			11.5	2.79	15.4	3.06	15.5	3.07	17.9	3.24			15.3		
474401D			13.8	2.94	13.2	2.91	16.0	3.10	18.9	3.31			**11.8***	**1.08**	Day 7-21
474401-AVG			12.6	2.03	14.3	2.11	15.7	2.18	18.4	2.31					
474402			47.2	5.10	58.5	5.84	59.4	5.91	67.1	6.40					
474402D			57.7	5.76	57.6	5.79	60.7	5.96	59.6	5.93			**58.5**	**2.07**	Day 7-21
474402-AVG			52.4	3.85	58.0	4.11	60.0	4.20	63.3	4.36					

*** Report. Sample contained a rocks, which were removed for testing. Kd was corrected according to the method Kd x (*100-%gravel)/100**

$$Kd = \frac{200\,(C_{avg\ blank} - C_{day\ x})}{m \times \%\ solids} \Big/ C_{day\ x}$$

Sample calc
474212 Day 7 = $200(101800 - 95600) / (8.0167 \times 0.904) / 95600 = 1.79$

C-1095

RSpm 11/22/11

010009

Fluor 16526.05.006
110830-12,110831-5,110901-7,110902-3

TC-99 - Instrument Results

Sample ID	Day 0		Day 7		Day 10		Day 14		Day 21	
	pCi/mL	err	pCi/mL	err	pCi/L	err	pCi/L	err	pCi/L	err
Blank	783	46.9	765	44.9	743	43.6	761	44.7	743	43.6
474212			676	39.8	666	39.2	671	39.5	667	39.3
474212D			676	39.8	664	39.1	650	38.3	653	38.5
474213			687	40.4	695	40.8	684	40.2	676	39.8
474213D			662	39.0	662	39.0	679	40.0	667	39.3
474214			654	38.5	668	39.3	660	38.9	663	39.0
474214D			657	38.7	654	38.5	637	37.5	645	38.0
474221			664	39.1	661	38.9	675	39.7	661	38.9
474221D			683	40.2	673	39.6	672	39.5	664	39.1
474222			690	40.6	663	39.0	654	38.5	662	39.0
474222D			696	40.9	659	38.8	645	38.0	658	38.7
474300			665	39.1	657	38.7	655	38.6	639	37.6
474300D			667	39.2	656	38.6	651	38.3	637	37.6
474301			659	38.8	672	39.6	658	38.7	664	39.1
474301D			668	39.3	664	39.1	662	39.0	650	38.3
474302			657	38.7	650	38.3	653	38.4	651	38.3
474302D			660	38.9	660	38.8	660	38.9	659	38.8
474340			635	37.4	647	38.1	615	36.3	613	36.1
474340D			642	37.8	638	37.6	630	37.1	594	35.0
474341			670	39.4	692	40.7	678	39.9	649	38.2
474341D			672	39.6	662	39.0	674	39.6	656	38.6
474344			677	39.8	667	39.3	670	39.4	661	38.9
474344D			673	39.6	674	39.6	667	39.2	671	39.5
474401			652	38.4	661	38.9	670	39.4	663	39.0
474401D			666	39.2	678	39.9	656	38.6	639	37.7
474402			675	39.7	661	38.9	653	38.4	643	37.9
474402D			672	39.6	645	38.0	647	38.1	633	37.3

$C_{avg\ blk}$	err	Rel Err
759	**20.02**	**2.64%**

010010

Fluor 16526.05.006
110830-12,110831-5,110901-7,110902-3

Total U - Instrument Results

Day X = Day 32

Sample ID	Day 0		Day 7		Day 10		Day 14		Day 21		Day X		$C_{avg\ blk}$	err	
	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err	ng/L	err			
Blank	102000	6903	103000	6973	102000	6902	99800	6740	102000	6853	102000	6862	**101800**	**2805.70**	**2.76%**
474212			95600	6456	93200	6291	91800	6200	94200	6357					
474212D			95100	6421	95400	6437	91500	6179	94000	6347					
474213			76200	5142	71400	4823	70300	4748	60300	4070	67300	4545			
474213D			74600	5033	72600	4902	70700	4771	66100	4463	69900	4719			
474214			34000	2292	29700	2008	30100	2029	24200	1636	29400	1987			
474214D			31600	2132	31300	2112	29400	1986	28300	1909	29400	1988			
474221			56000	3780	52200	3523	54700	3691	51000	3443	57300	3866			
474221D			54700	3695	54400	3672	56900	3838	49600	3349	53300	3597			
474222			53700	3623	55900	3771	30700	2072	43900	2961	35500	2399			
474222D			51200	3459	38000	2566	46100	3112	33900	2289	41800	2821			
474300			88600	5981	90500	6107	88400	5965	87700	5920					
474300D			87600	5916	88900	6002	90600	6117	87000	5876					
474301			83300	5623	74800	5048	84400	5701	81600	5510					
474301D			80100	5410	75000	5064	81300	5485	83100	5611					
474302			79200	5348	81200	5485	81300	5485	78500	5298					
474302D			82700	5586	78600	5306	85400	5768	80900	5463					
474340			6080	411	4040	274	2920	198	3700	250	3440	233			
474340D			5850	395	4830	327	4020	272	3670	249	3490	236			
474341			67000	4522	67200	4539	67200	4537	61900	4180					
474341D			65700	4436	68600	4633	68300	4610	67300	4546					
474344			54600	3686	50400	3406	50300	3394	49900	3370					
474344D			51000	3442	48300	3260	50300	3399	54600	3686					
474401			71100	4803	64500	4357	64400	4349	60800	4104					
474401D			67100	4527	68000	4588	63600	4296	59600	4025					
474402			38300	2584	33400	2254	33000	2227	30500	2062					
474402D			33800	2279	33700	2278	32700	2208	32900	2224					

11/21/11

010011

Distribution Coefficient pH Data

010013

Fluor 16526.05.006
110830-12,110831-5,110901-7,110902-3

RSpruce 11/21/11

pH Data

Day X = Day 32

Sample	Day 0	Day 7	Day 10	Day 14	Day 21	Day X
	pH	pH	pH	pH	pH	pH
Blank	7.75	7.77	7.88	7.83	7.92	8.21
474212		8.06	8.11	8.04	8.27	
474212D		8.13	8.02	8.11	8.20	
474213		7.98	8.08	7.86	8.02	8.01
474213D		7.89	8.00	7.91	8.04	8.15
474214		8.11	8.19	8.06	8.08	8.28
474214D		8.17	8.10	8.05	8.11	8.27
474221		8.12	8.19	8.04	8.16	8.40
474221D		8.21	8.23	8.03	8.20	8.30
474222		8.37	8.38	8.14	8.18	8.57
474222D		8.42	8.34	8.15	8.20	8.63
474300		8.10	7.98	8.08	8.13	
474300D		8.03	8.05	8.09	8.24	
474301		7.98	8.21	8.13	8.25	
474301D		7.97	8.24	7.94	8.18	
474302		8.05	8.00	7.98	8.20	
474302D		8.15	7.90	7.95	8.05	
474340		7.66	7.57	7.38	7.54	7.96
474340D		7.60	7.40	7.20	7.50	8.03
474341		8.40	8.37	8.00	8.18	
474341D		8.41	8.36	8.04	8.16	
474344		8.39	8.37	8.12	8.15	
474344D		8.38	8.45	8.19	8.14	
474401		8.14	8.11	8.02	8.11	
474401D		8.07	7.96	8.00	8.09	
474402		8.28	8.29	8.01	8.19	
474402D		8.29	8.35	8.05	8.15	

0010014

Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAYO Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110831-5, 110991-7, 110902-3

QC Source: INORG # 8325 8235 @ 10/14/11 mm TV: 7.52

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA				
4.0	4.00	8958	1/13	22.0
7.0	7.01	8960	2/13	22.1
10.0	10.04	8961	1/13	22.0
NA				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.50	N/A	N/A	N/A	21.7
DAYO Blank	7.75	↓	↓	↓	21.1
CCV	7.51	↓	↓	↓	22.0

JAM 10/17/11

Analyst Signature: James Maha Date: 10/17/11

Reviewed by: M. Mendiza Date: 10/14/11

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Southwest Research Institute® Logbook: pH 010015

Analysis/Method: pH DAY 7 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
2.0	2.00	8904	6/12	23.6
4.0	4.00	8958	1/13	23.1
7.0	7.00	8960	2/13	22.9
10.0	10.00	8961	1/13	22.6
N/A	—	—	—	—

	Liquids	Solids/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.53	—			22.2
474212	8.06				22.2
474212D	8.13				22.2
474213	7.98				22.1
474213D	7.89				22.2
474214	8.11				22.2
474214D	8.17				22.1
474341	8.40				22.1
474341D	8.41				22.1
474344	8.39				21.9
474344D	8.38				21.9
CCV	7.523 TE SAM 10/14/11				22.3
~~CCB~~ 474221 TE SAM 10/14/11		TE 10/14/11 gcm			
474221	8.07 12				21.7
474221D	8.21				21.7
	Judy Herrera				

Analyst Signature: Judy Herrera * Date: 10/14/11

Reviewed by: M. Meinl Date: 11/8/11

* incorrect analyst 10/14/11 ge

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FRM-241 (Rev 2/Feb 04)

Southwest Research Institute® Logbook: pH 010016

Analysis/Method: pH DAY7 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
2.0	2.00	8904	6/12	23.6
4.0	4.00	8958	1/13	23.1
7.0	7.00	8960	2/13	22.9
10.0	10.00	8961	1/13	22.6
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
474300	8.10				22.1
474300D	8.03				22.6
474401	8.14				22.3
474401D	8.07				22.2
474402	8.28				22.2
474402D	8.29				22.1
474301	7.98				22.2
474301D	7.97				22.0
CCV2	7.57				22.7
474302	8.025				22.1
474302D	8.15				22.3
474340	7.606				22.2
474340D	7.600				22.2
474222	8.37				22.2
474222D	8.42				22.2
CCV3	7.54				22.7
Blank Day 7	7.77				22.4
CCV4	7.54				22.6

SAM 10/14/11

Analyst Signature: [signature] Date: 10/14/11

Reviewed by: [signature] Date: 11/8/11

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Southwest Research Institute® Logbook: pH 110017

Analysis/Method: pH DAY 10 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA				
4.0	4.00	8958	1/13	22.0
7.0	7.01	8960	2/13	22.1
10.0	10.03	8961	1/13	22.1
NA				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.51				22.4
474212	8.11				22.2
474212D	8.02				22.6
474213	8.08				22.4
474213D	8.00				22.4
474214	8.19				22.2
474214D	8.10				22.2
474341	8.37				22.0
474341D	8.36				22.2
474344	8.37				22.1
474344D	8.45				21.9
CCV	7.54				22.2
474221	8.19				22.2
474221D	8.23				22.2
474300	7.98				22.1
474300D	8.05				21.9
474401	8.11				22.1
474401D	7.96				22.2

JAM 10/17/11

Analyst Signature: James Maher Date: 10/17/11

Reviewed by: M. Mendoza Date: 11/8/11

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FRM-241 (Rev 2/Feb 04)

010018

Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAY 10 Project#: 16.526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG #~~833~~ 8325 TE SAM 10/17/11 TV: 7.526u

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA	—	—	—	—
4.0	4.00	8958	1/13	22.0
7.0	7.01	8960	2/13	22.1
10.0	10.03	8961	1/13	22.1
NA	—	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
474222	8.38				21.9
474222D	8.34				21.9
474402	8.29				21.9
474402D	8.35				22.0
CCV2	7.55				22.3
474301	8.21				21.8
474301D	8.24				21.6
474302	8.00				21.9
474302D	7.90				22.2
474340	7.57				22.1
474340D	7.40				22.0
Blank DAY10	7.88				22.2
CCV3	7.54				22.3

SAM 10/17/11

MM 11/3/11

Analyst Signature: James Mahe Date: 10/17/11

Reviewed by: M. Medley Date: 11/8/11

010019

Southwest Research Institute® Logbook: pH

Analysis/Method: pH DAY 14 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG # 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
4.0	4.00	8958	1/13	20.9
7.0	7.01	8960	2/13	↓
10.0	10.04	8961	1/13	

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.45				21.9
474212	8.04				21.9
474212D	8.11				21.9
474213	7.86				22°
474213D	7.91				22°
474214	8.06				22.1°
474214D	8.05				22.2°
474341	8.0				22.2°
474341D	8.04				22.3
474344	8.12				22.1°
474344D	8.19				22.2°
CCV	7.47				21.9
474221	8.04				22.2
474221D	8.03				22.4°
474222	8.14				22.2°
474222D	8.15				22.2
474300	8.08				22.2
474300D	8.09				22.2

YAM 10/31/11

Analyst Signature: _____ Date: 10-21-11

Reviewed by: _____ Date: 10/27/11

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Southwest Research Institute® Logbook: pH 010020

Analysis/Method: pH Day 14 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG# 8325 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
4.0	4.00	8958	1/13	20.9
7.0	7.01	8960	2/13	20.9
10.0	10.04	8961	1/13	20.9

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
474401	8.02				22.2°
474401D	8.00				22.4°
474402	8.01				22.6°
474402D	8.05				22.5°
CCV2	7.45				21.9°
474301	8.13				22.2°
474301D	7.94				23.1
474302	7.98				22.3
474302D	7.95				22.2
474340	7.38				22.3
474340D	7.20				22.1
Blank D14	7.83				22.1
CCV3	7.47				22.1
Blank Day0	7.75				20.9
CCV4	7.46				22.1

AM 10/21/11

Analyst Signature: [signature] Date: 10-21-11

Reviewed by: [signature] Date: 10/22/11

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010021

Southwest Research Institute® Logbook: pH

Analysis/Method: pH Day 2 V 7:15 AM TO 10/28/11 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110820-12, 110901-7, 110831-5, 110902-3

QC Source: INORG # 8225 TV: 7.52 s.u.

Notes: QC Range 7.43 - 7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA	—	—	—	—
4.0	4.00	8958	1/13	22.4
7.0	7.01	8960	2/13	22.6
10.0	10.04	8961	1/13	21.9
NA	—	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.51	—	—	—	22.3
474212	8.27				22.6
474212D	8.20				22.3
213	8.02				22.4
213D	8.04				22.1
214	8.08				22.2
214D	8.11				22.0
341	8.18				22.2
341D	8.16				22.2
344	8.15				22.1
344D	8.14				22.2
CCV	7.52				22.4
474 221	8.16				22.2
221D	8.20				22.1
222	8.18				22.2
222D	8.20				22.0
300	8.13				22.1
300D	8.24	—	—	—	22.2

JAM 10/28/11

Analyst Signature: James Maher Date: 10/28/11

Reviewed by: M. Merrill Date: 11/8/11

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Southwest Research Institute® Logbook: pH 110022

Analysis/Method: PH DAY 21 Project#: 16526.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: INORG#8325 TV: 7.52 s.u.

Notes: QC Range 7.43-7.61 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA				22.4
4.0	4.00	4.00	8958	22.6
7.0	7.01	7.01	8960	21.9
10.0	10.04	10.04	8961	
N/A				

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
474401	8.11				22.0
401D	8.09				22.1
402	8.19				22.1
402D	8.15				22.0
CCV2	7.51				22.3
474301	8.25				21.9
301D	8.18				22.0
302	8.20				21.9
302D	8.05				22.4
340	7.54				21.9
340D	7.50				21.9
Blank D21	7.92				22.2
CCV3	7.52				22.6

JAM 10/28/11

JAM 10/28/11

Analyst Signature: James Mather Date: 10/28/11

Reviewed by: M. Mendoza Date: 11/8/11

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010023

Southwest Research Institute® Logbook: pH

Analysis/Method: DAY X 32 pH Project#: 16626.05.006

Client: Fluor B&W Portsmouth TO#: 110830-12, 110901-7, 110831-5, 110902-3

QC Source: 8294 TV: 7.97 s.u.

Notes: QC Range 7.83-8.11 s.u.

Standardization of pH Meter:

Buffer Solution	pH Reading	Inorg #	Expiration Date	Temp, °C
NA	—	—	—	—
4.0	4.00	8958	1/13	22.4
7.0	7.01	8960	2/13	22.6
10.0	10.03	8961	1/13	22.4
NA	NA	—	—	—

	Liquids	Soils/Solids			
Sample ID	pH	Sample Wt, g	Water Wt, g	pH	Temp, °C
ICV	7.99				22.2
474213	8.01				22.3
474213D	8.15				22.8
474214	8.28				24.1
474214D	8.27				23.8
474221	8.40				23.4
474221D	8.30				23.9
474222	8.57				21.2
474222D	8.63				21.0
474346	7.96				21.9
474346D	8.03				21.4
CCV	7.96				23.4
Blank DX	8.21				24.1
CCV	7.97				23.6

SAM 11/8/11

SAM 11/8/11

Analyst Signature: James Mohr Date: 11/8/11

Reviewed by: [signature] Date: 11/17/11

Book/Page 00 336

Distribution Coefficient Prep

Fluor 16526.05.006
110830-12,110831-S,110901-7,110902-3

Prep Information

ıy X = Day 32

Sample ID			Day 7		Day 10 (9)		Day 14		Day 21		Day x	
	%gravel removed	% Solids	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL	Wt g	Vol mL
Blank												
474212		90.40%	8.0167	200	8.0856	200	8.0109	200	8.0451	200		
474212D		90.40%	8.0121	200	8.0409	200	8.0077	200	8.0800	200		
474213	2.78%	87.86%	8.0137	200	8.0393	200	8.0742	200	8.0599	200	8.0852	200
474213D	2.78%	87.86%	8.0206	200	8.0148	200	8.0333	200	8.0543	200	8.0831	200
474214	9.20%	89.63%	8.0140	200	8.0720	200	8.0010	200	8.0837	200	8.0602	200
474214D	9.20%	89.63%	8.0952	200	8.0482	200	8.0721	200	8.0658	200	8.0451	200
474221		79.59%	8.0645	200	8.0882	200	8.0187	200	8.0294	200	8.0310	200
474221D		79.59%	8.0625	200	8.0877	200	8.0018	200	8.0214	200	8.0136	200
474222		81.18%	8.0372	200	8.0186	200	8.0420	200	8.0352	200	8.0959	200
474222D		81.18%	8.0254	200	8.0289	200	8.0244	200	8.0665	200	8.0576	200
474300		87.77%	8.0018	200	8.0408	200	8.0114	200	8.0704	200		
474300D		87.77%	8.0856	200	8.0573	200	8.0452	200	8.0321	200		
474301		85.62%	8.0840	200	8.0541	200	8.0587	200	8.0208	200		
474301D		85.62%	8.0558	200	8.0288	200	8.0682	200	8.0688	200		
474302		86.14%	8.0351	200	8.0272	200	8.0133	200	8.0745	200		
474302D		86.14%	8.0585	200	8.0885	200	8.0558	200	8.0988	200		
474340		88.86%	8.0703	200	8.0153	200	8.0472	200	8.0630	200	8.0376	200
474340D		88.86%	8.0406	200	8.0011	200	8.0795	200	8.0271	200	8.0478	200
474341		93.66%	8.0377	200	8.0707	200	8.0233	200	8.0797	200		
474341D		93.66%	8.0464	200	8.0812	200	8.0523	200	8.0300	200		
474344		90.77%	8.0630	200	8.0481	200	8.0288	200	8.0236	200		
474344D		90.77%	8.0744	200	8.0453	200	8.0811	200	8.0710	200		
474401	22.5%	93.52%	8.0618	200	8.0187	200	8.0163	200	8.0398	200		
474401D	22.5%	93.52%	8.0297	200	8.0570	200	8.0313	200	8.0090	200		
474402		86.90%	8.0883	200	8.0610	200	8.0759	200	8.0226	200		
474402D		86.90%	8.0288	200	8.0743	200	8.0188	200	8.0867	200		

RSpms 11/22/11

010026

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 00146_ Book I.D. # _10-0406-057_

Analysis: ASTM_ C 1733 Project #: 16526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 10830-12
Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 88 Pipette ID: 5000-___ 1000-___ 200-___
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: F.V. Prep used 474734, 475064, 475065 spiked with 2.8ml INORG 9204 uranium/uranyl
9/21/11 10/7/11 F.V.= 28L

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)			
D7	474212	8.0167	200ml			
D7	474212D	8.0121				
D10	474212	8.0856				
D10	474212D	8.0409				
D14	474212	8.0109				
D14	474212D	8.0077				
D21	474212	8.0451				
D21	474212D	8.0800				
DX	474212	8.0016				
DX	474212D	8.0656				
D7	474213	8.0137				
D7	474213D	8.0206				
D10	474213	8.0393				
D10	474213D	8.0148				
D14	474213	8.0742				
D14	474213D	8.0333				
D21	474213	8.0599				
D21	474213D	8.0543				
DX	474213	8.0852				
DX	474213D	8.0831				

large rocks removed

total sample wt (g) = 108g

rocks removed = 3.00g

% rocks = $\frac{3.00}{108}$ = 2.78%

jeu 09/21/11

Analyst Signature: James Mosher Date: 9/21/11
Reviewed by: [signature] Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

010027

Book/Page: _15_ 00147_

Book I.D. # _10-0406-057_

Analysis: ASTM-C1733

Method (circle) Digestion / Distillation / Extraction / Bomb

Client: Fluor B&W Portsmouth

Project #: 116526.05.0006

Task Order#: 110830-12; 110901-7

TAP#: N/A

Balance ID: 12 / 188 (474214) (474341)

Pipette ID: 5000- — 1000- — 200- —

Digestion Apparatus: N/A

Temperature: N/A

LCS ID: N/A

LCS TV = N/A

Notes / Prep: *TE 09/21/11 gau 9/21/11 10/7/11

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)			
D07	474214	8.0140	200 mL	large rocks removed		
D7	474214D	8.0952				
D10	474214	8.0720		total Sample Wt (g) = 1163g		
D10	474214D	8.0482				
D14	474214	8.0010		rocks removed = 15g		
D14	474214D	8.0721				
D21	474214	8.0837		% rocks = 15/1163 = 9.20%		
D21	474214D	8.0658				
DX	474214	8.0602				
DX	474214D	8.0451				
D07	474341	8.0377				
D7	474341D	8.0464				
*DNQ	474341	8.0707		D10		
*DNQ	474341D	8.0812		D10	Cl 09/21/11 gau	
*DNQ	474341	8.0233		D14		
D14	474341D	8.0523		D14		
D21	474341	8.0797				
D21	474341D	8.0300				
DX	474341	8.0874				
DX	474341D	8.0642				
				gau 09/21/11		

Analyst Signature: Gay Herrera / James Mahe Date: 09/21/11

Reviewed by: DSpies Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 00148_ Book I.D. # _10-0406-057_

Analysis: ASTM_C1733 Project #: 16526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110901-7; 110830-12
Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 12 (474344) / 88 (474221) Pipette ID: 5000-✓ 1000-__ 200-__
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep:

	Sample ID	Sample Wt (g) 9/21/11 / Sample Vol (ml)	Final Volume (ml) 10/7/11			
D7	474344	8.0630	200 ml			
D7	474344D	8.0744				
D10	474344	8.0481				
D10	474344D	8.0453				
D14	474344	8.0288				
D14	474344D	8.0811				
D21	474344	8.0236				
D21	474344D	8.0710				
DX	474344	8.0986				
DX	474344D	8.0134				
D7	474221	8.0645				
D7	474221D	8.0625				
D10	474221	8.0882				
D10	474221D	8.0877				
D14	474221	8.0187				
D14	474221D	8.0018				
D21	474221	8.0294				
D21	474221D	8.0214				
DX	474221	8.0310				
DX	474221D	8.0136	↓			
			gau	09/21/11		

Analyst Signature: Jaqueline Herrera / James Mohan Date: 09/21/11
Reviewed by: [signature] Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page:_15_ 00149_ Book I.D. # _10-0406-057_

Analysis: ASTM-C1733 Project #: 116526.05.0060

Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110830-12; 110831-5

Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 12 (474222) 188 (474300) Pipette ID: 5000-✓ 1000-✓ 200-✓

Digestion Apparatus: N/A Temperature: N/A

LCS ID: N/A LCS TV = N/A

Notes / Prep:

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml) 9/21/11 10/7/11			
D7	474222	8.0372	200ml			
D7	474222D	8.0854				
D10	474222	8.0186				
D10	474222D	8.0289				
D14	474222	8.0420				
D14	474222D	8.0244				
D21	474222	8.0352				
D21	474222D	8.01065				
DX	474222	8.0959				
DX	474222D	8.0576				
D7	474300	8.0018				
D7	474300D	8.0856				
D10	474300	8.0408				
D10	474300D	8.0573				
D14	474300	8.0114				
D14	474300D	8.0452				
D21	474300	8.0704				
D21	474300D	8.0321				
DX	474300	8.0636				
DX	474300D	8.0089				
			gall 09/21/11			

Analyst Signature: Jessy Herrera / James Mota Date: 09/21/11

Reviewed by: [signature] Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 00150_ Book I.D. # _10-0406-057_

Analysis: ASTM-C1733 Project #: 116526.05.006
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110902-3
Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 88 / 12 (474401) (474402) Pipette ID: 5000-___ 1000-___ 200-___
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: *TE 09/21/11 gcm 10/17/11

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume * (ml)	
D7	474401	8.0618 ~~8.0883~~	200 nL	large rocks removed
D7	474401D	8.0297		
D10	474401	8.0187		total sample Wt (g) = 129g
D10	474401D	8.0570		
D14	474401	8.0163		
D14	474401D	8.0313		rocks removed = 29g
D21	474401	8.0398		
D21	474401D	8.0090		% rocks = $\frac{29}{129}$ = 22.5%
DX	474401	8.0715		
DX	474401D	8.0135		
D7	474402	8.0883		
D7	474402D	8.0288		
D10	474402	8.0610		
D10	474402D	8.0743		
D14	474402	8.0759		
D14	474402D	8.0188		
D21	474402	8.0226		
D21	474402D	8.0867		
DX	474402	8.0784		
DX	474402D	8.0161		
			gcm 09/21/11	

Analyst Signature: Jeremy Mahan/Judy Flerrera Date: 09/21/11
Reviewed by: [illegible] Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: _15_ 00151_ Book I.D. # _10-0406-057_

Analysis: ASTM_C1733 Project #: 116526.05.0060
Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110831-5
Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: ~~(474301)~~ 12 / ~~88 (474302)~~ * Pipette ID: 5000- ✓ 1000- ✓ 200- ✓
Digestion Apparatus: N/A Temperature: N/A
LCS ID: N/A LCS TV = N/A
Notes / Prep: * TE 09/22/11 gau

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)			
		9/21/11	10/7/11			
D7	474301	8.0840	200			
D7	474301D	8.0558				
D10	474301	8.0541				
D10	474301D	8.0288				
D14	474301	8.0587				
D14	474301D	8.0682				
D21	474301	8.0208				
D21	474301D	8.01688				
DX	474301	8.0543				
DX	474301D	8.0851				
D7	474302	8.0351				
D7	474302D	8.0585				
D10	474302	8.0272				
D10	474302D	8.0885				
D14	474302	8.0133				
D14	474302D	8.0558				
D21	474302	8.0745				
D21	474302D	8.0988				
DX	474302	8.0634				
DX	474302D	8.0457				
			gau	09/21/11	gau	

Analyst Signature: Mary Herrera Date: 09/21/11
Reviewed by: [illegible] Date: 10/13/11

Southwest Research Institute
WC Sample Prep Logbook

Book/Page: 15 00152

Book I.D. # 10-0406-057

Analysis: ASTM-C1733 Project #: 16526.05.006

Method (circle) Digestion / Distillation / Extraction / Bomb Task Order#: 110901-7

Client: Fluor B&W Portsmouth TAP#: N/A

Balance ID: 88 Pipette ID: 5000- ✓ 1000- ✓ 200- ✓

Digestion Apparatus: N/A Temperature: N/A

LCS ID: N/A LCS TV = N/A

Notes / Prep:

10/7/11

	Sample ID	Sample Wt (g) / Sample Vol (ml)	Final Volume (ml)			
D7	474340	8.0703	200ml			
D7	474340D	8.0406				
D10	474340	8.0153				
D10	474340D	8.0011				
D14	474340	8.0472				
D14	474340D	8.0795				
D21	474340	8.0630				
D21	474340D	8.0271				
DX	474340	8.0376				
DX	474340D	8.0478				

09/21/11

Analyst Signature: James Mohen Date: 09/21/11

Reviewed by: [signature] Date: 10/3/11

110033

Southwest Research Institute

Electronic Bench Sheet

% Solids

09/14/11

Project #: 16526.05.006
Client: Fluor - B&W Portsmouth LLC
Method: %solid
TO# 110825-10, 110830-12, 110831-5

Date: 09/01/11
Analyst: James Moken

Seq #	Sample ID	A Tare Wt(g)	B Wet Sample + Tare Wt(g)	(B - A) Wet Sample Wt(g)	C Dried Sample + Tare Wt(g)	(C - A) Dried Sample Wt(g)	% Solids	RPD
1	PB1	0.9611	0.9611	0.0000	0.9610	-0.0001	<0.05	
2	473754	0.9823	6.8311	5.8688	5.3388	4.3765	74.57	
3	473754D	0.9598	6.7724	5.8126	5.2845	4.3247	74.40	0.228%
4	473755	0.9801	6.8844	5.9339	5.1459	4.1858	70.54	
5	473756	0.9654	6.7583	5.7934	5.9091	4.9437	85.33	
6	473757	0.9629	6.8881	5.9252	5.7378	4.7749	80.59	
7	473758	0.9630	6.5646	5.6016	5.5092	4.5462	81.16	
8	473760	0.9612	6.9096	5.9484	5.8694	4.9082	82.51	
9	473763	0.9613	6.4828	5.5215	5.3054	4.3441	78.68	
10	473770	0.9589	6.3777	5.4188	5.6575	4.6986	86.71	
11	473771	0.9557	6.6900	5.7343	5.8116	4.8559	84.68	
12	PB2	0.9571	0.9571	0.0000	0.9571	0.0000	<0.05	
13	473772	0.9575	6.8693	5.9118	6.0142	5.0567	85.54	
14	473776	0.9633	6.6260	5.6627	5.6551	4.6918	82.85	
15	474212	0.9640	6.8165	5.8525	6.2547	5.2907	90.40	
16	474212D	0.9590	6.9142	5.9552	6.3621	5.4031	90.73	0.363%
17	474213	1.0153	6.7501	5.7348	6.0538	5.0385	87.86	
18	474214	1.0149	6.6879	5.6733	6.0996	5.0850	89.63	
19	474221	1.0068	6.5495	5.5427	5.4183	4.4115	79.59	
20	474222	1.0063	6.6579	5.6516	5.5944	4.5881	81.18	
21	474300	0.9971	6.3794	5.3823	5.7209	4.7238	87.77	
22	474301	0.9639	6.3362	5.3763	5.5632	4.6033	85.62	
23	PB3	1.0439	1.0439	0.0000	1.0437	-0.0002	<0.05	
24	474302	1.0182	6.7701	5.7519	5.9726	4.9544	86.14	

% Solids = Dried Sample Wt(g)*100 / Wet Sample Wt(g)

Sample Calculation: 473754

$$\frac{4.37659}{5.86889} \times 100 = 74.57\%$$

0110034

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid
Client: Fluor B&W Portsmouth
Project# 165226.05.006
TO# 110825-10, 110830-12, 110831-5

LCS Info: N/A TV= N/A Balance#: 88
Notes: in oven # 31 12:00 9/1/11
out oven # 31 7:00 9/2/11

Sample ID	tare wt (g)	tare + sump (g)	dried + tare (g)
PB	0.9611	0.9611	0.9610
473754	0.9623	6.8311	5.3388
473754D	0.9598	6.7724	5.2845
473755	0.9601	6.8940	5.1459
473756	0.9654	6.7588	5.9091
473757	0.9629	6.8881	5.7378
473758	0.9630	6.5646	5.5092
473768	0.9612	6.9096	5.8694
473769	0.9628*	6.4828	5.3054
473770	0.9689	6.3777	5.6575
473771	0.9557	6.6900	5.8116
PB2	0.9571	0.9571	0.9571
473772	0.9575	6.8693	6.0142
473778	0.9633	6.6260	5.6551
474212	0.9640	6.8165	6.2547
474212D	0.9590	6.9142	6.3621
474213	1.0153	6.7501	6.0538
474214	1.0146	6.6879	6.0996
474221	1.0068	6.5495	5.4183

JAM 9/3/11

Calculation: *TE JAM 9/1/11

Analyst Signature: James Mahen Date: 9/1/11
Reviewed by: Julian Herrera Date: 09/14/11
Logbook #/Page # 10 153

010035

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid
Client: Fluor B&W Portsmouth

Project# 16526.05.006
TO# 11825-10, 110830-12, 110831-5

LCS Info: N/A TV= N/A
Balance#: 88
Notes: in oven #31 12:00 9/1/11
out oven #31 7:00 9/2/11

Sample ID	tare wt (g)	samp + tare (g)	dried + tare (g)		
474272	1.0063	6.6579	5.5944		
474300	0.9971	6.3794	5.7209		
474301	0.9599	6.3362	5.5632		
PB3	1.0439	1.0439	1.0437		
474302	1.0182	6.7701	5.9726		

JAM 9/2/11

Calculation:

Analyst Signature: James Mahon Date: 9/1/11
Reviewed by: Lucy Llerena Date: 09/14/11
Logbook #/ Page # 10 154

010036

Jacqueline Rivera 10/31/11

Southwest Research Institute

Electronic Bench Sheet

% Solids

Jacqueline Rivera 09/14/11

Project #: 16526.05.006
Client: Fluor - B&W Portsmouth LLC
Method: %solid
TO# 110902-3, 110901-7, ~~110613-4~~ 110915-9

Date: 09/12/11
Analyst: James Moken JM

(C) 10/27/11 mn

Seq #	Sample ID	A Tare Wt(g)	B Wet Sample + Tare Wt(g)	(B - A) Wet Sample Wt(g)	C Dried Sample + Tare Wt(g)	(C - A) Dried Sample Wt(g)	% Solids	RPD
1	PB	0.9699	0.9699	0.0000	0.9698	-0.0001	<0.05	
2	473045	0.9804	4.8778	3.8974	4.3486	3.3682	86.42	
3	474401	0.9825	4.0451	3.0626	3.8466	2.8641	93.52	
4	474401D	0.9804	4.0037	3.0233	3.7929	2.8125	93.03	0.527%
5	474402	0.9559	3.7876	2.8317	3.4167	2.4608	86.90	
6	474341	1.0125	3.6139	2.6014	3.4489	2.4364	93.66	
7	474344	1.0169	3.6565	2.6396	3.4128	2.3959	90.77	
8	474340	0.9864	3.6943	2.7079	3.3926	2.4062	88.86	

% Solids = Dried Sample Wt(g)*100 / Wet Sample Wt(g)

Sample Calculation: 473045

$$\frac{3.36829}{3.8974g} \times 100 = 86.42\ \%$$

Southwest Research Institute®
Logbook: Physical Testing

Analysis / Method: % Solid Project# 16526.05.006

Client: Fluor B&W Portsmouth TO# 110902-3 110901-7 110902-4 110915-9

@ 10/27/11 mm

LCS Info: N/A TV= N/A Balance#: 12

Notes: in oven #31 14:15 9/12/11

out oven #31 8:15 9/13/11

Sample ID	tare wt (g)	samp + tare (g)	dried + tare (g)		
PB	0.9699	0.9699	0.9698		
473045	0.9804	4.8778	4.3486		
474401	0.9825	4.0451	3.8466		
474401D	0.9804	4.0037	3.7929		
474402	0.9559	3.7876	3.4167		
474341	1.0125	3.6139	3.4489		
474344	1.0169	3.6565	3.4128		
474340	0.9864	3.6943	3.3926		

Calculation:

Analyst Signature: Jumoa Mohen Date: 9/12/11

Reviewed by: Jay Clemena Date: 09/13/11

Logbook # / Page # 10 156

010038

Tc99 Data for Distribution Coefficient

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-222
Prep Date: 17-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

WAN √WR

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK17JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK17JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK17JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-0	0.10	50.0	0.00200	25.0	0.050	20.00		
Blank-7	0.10	50.0	0.00200	50.0	0.100	10.00		
474212	0.10	50.0	0.00200	50.0	0.100	10.00		
474212D	0.10	50.0	0.00200	50.0	0.100	10.00		
474213	0.10	50.0	0.00200	50.0	0.100	10.00		
474213D	0.10	50.0	0.00200	50.0	0.100	10.00		
474214	0.10	50.0	0.00200	50.0	0.100	10.00		
474214D	0.10	50.0	0.00200	50.0	0.100	10.00		
474221	0.10	50.0	0.00200	50.0	0.100	10.00		
474221D	0.10	50.0	0.00200	50.0	0.100	10.00		
474222	0.10	50.0	0.00200	50.0	0.100	10.00		
474222D	0.10	50.0	0.00200	50.0	0.100	10.00		
474300	0.10	50.0	0.00200	50.0	0.100	10.00		
474300D	0.10	50.0	0.00200	50.0	0.100	10.00		
474301	0.10	50.0	0.00200	50.0	0.100	10.00		
474301D	0.10	50.0	0.00200	50.0	0.100	10.00		
474302	0.10	50.0	0.00200	50.0	0.100	10.00		
474302D	0.10	50.0	0.00200	50.0	0.100	10.00		
474340	0.10	50.0	0.00200	50.0	0.100	10.00		
474340D	0.10	50.0	0.00200	50.0	0.100	10.00		
474341	0.10	50.0	0.00200	50.0	0.100	10.00		
474341D	0.10	50.0	0.00200	50.0	0.100	10.00		
474344	0.10	50.0	0.00200	50.0	0.100	10.00		
474344D	0.10	50.0	0.00200	50.0	0.100	10.00		
474401	0.10	50.0	0.00200	50.0	0.100	10.00		
474401D	0.10	50.0	0.00200	50.0	0.100	10.00		
474402	0.10	50.0	0.00200	50.0	0.100	10.00		
474402D	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010039

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-222
Prep Date: 17-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	338.67	15.41	8.32	15.66	98.40	
BKG-2	Tc-99	Water	60	317.87	15.30	8.27	15.69	97.52	
				AVG BKG	15.36	AVG BKG	15.67		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK17JV1	Tc-99	Water	60	357.00	14.98	8.42	-0.38	98.79		-1.71E+00	3.24E+00	1.10E+01	3.24E+00		PB < 1.65*TPU	
LCSWK17JV1	Tc-99	Water	60	352.80	1108.33	0.78	1107.37	98.70		4.99E+03	2.88E+02	1.10E+01	1.98E+01	5000	99.8%	-0.002
LCSWK17JV2	Tc-99	Water	60	338.32	1104.22	0.78	1106.80	98.38		4.99E+03	2.88E+02	1.10E+01	1.98E+01	5000	99.7%	-0.003
Blank-0	Tc-99	Water	60	357.20	101.17	2.68	86.87	98.79		7.83E+02	4.69E+01	2.19E+01	1.27E+01			
Blank-7	Tc-99	Water	60	337.64	182.36	1.96	169.81	98.35		7.65E+02	4.49E+01	1.10E+01	8.31E+00			
474212	Tc-99	Water	60	338.81	163.11	2.07	150.16	98.40		6.76E+02	3.98E+01	1.10E+01	7.90E+00	RPD	Dup Evaluation	
474212D	Tc-99	Water	60	362.83	163.88	2.07	150.16	98.91		6.76E+02	3.98E+01	1.09E+01	7.87E+00	0.00	0.00	Pass
474213	Tc-99	Water	60	358.92	166.07	2.06	152.50	98.83		6.87E+02	4.04E+01	1.09E+01	7.93E+00	RPD	Dup Evaluation	
474213D	Tc-99	Water	60	347.45	160.35	2.09	147.07	98.59		6.62E+02	3.90E+01	1.10E+01	7.82E+00	3.63	0.44	Pass
474214	Tc-99	Water	60	365.65	158.99	2.10	145.13	98.97		6.54E+02	3.85E+01	1.09E+01	7.76E+00	RPD	Dup Evaluation	
474214D	Tc-99	Water	60	366.74	159.65	2.10	145.77	98.99		6.57E+02	3.87E+01	1.09E+01	7.77E+00	0.44	0.05	Pass
474221	Tc-99	Water	60	331.94	159.96	2.10	147.39	98.11		6.64E+02	3.91E+01	1.10E+01	7.85E+00	RPD	Dup Evaluation	
474221D	Tc-99	Water	60	343.14	164.78	2.06	151.69	98.51		6.83E+02	4.02E+01	1.10E+01	7.92E+00	2.87	0.35	Pass
474222	Tc-99	Water	60	323.31	165.19	2.06	153.28	97.75		6.90E+02	4.06E+01	1.11E+01	7.99E+00	RPD	Dup Evaluation	
474222D	Tc-99	Water	60	345.44	167.55	2.05	154.43	98.55		6.96E+02	4.09E+01	1.10E+01	7.98E+00	0.75	0.09	Pass
474300	Tc-99	Water	60	353.27	161.05	2.09	147.60	98.71		6.65E+02	3.91E+01	1.10E+01	7.82E+00	RPD	Dup Evaluation	
474300D	Tc-99	Water	60	314.53	159.48	2.10	148.00	97.38		6.67E+02	3.92E+01	1.11E+01	7.90E+00	0.27	0.03	Pass
474301	Tc-99	Water	60	349.56	159.76	2.10	146.40	98.64		6.59E+02	3.88E+01	1.10E+01	7.80E+00	RPD	Dup Evaluation	
474301D	Tc-99	Water	60	349.98	161.66	2.09	148.31	98.65		6.68E+02	3.93E+01	1.10E+01	7.84E+00	1.30	0.16	Pass
474302	Tc-99	Water	60	351.00	159.33	2.10	145.92	98.67		6.57E+02	3.87E+01	1.10E+01	7.79E+00	RPD	Dup Evaluation	
474302D	Tc-99	Water	60	357.61	160.17	2.10	146.57	98.80		6.60E+02	3.89E+01	1.10E+01	7.80E+00	0.45	0.05	Pass
474340	Tc-99	Water	60	333.51	153.85	2.14	141.06	98.18		6.35E+02	3.74E+01	1.10E+01	7.70E+00	RPD	Dup Evaluation	
474340D	Tc-99	Water	60	332.01	155.29	2.13	142.62	98.12		6.42E+02	3.78E+01	1.10E+01	7.74E+00	1.10	0.13	Pass
474341	Tc-99	Water	60	349.48	162.00	2.08	148.67	98.64		6.70E+02	3.94E+01	1.10E+01	7.85E+00	RPD	Dup Evaluation	
474341D	Tc-99	Water	60	365.41	163.08	2.08	149.28	98.96		6.72E+02	3.96E+01	1.09E+01	7.85E+00	0.41	0.05	Pass
474344	Tc-99	Water	60	358.76	163.84	2.07	150.24	98.83		6.77E+02	3.98E+01	1.09E+01	7.88E+00	RPD	Dup Evaluation	
474344D	Tc-99	Water	60	341.54	162.45	2.08	149.38	98.47		6.73E+02	3.96E+01	1.10E+01	7.87E+00	0.58	0.07	Pass
474401	Tc-99	Water	60	341.16	157.77	2.11	144.64	98.46		6.52E+02	3.84E+01	1.10E+01	7.77E+00	RPD	Dup Evaluation	
474401D	Tc-99	Water	60	347.82	161.10	2.09	147.81	98.60		6.66E+02	3.92E+01	1.10E+01	7.83E+00	2.17	0.26	Pass
474402	Tc-99	Water	60	370.26	163.73	2.07	149.89	98.99		6.75E+02	3.97E+01	1.09E+01	7.86E+00	RPD	Dup Evaluation	
474402D	Tc-99	Water	60	361.74	162.95	2.08	149.25	98.89		6.72E+02	3.96E+01	1.09E+01	7.85E+00	0.43	0.05	Pass

Notes: Day #7 results.

010040

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-222
Prep Date: 17-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

0100041

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111021_1202\Replay_20111024_092933
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111021_1202\20111021_1202.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
   Quench Indicator: tSIE/AEC
   External Std Terminator (sec): 10 sec
   Pre-Count Delay (min): 0.00
Quench Set:
   Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B+W Portsmouth
165226.05.00X
TO# 110830-12, 110831-5, 110901-7, 110902-3
12-222, 12-223
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

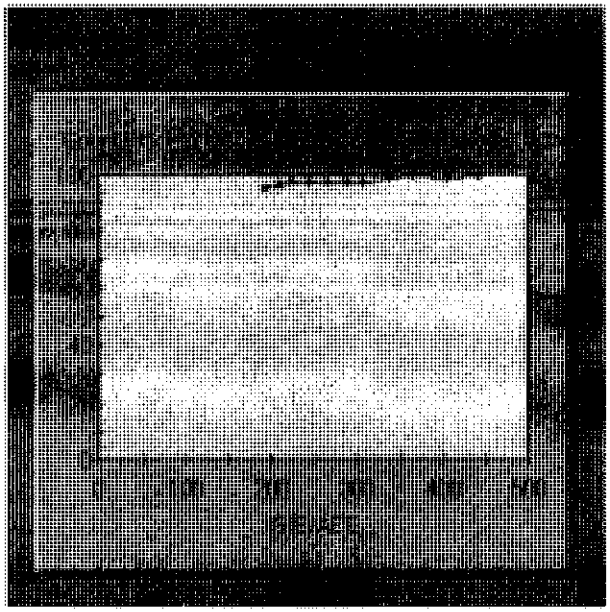
010042

MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 14.18 Date Processed: 10/21/2011 12:01:24 PM
14C Chi Square: 13.00 Date Processed: 10/21/2011 12:01:24 PM
3H E^2/B (1-18.6 keV): 1526.90 Date Processed: 10/21/2011 12:01:24 PM
14C E^2/B (4-156 keV): 5527.44 Date Processed: 10/21/2011 12:01:24 PM
3H Efficiency (1-18.6 keV): 64.55 Date Processed: 10/21/2011 12:01:24 PM
14C Efficiency (4-156 keV): 92.56 Date Processed: 10/21/2011 12:01:24 PM
IPA Background Date Processed: 10/21/2011 12:01:24 PM
3H Background CPM (1-18.6 keV): 2.73 Date Processed: 10/21/2011 12:01:24 PM
14C Background CPM (4-156 keV): 1.55 Date Processed: 10/21/2011 12:01:24 PM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data



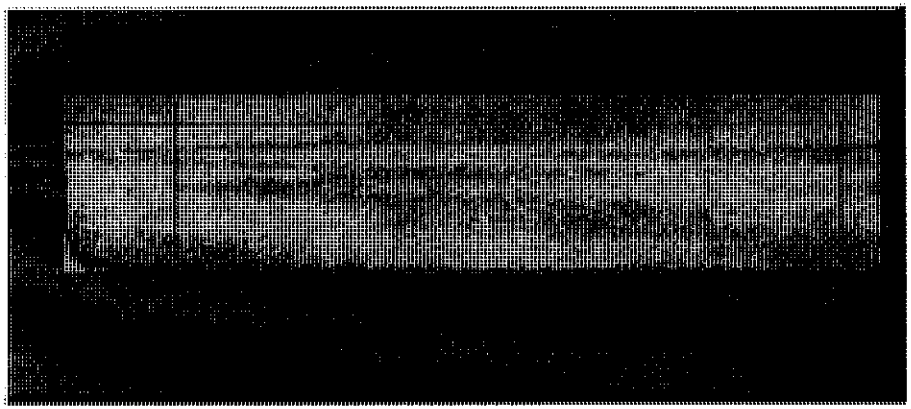
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nucl In A									
1	5	1	60.00	Bkg-1	15.41	16	449.24	338.67		8.32	0:00:02	16
10/21/2011			12:03:43 PM 98.40									

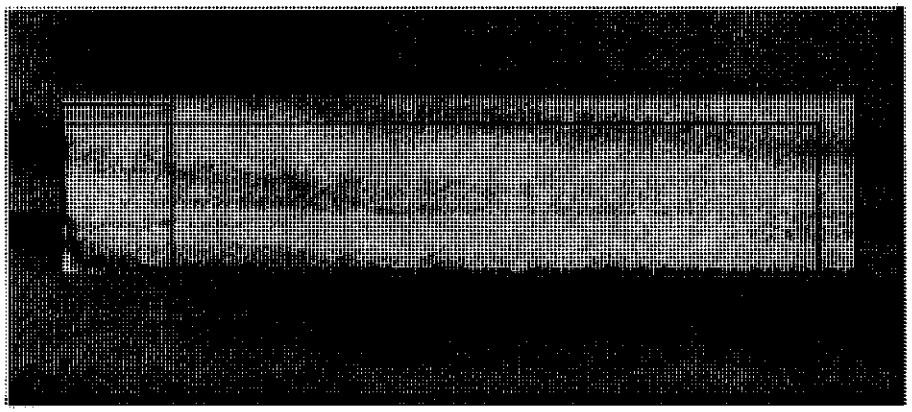
0100044

SpectraView Block Data



2	5	1	60.00		Bkg-2	15.30	16	470.50	317.87	8.27	0:00:03	15
10/21/2011	1:05:14 PM		97.52									

SpectraView Block Data

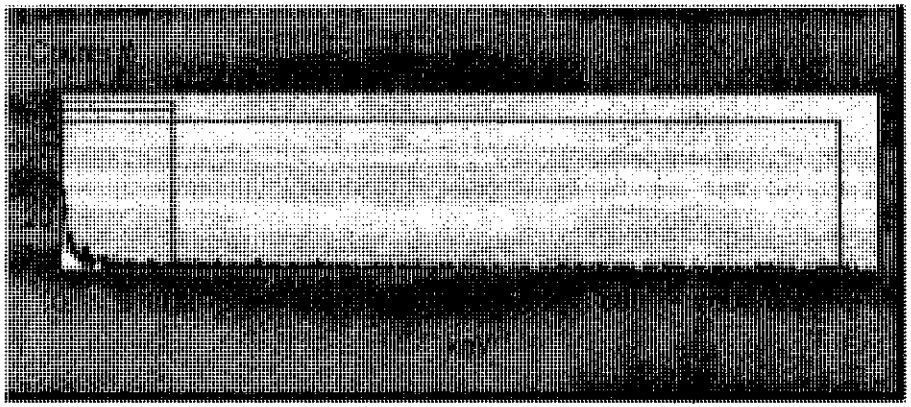


Missing vial 3.

4	5	1	60.00		PBWK17JV1	14.98	15	476.34	357.00	8.42	0:00:04	16
10/21/2011	2:06:44 PM		98.79									

010045

SpectraView Block Data

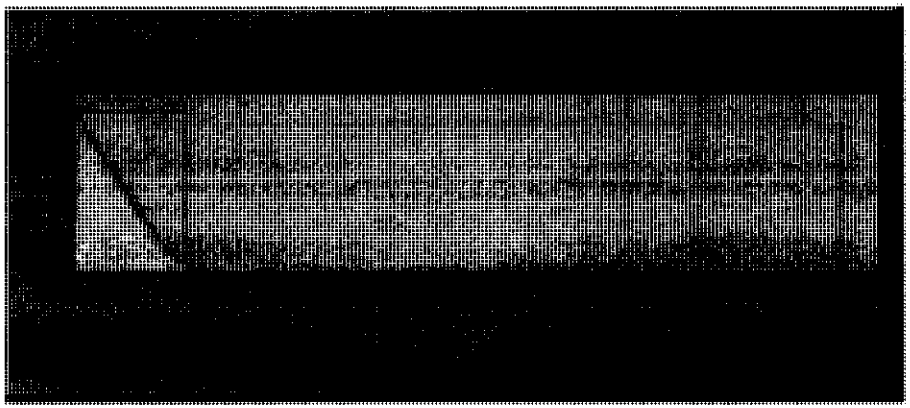


5	5	1	60.00	LCSWK17JV1	1108.33	1123	134.26	352.80		0.78	0:00:06	0
10/21/2011	3:08:14 PM		98.70									

SpectraView Block Data

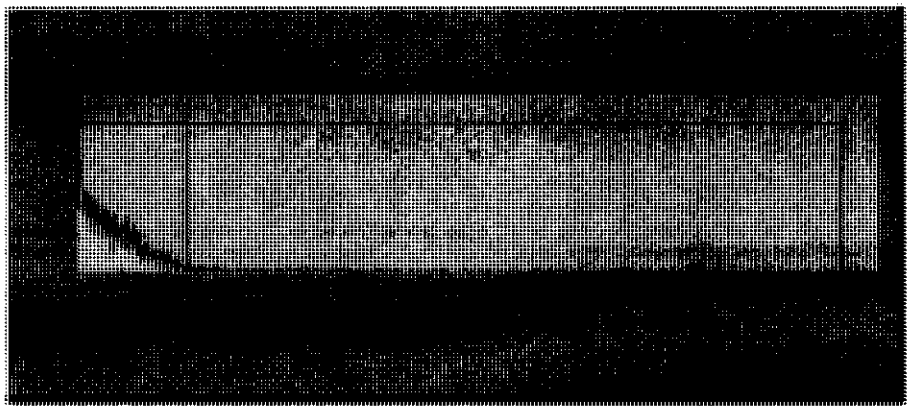
6	5	1	60.00	LCSWK17JV2	1104.22	1122	133.43	338.32		0.78	0:00:07	0
10/21/2011	4:09:54 PM		98.38									

SpectraView Block Data



7	5	1	60.00	Blank Day 0	101.17	102	219.65	357.20		2.68	0:00:08	4
10/21/2011	5:11:27 PM		98.79									

SpectraView Block Data

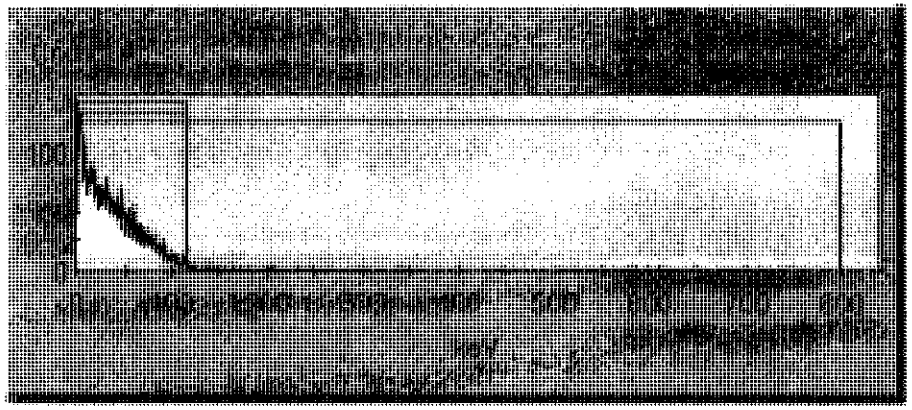


8	5	1	60.00	Blank Day 7	182.36	185	176.77	337.64		1.96	0:00:09	2
10/21/2011	6:12:57 PM		98.35									

SpectraView Block Data

9	5	1	60.00	474212-7	163.11	166	185.05	338.81		2.07	0:00:10	2
10/21/2011	7:14:27 PM		98.40									

SpectraView Block Data

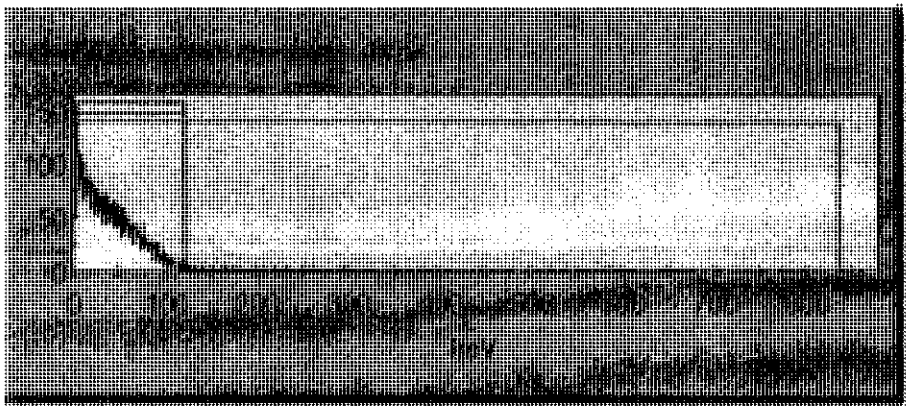


10	5	1	60.00	474212D-7	163.88	166	178.45	362.83		2.07	0:00:12	3
10/21/2011	8:15:58 PM		98.91									

SpectraView Block Data

11	5	1	60.00	474213-7	166.07	168	184.33	358.92		2.06	0:00:13	3
10/21/2011	9:17:29 PM		98.83									

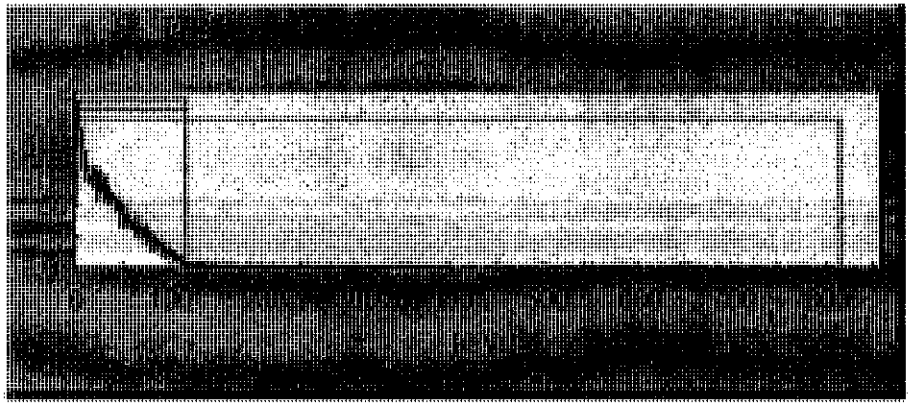
SpectraView Block Data



12	5	1	60.00	474213D-7	160.35	163	180.42	347.45		2.09	0:00:14	2
10/21/2011	10:19:00 PM		98.59									

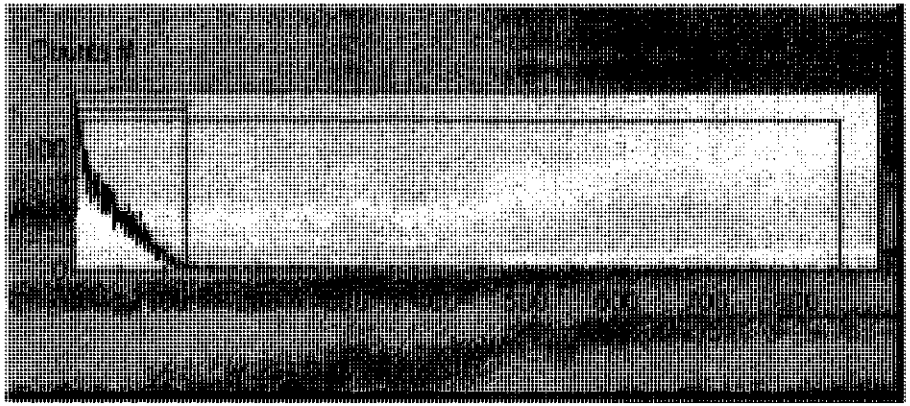
SpectraView Block Data

010049



13	5	2	60.00	474214-7	158.99	161	181.51	365.65		2.10	0:00:15	3
10/21/2011	11:20:36 PM			98.97								

SpectraView Block Data



14	5	2	60.00	474214D-7	159.65	161	179.08	366.74		2.10	0:00:16	3
10/22/2011	12:22:07 AM			98.99								

SpectraView Block Data

010050

15	5	2	60.00	474221-7	159.96	163	176.94	331.94		2.10	0:00:17	3
10/22/2011	1:23:37 AM		98.11									

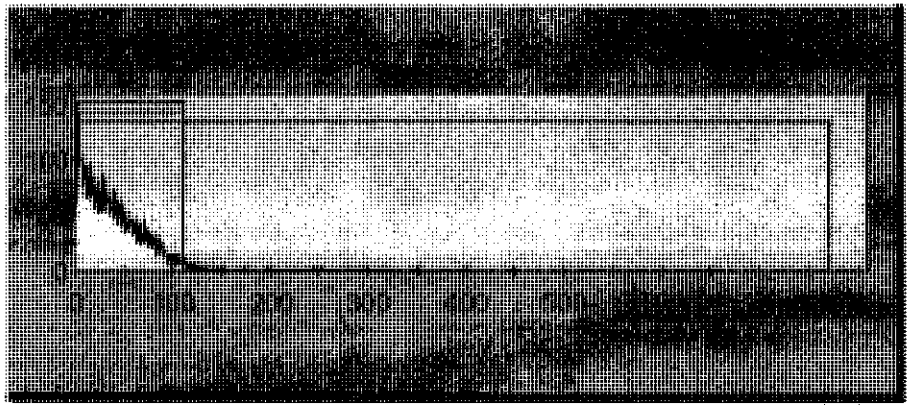
SpectraView Block Data

16	5	2	60.00	474221D-7	164.78	167	180.11	343.14		2.06	0:00:18	2
10/22/2011	2:25:08 AM		98.51									

SpectraView Block Data

17	5	2	60.00	474222-7	165.19	169	174.15	323.31		2.06	0:00:20	3
10/22/2011	3:26:40 AM		97.75									

SpectraView Block Data



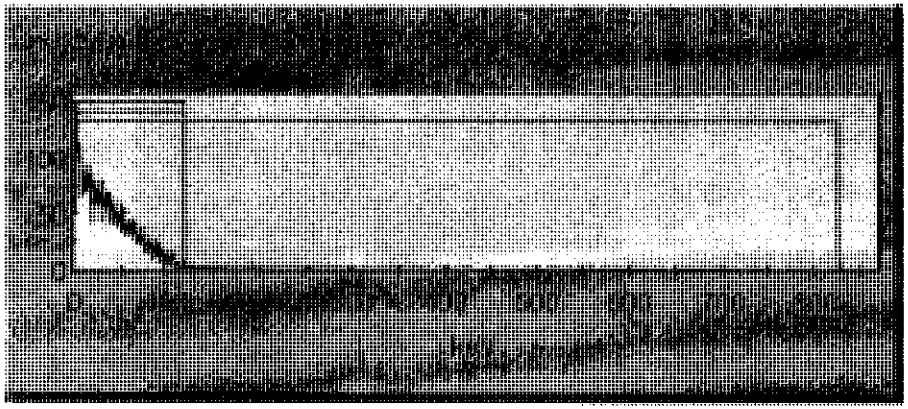
18	5	2	60.00	474222D-7	167.55	170	174.93	345.44		2.05	0:00:21	2
10/22/2011	4:28:11 AM		98.55									

SpectraView Block Data

010052

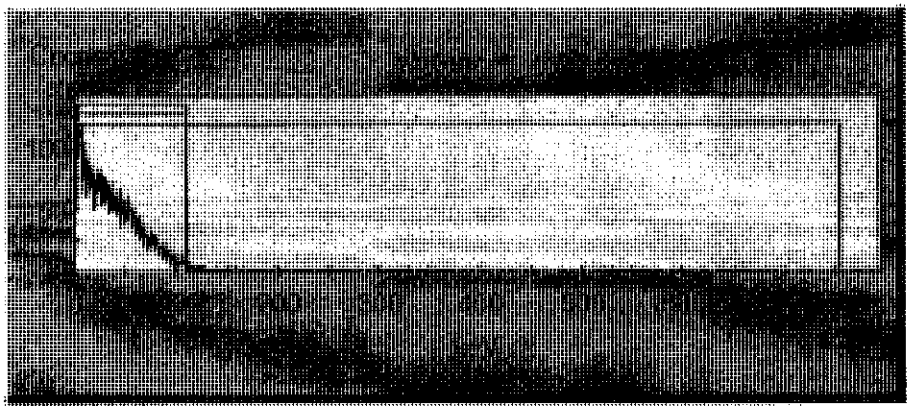
19	5	2	60.00	474300-7	161.05	163	177.48	353.27		2.09	0:00:22	3
10/22/2011	5:29:41 AM		98.71									

SpectraView Block Data



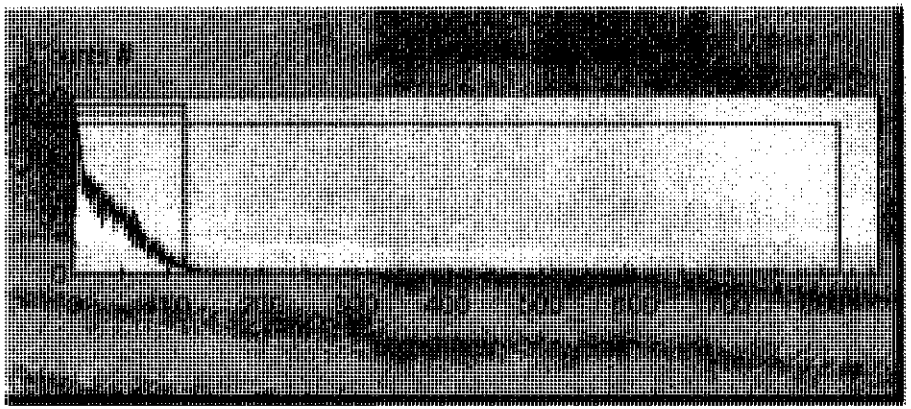
20	5	2	60.00	474300D-7	159.48	164	167.40	314.53		2.10	0:00:23	3
10/22/2011	6:31:13 AM		97.38									

SpectraView Block Data



21	5	2	60.00	474301-7	159.76	162	189.06	349.56		2.10	0:00:24	3
10/22/2011	7:32:44 AM		98.64									

SpectraView Block Data



22	5	2	60.00	474301D-7	161.66	164	188.39	349.98		2.09	0:00:25	3
10/22/2011	8:34:16 AM		98.65									

SpectraView Block Data

010054

23	5	2	60.00	474302-7	159.33	161	180.65	351.00		2.10	0:00:26	3
10/22/2011	9:35:47 AM		98.67									

SpectraView Block Data

24	5	2	60.00	474302D-7	160.17	162	181.44	357.61		2.10	0:00:28	3
10/22/2011	10:37:18 AM		98.80									

SpectraView Block Data

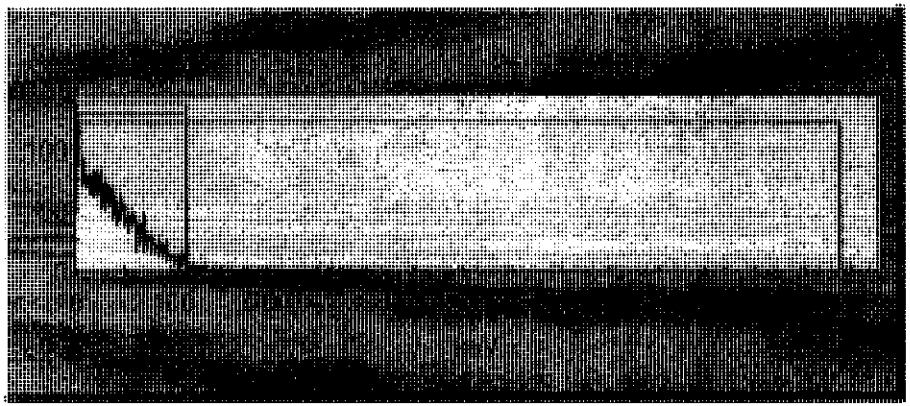
010055

25	5	6	60.00	474340-7	153.85	157	178.13	333.51		2.14	0:00:29	3
10/22/2011	11:38:54 AM			98.18								

SpectraView Block Data

26	5	6	60.00	474340D-7	155.29	158	177.72	332.01		2.13	0:00:30	3
10/22/2011	12:40:25 PM			98.12								

SpectraView Block Data



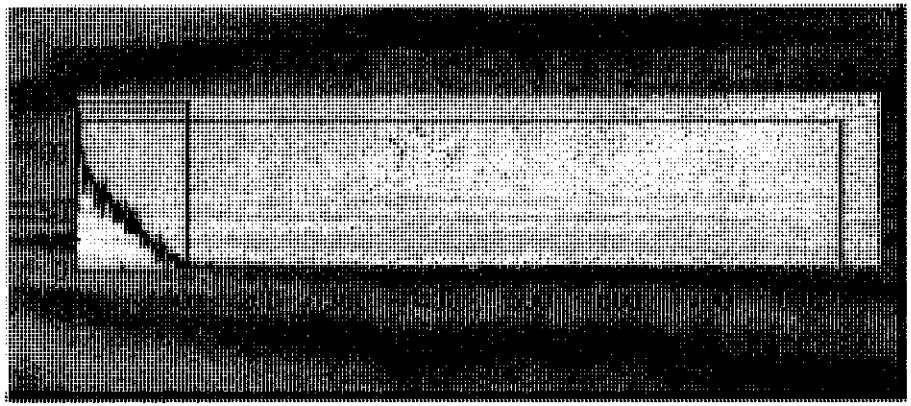
27	5	6	60.00	474341-7	162.00	164	186.74	349.48		2.08	0:00:31	3
10/22/2011	1:41:56 PM		98.64									

SpectraView Block Data

28	5	6	60.00	474341D-7	163.08	165	185.52	365.41		2.08	0:00:32	3
10/22/2011	2:43:28 PM		98.96									

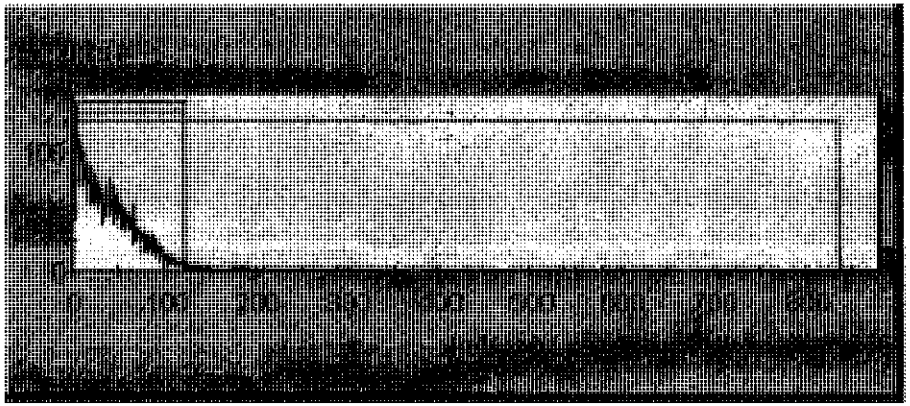
SpectraView Block Data

010057



29	5	6	60.00	474344-7	163.84	166	182.68	358.76		2.07	0:00:33	2
10/22/2011	3:44:59 PM		98.83									

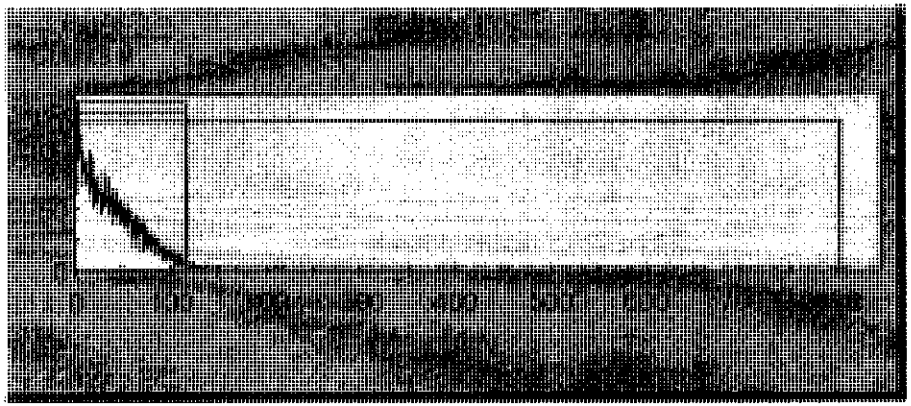
SpectraView Block Data



30	5	6	60.00	474344D-7	162.45	165	175.15	341.54		2.08	0:00:34	3
10/22/2011	4:46:28 PM		98.47									

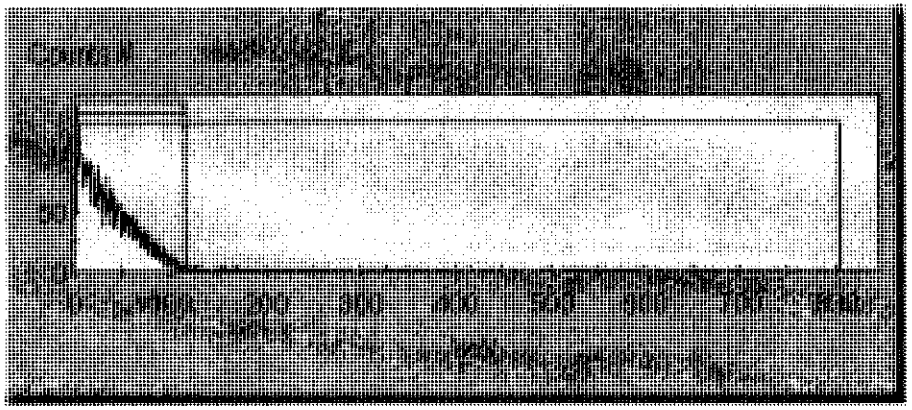
SpectraView Block Data

0100538



31	5	6	60.00	474401-7	157.77	160	173.06	341.16		2.11	0:00:35	3
10/22/2011	5:47:59 PM		98.46									

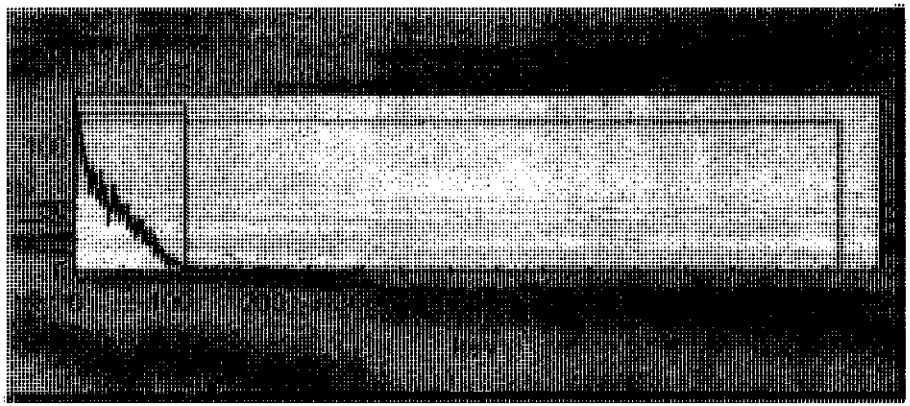
SpectraView Block Data



32	5	6	60.00	47401D-7	161.10	163	176.55	347.82		2.09	0:00:36	3
10/22/2011	6:49:29 PM		98.60									

SpectraView Block Data

010059



33 5 6 60.00 47402-7 163.73 165 189.78 370.26 2.07 0:00:38 3
10/22/2011 7:51:00 PM 98.99

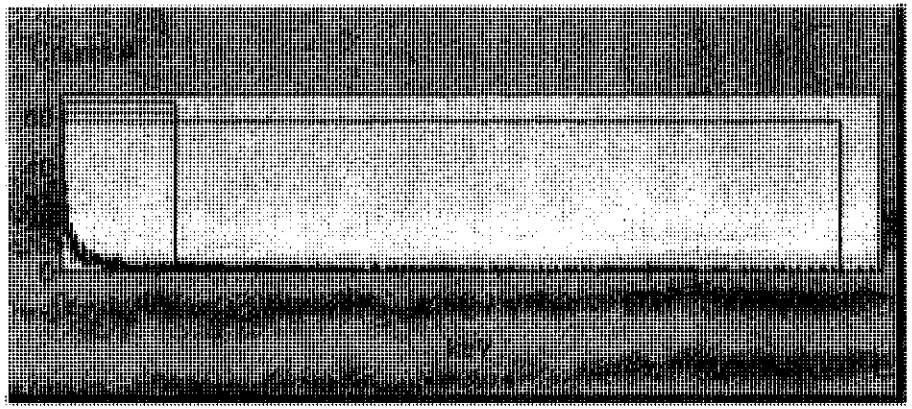
SpectraView Block Data

34 5 6 60.00 47402D-7 162.95 165 177.94 361.74 2.08 0:00:39 2
10/22/2011 8:52:30 PM 98.89

SpectraView Block Data

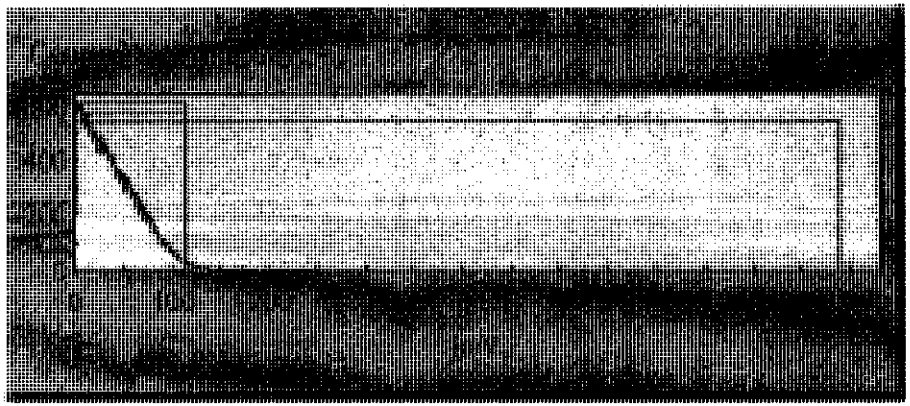
35 5 6 60.00 PBWK18JV1 14.38 15 450.57 338.64 8.66 0:00:40 17
10/22/2011 9:54:02 PM 98.39

SpectraView Block Data



36 5 6 60.00 LCSWK18JV1 1099.23 1120 132.30 333.37 0.78 0:00:41 0
10/22/2011 10:55:32 PM 98.17

SpectraView Block Data



37	5	14	60.00	LCSWK18JV2	1116.67	1135	134.37	337.83	0.78	0:00:42	0
10/22/2011	11:57:10 PM		98.36								

SpectraView Block Data

38	5	14	60.00	Blank Day-10	178.25	181	175.36	353.33	1.98	0:00:43	2
10/23/2011	12:58:47 AM		98.71								
39	5	14	60.00	474212-10	161.13	163	181.26	346.30	2.09	0:00:43	3
10/23/2011	2:00:16 AM		98.57								
40	5	14	60.00	474212D-10	160.46	163	186.45	342.10	2.09	0:00:44	3
10/23/2011	3:01:47 AM		98.48								

010062

41	5	14	60.00	472213-10	167.49	170	178.43	350.33	2.05	0:00:44	2
10/23/2011	4:03:17 AM			98.65							
42	5	14	60.00	474213D-10	159.94	163	179.48	337.68	2.10	0:00:44	3
10/23/2011	5:04:47 AM			98.35							
43	5	14	60.00	474214-10	161.42	164	188.93	341.24	2.09	0:00:44	3
10/23/2011	6:06:17 AM			98.47							
44	5	14	60.00	474214D-10	157.97	161	184.84	334.24	2.11	0:00:44	3
10/23/2011	7:07:45 AM			98.21							
45	5	14	60.00	474221-10	159.91	162	168.90	345.54	2.10	0:00:45	3
10/23/2011	8:09:14 AM			98.55							
46	5	14	60.00	474221D-10	161.71	165	179.83	329.58	2.09	0:00:45	3
10/23/2011	9:10:43 AM			98.01							
47	5	14	60.00	474222-10	160.55	163	181.23	351.56	2.09	0:00:45	3
10/23/2011	10:12:12 AM			98.68							
48	5	14	60.00	474222D-10	158.01	162	177.00	317.87	2.11	0:00:45	3
10/23/2011	11:13:43 AM			97.52							
49	5	19	60.00	474300-10	158.53	162	184.43	332.98	2.11	0:00:45	3
10/23/2011	12:15:19 PM			98.16							
50	5	19	60.00	474300D-10	158.65	161	180.30	339.93	2.11	0:00:46	3
10/23/2011	1:16:48 PM			98.44							
51	5	19	60.00	474301-10	162.84	165	183.34	357.10	2.08	0:00:46	3
10/23/2011	2:18:18 PM			98.79							
52	5	19	60.00	474301D-10	158.85	163	173.83	301.18	2.10	0:00:46	3
10/23/2011	3:19:49 PM			97.28							
53	5	19	60.00	474302-10	157.57	160	187.32	345.91	2.12	0:00:46	3
10/23/2011	4:21:18 PM			98.56							
54	5	19	60.00	474302D-10	159.70	162	181.62	344.59	2.10	0:00:47	3
10/23/2011	5:22:47 PM			98.53							
55	5	19	60.00	474340-10	156.84	159	177.76	340.06	2.12	0:00:47	3
10/23/2011	6:24:17 PM			98.44							
56	5	19	60.00	474340D-10	154.38	157	186.89	334.09	2.14	0:00:47	3
10/23/2011	7:25:47 PM			98.20							
57	5	19	60.00	474341-10	166.96	169	181.99	350.98	2.05	0:00:47	3
10/23/2011	8:27:17 PM			98.67							
58	5	19	60.00	474341D-10	159.88	163	180.17	336.45	2.10	0:00:47	3
10/23/2011	9:28:47 PM			98.30							
59	5	19	60.00	474344-10	161.63	164	182.87	354.63	2.09	0:00:48	3
10/23/2011	10:30:15 PM			98.74							
60	5	19	60.00	474344D-10	163.27	165	184.48	360.81	2.08	0:00:48	3
10/23/2011	11:31:45 PM			98.87							
61	5	7	60.00	474401-10	159.98	162	176.37	344.73	2.10	0:00:48	3
10/24/2011	12:33:21 AM			98.54							
62	5	7	60.00	474401D-10	162.16	166	170.05	318.93	2.08	0:00:48	3
10/24/2011	1:34:50 AM			97.57							
63	5	7	60.00	474402-10	159.97	162	179.39	346.11	2.10	0:00:49	3
10/24/2011	2:36:21 AM			98.57							

64	5	7	60.00	474402D-10	156.67	159	178.80	354.01		2.12	0:00:49	3
10/24/2011	3:37:50 AM			98.73								

010094

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-223
Prep Date: 18-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK18JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK18JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK18JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-10	0.10	50.0	0.00200	50.0	0.100	10.00		
474212	0.10	50.0	0.00200	50.0	0.100	10.00		
474212D	0.10	50.0	0.00200	50.0	0.100	10.00		
474213	0.10	50.0	0.00200	50.0	0.100	10.00		
474213D	0.10	50.0	0.00200	50.0	0.100	10.00		
474214	0.10	50.0	0.00200	50.0	0.100	10.00		
474214D	0.10	50.0	0.00200	50.0	0.100	10.00		
474221	0.10	50.0	0.00200	50.0	0.100	10.00		
474221D	0.10	50.0	0.00200	50.0	0.100	10.00		
474222	0.10	50.0	0.00200	50.0	0.100	10.00		
474222D	0.10	50.0	0.00200	50.0	0.100	10.00		
474300	0.10	50.0	0.00200	50.0	0.100	10.00		
474300D	0.10	50.0	0.00200	50.0	0.100	10.00		
474301	0.10	50.0	0.00200	50.0	0.100	10.00		
474301D	0.10	50.0	0.00200	50.0	0.100	10.00		
474302	0.10	50.0	0.00200	50.0	0.100	10.00		
474302D	0.10	50.0	0.00200	50.0	0.100	10.00		
474340	0.10	50.0	0.00200	50.0	0.100	10.00		
474340D	0.10	50.0	0.00200	50.0	0.100	10.00		
474341	0.10	50.0	0.00200	50.0	0.100	10.00		
474341D	0.10	50.0	0.00200	50.0	0.100	10.00		
474344	0.10	50.0	0.00200	50.0	0.100	10.00		
474344D	0.10	50.0	0.00200	50.0	0.100	10.00		
474401	0.10	50.0	0.00200	50.0	0.100	10.00		
474401D	0.10	50.0	0.00200	50.0	0.100	10.00		
474402	0.10	50.0	0.00200	50.0	0.100	10.00		
474402D	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010065

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-223
Prep Date: 18-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	338.67	15.41	8.32	15.66	98.40	
BKG-2	Tc-99	Water	60	317.87	15.30	8.27	15.69	97.52	
				AVG BKG	15.36	AVG BKG	15.67		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK18JV1	Tc-99	Water	60	338.64	14.38	8.66	-0.99	98.39		-4.46E+00	3.23E+00	1.10E+01	3.22E+00		PB < 1.65*TPU	
LCSWK18JV1	Tc-99	Water	60	333.37	1099.23	0.78	1104.08	98.17		4.97E+03	2.87E+02	1.10E+01	1.98E+01	5000	99.5%	-0.005
LCSWK18JV2	Tc-99	Water	60	337.83	1116.67	0.78	1119.68	98.36		5.04E+03	2.92E+02	1.10E+01	1.99E+01	5000	100.9%	0.009
Blank-10	Tc-99	Water	60	353.33	178.25	1.98	165.02	98.71		7.43E+02	4.36E+01	1.10E+01	8.20E+00			
474212	Tc-99	Water	60	346.30	161.13	2.09	147.89	98.57		6.66E+02	3.92E+01	1.10E+01	7.84E+00	RPD	Dup Evaluation	
474212D	Tc-99	Water	60	342.10	160.46	2.09	147.34	98.48		6.64E+02	3.91E+01	1.10E+01	7.83E+00	0.37	0.04	Pass
474213	Tc-99	Water	60	350.33	167.49	2.05	154.22	98.65		6.95E+02	4.08E+01	1.10E+01	7.97E+00	RPD	Dup Evaluation	
474213D	Tc-99	Water	60	337.68	159.94	2.10	147.01	98.35		6.62E+02	3.90E+01	1.10E+01	7.83E+00	4.78	0.57	Pass
474214	Tc-99	Water	60	341.24	161.42	2.09	148.33	98.47		6.68E+02	3.93E+01	1.10E+01	7.85E+00	RPD	Dup Evaluation	
474214D	Tc-99	Water	60	334.24	157.97	2.11	145.21	98.21		6.54E+02	3.85E+01	1.10E+01	7.80E+00	2.13	0.26	Pass
474221	Tc-99	Water	60	345.54	159.91	2.10	146.68	98.55		6.61E+02	3.89E+01	1.10E+01	7.81E+00	RPD	Dup Evaluation	
474221D	Tc-99	Water	60	329.58	161.71	2.09	149.33	98.01		6.73E+02	3.96E+01	1.10E+01	7.90E+00	1.79	0.21	Pass
474222	Tc-99	Water	60	351.56	160.55	2.09	147.14	98.68		6.63E+02	3.90E+01	1.10E+01	7.82E+00	RPD	Dup Evaluation	
474222D	Tc-99	Water	60	317.87	158.01	2.11	146.28	97.52		6.59E+02	3.88E+01	1.11E+01	7.85E+00	0.58	0.07	Pass
474300	Tc-99	Water	60	332.98	158.53	2.11	145.86	98.16		6.57E+02	3.87E+01	1.10E+01	7.81E+00	RPD	Dup Evaluation	
474300D	Tc-99	Water	60	339.93	158.65	2.11	145.57	98.44		6.56E+02	3.86E+01	1.10E+01	7.79E+00	0.20	0.02	Pass
474301	Tc-99	Water	60	357.10	162.84	2.08	149.29	98.79		6.72E+02	3.96E+01	1.10E+01	7.86E+00	RPD	Dup Evaluation	
474301D	Tc-99	Water	60	301.18	158.85	2.10	147.51	97.28		6.64E+02	3.91E+01	1.11E+01	7.89E+00	1.20	0.14	Pass
474302	Tc-99	Water	60	345.91	157.57	2.12	144.29	98.56		6.50E+02	3.83E+01	1.10E+01	7.76E+00	RPD	Dup Evaluation	
474302D	Tc-99	Water	60	344.59	159.70	2.10	146.50	98.53		6.60E+02	3.88E+01	1.10E+01	7.81E+00	1.52	0.18	Pass
474340	Tc-99	Water	60	340.06	156.84	2.12	143.73	98.44		6.47E+02	3.81E+01	1.10E+01	7.75E+00	RPD	Dup Evaluation	
474340D	Tc-99	Water	60	334.09	154.38	2.14	141.57	98.20		6.38E+02	3.76E+01	1.10E+01	7.72E+00	1.51	0.18	Pass
474341	Tc-99	Water	60	350.98	166.96	2.05	153.65	98.67		6.92E+02	4.07E+01	1.10E+01	7.96E+00	RPD	Dup Evaluation	
474341D	Tc-99	Water	60	336.45	159.88	2.10	147.02	98.30		6.62E+02	3.90E+01	1.10E+01	7.83E+00	4.41	0.53	Pass
474344	Tc-99	Water	60	354.63	161.63	2.09	148.14	98.74		6.67E+02	3.93E+01	1.10E+01	7.84E+00	RPD	Dup Evaluation	
474344D	Tc-99	Water	60	360.81	163.27	2.08	149.61	98.87		6.74E+02	3.96E+01	1.09E+01	7.86E+00	0.98	0.12	Pass
474401	Tc-99	Water	60	344.73	159.98	2.10	146.77	98.54		6.61E+02	3.89E+01	1.10E+01	7.81E+00	RPD	Dup Evaluation	
474401D	Tc-99	Water	60	318.93	162.16	2.08	150.46	97.57		6.78E+02	3.99E+01	1.11E+01	7.94E+00	2.49	0.30	Pass
474402	Tc-99	Water	60	346.11	159.97	2.10	146.71	98.57		6.61E+02	3.89E+01	1.10E+01	7.81E+00	RPD	Dup Evaluation	
474402D	Tc-99	Water	60	354.01	156.67	2.12	143.13	98.73		6.45E+02	3.80E+01	1.10E+01	7.73E+00	2.47	0.30	Pass

Notes: Day #10 results.

010066

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-223
Prep Date: 18-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm

Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)

TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)

MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22

Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)

(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100

Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010067

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111021_1202\Replay_20111024_092933
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111021_1202\20111021_1202.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B&W Portsmouth
165216.05.00X
TO# 110830-12, 110831-5, 110901-7, 110902-3
12-222, 12-223
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010068

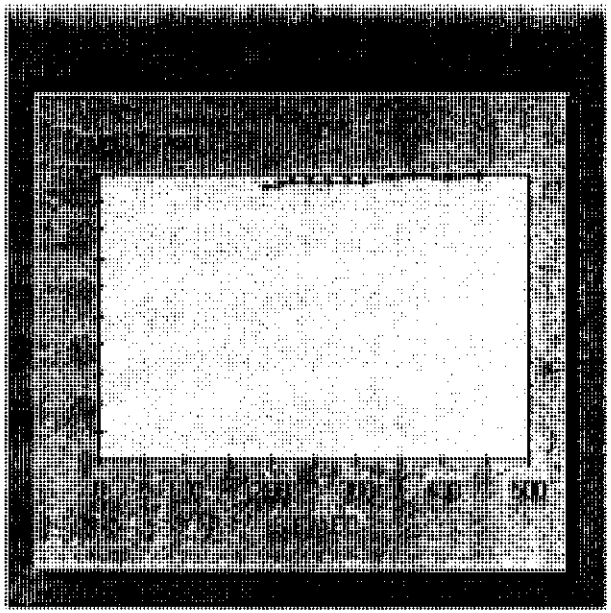
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 14.18 Date Processed: 10/21/2011 12:01:24 PM
14C Chi Square: 13.00 Date Processed: 10/21/2011 12:01:24 PM
3H E^2/B (1-18.6 keV): 1526.90 Date Processed: 10/21/2011 12:01:24 PM
14C E^2/B (4-156 keV): 5527.44 Date Processed: 10/21/2011 12:01:24 PM
3H Efficiency (1-18.6 keV): 64.55 Date Processed: 10/21/2011 12:01:24 PM
14C Efficiency (4-156 keV): 92.56 Date Processed: 10/21/2011 12:01:24 PM
IPA Background Date Processed: 10/21/2011 12:01:24 PM
3H Background CPM (1-18.6 keV): 2.73 Date Processed: 10/21/2011 12:01:24 PM
14C Background CPM (4-156 keV): 1.55 Date Processed: 10/21/2011 12:01:24 PM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010069



Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

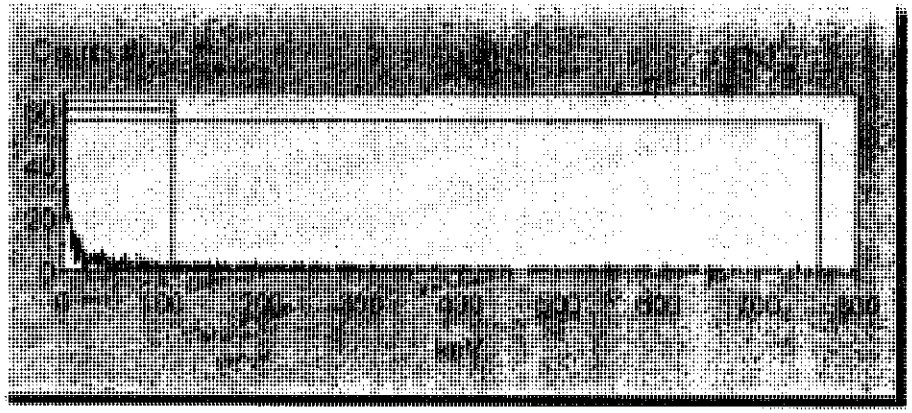
S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE		TIME	Eff Nucl In A									
1	5	1	60.00	Bkg-1	15.41	16	449.24	338.67		8.32	0:00:02	16
10/21/2011		12:03:43 PM	98.40									

010070

SpectraView Block Data

2	5	1	60.00	Bkg-2	15.30	16	470.50	317.87		8.27	0:00:03	15
10/21/2011	1:05:14 PM		97.52									

SpectraView Block Data

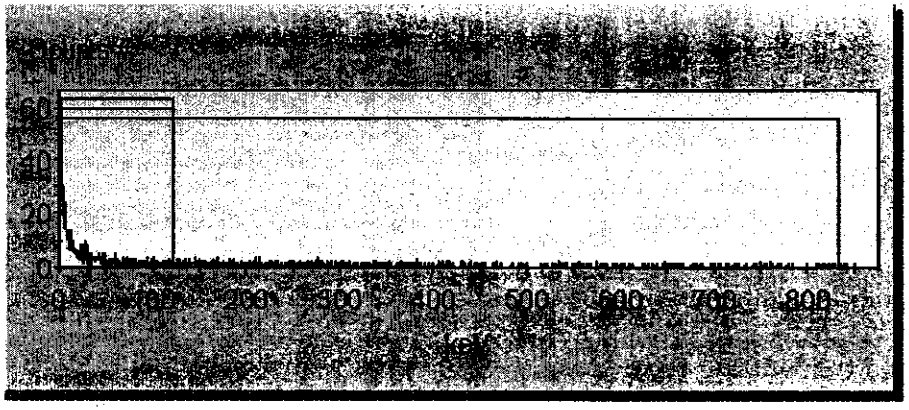


Missing vial 3.

4	5	1	60.00	PBWK17JV1	14.98	15	476.34	357.00		8.42	0:00:04	16
10/21/2011	2:06:44 PM		98.79									

010071

SpectraView Block Data



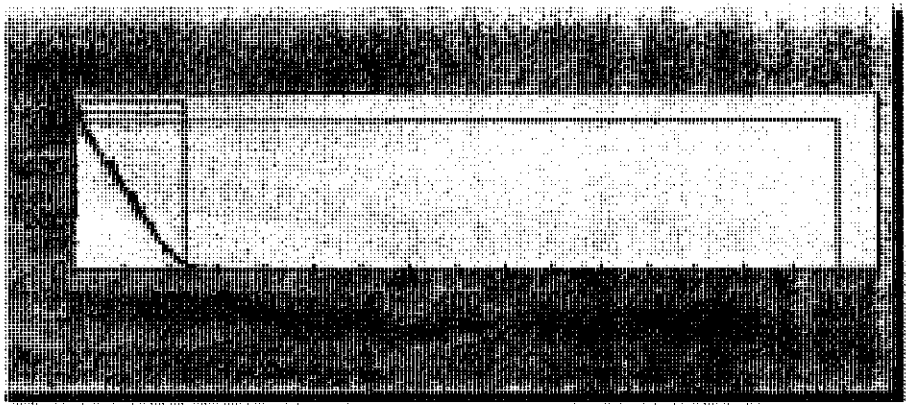
5	5	1	60.00	LCSWK17JV1	1108.33	1123	134.26	352.80		0.78	0:00:06	0
10/21/2011	3:08:14 PM		98.70									

SpectraView Block Data

6	5	1	60.00	LCSWK17JV2	1104.22	1122	133.43	338.32		0.78	0:00:07	0
10/21/2011	4:09:54 PM		98.38									

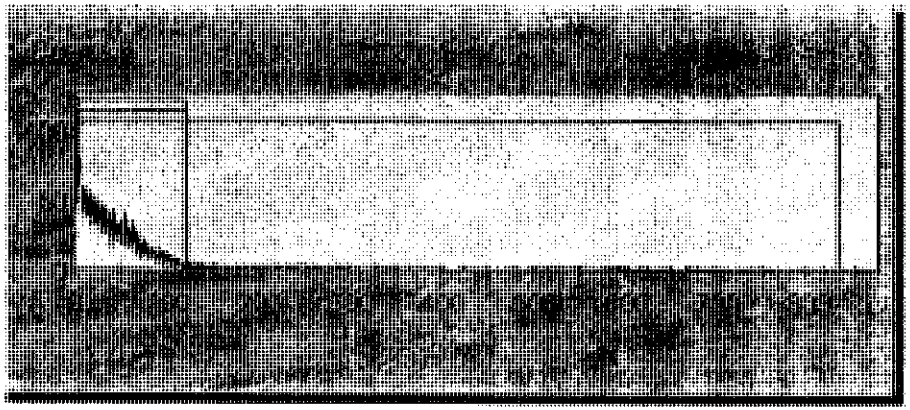
SpectraView Block Data

010072



7	5	1	60.00	Blank Day 0	101.17	102	219.65	357.20		2.68	0:00:08	4
10/21/2011	5:11:27 PM		98.79									

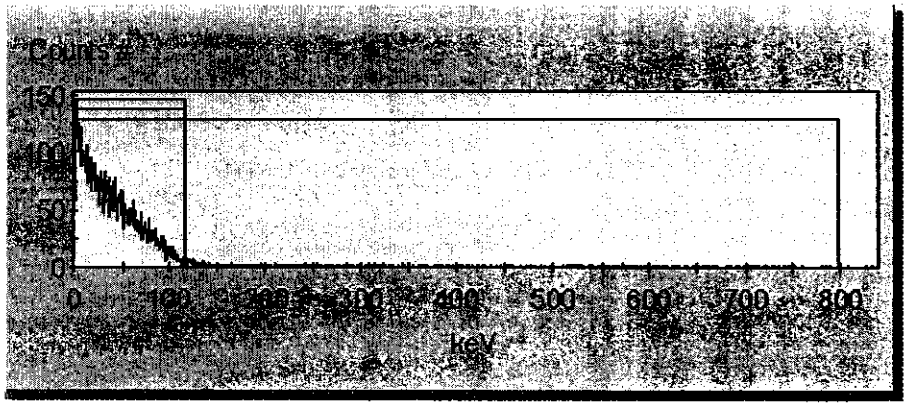
SpectraView Block Data



8	5	1	60.00	Blank Day 7	182.36	185	176.77	337.64		1.96	0:00:09	2
10/21/2011	6:12:57 PM		98.35									

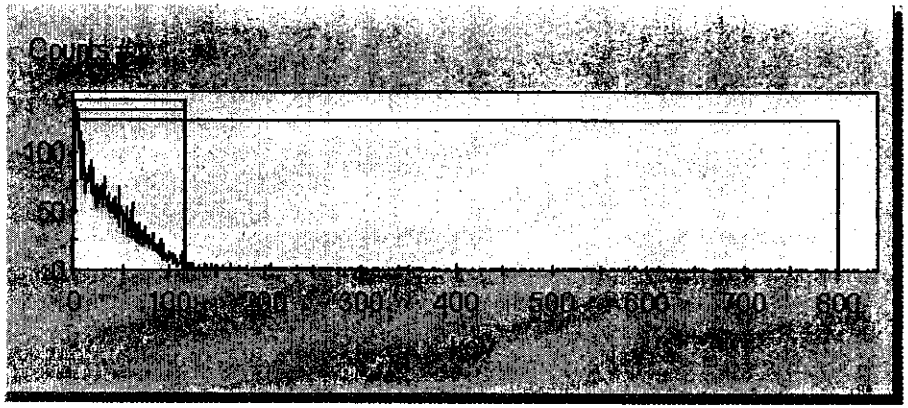
SpectraView Block Data

010073



9	5	1	60.00	474212-7	163.11	166	185.05	338.81		2.07	0:00:10	2
10/21/2011	7:14:27 PM			98.40								

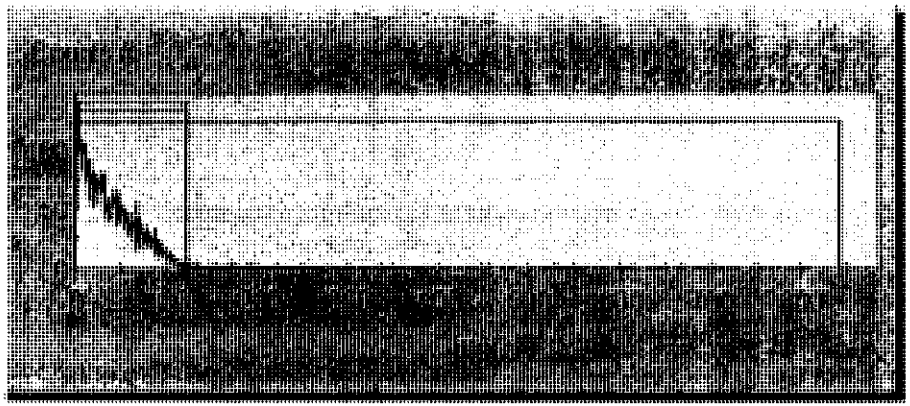
SpectraView Block Data



10	5	1	60.00	474212D-7	163.88	166	178.45	362.83		2.07	0:00:12	3
10/21/2011	8:15:58 PM			98.91								

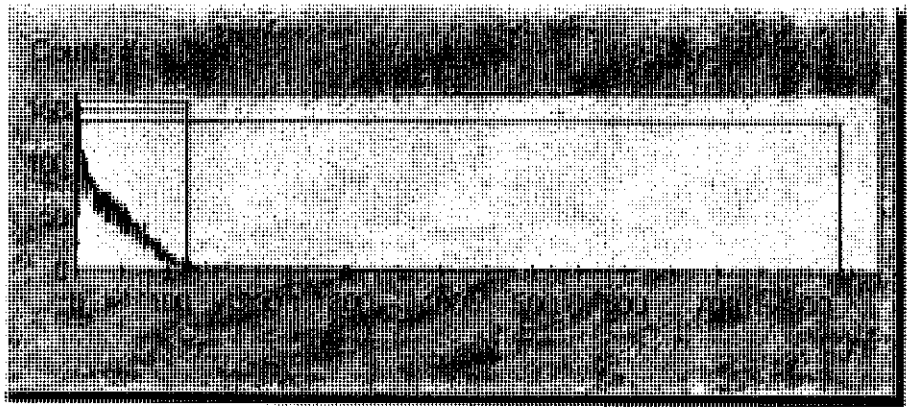
SpectraView Block Data

010074



11	5	1	60.00	474213-7	166.07	168	184.33	358.92		2.06	0:00:13	3
10/21/2011	9:17:29 PM		98.83									

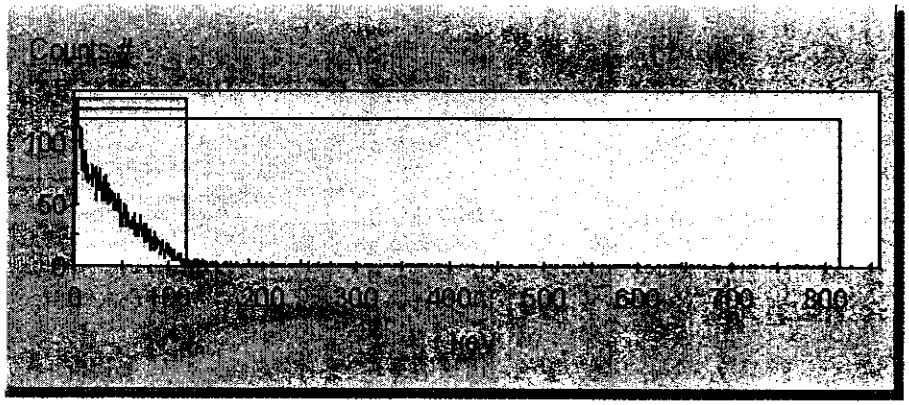
SpectraView Block Data



12	5	1	60.00	474213D-7	160.35	163	180.42	347.45		2.09	0:00:14	2
10/21/2011	10:19:00 PM		98.59									

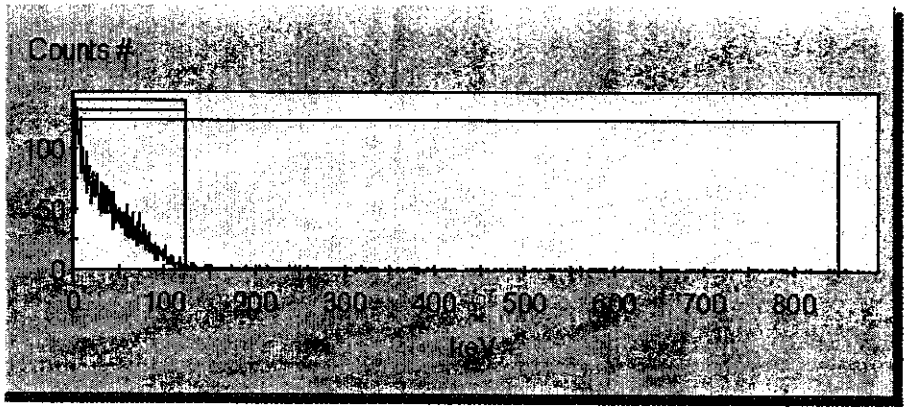
SpectraView Block Data

010075



13	5	2	60.00	474214-7	158.99	161	181.51	365.65		2.10	0:00:15	3
10/21/2011	11:20:36 PM			98.97								

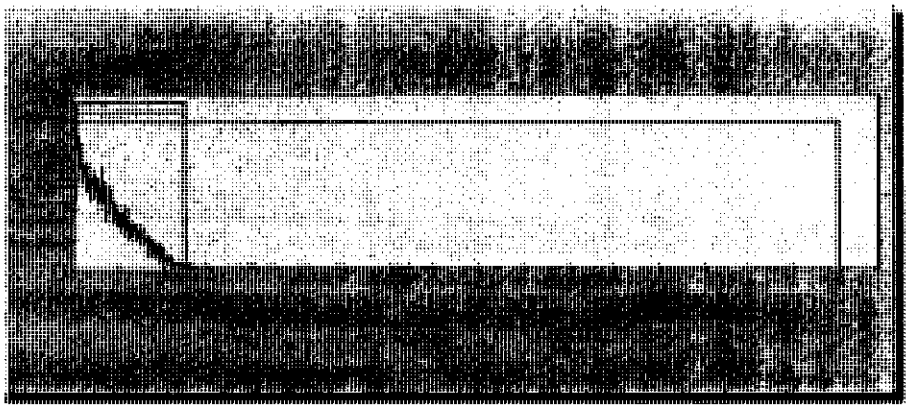
SpectraView Block Data



14	5	2	60.00	474214D-7	159.65	161	179.08	366.74		2.10	0:00:16	3
10/22/2011	12:22:07 AM			98.99								

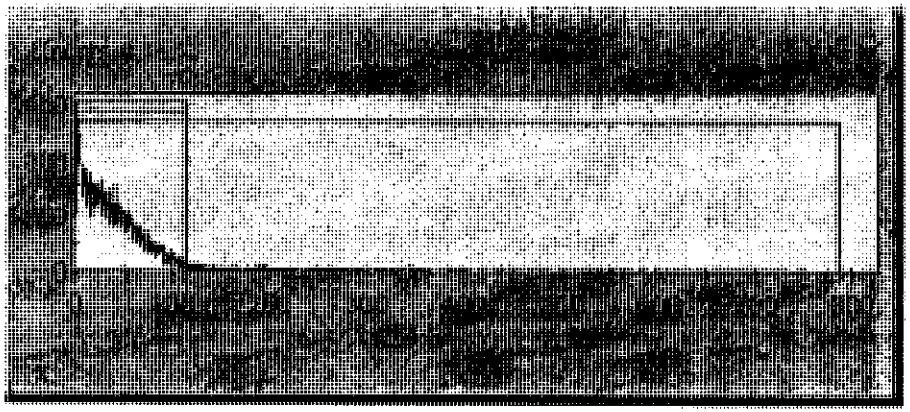
SpectraView Block Data

010076



15 5 2 60.00 474221-7 159.96 163 176.94 331.94 2.10 0:00:17 3
10/22/2011 1:23:37 AM 98.11

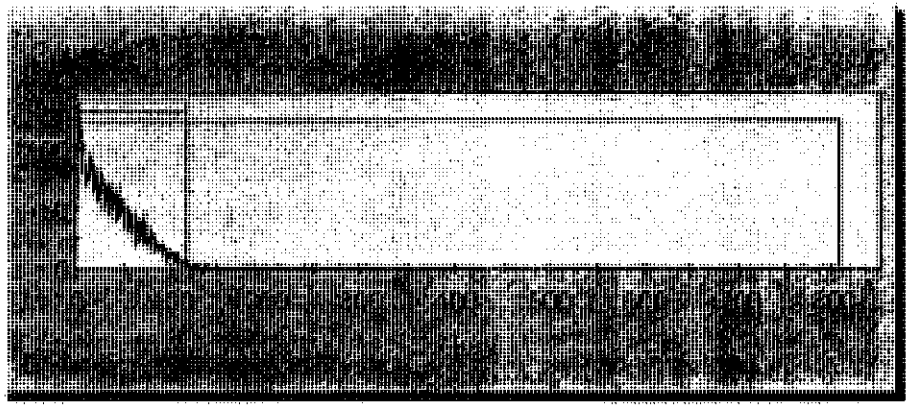
SpectraView Block Data



16 5 2 60.00 474221D-7 164.78 167 180.11 343.14 2.06 0:00:18 2
10/22/2011 2:25:08 AM 98.51

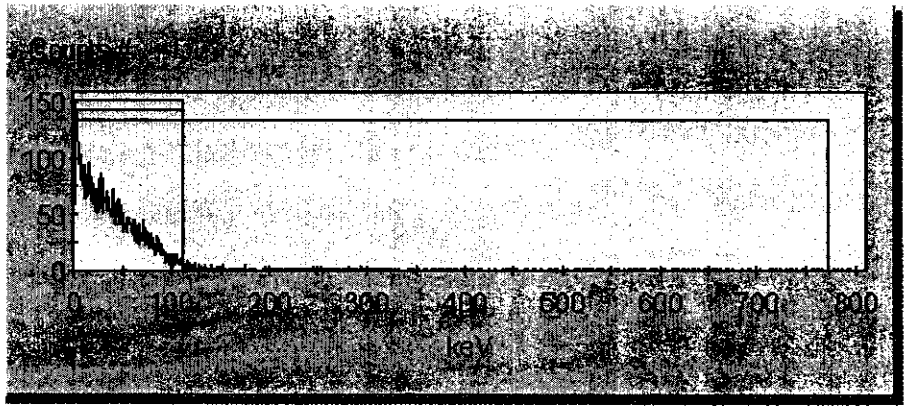
SpectraView Block Data

010077



17 5 2 60.00 474222-7 165.19 169 174.15 323.31 2.06 0:00:20 3
10/22/2011 3:26:40 AM 97.75

SpectraView Block Data



18 5 2 60.00 474222D-7 167.55 170 174.93 345.44 2.05 0:00:21 2
10/22/2011 4:28:11 AM 98.55

SpectraView Block Data

010078

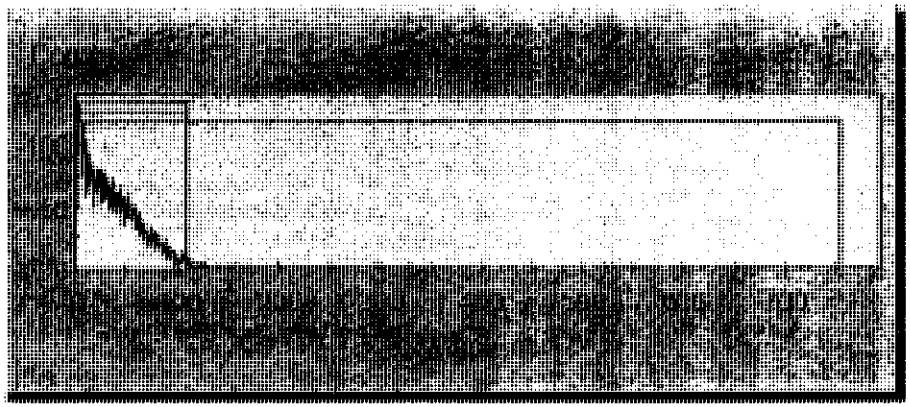
19	5	2	60.00	474300-7	161.05	163	177.48	353.27		2.09	0:00:22	3
10/22/2011	5:29:41 AM			98.71								

SpectraView Block Data

20	5	2	60.00	474300D-7	159.48	164	167.40	314.53		2.10	0:00:23	3
10/22/2011	6:31:13 AM			97.38								

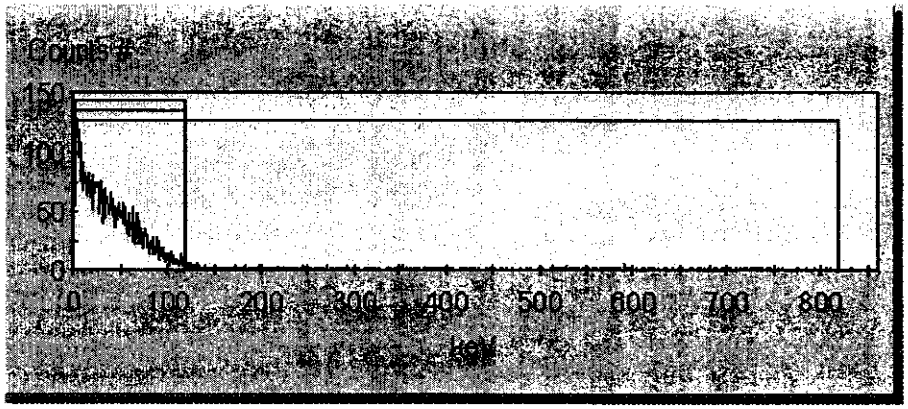
SpectraView Block Data

010079



21 5 2 60.00 474301-7 159.76 162 189.06 349.56 2.10 0:00:24 3
10/22/2011 7:32:44 AM 98.64

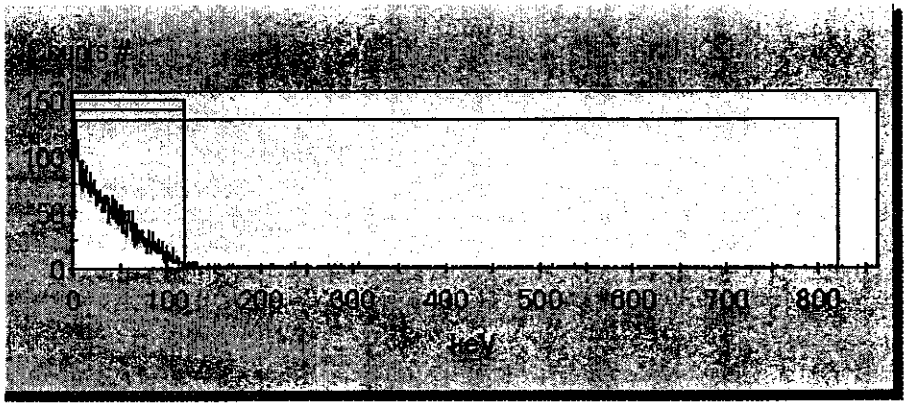
SpectraView Block Data



22 5 2 60.00 474301D-7 161.66 164 188.39 349.98 2.09 0:00:25 3
10/22/2011 8:34:16 AM 98.65

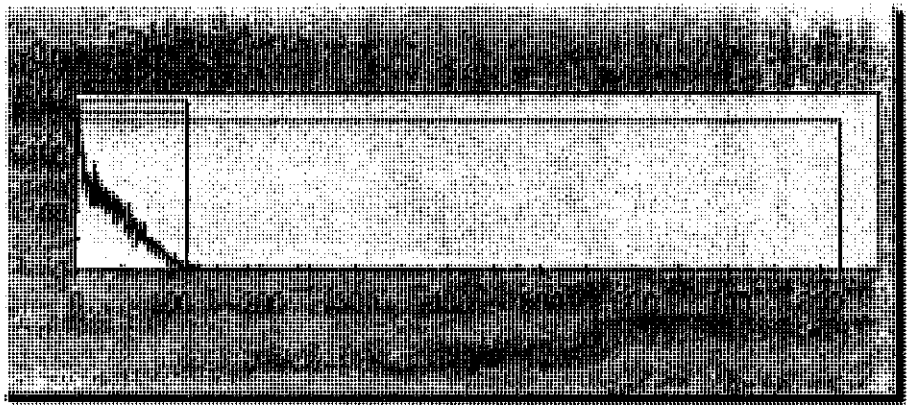
SpectraView Block Data

010080



23	5	2	60.00	474302-7	159.33	161	180.65	351.00		2.10	0:00:26	3
10/22/2011	9:35:47 AM		98.67									

SpectraView Block Data



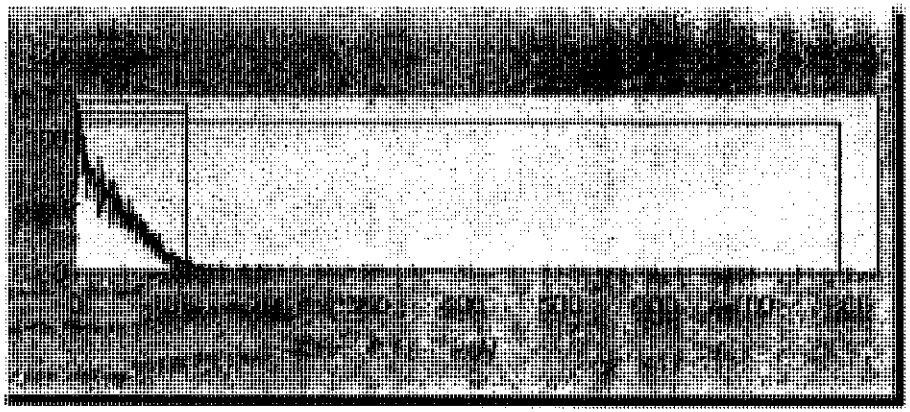
24	5	2	60.00	474302D-7	160.17	162	181.44	357.61		2.10	0:00:28	3
10/22/2011	10:37:18 AM		98.80									

SpectraView Block Data

010081

25	5	6	60.00	474340-7	153.85	157	178.13	333.51		2.14	0:00:29	3
10/22/2011	11:38:54 AM			98.18								

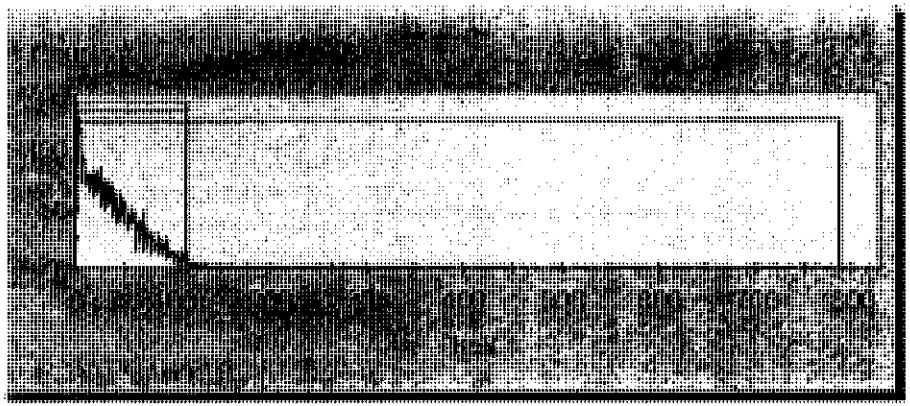
SpectraView Block Data



26	5	6	60.00	474340D-7	155.29	158	177.72	332.01		2.13	0:00:30	3
10/22/2011	12:40:25 PM			98.12								

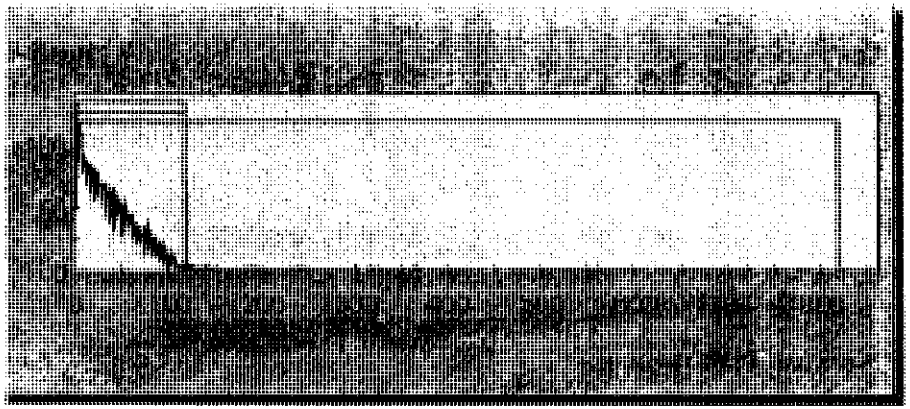
SpectraView Block Data

010082



27 5 6 60.00 474341-7 162.00 164 186.74 349.48 2.08 0:00:31 3
10/22/2011 1:41:56 PM 98.64

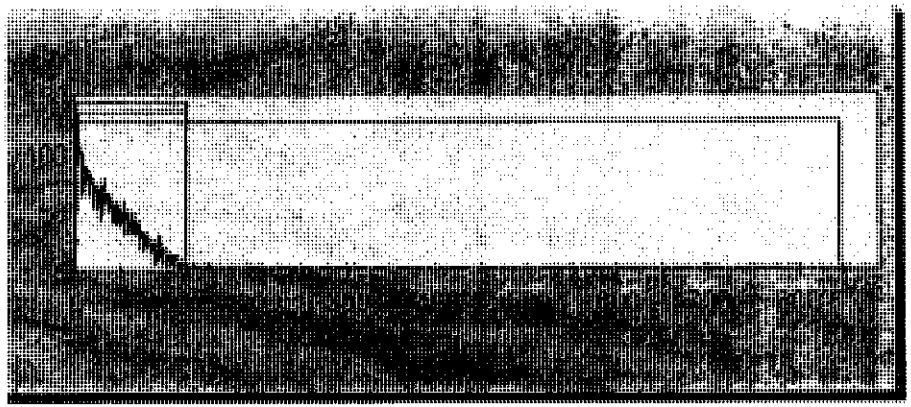
SpectraView Block Data



28 5 6 60.00 474341D-7 163.08 165 185.52 365.41 2.08 0:00:32 3
10/22/2011 2:43:28 PM 98.96

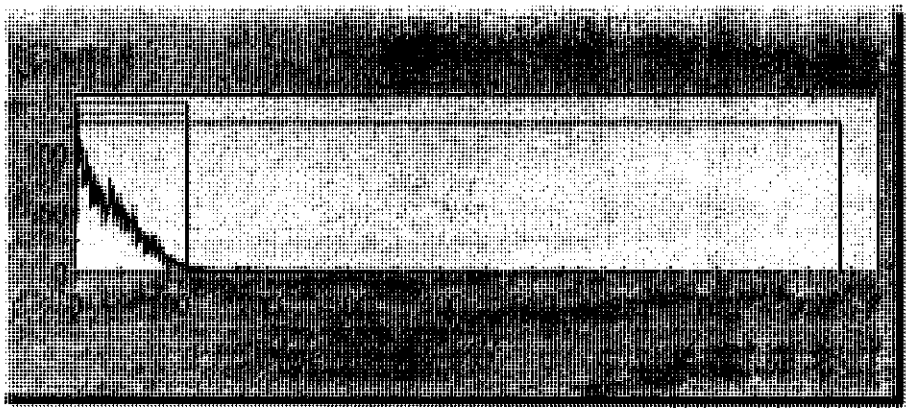
SpectraView Block Data

010083



29 5 6 60.00 474344-7 163.84 166 182.68 358.76 2.07 0:00:33 2
10/22/2011 3:44:59 PM 98.83

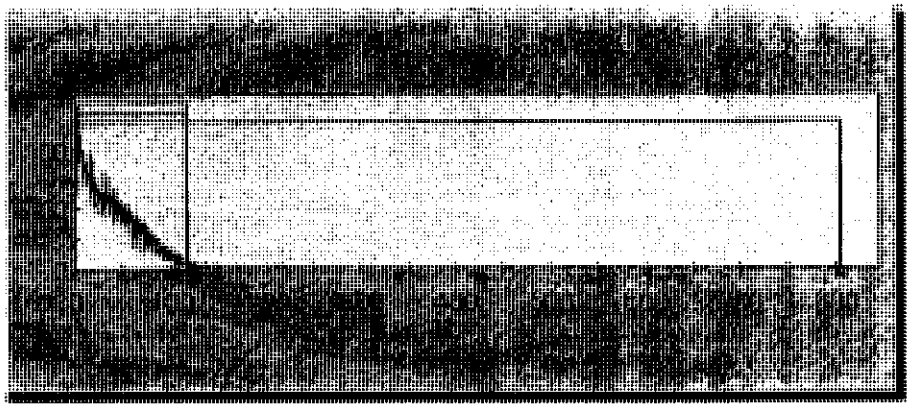
SpectraView Block Data



30 5 6 60.00 474344D-7 162.45 165 175.15 341.54 2.08 0:00:34 3
10/22/2011 4:46:28 PM 98.47

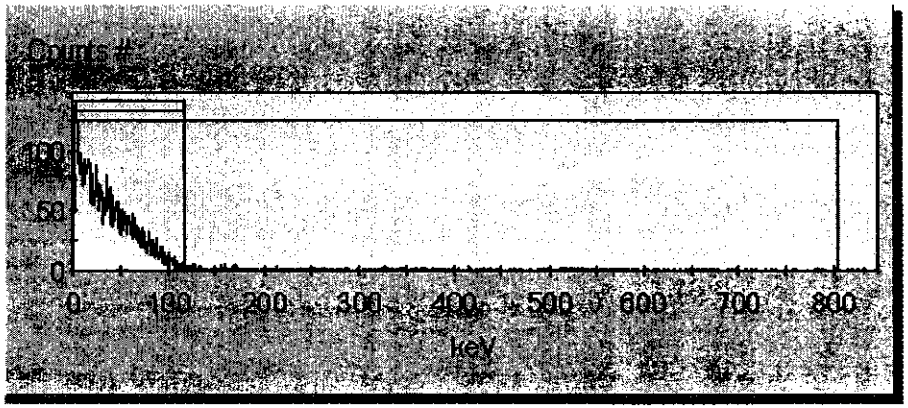
SpectraView Block Data

010084



31 5 6 60.00 474401-7 157.77 160 173.06 341.16 2.11 0:00:35 3
10/22/2011 5:47:59 PM 98.46

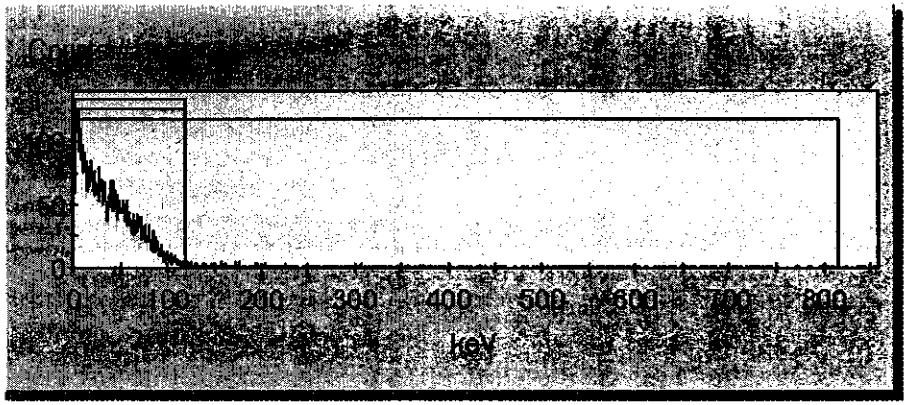
SpectraView Block Data



32 5 6 60.00 47401D-7 161.10 163 176.55 347.82 2.09 0:00:36 3
10/22/2011 6:49:29 PM 98.60

SpectraView Block Data

010085



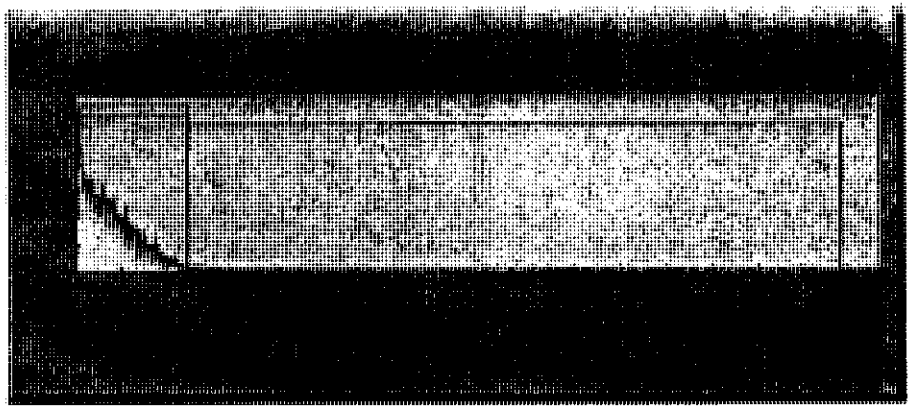
33 5 6 60.00 47402-7 163.73 165 189.78 370.26 2.07 0:00:38 3
10/22/2011 7:51:00 PM 98.99

SpectraView Block Data

34 5 6 60.00 47402D-7 162.95 165 177.94 361.74 2.08 0:00:39 2
10/22/2011 8:52:30 PM 98.89

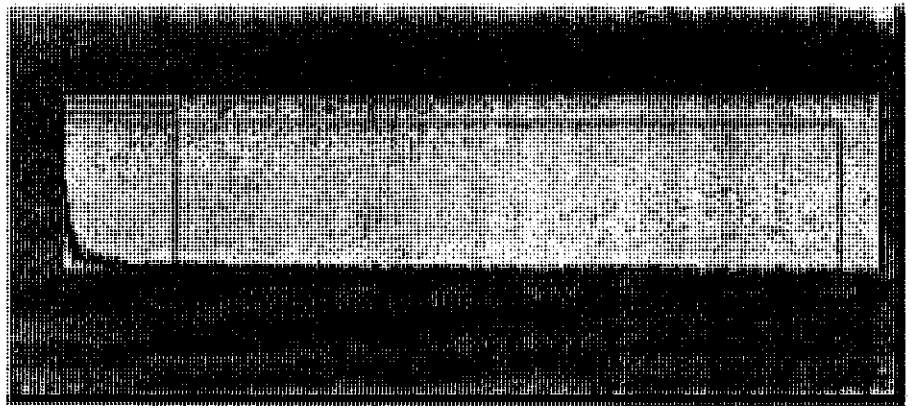
SpectraView Block Data

010086



35 5 6 60.00 PBWK18JV1 14.38 15 450.57 338.64 8.66 0:00:40 17
10/22/2011 9:54:02 PM 98.39

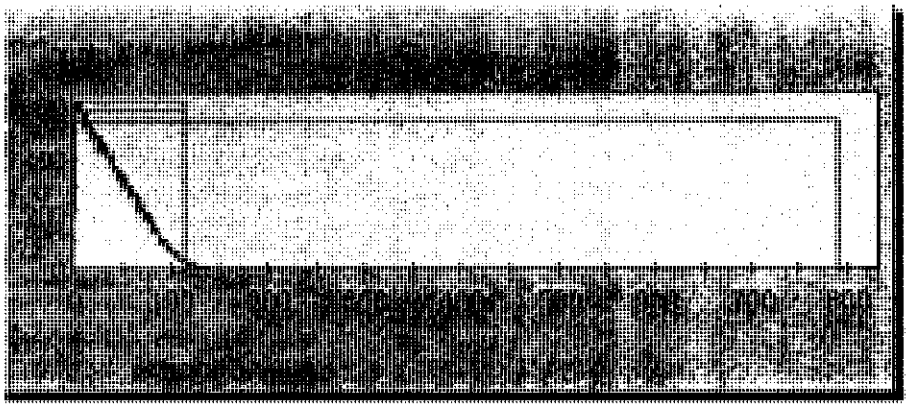
SpectraView Block Data



36 5 6 60.00 LCSWK18JV1 1099.23 1120 132.30 333.37 0.78 0:00:41 0
10/22/2011 10:55:32 PM 98.17

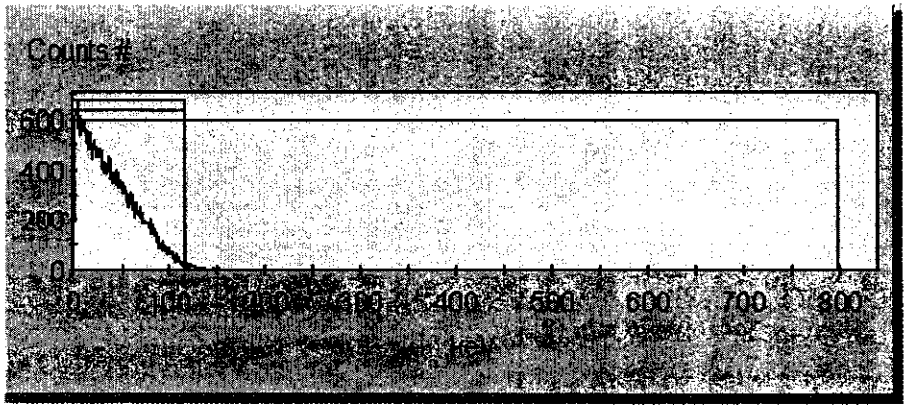
SpectraView Block Data

010087



37	5	14	60.00	LCSWK18JV2	1116.67	1135	134.37	337.83		0.78	0:00:42	0
10/22/2011	11:57:10 PM		98.36									

SpectraView Block Data



38	5	14	60.00	Blank Day-10	178.25	181	175.36	353.33		1.98	0:00:43	2
10/23/2011	12:58:47 AM		98.71									
39	5	14	60.00	474212-10	161.13	163	181.26	346.30		2.09	0:00:43	3
10/23/2011	2:00:16 AM		98.57									
40	5	14	60.00	474212D-10	160.46	163	186.45	342.10		2.09	0:00:44	3
10/23/2011	3:01:47 AM		98.48									

010088

41	5	14	60.00	472213-10	167.49	170	178.43	350.33	2.05	0:00:44	2
10/23/2011	4:03:17 AM			98.65							
42	5	14	60.00	474213D-10	159.94	163	179.48	337.68	2.10	0:00:44	3
10/23/2011	5:04:47 AM			98.35							
43	5	14	60.00	474214-10	161.42	164	188.93	341.24	2.09	0:00:44	3
10/23/2011	6:06:17 AM			98.47							
44	5	14	60.00	474214D-10	157.97	161	184.84	334.24	2.11	0:00:44	3
10/23/2011	7:07:45 AM			98.21							
45	5	14	60.00	474221-10	159.91	162	168.90	345.54	2.10	0:00:45	3
10/23/2011	8:09:14 AM			98.55							
46	5	14	60.00	474221D-10	161.71	165	179.83	329.58	2.09	0:00:45	3
10/23/2011	9:10:43 AM			98.01							
47	5	14	60.00	474222-10	160.55	163	181.23	351.56	2.09	0:00:45	3
10/23/2011	10:12:12 AM			98.68							
48	5	14	60.00	474222D-10	158.01	162	177.00	317.87	2.11	0:00:45	3
10/23/2011	11:13:43 AM			97.52							
49	5	19	60.00	474300-10	158.53	162	184.43	332.98	2.11	0:00:45	3
10/23/2011	12:15:19 PM			98.16							
50	5	19	60.00	474300D-10	158.65	161	180.30	339.93	2.11	0:00:46	3
10/23/2011	1:16:48 PM			98.44							
51	5	19	60.00	474301-10	162.84	165	183.34	357.10	2.08	0:00:46	3
10/23/2011	2:18:18 PM			98.79							
52	5	19	60.00	474301D-10	158.85	163	173.83	301.18	2.10	0:00:46	3
10/23/2011	3:19:49 PM			97.28							
53	5	19	60.00	474302-10	157.57	160	187.32	345.91	2.12	0:00:46	3
10/23/2011	4:21:18 PM			98.56							
54	5	19	60.00	474302D-10	159.70	162	181.62	344.59	2.10	0:00:47	3
10/23/2011	5:22:47 PM			98.53							
55	5	19	60.00	474340-10	156.84	159	177.76	340.06	2.12	0:00:47	3
10/23/2011	6:24:17 PM			98.44							
56	5	19	60.00	474340D-10	154.38	157	186.89	334.09	2.14	0:00:47	3
10/23/2011	7:25:47 PM			98.20							
57	5	19	60.00	474341-10	166.96	169	181.99	350.98	2.05	0:00:47	3
10/23/2011	8:27:17 PM			98.67							
58	5	19	60.00	474341D-10	159.88	163	180.17	336.45	2.10	0:00:47	3
10/23/2011	9:28:47 PM			98.30							
59	5	19	60.00	474344-10	161.63	164	182.87	354.63	2.09	0:00:48	3
10/23/2011	10:30:15 PM			98.74							
60	5	19	60.00	474344D-10	163.27	165	184.48	360.81	2.08	0:00:48	3
10/23/2011	11:31:45 PM			98.87							
61	5	7	60.00	474401-10	159.98	162	176.37	344.73	2.10	0:00:48	3
10/24/2011	12:33:21 AM			98.54							
62	5	7	60.00	474401D-10	162.16	166	170.05	318.93	2.08	0:00:48	3
10/24/2011	1:34:50 AM			97.57							
63	5	7	60.00	474402-10	159.97	162	179.39	346.11	2.10	0:00:49	3
10/24/2011	2:36:21 AM			98.57							

010089

64	5	7	60.00	474402D-10	156.67	159	178.80	354.01		2.12	0:00:49	3
10/24/2011	3:37:50 AM			98.73								

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-238
Prep Date: 24-Oct-11 WAN √WL

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK24JV3	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK24JV4	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK24JV5	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-14	0.10	50.0	0.00200	50.0	0.100	10.00		
474212	0.10	50.0	0.00200	50.0	0.100	10.00		
474212D	0.10	50.0	0.00200	50.0	0.100	10.00		
474213	0.10	50.0	0.00200	50.0	0.100	10.00		
474213D	0.10	50.0	0.00200	50.0	0.100	10.00		
474214	0.10	50.0	0.00200	50.0	0.100	10.00		
474214D	0.10	50.0	0.00200	50.0	0.100	10.00		
474221	0.10	50.0	0.00200	50.0	0.100	10.00		
474221D	0.10	50.0	0.00200	50.0	0.100	10.00		
474222	0.10	50.0	0.00200	50.0	0.100	10.00		
474222D	0.10	50.0	0.00200	50.0	0.100	10.00		
474300	0.10	50.0	0.00200	50.0	0.100	10.00		
474300D	0.10	50.0	0.00200	50.0	0.100	10.00		
474301	0.10	50.0	0.00200	50.0	0.100	10.00		
474301D	0.10	50.0	0.00200	50.0	0.100	10.00		
474302	0.10	50.0	0.00200	50.0	0.100	10.00		
474302D	0.10	50.0	0.00200	50.0	0.100	10.00		
474340	0.10	50.0	0.00200	50.0	0.100	10.00		
474340D	0.10	50.0	0.00200	50.0	0.100	10.00		
474341	0.10	50.0	0.00200	50.0	0.100	10.00		
474341D	0.10	50.0	0.00200	50.0	0.100	10.00		
474344	0.10	50.0	0.00200	50.0	0.100	10.00		
474344D	0.10	50.0	0.00200	50.0	0.100	10.00		
474401	0.10	50.0	0.00200	50.0	0.100	10.00		
474401D	0.10	50.0	0.00200	50.0	0.100	10.00		
474402	0.10	50.0	0.00200	50.0	0.100	10.00		
474402D	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

010091

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-238
Prep Date: 24-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	Raw tSIE	Raw cpm	Raw %error	Raw dpm	Raw eff-1	
BKG-1	Tc-99	Water	60	345.81	14.95	8.50	15.17	98.56	
BKG-2	Tc-99	Water	60	356.09	15.80	8.15	16.00	98.77	
				AVG BKG	15.38	AVG BKG	15.58		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK24JV3	Tc-99	Water	60	344.64	15.75	8.16	0.38	98.54		1.71E+00	3.29E+00	1.10E+01	3.29E+00		PB < 1.65*TPU	
LCSWK24JV4	Tc-99	Water	60	346.77	1115.87	0.78	1116.35	98.58		5.03E+03	2.91E+02	1.10E+01	1.98E+01	5000	100.6%	0.006
LCSWK24JV5	Tc-99	Water	60	353.56	1097.29	0.78	1095.94	98.72		4.94E+03	2.85E+02	1.10E+01	1.96E+01	5000	98.7%	-0.013
Blank-14	Tc-99	Water	60	356.17	182.22	1.96	168.92	98.77		7.61E+02	4.47E+01	1.10E+01	8.28E+00			
474212	Tc-99	Water	60	304.36	160.17	2.09	148.89	97.25		6.71E+02	3.95E+01	1.11E+01	7.92E+00	RPD	Dup Evaluation	
474212D	Tc-99	Water	60	354.22	157.85	2.11	144.31	98.73		6.50E+02	3.83E+01	1.10E+01	7.75E+00	3.13	0.38	Pass
474213	Tc-99	Water	60	365.51	165.57	2.06	151.77	98.96		6.84E+02	4.02E+01	1.09E+01	7.90E+00	RPD	Dup Evaluation	
474213D	Tc-99	Water	60	332.66	163.34	2.08	150.77	98.14		6.79E+02	4.00E+01	1.10E+01	7.92E+00	0.66	0.08	Pass
474214	Tc-99	Water	60	331.38	159.10	2.10	146.52	98.09		6.60E+02	3.89E+01	1.10E+01	7.83E+00	RPD	Dup Evaluation	
474214D	Tc-99	Water	60	343.50	154.72	2.13	141.45	98.51		6.37E+02	3.75E+01	1.10E+01	7.70E+00	3.52	0.42	Pass
474221	Tc-99	Water	60	351.73	163.33	2.08	149.93	98.68		6.75E+02	3.97E+01	1.10E+01	7.88E+00	RPD	Dup Evaluation	
474221D	Tc-99	Water	60	343.63	162.32	2.08	149.15	98.52		6.72E+02	3.95E+01	1.10E+01	7.87E+00	0.52	0.06	Pass
474222	Tc-99	Water	60	325.72	157.41	2.11	145.16	97.85		6.54E+02	3.85E+01	1.11E+01	7.81E+00	RPD	Dup Evaluation	
474222D	Tc-99	Water	60	345.91	156.45	2.12	143.14	98.56		6.45E+02	3.80E+01	1.10E+01	7.73E+00	1.40	0.17	Pass
474300	Tc-99	Water	60	348.48	158.87	2.11	145.52	98.61		6.55E+02	3.86E+01	1.10E+01	7.78E+00	RPD	Dup Evaluation	
474300D	Tc-99	Water	60	352.73	158.07	2.11	144.57	98.70		6.51E+02	3.83E+01	1.10E+01	7.76E+00	0.65	0.08	Pass
474301	Tc-99	Water	60	366.80	160.02	2.10	146.12	98.99		6.58E+02	3.87E+01	1.09E+01	7.78E+00	RPD	Dup Evaluation	
474301D	Tc-99	Water	60	342.37	160.15	2.10	146.99	98.49		6.62E+02	3.90E+01	1.10E+01	7.82E+00	0.60	0.07	Pass
474302	Tc-99	Water	60	365.36	158.82	2.11	144.95	98.96		6.53E+02	3.84E+01	1.09E+01	7.76E+00	RPD	Dup Evaluation	
474302D	Tc-99	Water	60	332.55	159.17	2.10	146.52	98.14		6.60E+02	3.89E+01	1.10E+01	7.83E+00	1.08	0.13	Pass
474340	Tc-99	Water	60	345.59	150.03	2.17	136.62	98.56		6.15E+02	3.63E+01	1.10E+01	7.59E+00	RPD	Dup Evaluation	
474340D	Tc-99	Water	60	361.78	153.68	2.14	139.86	98.89		6.30E+02	3.71E+01	1.09E+01	7.65E+00	2.34	0.28	Pass
474341	Tc-99	Water	60	343.61	163.67	2.07	150.54	98.51		6.78E+02	3.99E+01	1.10E+01	7.90E+00	RPD	Dup Evaluation	
474341D	Tc-99	Water	60	334.15	162.23	2.08	149.53	98.21		6.74E+02	3.96E+01	1.10E+01	7.89E+00	0.67	0.08	Pass
474344	Tc-99	Water	60	356.57	162.38	2.08	148.82	98.78		6.70E+02	3.94E+01	1.10E+01	7.85E+00	RPD	Dup Evaluation	
474344D	Tc-99	Water	60	330.59	160.50	2.09	148.00	98.06		6.67E+02	3.92E+01	1.10E+01	7.86E+00	0.56	0.07	Pass
474401	Tc-99	Water	60	347.20	162.06	2.08	148.78	98.59		6.70E+02	3.94E+01	1.10E+01	7.86E+00	RPD	Dup Evaluation	
474401D	Tc-99	Water	60	349.54	158.92	2.11	145.52	98.64		6.56E+02	3.86E+01	1.10E+01	7.78E+00	2.21	0.27	Pass
474402	Tc-99	Water	60	348.55	158.30	2.11	144.92	98.62		6.53E+02	3.84E+01	1.10E+01	7.77E+00	RPD	Dup Evaluation	
474402D	Tc-99	Water	60	338.42	156.58	2.12	143.53	98.38		6.47E+02	3.81E+01	1.10E+01	7.75E+00	0.97	0.12	Pass

Notes: Day #14 results.

010092

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-238
Prep Date: 24-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Sample Calculations

dpm = cpm / (eff-1 / 100) - avg bkg dpm

Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)

TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)

MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22

Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)

(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100

Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010093

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111026_0915\Replay_20111027_181337
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111026_0915\20111026_0915.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
   Quench Indicator: tSIE/AEC
   External Std Terminator (sec): 10 sec
   Pre-Count Delay (min): 0.00
Quench Set:
   Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B+W Portsmouth
165260.05.00K
TO# 110830-12, 110831-5, 110901-7, 110902-3
12-238
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010094

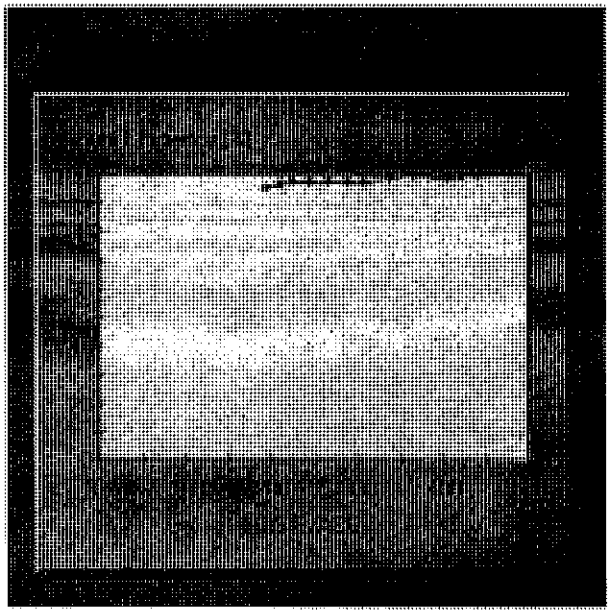
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 23.43 Date Processed: 10/26/2011 3:47:52 AM
14C Chi Square: 15.63 Date Processed: 10/26/2011 3:47:52 AM
3H E^2/B (1-18.6 keV): 1654.05 Date Processed: 10/26/2011 3:47:52 AM
14C E^2/B (4-156 keV): 5564.37 Date Processed: 10/26/2011 3:47:52 AM
3H Efficiency (1-18.6 keV): 64.63 Date Processed: 10/26/2011 3:47:52 AM
14C Efficiency (4-156 keV): 93.55 Date Processed: 10/26/2011 3:47:52 AM
IPA Background Date Processed: 10/26/2011 3:47:52 AM
3H Background CPM (1-18.6 keV): 2.53 Date Processed: 10/26/2011 3:47:52 AM
14C Background CPM (4-156 keV): 1.57 Date Processed: 10/26/2011 3:47:52 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010095



Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nuc1 In A									
1	5	1	60.00	Bkg-1	14.95	15	474.16	345.81		8.50	0:00:02	17
10/26/2011			9:16:33 AM 98.56									

010096

SpectraView Block Data

2	5	1	60.00	Bkg-2	15.80	16	458.80	356.09		8.15	0:00:03	16
10/26/2011	10:18:05 AM		98.77									

SpectraView Block Data

Missing vial 3.

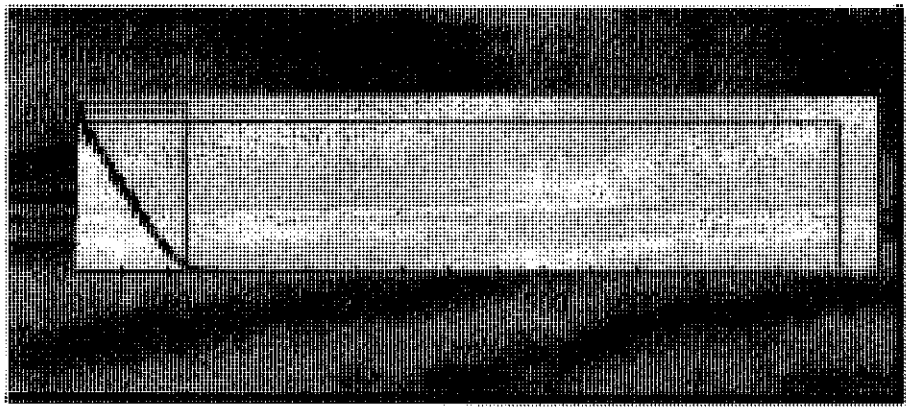
4	5	1	60.00	PBWK24JV3	15.75	16	451.94	344.64		8.16	0:00:05	16
10/26/2011	11:19:36 AM		98.54									

010097

SpectraView Block Data

5	5	1	60.00	LCSWK24JV4	1115.87	1132	136.55	346.77		0.78	0:00:06	0
10/26/2011	12:21:06 PM		98.58									

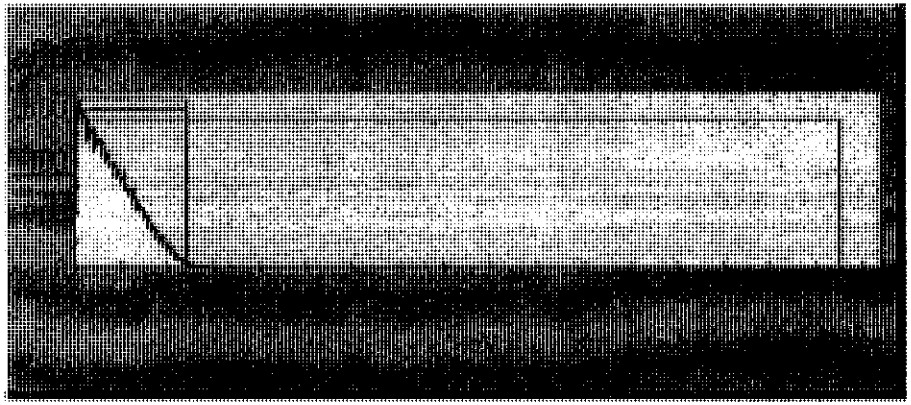
SpectraView Block Data



6	5	1	60.00	LCSWK24JV5	1097.29	1112	134.80	353.56		0.78	0:00:07	0
10/26/2011	1:22:39 PM		98.72									

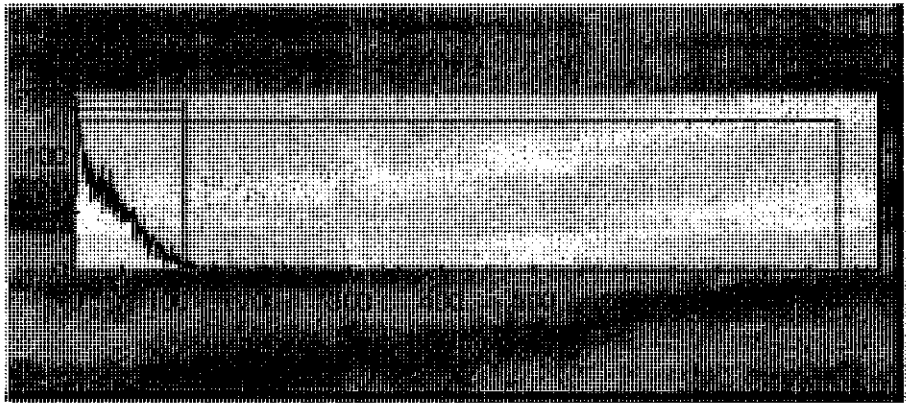
SpectraView Block Data

010098



7	5	1	60.00	Blank Day-14	182.22	184	179.96	356.17		1.96	0:00:08	2
10/26/2011	2:24:12 PM		98.77									

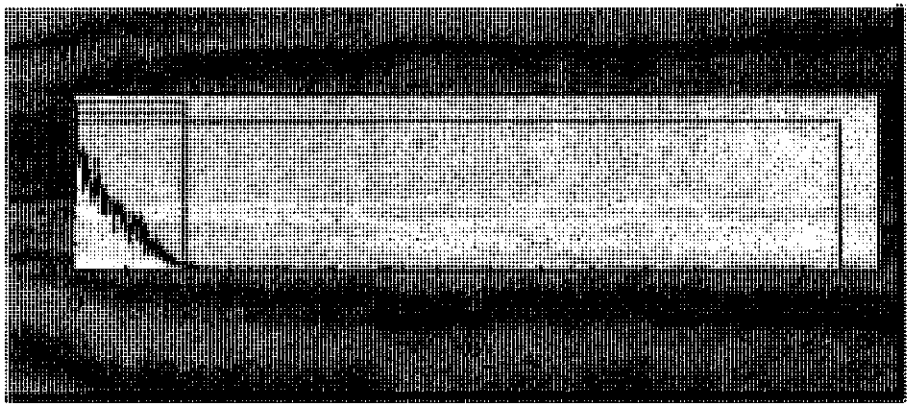
SpectraView Block Data



8	5	1	60.00	474212-14	160.17	165	160.11	304.36		2.09	0:00:09	3
10/26/2011	3:25:47 PM		97.25									

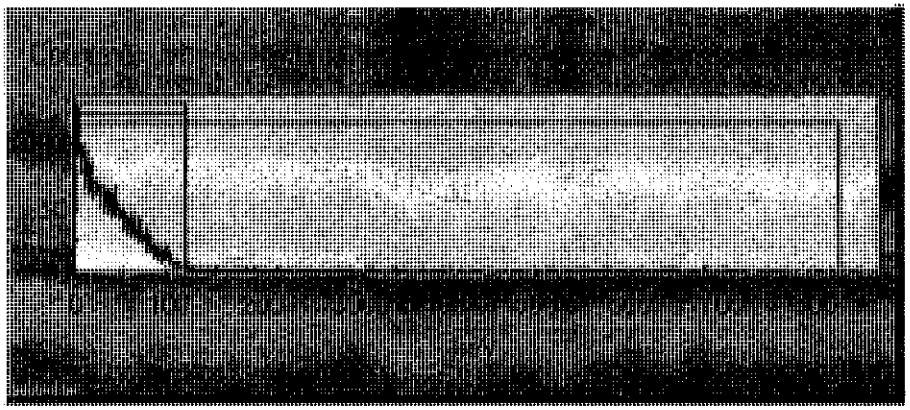
SpectraView Block Data

010099



9	5	1	60.00	474212D-14	157.85	160	186.35	354.22		2.11	0:00:11	3
10/26/2011	4:27:22 PM		98.73									

SpectraView Block Data



10	5	1	60.00	474213-14	165.57	167	186.56	365.51		2.06	0:00:12	3
10/26/2011	5:28:57 PM		98.96									

SpectraView Block Data

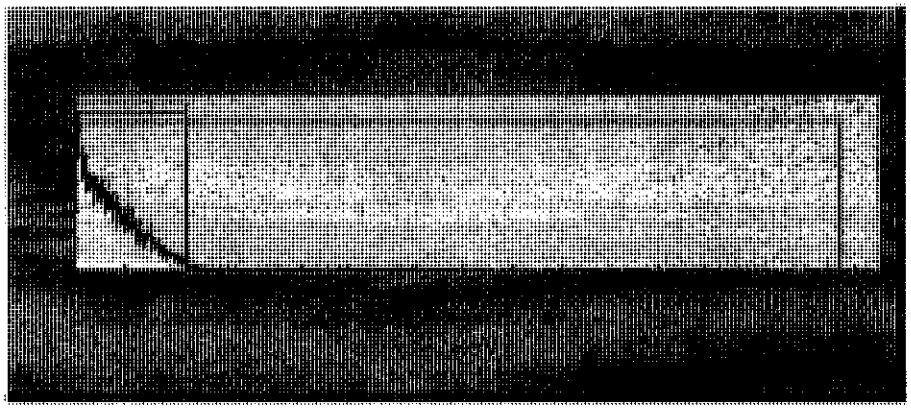
11	5	1	60.00	474213D-14	163.34	166	183.03	332.66		2.08	0:00:13	3
10/26/2011	6:30:30 PM		98.14									

SpectraView Block Data

12	5	1	60.00	474214-14	159.10	162	185.68	331.38		2.10	0:00:14	3
10/26/2011	7:32:03 PM		98.09									

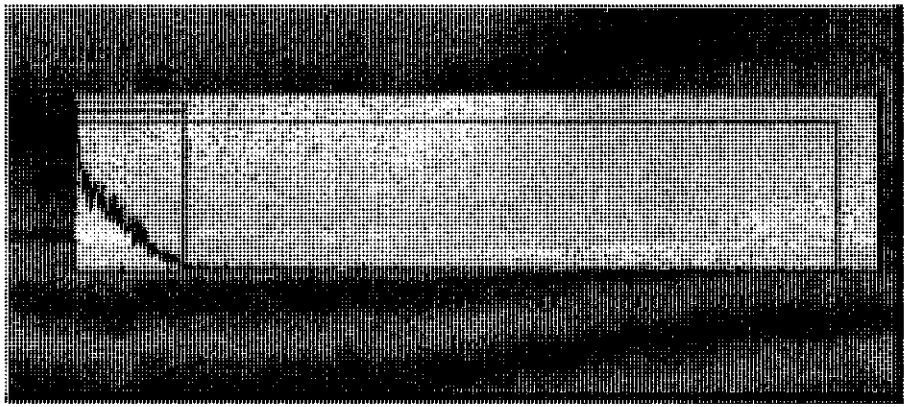
SpectraView Block Data

010101



13	5	2	60.00	474214D-14	154.72	157	183.25	343.50		2.13	0:00:15	3
10/26/2011	8:33:40 PM		98.51									

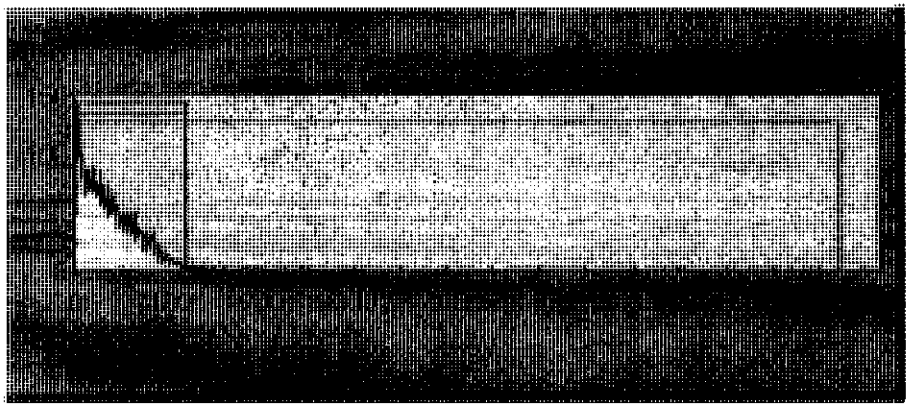
SpectraView Block Data



14	5	2	60.00	474221-14	163.33	166	176.13	351.73		2.08	0:00:16	3
10/26/2011	9:35:15 PM		98.68									

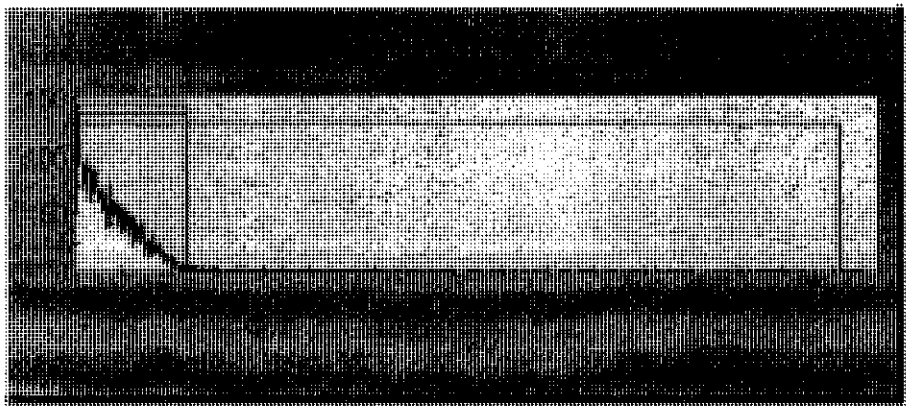
SpectraView Block Data

010102



15	5	2	60.00	474221D-14	162.32	165	184.45	343.63		2.08	0:00:17	3
10/26/2011	10:36:48 PM			98.52								

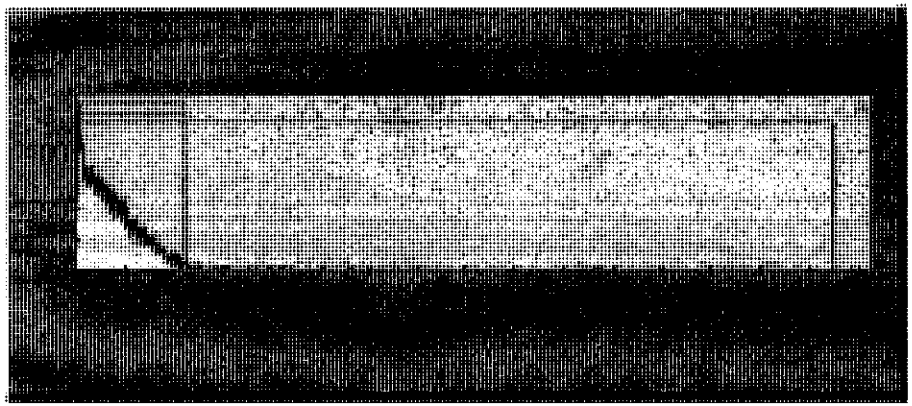
SpectraView Block Data



16	5	2	60.00	474222-14	157.41	161	177.55	325.72		2.11	0:00:19	3
10/26/2011	11:38:21 PM			97.85								

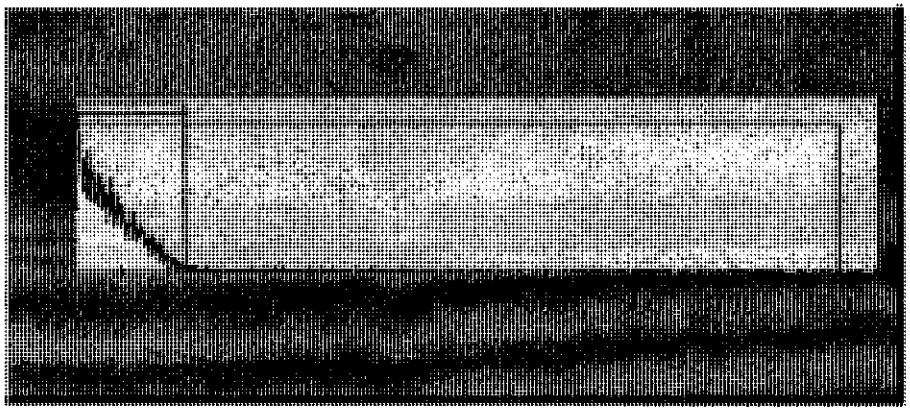
SpectraView Block Data

010103



17	5	2	60.00	474222D-14	156.45	159	183.48	345.91		2.12	0:00:20	3
10/27/2011	12:39:54 AM		98.56									

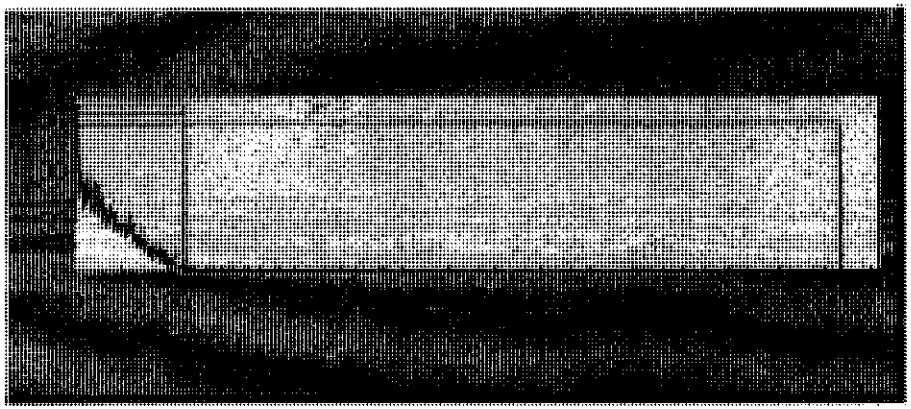
SpectraView Block Data



18	5	2	60.00	474300-14	158.87	161	188.49	348.48		2.11	0:00:21	3
10/27/2011	1:41:28 AM		98.61									

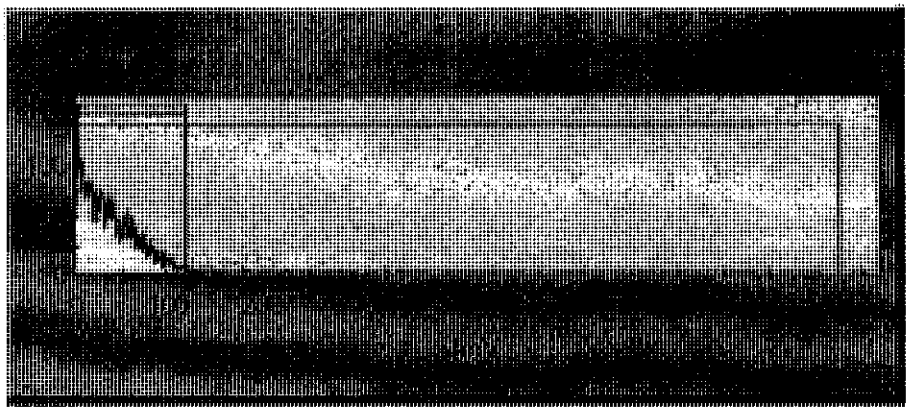
SpectraView Block Data

010104



19	5	2	60.00	474300D-14	158.07	160	178.16	352.73		2.11	0:00:22	3
10/27/2011	2:42:59 AM			98.70								

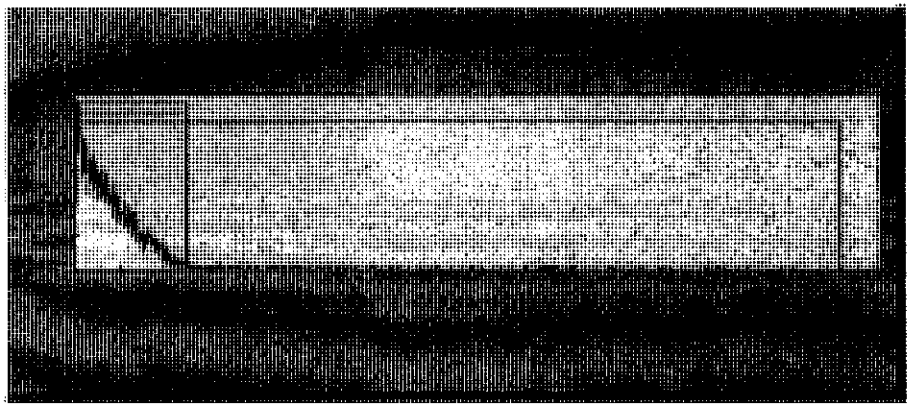
SpectraView Block Data



20	5	2	60.00	474301-14	160.02	162	183.45	366.80		2.10	0:00:23	3
10/27/2011	3:44:31 AM			98.99								

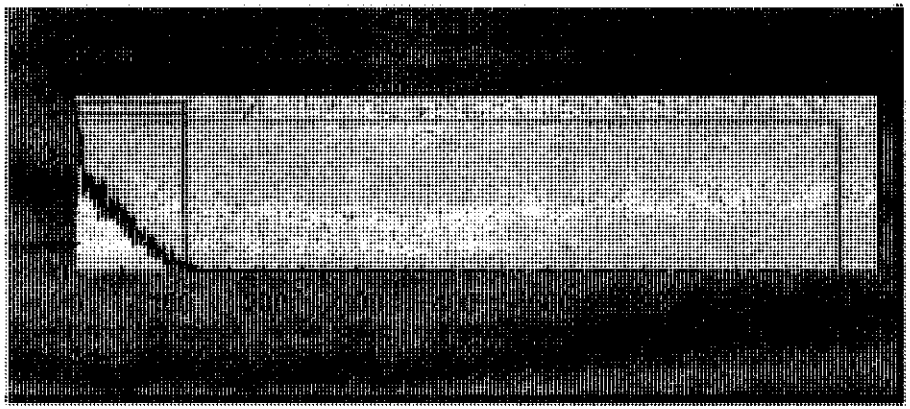
SpectraView Block Data

010105



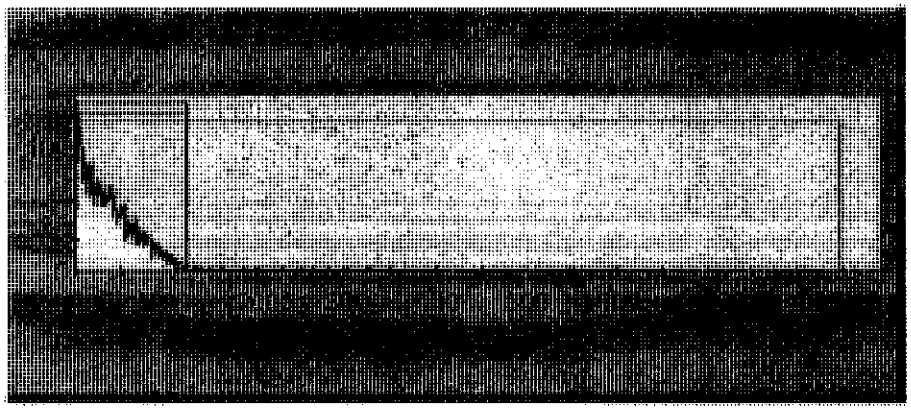
21 5 2 60.00 474301D-14 160.15 163 183.95 342.37 2.10 0:00:25 3
10/27/2011 4:46:02 AM 98.49

SpectraView Block Data



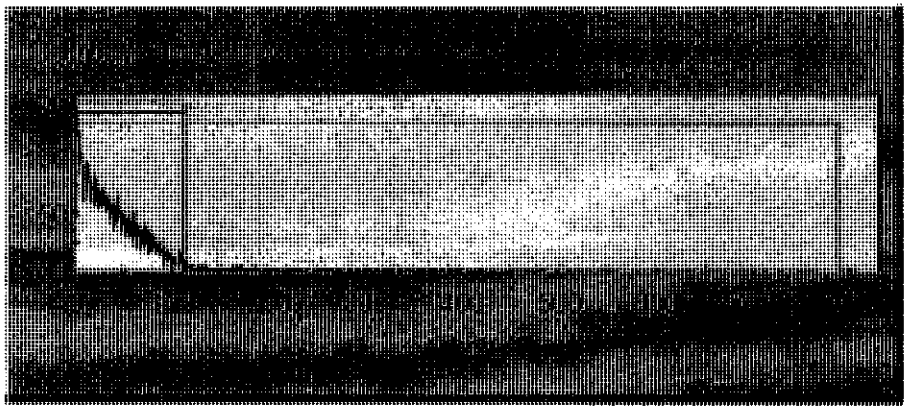
22 5 2 60.00 474302-14 158.82 160 180.16 365.36 2.11 0:00:26 3
10/27/2011 5:47:33 AM 98.96

SpectraView Block Data



23	5	2	60.00	474302D-14	159.17	162	183.97	332.55		2.10	0:00:27	3
10/27/2011	6:49:04 AM		98.14									

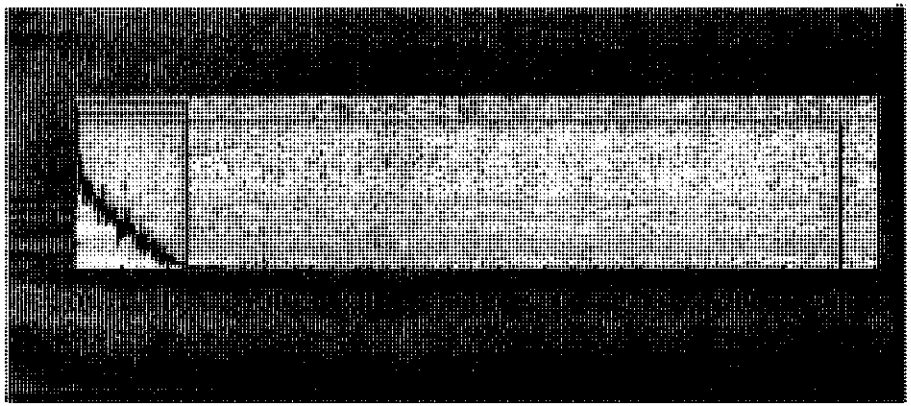
SpectraView Block Data



24	5	2	60.00	474340-14	150.03	152	181.03	345.59		2.17	0:00:28	3
10/27/2011	7:50:36 AM		98.56									

SpectraView Block Data

010107



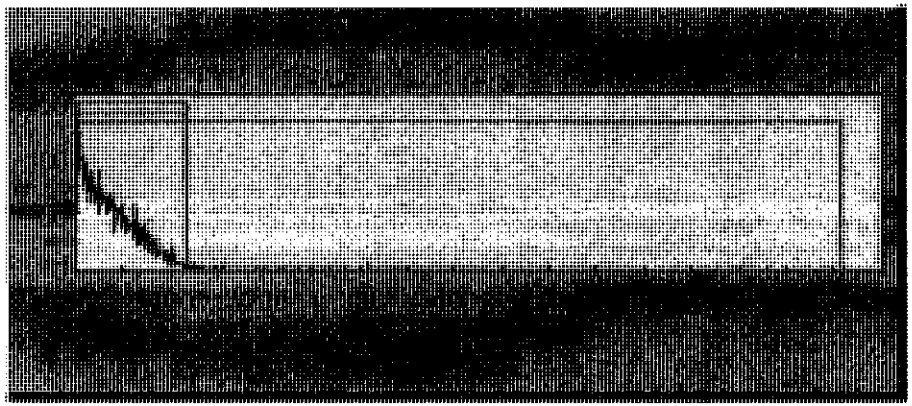
25 5 6 60.00 474340D-14 153.68 155 185.85 361.78 2.14 0:00:29 3
10/27/2011 8:52:14 AM 98.89

SpectraView Block Data

26 5 6 60.00 474341-14 163.67 166 182.89 343.61 2.07 0:00:30 3
10/27/2011 9:53:50 AM 98.51

SpectraView Block Data

010108



27	5	6	60.00	474341D-14	162.23	165	175.68	334.15		2.08	0:00:31	3
10/27/2011	10:55:22 AM		98.21									

SpectraView Block Data

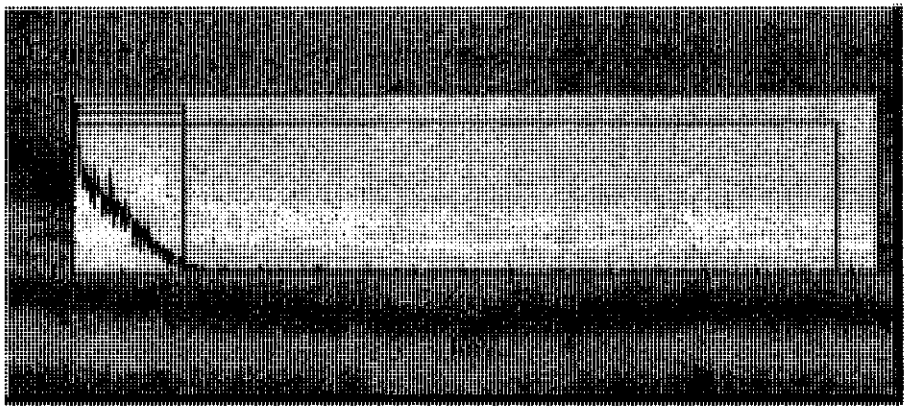
28	5	6	60.00	474344-14	162.38	164	181.25	356.57		2.08	0:00:33	3
10/27/2011	11:56:55 AM		98.78									

SpectraView Block Data

010109

29	5	6	60.00	474344D-14	160.50	164	185.89	330.59		2.09	0:00:34	3
10/27/2011	12:58:27 PM		98.06									

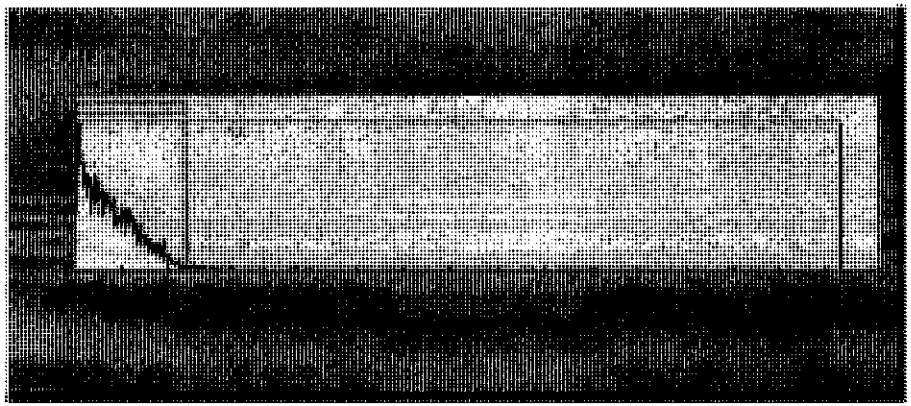
SpectraView Block Data



30	5	6	60.00	474401-14	162.06	164	181.51	347.20		2.08	0:00:35	3
10/27/2011	1:59:57 PM		98.59									

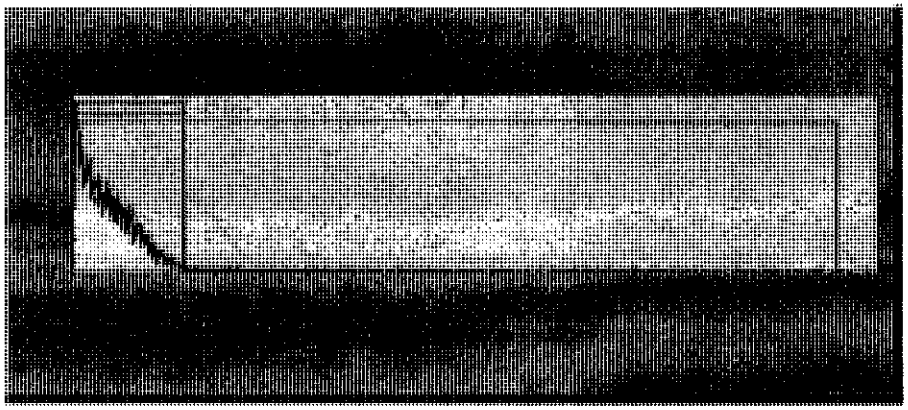
SpectraView Block Data

010110



31	5	6	60.00	474401D-14	158.92	161	187.67	349.54		2.11	0:00:36	3
10/27/2011	3:01:28 PM		98.64									

SpectraView Block Data



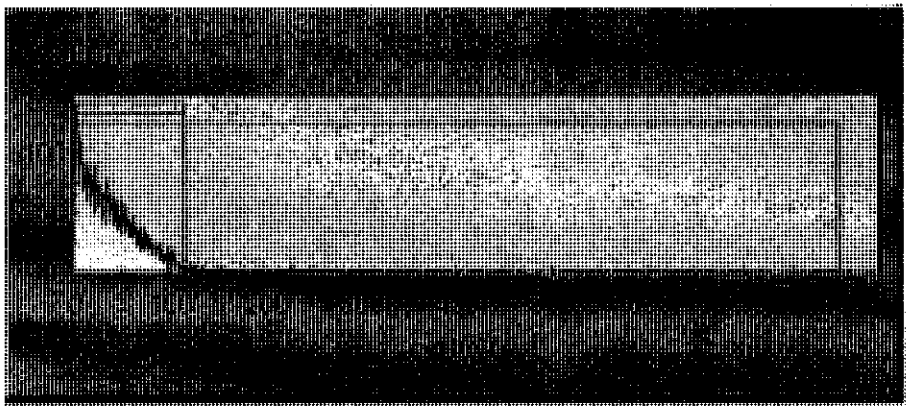
32	5	6	60.00	474402-14	158.30	161	174.80	348.55		2.11	0:00:37	3
10/27/2011	4:03:00 PM		98.62									

SpectraView Block Data

0101111

33 5 6 60.00 474402D-14 156.58 159 177.05 338.42 2.12 0:00:38 3
10/27/2011 5:04:32 PM 98.38

SpectraView Block Data



010112

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-243
Prep Date: 31-Oct-11 WAN √ WL

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Lab Id	Initial Sample Amount (L)	Digestion Final Volume (ml)	L/mL	Amount used for Column Sep. (mL)	Sample aliquot analyzed (L)	Total DF	No Tracer %Rec	No Tracer % error
PBWK31JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK31JV1	0.10	50.0	0.00200	50.0	0.100	10.00		
LCSWK31JV2	0.10	50.0	0.00200	50.0	0.100	10.00		
Blank-21	0.10	50.0	0.00200	50.0	0.100	10.00		
474212	0.10	50.0	0.00200	50.0	0.100	10.00		
474212D	0.10	50.0	0.00200	50.0	0.100	10.00		
474213	0.10	50.0	0.00200	50.0	0.100	10.00		
474213D	0.10	50.0	0.00200	50.0	0.100	10.00		
474214	0.10	50.0	0.00200	50.0	0.100	10.00		
474214D	0.10	50.0	0.00200	50.0	0.100	10.00		
474221	0.10	50.0	0.00200	50.0	0.100	10.00		
474221D	0.10	50.0	0.00200	50.0	0.100	10.00		
474222	0.10	50.0	0.00200	50.0	0.100	10.00		
474222D	0.10	50.0	0.00200	50.0	0.100	10.00		
474300	0.10	50.0	0.00200	50.0	0.100	10.00		
474300D	0.10	50.0	0.00200	50.0	0.100	10.00		
474301	0.10	50.0	0.00200	50.0	0.100	10.00		
474301D	0.10	50.0	0.00200	50.0	0.100	10.00		
474302	0.10	50.0	0.00200	50.0	0.100	10.00		
474302D	0.10	50.0	0.00200	50.0	0.100	10.00		
474340	0.10	50.0	0.00200	50.0	0.100	10.00		
474340D	0.10	50.0	0.00200	50.0	0.100	10.00		
474341	0.10	50.0	0.00200	50.0	0.100	10.00		
474341D	0.10	50.0	0.00200	50.0	0.100	10.00		
474344	0.10	50.0	0.00200	50.0	0.100	10.00		
474344D	0.10	50.0	0.00200	50.0	0.100	10.00		
474401	0.10	50.0	0.00200	50.0	0.100	10.00		
474401D	0.10	50.0	0.00200	50.0	0.100	10.00		
474402	0.10	50.0	0.00200	50.0	0.100	10.00		
474402D	0.10	50.0	0.00200	50.0	0.100	10.00		
	A	B	C	D	E	F		

Sample Calculations: C = (A / B) E = (C * D) F = (1 / E)

0101113

Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet

Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-243
Prep Date: 31-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Liquid Scintilliation Results

Lab Id	Analyte	Matrix	Time (m)	tSIE	Raw cpm	%error	dpm	eff-1	
BKG-1	Tc-99	Water	60	402.09	16.44	7.93	16.63	98.85	
BKG-2	Tc-99	Water	60	331.61	15.62	8.25	15.92	98.10	
				AVG BKG	16.03	AVG BKG	16.28		

		Matrix	Time	tSIE	cpm	%error	dpm	eff-1	Messages	Activity	TPU (1s)	MDC	Error (1s)	TV	%r	Bias
PBWK31JV1	Tc-99	Water	60	372.26	15.23	8.35	-0.81	98.98		-3.64E+00	3.29E+00	1.12E+01	3.28E+00		PB < 1.65*TPU	
LCSWK31JV1	Tc-99	Water	60	308.50	1109.41	0.78	1124.65	97.22		5.07E+03	2.93E+02	1.14E+01	2.01E+01	5000	101.3%	0.013
LCSWK31JV2	Tc-99	Water	60	383.52	1113.31	0.78	1109.15	98.93		5.00E+03	2.89E+02	1.12E+01	1.98E+01	5000	99.9%	-0.001
Blank-21	Tc-99	Water	60	396.87	179.02	1.98	164.84	98.88		7.43E+02	4.36E+01	1.12E+01	8.21E+00			
474212	Tc-99	Water	60	365.01	162.56	2.09	148.08	98.95		6.67E+02	3.93E+01	1.12E+01	7.85E+00	RPD	Dup Evaluation	
474212D	Tc-99	Water	60	399.36	159.38	2.11	144.99	98.87		6.53E+02	3.85E+01	1.12E+01	7.79E+00	2.11	0.25	Pass
474213	Tc-99	Water	60	346.97	164.05	2.07	150.15	98.58		6.76E+02	3.98E+01	1.12E+01	7.92E+00	RPD	Dup Evaluation	
474213D	Tc-99	Water	60	370.05	162.64	2.08	148.11	98.99		6.67E+02	3.93E+01	1.12E+01	7.85E+00	1.37	0.16	Pass
474214	Tc-99	Water	60	355.86	161.46	2.09	147.24	98.77		6.63E+02	3.90E+01	1.12E+01	7.84E+00	RPD	Dup Evaluation	
474214D	Tc-99	Water	60	385.41	157.76	2.12	143.28	98.92		6.45E+02	3.80E+01	1.12E+01	7.75E+00	2.73	0.33	Pass
474221	Tc-99	Water	60	378.23	161.32	2.09	146.83	98.95		6.61E+02	3.89E+01	1.12E+01	7.83E+00	RPD	Dup Evaluation	
474221D	Tc-99	Water	60	342.51	161.19	2.09	147.39	98.49		6.64E+02	3.91E+01	1.12E+01	7.86E+00	0.38	0.05	Pass
474222	Tc-99	Water	60	378.41	161.50	2.09	147.01	98.95		6.62E+02	3.90E+01	1.12E+01	7.83E+00	RPD	Dup Evaluation	
474222D	Tc-99	Water	60	369.94	160.53	2.10	145.97	98.99		6.58E+02	3.87E+01	1.12E+01	7.81E+00	0.71	0.09	Pass
474300	Tc-99	Water	60	387.87	156.30	2.13	141.82	98.91		6.39E+02	3.76E+01	1.12E+01	7.72E+00	RPD	Dup Evaluation	
474300D	Tc-99	Water	60	349.29	155.58	2.13	141.49	98.63		6.37E+02	3.76E+01	1.12E+01	7.72E+00	0.23	0.03	Pass
474301	Tc-99	Water	60	352.97	161.44	2.09	147.31	98.71		6.64E+02	3.91E+01	1.12E+01	7.85E+00	RPD	Dup Evaluation	
474301D	Tc-99	Water	60	356.59	158.49	2.11	144.22	98.78		6.50E+02	3.83E+01	1.12E+01	7.78E+00	2.12	0.25	Pass
474302	Tc-99	Water	60	356.56	158.78	2.11	144.51	98.78		6.51E+02	3.83E+01	1.12E+01	7.78E+00	RPD	Dup Evaluation	
474302D	Tc-99	Water	60	376.43	160.84	2.09	146.33	98.96		6.59E+02	3.88E+01	1.12E+01	7.82E+00	1.25	0.15	Pass
474340	Tc-99	Water	60	355.05	150.36	2.17	136.03	98.75		6.13E+02	3.61E+01	1.12E+01	7.60E+00	RPD	Dup Evaluation	
474340D	Tc-99	Water	60	365.32	146.42	2.20	131.76	98.96		5.94E+02	3.50E+01	1.12E+01	7.49E+00	3.19	0.38	Pass
474341	Tc-99	Water	60	365.45	158.61	2.11	144.08	98.96		6.49E+02	3.82E+01	1.12E+01	7.77E+00	RPD	Dup Evaluation	
474341D	Tc-99	Water	60	371.15	160.28	2.10	145.74	98.98		6.56E+02	3.86E+01	1.12E+01	7.80E+00	1.14	0.14	Pass
474344	Tc-99	Water	60	383.27	161.17	2.09	146.71	98.93		6.61E+02	3.89E+01	1.12E+01	7.82E+00	RPD	Dup Evaluation	
474344D	Tc-99	Water	60	399.25	163.30	2.08	148.95	98.87		6.71E+02	3.95E+01	1.12E+01	7.88E+00	1.52	0.18	Pass
474401	Tc-99	Water	60	355.21	161.30	2.09	147.11	98.75		6.63E+02	3.90E+01	1.12E+01	7.84E+00	RPD	Dup Evaluation	
474401D	Tc-99	Water	60	320.39	154.53	2.14	141.86	97.63		6.39E+02	3.77E+01	1.13E+01	7.78E+00	3.63	0.44	Pass
474402	Tc-99	Water	60	362.20	157.24	2.12	142.78	98.90		6.43E+02	3.79E+01	1.12E+01	7.74E+00	RPD	Dup Evaluation	
474402D	Tc-99	Water	60	346.63	154.55	2.14	140.52	98.58		6.33E+02	3.73E+01	1.12E+01	7.70E+00	1.60	0.19	Pass

Notes: Day #21 results.

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Southwest Research Institute, Division 1, Radiochemistry

LSC Bench Sheet
Tc-99

Client: Fluor-B&W Portsmouth
Task Order: 110830-12, 110831-5, 110901-7, 110902-3
Prep Page: 12-243
Prep Date: 31-Oct-11

Project #: 16526.05.00X
SRR: 45547, 45562, 45570, 45578
RL: 20 pCi/L
Units: L

Sample Calculations
dpm = cpm / (eff-1 / 100) - avg bkg dpm
Activity pCi/g = dpm * DF / 2.22 (dpm to pCi)
TPU pCi/L =SQRT(Counting Error^2+ (systematic TPU% /100) ^2*Sample Activity^2)
MDC pCi/g = (4.65*SQRT((AVG(bkg cpm))/time)/((Eff / 100)*Sample Amt)/2.22+3/(Eff /100*Sample Amt* Time))/ 2.22
Counting Error = SQRT(cpm/time + bkg cpm/bkg time)/ Sample Amount / (Eff/100 * 2.22)
(RPD) = Abs Value(Sample-Duplicate) / ((Sample + Duplicate) / 2) * 100
Duplicate Evaluation = (Sample-Duplicate) / sqrt ((TPUsample^2) + (TPUdup^2)) ≤ 3

TPU Factors	%
Aliquot Amount	2.00%
Standards	5.00%
Quench Curve	0.50%
Sub Sampling	2%
TPU of net Counts	5.77%

010115

Assay Definition

Assay Description:

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111101_0951
Raw Results Path: C:\Packard\Tricarb\Results\Default\99tc_dpm\20111101_0951\20111101_0951.results
Assay File Name: C:\Packard\TriCarb\Assays\99tc_dpm.lsa

Count Conditions

Nuclide: 99tc
  Quench Indicator: tSIE/AEC
  External Std Terminator (sec): 10 sec
  Pre-Count Delay (min): 0.00
Quench Set:
  Low Energy: 99Tc
Count Time (min): 60.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

Fluor B&W Portsmouth
16526.05.00X
TO# N0830-12, 110831-5, 110901-7, 110902-3
12-217
WAN

Background Subtract

Background Subtract: Off
Low CPM Threshold: Off
2 Sigma % Terminator: Off

Regions	LL	UL
A	0.0	292.0
B	0.0	292.0
C	0.0	2000.0

Count Corrections

Static Controller: On Luminescence Correction: On
Colored Samples: On Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Instrument Block Data

010116

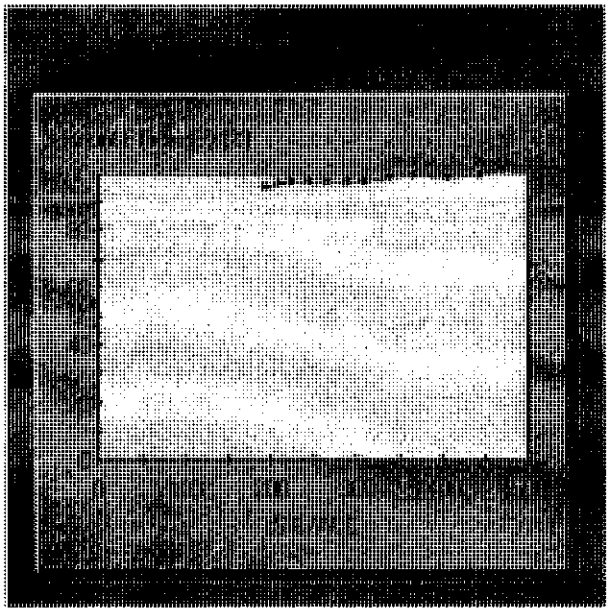
MODEL=Tri-Carb 3180TR/SL
VERSION=2.12
SERIAL=084368

IPA Block Data

Software Version IC: 2.12
Software Version EC: 3.00
Instrument Model: Tri-Carb 3180TR/SL
Instrument Serial Number: 084368
3H Chi Square: 15.47 Date Processed: 11/1/2011 9:37:00 AM
14C Chi Square: 22.26 Date Processed: 11/1/2011 9:37:00 AM
3H E^2/B (1-18.6 keV): 1536.52 Date Processed: 11/1/2011 9:37:00 AM
14C E^2/B (4-156 keV): 6056.23 Date Processed: 11/1/2011 9:37:00 AM
3H Efficiency (1-18.6 keV): 64.34 Date Processed: 11/1/2011 9:37:00 AM
14C Efficiency (4-156 keV): 93.24 Date Processed: 11/1/2011 9:37:00 AM
IPA Background Date Processed: 11/1/2011 9:37:00 AM
3H Background CPM (1-18.6 keV): 2.69 Date Processed: 11/1/2011 9:37:00 AM
14C Background CPM (4-156 keV): 1.44 Date Processed: 11/1/2011 9:37:00 AM
3H Calibration DPM: 281700
3H Reference Date: 6/27/2008
14C Calibration DPM: 123000

Cycle 1 Results
Quench Curve Block Data

010117



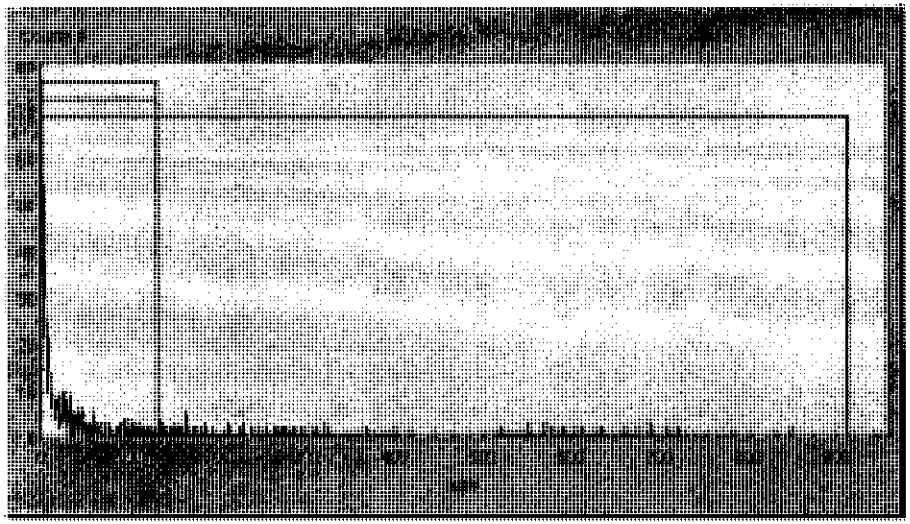
Date Acquired: 02/15/2011
Date Modified:
99Tc in A

tSIE/AEC	Count Efficiency (%)
443.42	99.12
406.31	98.84
367.18	99.00
339.52	98.43
310.34	97.21
291.55	97.35
267.03	97.31
246.83	97.51
224.44	96.91
211.47	96.41
195.92	95.37

S#	P#	PID	Count Time	SMPL ID	CPMA	DPM1	SIS	tSIE	MESSAGES	A:2S%	ELTIME	LUM
DATE			TIME Eff Nucl In A									
1	5	1	60.00	Bkg-1	16.44	17	463.32	402.09		7.93	1:01:32	16
11/1/2011			9:52:18 AM 98.85									

010118

SpectraView Block Data



2	5	1	60.00		Bkg-2	15.62	16	436.81	331.61		8.25	2:03:02	16
11/1/2011	10:53:50 AM		98.10										

SpectraView Block Data

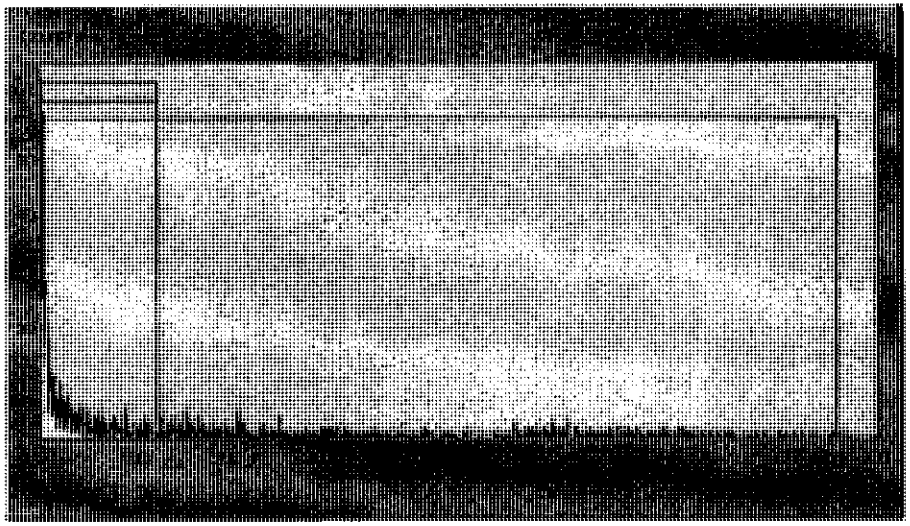
010119

Missing vial 3.

4	5	1	60.00	PBWK31JV1	15.23	15	495.75	372.26		8.35	3:04:33	16

11/1/2011 11:55:21 AM 98.98

SpectraView Block Data



010120

5	5	1	60.00	LCSWK31JV1	1109.41	1141	120.78	308.50		0.78	4:06:10	0
11/1/2011	12:56:51 PM			97.22								

SpectraView Block Data

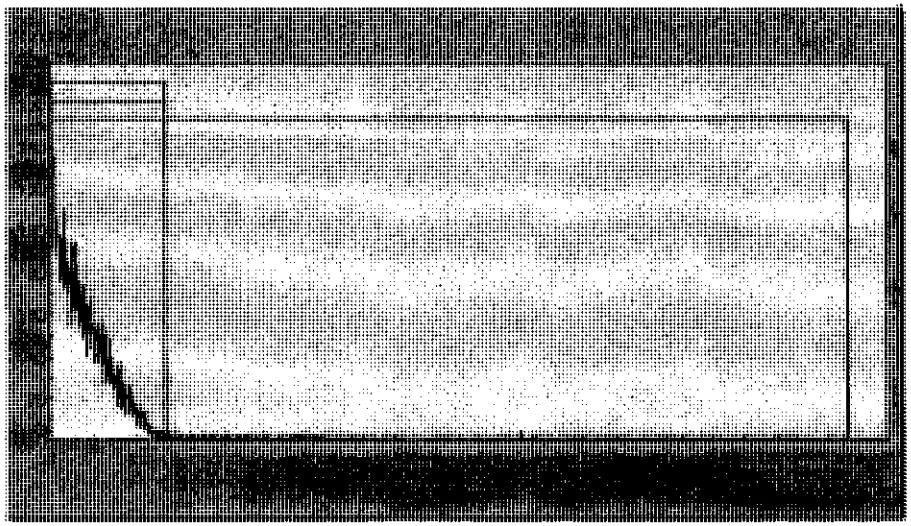
6	5	1	60.00	LCSWK31JV2	1113.31	1125	136.34	383.52		0.78	5:07:44	0
11/1/2011	1:58:29 PM			98.93								

SpectraView Block Data

0101121

7	5	1	60.00	Blank Day #21	179.02	181	180.78	396.87		1.98	6:10:13	3
11/1/2011	3:00:02 PM		98.88									

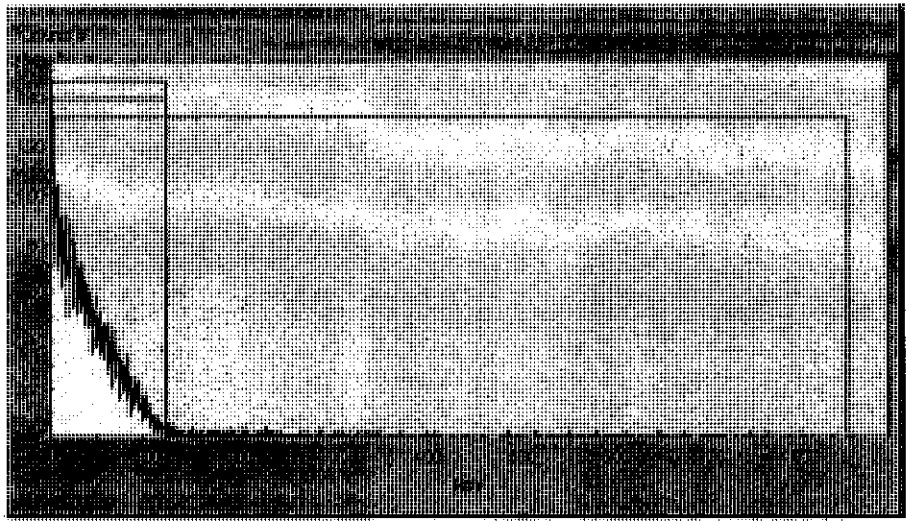
SpectraView Block Data



010122

8	5	1	60.00	474212 -21	162.56	164	186.50	365.01		2.09	7:12:43	3
11/1/2011	4:02:31 PM			98.95								

SpectraView Block Data



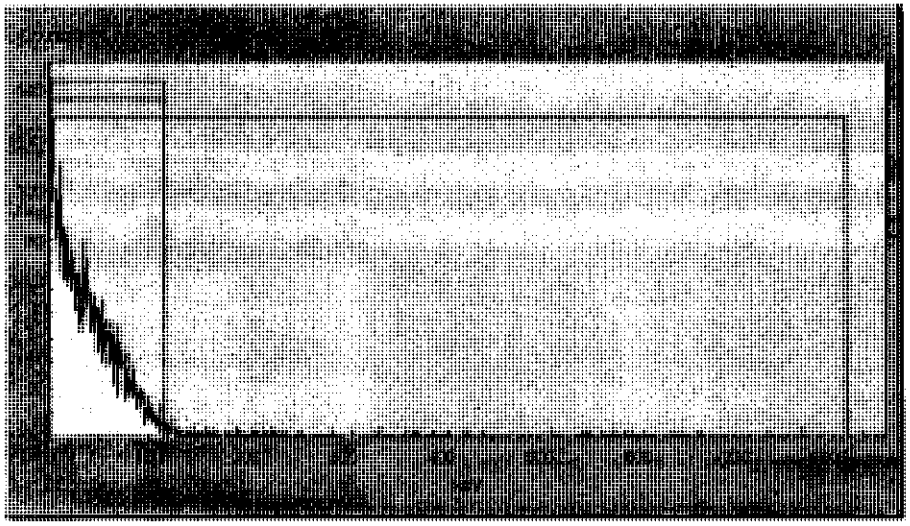
9	5	1	60.00	474212D-21	159.38	161	185.70	399.36		2.11	8:15:12	3
11/1/2011	5:05:01 PM			98.87								

SpectraView Block Data

010123

10	5	1	60.00	474213-21	164.05	166	184.25	346.97	2.07	9:17:42	3
11/1/2011	6:07:30 PM		98.58								

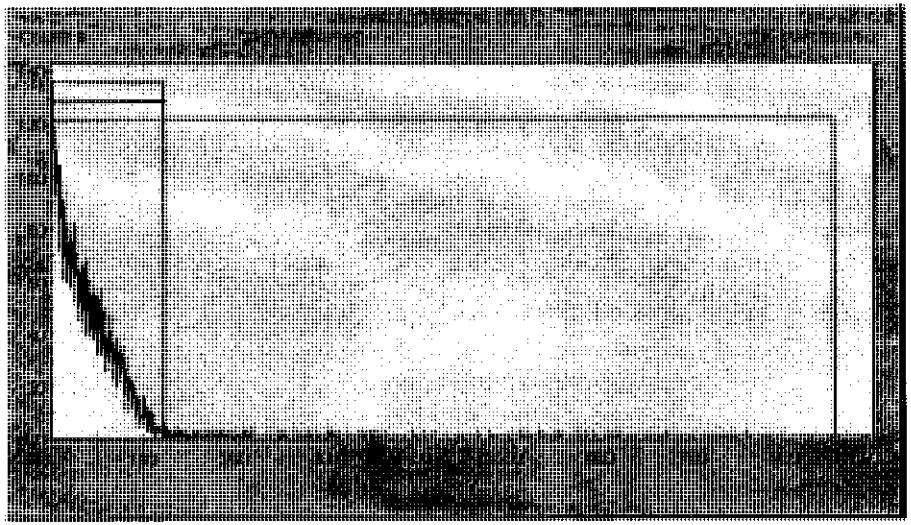
SpectraView Block Data



010124

11	5	1	60.00	474213D-21	162.64	164	186.88	370.05		2.08	10:20:08	3
11/1/2011		7:09:59 PM		98.99								

SpectraView Block Data



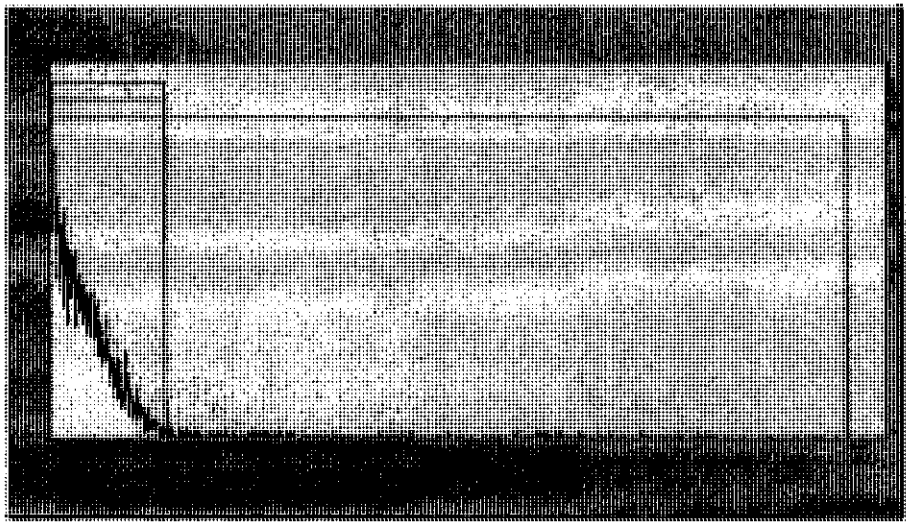
12	5	1	60.00	474214-21	161.46	163	188.10	355.86		2.09	11:22:35	3
11/1/2011		8:12:26 PM		98.77								

SpectraView Block Data

010125

13	5	14	60.00	474214D-21	157.76	159	186.26	385.41		2.12	12:25:08	3
11/1/2011	9:14:58 PM		98.92									

SpectraView Block Data



010126

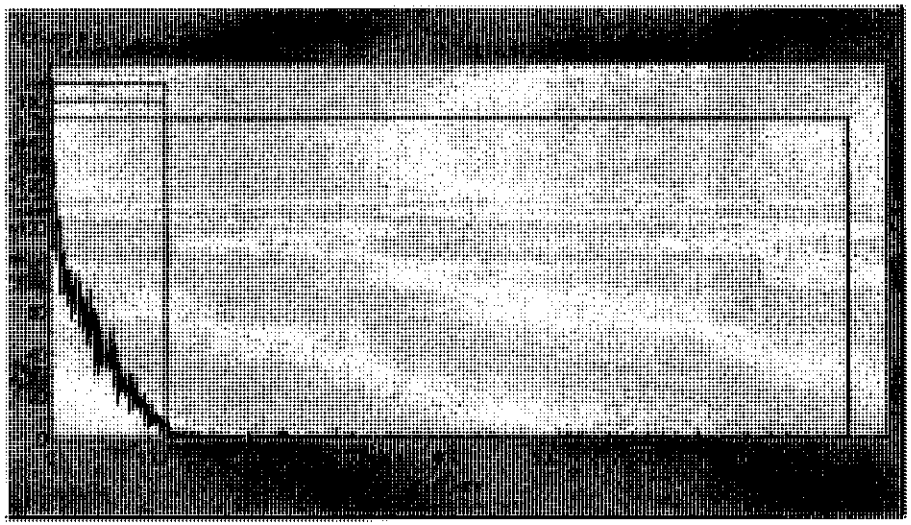
14	5	14	60.00	474221-21	161.32	163	190.90	378.23		2.09	13:27:39	3
11/1/2011	10:17:27 PM			98.95								

SpectraView Block Data

15	5	14	60.00	474221D-21	161.19	164	182.18	342.51		2.09	14:30:05	3
11/1/2011	11:19:57 PM			98.49								

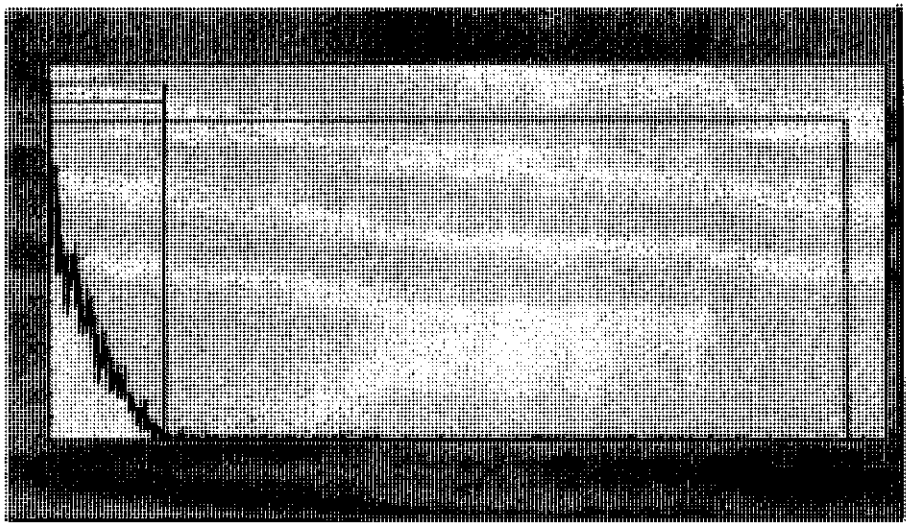
SpectraView Block Data

010127



16	5	14	60.00	474222-21	161.50	163	178.89	378.41		2.09	15:31:36	3
11/2/2011	12:22:23 AM		98.95									

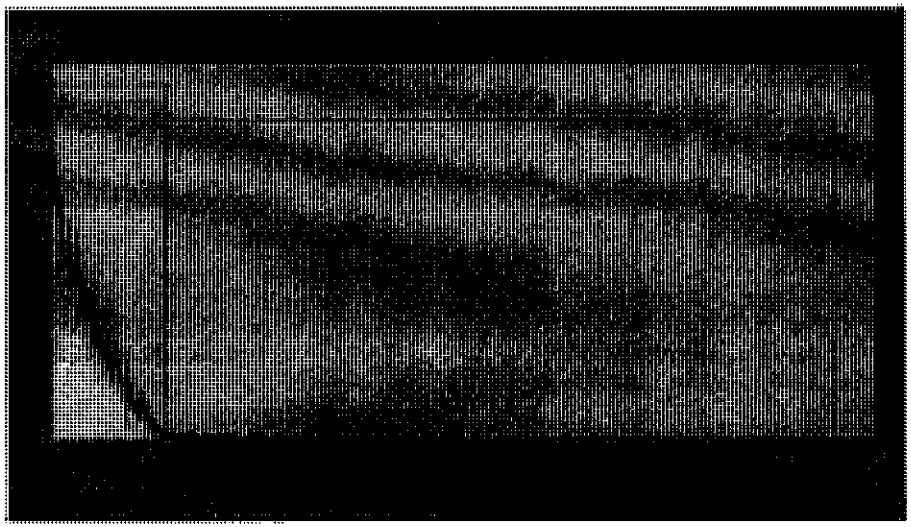
SpectraView Block Data



010128

17	5	14	60.00	474222D-21	160.53	162	179.56	369.94	2.10	16:33:58	3
11/2/2011	1:23:54 AM			98.99							

SpectraView Block Data



18	5	14	60.00	474300-21	156.30	158	183.73	387.87	2.13	17:36:17	3
11/2/2011	2:26:16 AM			98.91							

SpectraView Block Data

010129

19	5	14	60.00	474300D-21	155.58	158	185.60	349.29		2.13	18:38:29	3
11/2/2011	3:28:35 AM		98.63									

SpectraView Block Data

0101130

20	5	14	60.00	474301-21	161.44	164	186.49	352.97		2.09	19:40:42	3
11/2/2011	4:30:47 AM		98.71									

SpectraView Block Data

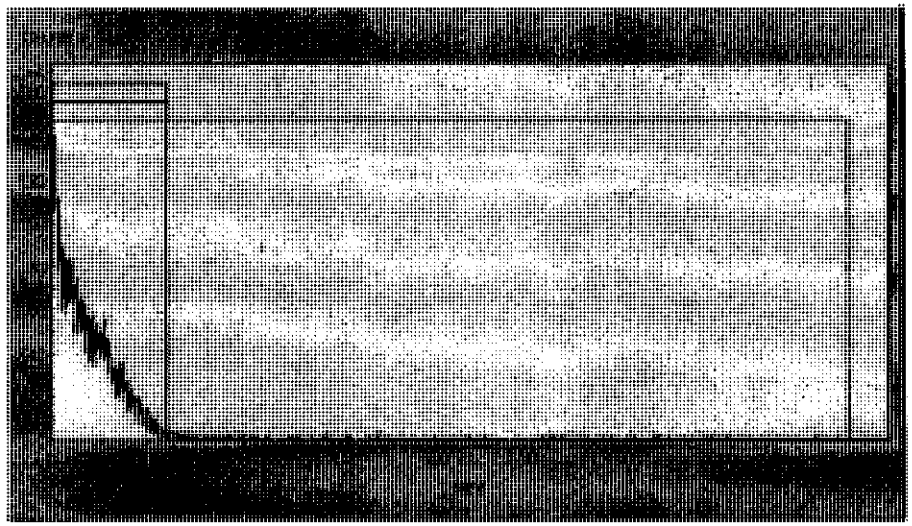
21	5	14	60.00	474301D-21	158.49	160	184.57	356.59		2.11	20:42:40	3
11/2/2011	5:33:00 AM		98.78									

SpectraView Block Data

0101131

22	5	14	60.00	474302-21	158.78	161	177.15	356.56		2.11	21:44:43	3
11/2/2011	6:34:59 AM		98.78									

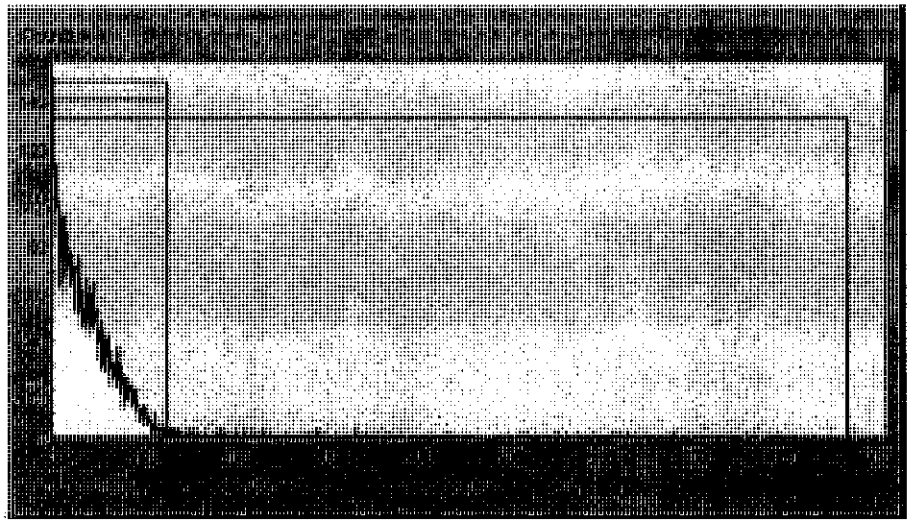
SpectraView Block Data



010132

23	5	14	60.00	474302D-21	160.84	163	180.86	376.43		2.09	22:46:35	3
11/2/2011	7:37:01 AM			98.96								

SpectraView Block Data



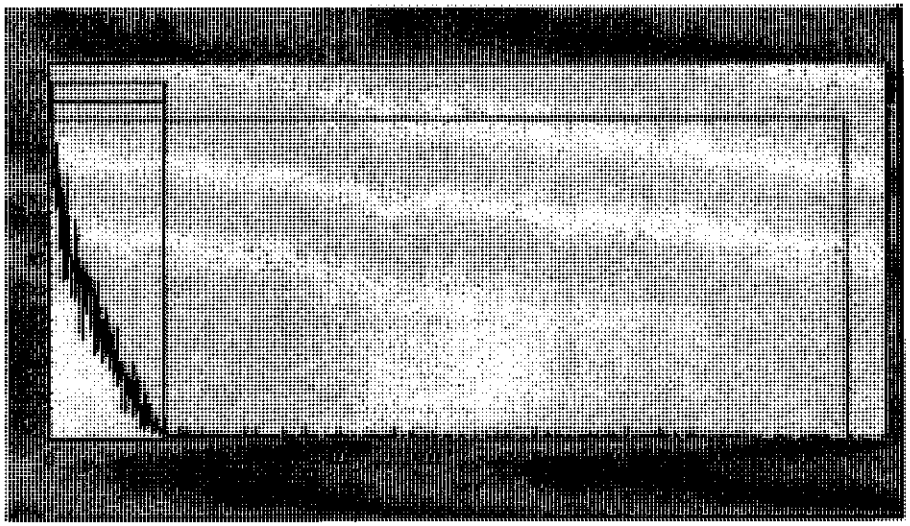
24	5	14	60.00	474340-21	150.36	152	185.28	355.05		2.17	23:48:41	3
11/2/2011	8:38:52 AM			98.75								

SpectraView Block Data

010133

25	5	6	60.00	474340D-21	146.42	148	190.02	365.32		2.20	24:50:54	3
11/2/2011	9:41:05 AM			98.96								

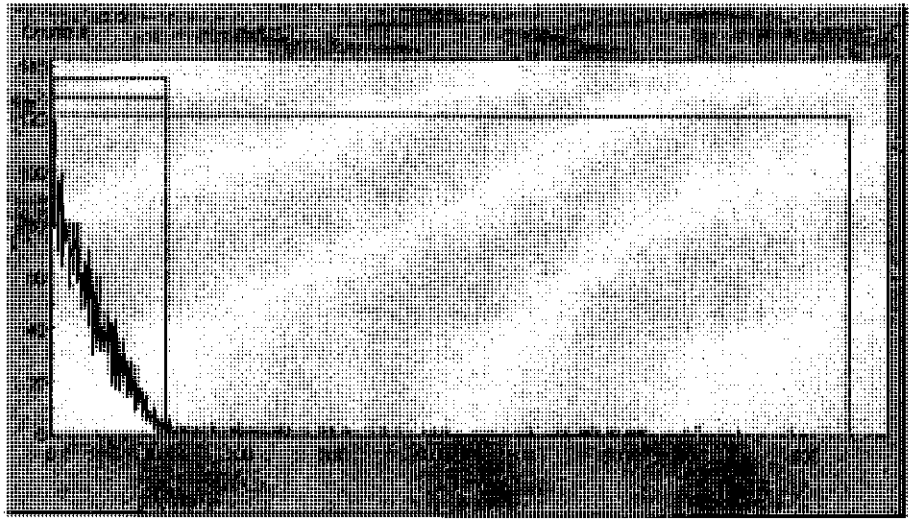
SpectraView Block Data



0101134

26	5	6	60.00	474341-21	158.61	160	184.94	365.45		2.11	25:52:48	3
11/2/2011	10:43:12 AM			98.96								

SpectraView Block Data



27	5	6	60.00	474341D-21	160.28	162	181.58	371.15		2.10	26:54:39	3
11/2/2011	11:45:06 AM			98.98								

SpectraView Block Data

0101135

28	5	6	60.00	474344-21	161.17	163	185.14	383.27		2.09	27:56:30	3
11/2/2011	12:46:57 PM		98.93									

SpectraView Block Data

010136

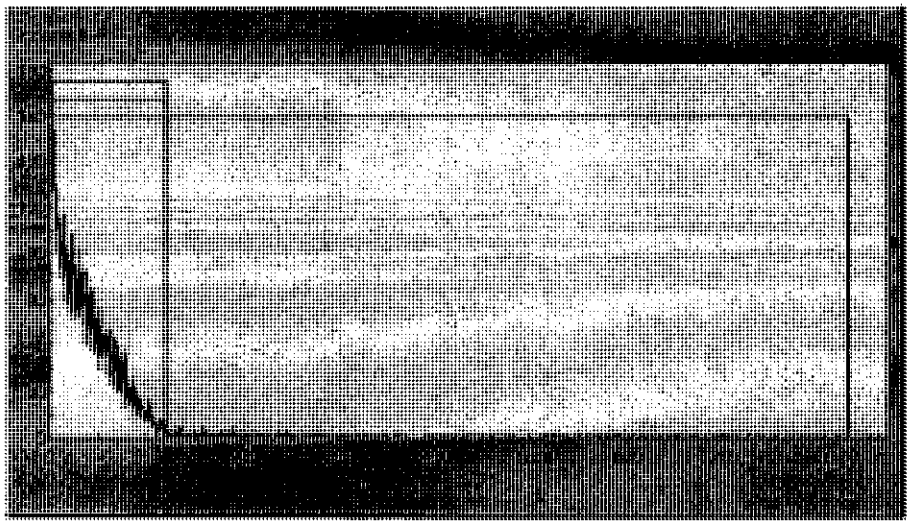
29	5	6	60.00	474344D-21	163.30	165	186.28	399.25		2.08	28:58:25	3
11/2/2011	1:48:48 PM			98.87								

SpectraView Block Data

30	5	6	60.00	474401-21	161.30	163	183.85	355.21		2.09	30:00:21	3
11/2/2011	2:50:42 PM			98.75								

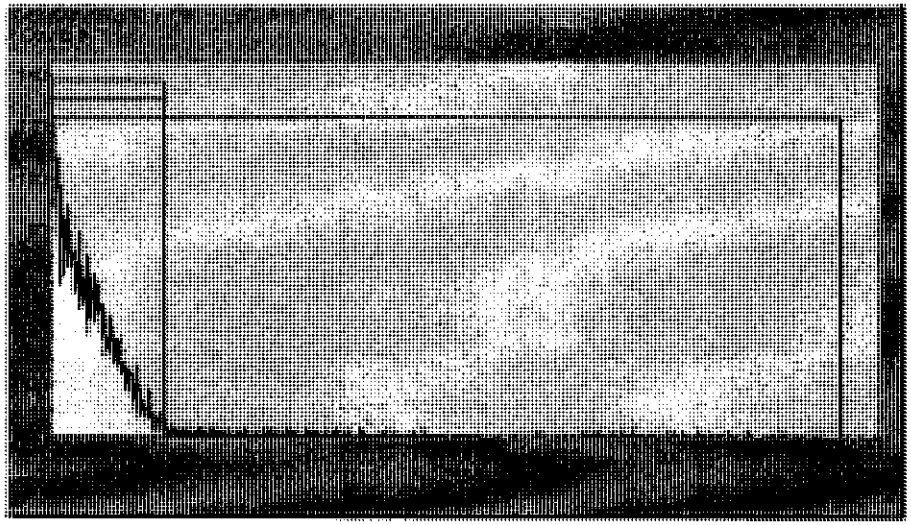
SpectraView Block Data

0101137



31	5	6	60.00	474401D-21	154.53	158	175.26	320.39		2.14	31:02:07	3
11/2/2011	3:52:39 PM			97.63								

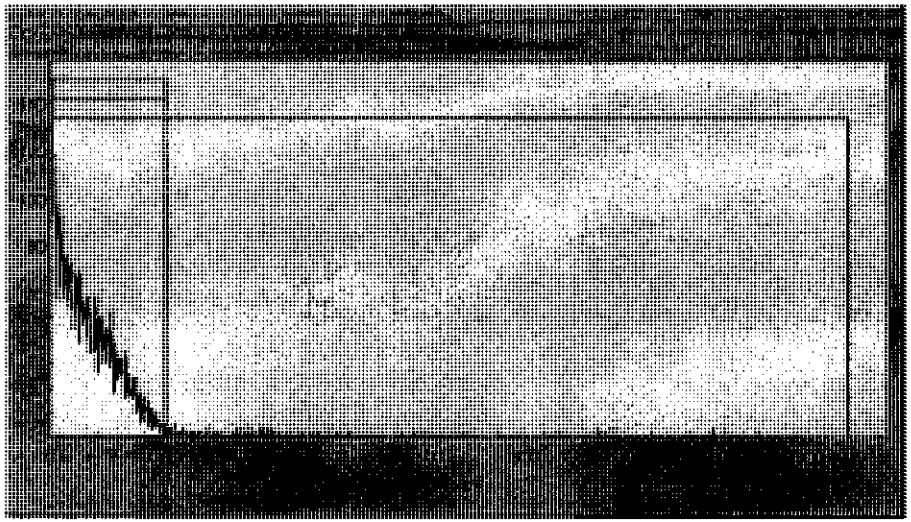
SpectraView Block Data



010138

32	5	6	60.00	474402-21	157.24	159	182.88	362.20		2.12	32:03:49	3
11/2/2011	4:54:25 PM			98.90								

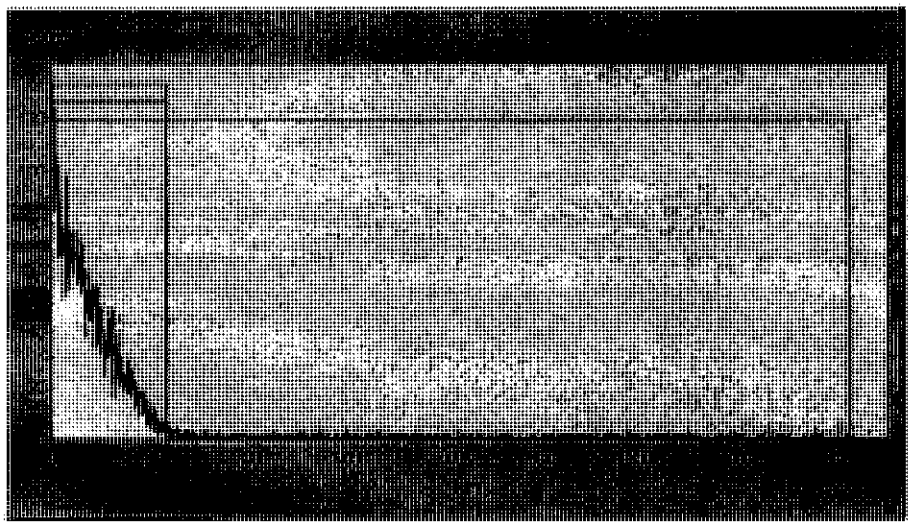
SpectraView Block Data



33	5	6	60.00	474402D-21	154.55	157	180.38	346.63		2.14	33:05:21	3
11/2/2011	5:56:07 PM			98.58								

SpectraView Block Data

010139



010140

Tc99
Prep Logs

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

DOE/PPPO/03-0246&D3
FBP-ER-RIFS-WD-RPT-0030
Revision 5
February 2014

010142

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00243___

CLIENT(S): FLOOR B&W PORTSMOUTH (KD DAY #21)
TASK ORDER(S): 110830-7, 110831-5, 110901-7, SDG(S): 3 | 47421Z, 45562
PROJECT NO(S): 16526.05.006
METHOD: TC 99
TAP: 01-0411-049 REV. # 4
MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER KD SOIL
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS _____ OTHER _____
ACID INORG #: HNO_3# ✓ HCl# _____ H_2SO_4# _____ $HClO_4$# _____ HF# _____ H_2O_2# ✓ 9285
Tracer(s): N/A * 0.5mL of TC 99, 038 RAD SOL 3 WAS SPIKED.
Oven/Hotplate/ Block ID: # 4 Temperature (°C): 130°C

1	FBW K31 JV1	100mL	50mL	27	47401 (21)	100mL	50mL
2	LCS FBW K31 JV1 *			28	401 Dup.		
3	LCS FBW K31 JV2 *			29	402		
4	BLANK DAY #21			30	✓ 402 Dup. ✓		
5	47421Z (DAY #21)						
6	212 Dup.			PIPETTES: 5000, 1000, 200			
7	213						
8	213 Dup.						
9	214						
10	214 Dup.						
11	221						
12	221 Dup.						
13	222						
14	222 Dup.						
15	300						
16	300 Dup.						
17	301						
18	301 Dup.						
19	302						
20	302 Dup.						
21	340						
22	340 Dup						
23	341						
24	341 Dup.						
25	344						
26	✓ 344 Dup. ✓	✓	✓				

PREPARED BY: _____ DATE: 10/31/11
REVIEWED BY: _____ DATE: 11.1.11
LOCATION: _____ DISPOSAL: _____

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010143

Book I.D. 11-0406-033 BOOK / PAGE: 12 00238

CLIENT(S): FLUOR B&W PORTSMOUTH (DAY #14) KD

TASK ORDER(S): 110830-7, 110831-5, 110901-7, 110902-3 SDG(S): 474212, 45562

PROJECT NO(S): 16526.05.006

METHOD: Tc 99

TAP: 01-0411-049 REV. #4

MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER KD SOIL

INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___

ACID INORG #: HNO_3# 9387 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# 9495

Tracer(s): N/A * 0.5 mL of Tc 99 033 RAD SOL 3 WAS SPIKED

Oven/Hotplate/ Block ID: #4 Temperature (°C): 130°C

	SAMPLE ID	ALIQUOT	FV. (M HNO_3)		SAMPLE ID	ALIQUOT	FV IN M HNO_3
1	PBWK24JV3	100mL	50mL	(27)	474401	100mL	50mL
2	LCSWK24JV4* (DAY #11)			(28)	401Dup		
3	LCSWK24JV5* (DAY #14)			(29)	402		
4	BLANK DAY #14 (DAY #14)			(30)	402Dup.		
5	474212 (DAY #14)						
6	474212 Dup (DAY #14)				PIPETTES: 5000-A, 1000-M, 200-2		
7	474213						
8	213 Dup						
9	214						
10	214 Dup						
11	221						
12	221 Dup						
13	222						
14	222 Dup						
15	300						
16	300 Dup.						
17	301						
18	301 Dup.						
19	302						
20	302 Dup.						
21	340						
22	340 Dup.						
23	341						
24	341 Dup						
25	344						
26	344 Dup.						

10/24/11

PREPARED BY: JW DATE: 10/24/11

REVIEWED BY: Wesley Jones DATE: 10.26.11

LOCATION: ___ DISPOSAL: ___

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

010144

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00223___

CLIENT(S): FLUOR B&W PORTS MOUTH (KD), DAY #10
TASK ORDER(S): 110830-12, 1K, 110831-5, 110901-7, 110902-3 SDG(S): 474212, 475162, 474212, 474212
PROJECT NO(S): 16526.05.006
METHOD: Tc 99
TAP: 01-0411-049 REV #4
MATRIX: Water ___ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER "KD" SOIL
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___
ACID INORG #: HNO_3# ✓9388 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# ✓9083
Tracer(s): N/A * 0.5mL of Tc99 038 RAD Sol. 3. WAS SPIKED.
Oven/Hotplate/ Block ID: #6 Temperature (°C): 130°C

	SAMPLE ID	Aliquot (mL)	Fin. Vol. HNO_3		SAMPLE ID	Aliquot	Fin. Vol. HNO_3
1	PBW KB-JW118	100mL	50mL	(27)	474401 (Day#10)	100mL	50mL
2	LCSW KB-JW118 *			(28)	401 Dup.		
3	LCSW KB-JW12 *			(29)	402		
4	BLANK DAY #18			(30)	402 Dup.		
5	474212 (Day#10)						
6	212 Dup.				PIPETTES: 5000-A, 1000-L, 200-K		
7	213						
8	213 Dup.						
9	214						
10	214 Dup.						
11	221						
12	221 Dup.						
13	222						
14	222 Dup.						
15	300						
16	300 Dup.						
17	301						
18	301 Dup.						
19	302						
20	302 Dup.						
21	340						
22	340 Dup.						
23	341						
24	341 Dup						
25	344						
26	344 Dup						

10/18/11

PREPARED BY: _____ DATE: 10/18/11
REVIEWED BY: _____ DATE: 10/24/11
LOCATION: _____ DISPOSAL: _____

SOUTHWEST RESEARCH INSTITUTE
RADIOCHEMISTRY SAMPLE PREPARATION LOG

0100145

Book I.D._11-0406-033_____ BOOK / PAGE:__12 00222___

CLIENT(S): FLUOR B&W PORTSMOUTH (DAY #7, KD)
TASK ORDER(S): 110830-12, 110831-5, 110901-7, 110902-3 SDG(S): 474212, 45562
PROJECT NO(S): 16526.05.006
METHOD: Tc-99
TAP: DI-0411-049 Rev. #4 DI DE 10/24/11
MATRIX: Water ✓ Soil ✓ Biota ___ Solid ___ Liquid ___ TCLP Ext ___ OTHER "KD" SOLID SOIL
INSTRUMENT: Gamma ___ Alpha ___ LSC ✓ GPC ___ ICP/MS ___ OTHER ___
ACID INORG #: HNO_3# 9388 HCl# ___ H_2SO_4# ___ $HClO_4$# ___ HF# ___ H_2O_2# 9093
Tracer(s): N/A * 0.5mL Tc 99 038 RAD SOL 3 WAS SPIKED
Oven/Hotplate/ Block ID: #6 Temperature (°C): 130°C

	SAMPLE ID	ALIQUOT	FV. 1M HNO_3		SAMPLE ID	ALIQUOT	FV. 1M HNO_3
1	PBWK17JV1	100mL	50mL	(27)	474344Dup.	100mL	50mL
2	LCSWK17JV1*	↓	↓	(28)	474401	↓	↓
3	LCSWK17JV2*	↓	↓	(29)	401Dup.	↓	↓
4	BLANK DAY Ø***	50mL**	↓	(30)	402	↓	↓
5	BLANK H_2O DAY #7	100mL	↓	(31)	402Dup.	↓	↓
6	474212 (DAY #7)	↓	↓				
7	212 Dup.	↓	↓				
8	213	↓	↓				
9	213 Dup.	↓	↓				
10	214	↓	↓				
11	214 Dup.	↓	↓				
12	221	↓	↓				
13	221 Dup.	↓	↓				
14	222	↓	↓				
16	474222 Dup.	↓	↓				
16	474300	↓	↓				
17	300 Dup.	↓	↓				
18	301	↓	↓				
19	301 Dup.	↓	↓				
20	302	↓	↓				
21	302 Dup.	↓	↓				
22	340	↓	↓				
23	340 Dup.	↓	↓				
24	341	↓	↓				
25	341 Dup.	↓	↓				
26	344	↓	↓				

** NOTE: ** 50% OF SAMPLE BLANK DAY Ø WAS "LOST" DURING COLUMN CLEAN-UP.

PIPETTES: 5000-A, 1000-M, 200-L

PREPARED BY: _____ DATE: 10/17/11
REVIEWED BY: _____ DATE: 10/24/11
LOCATION: _____ DISPOSAL: _____

ICPMS Total U Data for Distribution Coefficient

Fluor
16526.0S.006
110830-12/110831-5/110901-7/110902-3
1S_00146-15_001S2

10/31/11

474212d7 For total

2391 0.2ng/L x df 4 = 95640.8 ng/L = 95600 ng/L

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
icv	U-tot	7730			ng/L	40		100.8%	7670		40	7733.8213	7730	1	40	7733.8213	10/28/11	11:49 AM
icv	U233 IS	101			%R	0.5					0.5	100.60169	101	1	0.5	100.60169	10/28/11	11:49 AM
icb	U-tot	40.0	U		ng/L	40					40	-6.96812	-6.97	1	40	-6.96812	10/28/11	11:51 AM
icb	U233 IS	100			%R	0.5					0.5	100.32264	100	1	0.5	100.32264	10/28/11	11:51 AM
critotU	U-tot	40.0	U		ng/L	40		82.5%	40.0		40	33.0075	33	1	40	33.0075	10/28/11	11:53 AM
critotU	U233 IS	103			%R	0.5					0.5	102.89513	103	1	0.5	102.89513	10/28/11	11:53 AM
icsa	U-tot	40.0	U		ng/L	40			0		40	0.64052	0.641	1	40	0.64052	10/28/11	11:56 AM
icsa	U233 IS	102			%R	0.5					0.5	101.54348	102	1	0.5	101.54348	10/28/11	11:56 AM
icsab	U-tot	20400			ng/L	40		100.0%	20400		40	20353.58874	20400	1	40	20353.58874	10/28/11	11:58 AM
icsab	U233 IS	109			%R	0.5					0.5	109.11281	109	1	0.5	109.11281	10/28/11	11:58 AM
zzz	U-tot	40.0	U		ng/L	40					40	-13.22961	-13.2	1	40	-13.22961	10/28/11	12:01 PM
zzz	U233 IS	107			%R	0.5					0.5	107.15942	107	1	0.5	107.15942	10/28/11	12:01 PM
ccv	U-tot	7710			ng/L	40		100.5%	7670		40	7713.67203	7710	1	40	7713.67203	10/28/11	12:03 PM
ccv	U233 IS	114			%R	0.5					0.5	114.45858	114	1	0.5	114.45858	10/28/11	12:03 PM
ccb	U-tot	40.0	U		ng/L	40					40	-10.52386	-10.5	1	40	-10.52386	10/28/11	12:05 PM
ccb	U233 IS	107			%R	0.5					0.5	106.92396	107	1	0.5	106.92396	10/28/11	12:05 PM
Blankd0	U-tot	102000			ng/L	160				6903	40	102257.4628	102000	4	160	25564.36569	10/28/11	12:08 PM
Blankd0	U233 IS	107			%R	0.5					0.5	107.18557	107	4	0.5	107.18557	10/28/11	12:08 PM
Blankd7	U-tot	103000			ng/L	160				6973	40	103291.3256	103000	4	160	25822.83139	10/28/11	12:10 PM
Blankd7	U233 IS	106			%R	0.5					0.5	105.69438	106	4	0.5	105.69438	10/28/11	12:10 PM
474212d7	U-tot	95600	✓		ng/L	160				6456	40	95640.67756	95600	4	160	23910.16939	10/28/11	12:12 PM
474212d7	U233 IS	105			%R	0.5					0.5	104.88338	105	4	0.5	104.88338	10/28/11	12:12 PM
474212d7d	U-tot	95100			ng/L	160	0.5%			6421	40	95122.28912	95100	4	160	23780.57228	10/28/11	12:14 PM
474212d7d	U233 IS	104			%R	0.5					0.5	104.29911	104	4	0.5	104.29911	10/28/11	12:14 PM
474213d7	U-tot	76200			ng/L	160				5142	40	76173.1766	76200	4	160	19043.29415	10/28/11	12:17 PM
474213d7	U233 IS	103			%R	0.5					0.5	102.51143	103	4	0.5	102.51143	10/28/11	12:17 PM
474213d7d	U-tot	74600			ng/L	160	2.1%			5033	40	74552.85888	74600	4	160	18638.21472	10/28/11	12:19 PM
474213d7d	U233 IS	102			%R	0.5					0.5	102.24983	102	4	0.5	102.24983	10/28/11	12:19 PM
474214d7	U-tot	34000			ng/L	40				2292	40	33953.24136	34000	1	40	33953.24136	10/28/11	12:21 PM
474214d7	U233 IS	102			%R	0.5					0.5	102.47656	102	1	0.5	102.47656	10/28/11	12:21 PM
474214d7d	U-tot	31600			ng/L	40	7.3%			2132	40	31585.22379	31600	1	40	31585.22379	10/28/11	12:24 PM
474214d7d	U233 IS	103			%R	0.5					0.5	102.93873	103	1	0.5	102.93873	10/28/11	12:24 PM
zzz	U-tot	40.0	U		ng/L	40					40	-6.01212	-6.01	1	40	-6.01212	10/28/11	12:26 PM
zzz	U233 IS	102			%R	0.5					0.5	102.41551	102	1	0.5	102.41551	10/28/11	12:26 PM
critotU	U-tot	40.0	U		ng/L	40		77.9%	40.0		40	31.16525	31.2	1	40	31.16525	10/28/11	12:28 PM
critotU	U233 IS	106			%R	0.5					0.5	106.12168	106	1	0.5	106.12168	10/28/11	12:28 PM
ccv	U-tot	7930			ng/L	40		103.4%	7670		40	7929.63502	7930	1	40	7929.63502	10/28/11	12:31 PM
ccv	U233 IS	108			%R	0.5					0.5	108.34541	108	1	0.5	108.34541	10/28/11	12:31 PM
ccb	U-tot	40.0	U		ng/L	40					40	-7.07225	-7.07	1	40	-7.07225	10/28/11	12:33 PM
ccb	U233 IS	104			%R	0.5					0.5	103.81077	104	1	0.5	103.81077	10/28/11	12:33 PM
474221d7	U-tot	56000			ng/L	160				3780	40	55983.18768	56000	4	160	13995.79692	10/28/11	12:36 PM

✓RSDW 10/31/11

Y:\METALS\Nicholle\Fluor\Fluor 110830(12) 110831(5) 110901(7) 110902(3).d7

0101447

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (D)	Units	RL	%RPD	%Recovery	TV	uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
474221d7	U233 IS	102			%R	0.5					0.5	101.99693	102	4	0.5	101.99693	10/28/11	12:36 PM
474221d7d	U-tot	54700			ng/L	160	2.3%			3695	40	54729.72736	54700	4	160	13682.43184	10/28/11	12:38 PM
474221d7d	U233 IS	104			%R	0.5					0.5	104.45608	104	4	0.5	104.45608	10/28/11	12:38 PM
474222d7	U-tot	53700			ng/L	160				3623	40	53655.09652	53700	4	160	13413.77413	10/28/11	12:40 PM
474222d7	U233 IS	104			%R	0.5					0.5	103.84565	104	4	0.5	103.84565	10/28/11	12:40 PM
474222d7d	U-tot	51200			ng/L	160	4.8%			3459	40	51236.20408	51200	4	160	12809.05102	10/28/11	12:42 PM
474222d7d	U233 IS	104			%R	0.5					0.5	103.95029	104	4	0.5	103.95029	10/28/11	12:42 PM
474300d7	U-tot	88600			ng/L	160				5981	40	88594.11392	88600	4	160	22148.52848	10/28/11	12:45 PM
474300d7	U233 IS	104			%R	0.5					0.5	104.25551	104	4	0.5	104.25551	10/28/11	12:45 PM
474300d7d	U-tot	87600			ng/L	160	1.1%			5916	40	87641.39168	87600	4	160	21910.34792	10/28/11	12:47 PM
474300d7d	U233 IS	101			%R	0.5					0.5	100.93306	101	4	0.5	100.93306	10/28/11	12:47 PM
474301d7	U-tot	83300			ng/L	160				5623	40	83288.80968	83300	4	160	20822.20242	10/28/11	12:49 PM
474301d7	U233 IS	104			%R	0.5					0.5	104.14215	104	4	0.5	104.14215	10/28/11	12:49 PM
474301d7d	U-tot	80100			ng/L	160	3.9%			5410	40	80142.6776	80100	4	160	20035.6694	10/28/11	12:52 PM
474301d7d	U233 IS	105			%R	0.5					0.5	105.46765	105	4	0.5	105.46765	10/28/11	12:52 PM
zzz	U-tot	40.0	U		ng/L	40					40	-1.80082	-1.8	1	40	-1.80082	10/28/11	12:54 PM
zzz	U233 IS	106			%R	0.5					0.5	106.25248	106	1	0.5	106.25248	10/28/11	12:54 PM
critotU	U-tot	40.0	U		ng/L	40		86.1%	40.0		40	34.45912	34.5	1	40	34.45912	10/28/11	12:56 PM
critotU	U233 IS	108			%R	0.5					0.5	107.76985	108	1	0.5	107.76985	10/28/11	12:56 PM
ccv	U-tot	7840			ng/L	40		102.2%	7670		40	7840.15979	7840	1	40	7840.15979	10/28/11	12:59 PM
ccv	U233 IS	111			%R	0.5					0.5	110.74357	111	1	0.5	110.74357	10/28/11	12:59 PM
ccb	U-tot	40.0	U		ng/L	40					40	-7.94937	-7.95	1	40	-7.94937	10/28/11	1:01 PM
ccb	U233 IS	108			%R	0.5					0.5	107.88321	108	1	0.5	107.88321	10/28/11	1:01 PM
474302d7	U-tot	79200			ng/L	160				5348	40	79215.50168	79200	4	160	19803.87542	10/28/11	1:04 PM
474302d7	U233 IS	102			%R	0.5					0.5	102.24111	102	4	0.5	102.24111	10/28/11	1:04 PM
474302d7d	U-tot	82700			ng/L	160	4.3%			5586	40	82742.63968	82700	4	160	20685.65992	10/28/11	1:06 PM
474302d7d	U233 IS	100			%R	0.5					0.5	100.218	100	4	0.5	100.218	10/28/11	1:06 PM
474340d7	U-tot	6080			ng/L	40				411	40	6084.08962	6080	1	40	6084.08962	10/28/11	1:08 PM
474340d7	U233 IS	96.8			%R	0.5					0.5	96.7561	96.8	1	0.5	96.7561	10/28/11	1:08 PM
474340d7d	U-tot	5850			ng/L	40	3.9%			395	40	5845.54035	5850	1	40	5845.54035	10/28/11	1:10 PM
474340d7d	U233 IS	97.4			%R	0.5					0.5	97.4101	97.4	1	0.5	97.4101	10/28/11	1:10 PM
474341d7	U-tot	67000			ng/L	160				4522	40	66985.36484	67000	4	160	16746.34121	10/28/11	1:13 PM
474341d7	U233 IS	109			%R	0.5					0.5	108.58086	109	4	0.5	108.58086	10/28/11	1:13 PM
474341d7d	U-tot	65700			ng/L	160	2.0%			4436	40	65706.61356	65700	4	160	16426.65339	10/28/11	1:15 PM
474341d7d	U233 IS	111			%R	0.5					0.5	111.20576	111	4	0.5	111.20576	10/28/11	1:15 PM
474344d7	U-tot	54600			ng/L	160				3686	40	54587.57524	54600	4	160	13646.89381	10/28/11	1:17 PM
474344d7	U233 IS	109			%R	0.5					0.5	109.25235	109	4	0.5	109.25235	10/28/11	1:17 PM
474344d7d	U-tot	51000			ng/L	160	6.8%			3442	40	50978.31924	51000	4	160	12744.57981	10/28/11	1:20 PM
474344d7d	U233 IS	109			%R	0.5					0.5	109.31338	109	4	0.5	109.31338	10/28/11	1:20 PM
zzz	U-tot	40.0	U		ng/L	40					40	-4.38188	-4.38	1	40	-4.38188	10/28/11	1:22 PM
zzz	U233 IS	111			%R	0.5					0.5	110.98774	111	1	0.5	110.98774	10/28/11	1:22 PM

010148

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
1S_00146-1S_001S2

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
critotU	U-tot	40.0	U		ng/L	40		88.8%	40.0		40	35.51525	35.5	1	40	35.51525	10/28/11	1:24 PM
critotU	U233 IS	113			%R	0.5					0.5	113.35976	113	1	0.5	113.35976	10/28/11	1:24 PM
ccv	U-tot	7880			ng/L	40		102.7%	7670		40	7875.02474	7880	1	40	7875.02474	10/28/11	1:27 PM
ccv	U233 IS	115			%R	0.5					0.5	115.05159	115	1	0.5	115.05159	10/28/11	1:27 PM
ccb	U-tot	40.0	U		ng/L	40					40	-9.93553	-9.94	1	40	-9.93553	10/28/11	1:29 PM
ccb	U233 IS	113			%R	0.5					0.5	113.04581	113	1	0.5	113.04581	10/28/11	1:29 PM
474401d7	U-tot	71100			ng/L	160				4803	40	71149.14592	71100	4	160	17787.28648	10/28/11	1:31 PM
474401d7	U233 IS	108			%R	0.5					0.5	108.06635	108	4	0.5	108.06635	10/28/11	1:31 PM
474401d7d	U-tot	67100			ng/L	160	5.8%			4527	40	67062.79628	67100	4	160	16765.69907	10/28/11	1:34 PM
474401d7d	U233 IS	106			%R	0.5					0.5	105.91238	106	4	0.5	105.91238	10/28/11	1:34 PM
474402d7	U-tot	38300			ng/L	80				2584	40	38270.29106	38300	2	80	19135.14553	10/28/11	1:36 PM
474402d7	U233 IS	104			%R	0.5					0.5	104.17702	104	2	0.5	104.17702	10/28/11	1:36 PM
474402d7L	U-tot	37700			ng/L	400	1.6%			2551	40	37680.2283	37700	10	400	3768.02283	10/28/11	1:38 PM
474402d7L	U233 IS	109			%R	0.5					0.5	109.18257	109	10	0.5	109.18257	10/28/11	1:38 PM
474402d7D	U-tot	33800			ng/L	80	12.5%			2279	40	33758.6654	33800	2	80	16879.3327	10/28/11	1:41 PM
474402d7D	U233 IS	107			%R	0.5					0.5	106.68851	107	2	0.5	106.68851	10/28/11	1:41 PM
474402d7AS	U-tot	77800			ng/L	80		96.6%	40900	5252	40	77804.79054	77800	2	80	38902.39527	10/28/11	1:43 PM
474402d7AS	U233 IS	106			%R	0.5					0.5	106.24377	106	2	0.5	106.24377	10/28/11	1:43 PM
zzz	U-tot	40.0	U		ng/L	40					40	-6.65815	-6.66	1	40	-6.65815	10/28/11	1:45 PM
zzz	U233 IS	109			%R	0.5					0.5	108.59831	109	1	0.5	108.59831	10/28/11	1:45 PM
critotU	U-tot	40.0	U		ng/L	40		78.2%	40.0		40	31.28816	31.3	1	40	31.28816	10/28/11	1:48 PM
critotU	U233 IS	111			%R	0.5					0.5	110.80461	111	1	0.5	110.80461	10/28/11	1:48 PM
ccv	U-tot	7640			ng/L	40		99.6%	7670		40	7641.83407	7640	1	40	7641.83407	10/28/11	1:50 PM
ccv	U233 IS	117			%R	0.5					0.5	117.29284	117	1	0.5	117.29284	10/28/11	1:50 PM
ccb	U-tot	40.0	U		ng/L	40					40	-6.20995	-6.21	1	40	-6.20995	10/28/11	1:52 PM
ccb	U233 IS	115			%R	0.5					0.5	115.09519	115	1	0.5	115.09519	10/28/11	1:52 PM

010149

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

10/31/11

474212 d10 for U tot

23298 ng/L x df 4 = 93192 ng/L = 93200 ng/L

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
icv	U-tot	7670			ng/L	40		100.0%	7670		40	7671.35825	7670	1	40	7671.35825	10/28/11	8:18 PM
icv	U233 IS	103			%R	0.5					0.5	103.29711	103	1	0.5	103.29711	10/28/11	8:18 PM
icb	U-tot	40.0	U		ng/L	40					40	3.5891	3.59	1	40	3.5891	10/28/11	8:21 PM
icb	U233 IS	104			%R	0.5					0.5	103.59204	104	1	0.5	103.59204	10/28/11	8:21 PM
critotU	U-tot	42.9			ng/L	40		107.3%	40.0		40	42.91064	42.9	1	40	42.91064	10/28/11	8:23 PM
critotU	U233 IS	104			%R	0.5					0.5	104.25753	104	1	0.5	104.25753	10/28/11	8:23 PM
icsa	U-tot	40.0	U		ng/L	40			0		40	3.48122	3.48	1	40	3.48122	10/28/11	8:25 PM
icsa	U233 IS	88.6			%R	0.5					0.5	88.63444	88.6	1	0.5	88.63444	10/28/11	8:25 PM
icsab	U-tot	20800			ng/L	40		102.0%	20400		40	20845.2702	20800	1	40	20845.2702	10/28/11	8:28 PM
icsab	U233 IS	92.7			%R	0.5					0.5	92.74049	92.7	1	0.5	92.74049	10/28/11	8:28 PM
zzz	U-tot	40.0	U		ng/L	40					40	0.70756	0.708	1	40	0.70756	10/28/11	8:30 PM
zzz	U233 IS	99.5			%R	0.5					0.5	99.53872	99.5	1	0.5	99.53872	10/28/11	8:30 PM
ccv	U-tot	7770			ng/L	40		101.3%	7670		40	7769.64432	7770	1	40	7769.64432	10/28/11	8:32 PM
ccv	U233 IS	101			%R	0.5					0.5	101.12678	101	1	0.5	101.12678	10/28/11	8:32 PM
ccb	U-tot	40.0	U		ng/L	40					40	5.42693	5.43	1	40	5.42693	10/28/11	8:35 PM
ccb	U233 IS	102			%R	0.5					0.5	101.99641	102	1	0.5	101.99641	10/28/11	8:35 PM
Blankd10	U-tot	102000			ng/L	160				6902	40	102237.96	102000	4	160	25559.49007	10/28/11	8:37 PM
Blankd10	U233 IS	99.5	✓		%R	0.5					0.5	99.47821	99.5	4	0.5	99.47821	10/28/11	8:37 PM
474212d10	U-tot	93200			ng/L	160				6291	40	93193.3322	93200	4	160	23298.33306	10/28/11	8:39 PM
474212d10	U233 IS	99.9			%R	0.5					0.5	99.87144	99.9	4	0.5	99.87144	10/28/11	8:39 PM
474212d10d	U-tot	95400			ng/L	160	2.3%			6437	40	95353.1781	95400	4	160	23838.29453	10/28/11	8:42 PM
474212d10d	U233 IS	98.5			%R	0.5					0.5	98.51783	98.5	4	0.5	98.51783	10/28/11	8:42 PM
474213d10	U-tot	71400			ng/L	160				4823	40	71447.5131	71400	4	160	17861.87827	10/28/11	8:44 PM
474213d10	U233 IS	99.7			%R	0.5					0.5	99.74289	99.7	4	0.5	99.74289	10/28/11	8:44 PM
474213d10d	U-tot	72600			ng/L	160	1.7%			4902	40	72619.8186	72600	4	160	18154.95466	10/28/11	8:46 PM
474213d10d	U233 IS	99.7			%R	0.5					0.5	99.71265	99.7	4	0.5	99.71265	10/28/11	8:46 PM
474214d10	U-tot	29700			ng/L	40				2008	40	29744.0534	29700	1	40	29744.05341	10/28/11	8:49 PM
474214d10	U233 IS	94.2			%R	0.5					0.5	94.2075	94.2	1	0.5	94.2075	10/28/11	8:49 PM
474214d10d	U-tot	31300			ng/L	40	5.2%			2112	40	31290.0494	31300	1	40	31290.04944	10/28/11	8:51 PM
474214d10d	U233 IS	90.7			%R	0.5					0.5	90.72148	90.7	1	0.5	90.72148	10/28/11	8:51 PM
zzz	U-tot	40.0	U		ng/L	40					40	1.37322	1.37	1	40	1.37322	10/28/11	8:53 PM
zzz	U233 IS	93.7			%R	0.5					0.5	93.74622	93.7	1	0.5	93.74622	10/28/11	8:53 PM
critotU	U-tot	40.0	U		ng/L	40		84.0%	40.0		40	33.59959	33.6	1	40	33.59959	10/28/11	8:56 PM
critotU	U233 IS	90.9			%R	0.5					0.5	90.92565	90.9	1	0.5	90.92565	10/28/11	8:56 PM
ccv	U-tot	7910			ng/L	40		103.1%	7670		40	7910.13423	7910	1	40	7910.13423	10/28/11	8:58 PM
ccv	U233 IS	91.7			%R	0.5					0.5	91.71964	91.7	1	0.5	91.71964	10/28/11	8:58 PM
ccb	U-tot	40.0	U		ng/L	40					40	0.43102	0.431	1	40	0.43102	10/28/11	9:00 PM
ccb	U233 IS	94.7			%R	0.5					0.5	94.65365	94.7	1	0.5	94.65365	10/28/11	9:00 PM
474221d10	U-tot	52200			ng/L	160				3523	40	52182.8325	52200	4	160	13045.70813	10/28/11	9:03 PM
474221d10	U233 IS	94.8			%R	0.5					0.5	94.83513	94.8	4	0.5	94.83513	10/28/11	9:03 PM

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Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	CTV	uncert.	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
474221d10d	U-tot	54400			ng/L	160	4.1%			3672	40	54390.4093	54400	4	160	13597.60233	10/28/11	9:05 PM
474221d10d	U233 I5	93.3			%R	0.5					0.5	93.33787	93.3	4	0.5	93.33787	10/28/11	9:05 PM
474222d10	U-tot	55900			ng/L	160				3771	40	55858.3424	55900	4	160	13964.58561	10/28/11	9:07 PM
474222d10	U233 I5	92.2			%R	0.5					0.5	92.24141	92.2	4	0.5	92.24141	10/28/11	9:07 PM
474222d10d	U-tot	38000		*	ng/L	160	38.1%			2566	40	37998.9605	38000	4	160	9499.74013	10/28/11	9:10 PM
474222d10d	U233 I5	93.0			%R	0.5					0.5	92.99759	93	4	0.5	92.99759	10/28/11	9:10 PM
474300d10	U-tot	90500			ng/L	160				6107	40	90470.255	90500	4	160	22617.56376	10/28/11	9:12 PM
474300d10	U233 IS	91.2			%R	0.5					0.5	91.17519	91.2	4	0.5	91.17519	10/28/11	9:12 PM
474300d10d	U-tot	88900			ng/L	160	1.8%			6002	40	88917.438	88900	4	160	22229.3595	10/28/11	9:14 PM
474300d10d	U233 IS	94.3			%R	0.5					0.5	94.3058	94.3	4	0.5	94.3058	10/28/11	9:14 PM
474301d10	U-tot	74800			ng/L	160				5048	40	74776.6456	74800	4	160	18694.16141	10/28/11	9:17 PM
474301d10	U233 IS	91.8			%R	0.5					0.5	91.83306	91.8	4	0.5	91.83306	10/28/11	9:17 PM
474301d10d	U-tot	75000			ng/L	160	0.3%			5064	40	75016.645	75000	4	160	18754.16126	10/28/11	9:19 PM
474301d10d	U233 IS	94.1			%R	0.5					0.5	94.10164	94.1	4	0.5	94.10164	10/28/11	9:19 PM
zzz	U-tot	40.0	U		ng/L	40					40	-0.58045	-0.58	1	40	-0.58045	10/28/11	9:21 PM
zzz	U233 IS	93.1			%R	0.5					0.5	93.12615	93.1	1	0.5	93.12615	10/28/11	9:21 PM
critotU	U-tot	40.0	U		ng/L	40		95.5%	40.0		40	38.19262	38.2	1	40	38.19262	10/28/11	9:23 PM
critotU	U233 IS	96.4			%R	0.5					0.5	96.40803	96.4	1	0.5	96.40803	10/28/11	9:23 PM
ccv	U-tot	7900			ng/L	40		103.0%	7670		40	7900.43518	7900	1	40	7900.43518	10/28/11	9:26 PM
ccv	U233 IS	95.7			%R	0.5					0.5	95.72745	95.7	1	0.5	95.72745	10/28/11	9:26 PM
ccb	U-tot	40.0	U		ng/L	40					40	-4.22536	-4.23	1	40	-4.22536	10/28/11	9:28 PM
ccb	U233 IS	99.2			%R	0.5					0.5	99.19086	99.2	1	0.5	99.19086	10/28/11	9:28 PM
474302d10	U-tot	81200			ng/L	160				5485	40	81244.5979	81200	4	160	20311.14947	10/28/11	9:31 PM
474302d10	U233 IS	92.9			%R	0.5					0.5	92.94466	92.9	4	0.5	92.94466	10/28/11	9:31 PM
474302d10d	U-tot	78600			ng/L	160	3.3%			5306	40	78594.0112	78600	4	160	19648.50281	10/28/11	9:33 PM
474302d10d	U233 IS	92.4			%R	0.5					0.5	92.3624	92.4	4	0.5	92.3624	10/28/11	9:33 PM
474340d10	U-tot	4040			ng/L	40				274	40	4043.08081	4040	1	40	4043.08081	10/28/11	9:35 PM
474340d10	U233 IS	91.0			%R	0.5					0.5	90.98614	91	1	0.5	90.98614	10/28/11	9:35 PM
474340d10d	U-tot	4830			ng/L	40	17.8%			327	40	4830.30906	4830	1	40	4830.30906	10/28/11	9:37 PM
474340d10d	U233 IS	95.1			%R	0.5					0.5	95.09224	95.1	1	0.5	95.09224	10/28/11	9:37 PM
474341d10	U-tot	67200			ng/L	160				4539	40	67236.2856	67200	4	160	16809.07141	10/28/11	9:40 PM
474341d10	U233 IS	98.3			%R	0.5					0.5	98.32122	98.3	4	0.5	98.32122	10/28/11	9:40 PM
474341d10d	U-tot	68600			ng/L	160	2.1%			4633	40	68628.9581	68600	4	160	17157.23952	10/28/11	9:42 PM
474341d10d	U233 IS	100			%R	0.5					0.5	100.19662	100	4	0.5	100.19662	10/28/11	9:42 PM
474344d10	U-tot	50400			ng/L	160				3406	40	50448.766	50400	4	160	12612.1915	10/28/11	9:44 PM
474344d10	U233 IS	103			%R	0.5					0.5	103.11562	103	4	0.5	103.11562	10/28/11	9:44 PM
474344d10d	U-tot	48300			ng/L	160	4.3%			3260	40	48275.8667	48300	4	160	12068.96667	10/28/11	9:47 PM
474344d10d	U233 IS	102			%R	0.5					0.5	102.09473	102	4	0.5	102.09473	10/28/11	9:47 PM
zzz	U-tot	40.0	U		ng/L	40					40	-1.21016	-1.21	1	40	-1.21016	10/28/11	9:49 PM
zzz	U233 I5	99.0			%R	0.5					0.5	99.04718	99	1	0.5	99.04718	10/28/11	9:49 PM

0101151

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (O)	Units	RL	%RPD	%Recovery	%TV	vscert	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
critotU	U-tot	40.3			ng/L	40		100.7%	40.0		40	40.29066	40.3	1	40	40.29066	10/28/11	9:51 PM
critotU	U233 IS	103			%R	0.5					0.5	102.71483	103	1	0.5	102.71483	10/28/11	9:51 PM
ccv	U-tot	7880			ng/L	40		102.7%	7670		40	7877.73737	7880	1	40	7877.73737	10/28/11	9:54 PM
ccv	U233 IS	99.8			%R	0.5					0.5	99.82608	99.8	1	0.5	99.82608	10/28/11	9:54 PM
ccb	U-tot	40.0	U		ng/L	40					40	2.44458	2.44	1	40	2.44458	10/28/11	9:56 PM
ccb	U233 IS	103			%R	0.5					0.5	102.98708	103	1	0.5	102.98708	10/28/11	9:56 PM
474401d10	U-tot	64500			ng/L	160				4357	40	64537.5754	64500	4	160	16134.39385	10/28/11	9:59 PM
474401d10	U233 IS	100			%R	0.5					0.5	100.34787	100	4	0.5	100.34787	10/28/11	9:59 PM
474401d10d	U-tot	68000			ng/L	160	5.3%			4588	40	67966.9686	68000	4	160	16991.74214	10/28/11	10:01 PM
474401d10d	U233 IS	99.6			%R	0.5					0.5	99.62946	99.6	4	0.5	99.62946	10/28/11	10:01 PM
474402d10	U-tot	33400			ng/L	80				2254	40	33380.9866	33400	2	80	16690.49329	10/28/11	10:03 PM
474402d10	U233 IS	98.9			%R	0.5					0.5	98.85056	98.9	2	0.5	98.85056	10/28/11	10:03 PM
474402d10L	U-tot	33300			ng/L	400	0.3%			2253	40	33252.3546	33300	10	400	3325.23546	10/28/11	10:06 PM
474402d10L	U233 IS	102			%R	0.5					0.5	101.69393	102	10	0.5	101.69393	10/28/11	10:06 PM
474402d10D	U-tot	33700			ng/L	80	0.9%			2278	40	33740.5713	33700	2	80	16870.28565	10/28/11	10:08 PM
474402d10D	U233 IS	96.3			%R	0.5					0.5	96.33997	96.3	2	0.5	96.33997	10/28/11	10:08 PM
474402d10AS	U-tot	76300			ng/L	80		104.9%	40900	5149	40	76281.7762	76300	2	80	38140.88811	10/28/11	10:10 PM
474402d10AS	U233 IS	95.1			%R	0.5					0.5	95.14518	95.1	2	0.5	95.14518	10/28/11	10:10 PM
zzz	U-tot	40.0	U		ng/L	40					40	-2.47361	-2.47	1	40	-2.47361	10/28/11	10:13 PM
zzz	U233 IS	93.7			%R	0.5					0.5	93.70841	93.7	1	0.5	93.70841	10/28/11	10:13 PM
critotU	U-tot	40.0	U		ng/L	40		92.7%	40.0		40	37.08652	37.1	1	40	37.08652	10/28/11	10:15 PM
critotU	U233 IS	98.3			%R	0.5					0.5	98.27584	98.3	1	0.5	98.27584	10/28/11	10:15 PM
ccv	U-tot	7990			ng/L	40		104.2%	7670		40	7989.04542	7990	1	40	7989.04542	10/28/11	10:17 PM
ccv	U233 IS	96.5			%R	0.5					0.5	96.52146	96.5	1	0.5	96.52146	10/28/11	10:17 PM
ccb	U-tot	40.0	U		ng/L	40					40	-3.74037	-3.74	1	40	-3.74037	10/28/11	10:20 PM
ccb	U233 IS	98.6			%R	0.5					0.5	98.5632	98.6	1	0.5	98.5632	10/28/11	10:20 PM
Blankd14	U-tot	99800			ng/L	160				6740	40	99846.5428	99800	4	160	24961.63569	10/28/11	10:22 PM
Blankd14	U233 IS	96.5			%R	0.5					0.5	96.54414	96.5	4	0.5	96.54414	10/28/11	10:22 PM
474212d14	U-tot	91800			ng/L	160				6200	40	91843.0549	91800	4	160	22960.76373	10/28/11	10:24 PM
474212d14	U233 IS	106			%R	0.5					0.5	105.91367	106	4	0.5	105.91367	10/28/11	10:24 PM
474212d14d	U-tot	91500			ng/L	160	0.3%			6179	40	91532.0738	91500	4	160	22883.01846	10/28/11	10:27 PM
474212d14d	U233 IS	99.0			%R	0.5					0.5	99.04718	99	4	0.5	99.04718	10/28/11	10:27 PM
474213d14	U-tot	70300			ng/L	160				4748	40	70323.9161	70300	4	160	17580.97902	10/28/11	10:29 PM
474213d14	U233 IS	104			%R	0.5					0.5	104.49953	104	4	0.5	104.49953	10/28/11	10:29 PM
474213d14d	U-tot	70700			ng/L	160	0.6%			4771	40	70664.4676	70700	4	160	17666.11689	10/28/11	10:31 PM
474213d14d	U233 IS	103			%R	0.5					0.5	102.79044	103	4	0.5	102.79044	10/28/11	10:31 PM
474214d14	U-tot	30100			ng/L	40				2029	40	30060.6429	30100	1	40	30060.64289	10/28/11	10:34 PM
474214d14	U233 IS	99.3			%R	0.5					0.5	99.31942	99.3	1	0.5	99.31942	10/28/11	10:34 PM
474214d14d	U-tot	29400			ng/L	40	2.4%			1986	40	29427.4138	29400	1	40	29427.41381	10/28/11	10:36 PM
474214d14d	U233 IS	98.6			%R	0.5					0.5	98.57077	98.6	1	0.5	98.57077	10/28/11	10:36 PM

010152

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TEV	umpart	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
zzz	U-tot	40.0	U		ng/L	40					40	9.35832	9.36	1	40	9.35832	10/28/11	10:38 PM
zzz	U233 IS	103			%R	0.5					0.5	102.71482	103	1	0.5	102.71482	10/28/11	10:38 PM
critotU	U-tot	40.8			ng/L	40		101.9%	40.0		40	40.75111	40.8	1	40	40.75111	10/28/11	10:41 PM
critotU	U233 IS	105			%R	0.5					0.5	104.97594	105	1	0.5	104.97594	10/28/11	10:41 PM
ccv	U-tot	7870			ng/L	40		102.6%	7670		40	7865.23187	7870	1	40	7865.23187	10/28/11	10:43 PM
ccv	U233 IS	103			%R	0.5					0.5	103.04	103	1	0.5	103.04	10/28/11	10:43 PM
ccb	U-tot	40.0	U		ng/L	40					40	-5.32118	-5.32	1	40	-5.32118	10/28/11	10:45 PM
ccb	U233 IS	107			%R	0.5					0.5	106.71529	107	1	0.5	106.71529	10/28/11	10:45 PM
474221d14	U-tot	54700			ng/L	160				3691	40	54671.4389	54700	4	160	13667.85972	10/28/11	10:48 PM
474221d14	U233 IS	109			%R	0.5					0.5	108.90838	109	4	0.5	108.90838	10/28/11	10:48 PM
474221d14d	U-tot	56900			ng/L	160	3.9%			3838	40	56854.0567	56900	4	160	14213.51418	10/28/11	10:50 PM
474221d14d	U233 IS	106			%R	0.5					0.5	106.42035	106	4	0.5	106.42035	10/28/11	10:50 PM
474222d14	U-tot	30700			ng/L	160				2072	40	30673.6729	30700	4	160	7668.41823	10/28/11	10:52 PM
474222d14	U233 IS	105			%R	0.5					0.5	105.08182	105	4	0.5	105.08182	10/28/11	10:52 PM
474222d14d	U-tot	46100		*	ng/L	160	40.1%			3112	40	46083.1282	46100	4	160	11520.78205	10/28/11	10:55 PM
474222d14d	U233 IS	104			%R	0.5					0.5	104.46927	104	4	0.5	104.46927	10/28/11	10:55 PM
474300d14	U-tot	88400			ng/L	160				5965	40	88359.6926	88400	4	160	22089.92315	10/28/11	10:57 PM
474300d14	U233 IS	100			%R	0.5					0.5	100.17393	100	4	0.5	100.17393	10/28/11	10:57 PM
474300d14d	U-tot	90600			ng/L	160	2.5%			6117	40	90614.88	90600	4	160	22653.71999	10/28/11	10:59 PM
474300d14d	U233 IS	102			%R	0.5					0.5	101.80736	102	4	0.5	101.80736	10/28/11	10:59 PM
474301d14	U-tot	84400			ng/L	160				5701	40	84444.7617	84400	4	160	21111.19042	10/28/11	11:02 PM
474301d14	U233 IS	99.0			%R	0.5					0.5	98.95643	99	4	0.5	98.95643	10/28/11	11:02 PM
474301d14d	U-tot	81300			ng/L	160	3.7%			5485	40	81257.8095	81300	4	160	20314.45238	10/28/11	11:04 PM
474301d14d	U233 IS	94.5			%R	0.5					0.5	94.5251	94.5	4	0.5	94.5251	10/28/11	11:04 PM
zzz	U-tot	40.0	U		ng/L	40					40	0.053	0.053	1	40	0.053	10/28/11	11:06 PM
zzz	U233 IS	94.2			%R	0.5					0.5	94.16212	94.2	1	0.5	94.16212	10/28/11	11:06 PM
critotU	U-tot	40.0	U		ng/L	40		92.6%	40.0		40	37.03649	37	1	40	37.03649	10/28/11	11:09 PM
critotU	U233 IS	94.3			%R	0.5					0.5	94.3058	94.3	1	0.5	94.3058	10/28/11	11:09 PM
ccv	U-tot	7830			ng/L	40		102.1%	7670		40	7827.12242	7830	1	40	7827.12242	10/28/11	11:11 PM
ccv	U233 IS	96.7			%R	0.5					0.5	96.71807	96.7	1	0.5	96.71807	10/28/11	11:11 PM
ccb	U-tot	40.0	U		ng/L	40					40	-0.81387	-0.814	1	40	-0.81387	10/28/11	11:13 PM
ccb	U233 IS	98.6			%R	0.5					0.5	98.6237	98.6	1	0.5	98.6237	10/28/11	11:13 PM
474302d14	U-tot	81300			ng/L	160				5485	40	81258.0038	81300	4	160	20314.50096	10/28/11	11:16 PM
474302d14	U233 IS	97.0			%R	0.5					0.5	97.03567	97	4	0.5	97.03567	10/28/11	11:16 PM
474302d14d	U-tot	85400			ng/L	160	4.9%			5768	40	85447.3884	85400	4	160	21361.8471	10/28/11	11:18 PM
474302d14d	U233 IS	92.7			%R	0.5					0.5	92.72537	92.7	4	0.5	92.72537	10/28/11	11:18 PM
474340d14	U-tot	2920			ng/L	40				198	40	2923.94162	2920	1	40	2923.94162	10/28/11	11:20 PM
474340d14	U233 IS	89.0			%R	0.5					0.5	88.9974	89	1	0.5	88.9974	10/28/11	11:20 PM
474340d14d	U-tot	4020		*	ng/L	40	31.7%			272	40	4022.27675	4020	1	40	4022.27675	10/28/11	11:23 PM
474340d14d	U233 IS	88.3			%R	0.5					0.5	88.3093	88.3	1	0.5	88.3093	10/28/11	11:23 PM

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Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	%+/-SV	uncert	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
474341d14	U-tot	67200			ng/L	160				4537	40	67202.4166	67200	4	160	16800.60416	10/28/11	11:25 PM
474341d14	U233 IS	100			%R	0.5					0.5	100.19662	100	4	0.5	100.19662	10/28/11	11:25 PM
474341d14d	U-tot	68300			ng/L	160	1.6%			4610	40	68288.5241	68300	4	160	17072.13102	10/28/11	11:27 PM
474341d14d	U233 I5	99.3			%R	0.5					0.5	99.29672	99.3	4	0.5	99.29672	10/28/11	11:27 PM
474344d14	U-tot	50300			ng/L	160				3394	40	50263.0652	50300	4	160	12565.76631	10/28/11	11:29 PM
474344d14	U233 IS	104			%R	0.5					0.5	104.01553	104	4	0.5	104.01553	10/28/11	11:29 PM
474344d14d	U-tot	50300			ng/L	160	0.0%			3399	40	50343.6892	50300	4	160	12585.92229	10/28/11	11:32 PM
474344d14d	U233 IS	109			%R	0.5					0.5	109.32432	109	4	0.5	109.32432	10/28/11	11:32 PM
zzz	U-tot	40.0	U		ng/L	40					40	-2.94607	-2.95	1	40	-2.94607	10/28/11	11:34 PM
zzz	U233 IS	105			%R	0.5					0.5	105.07426	105	1	0.5	105.07426	10/28/11	11:34 PM
critotU	U-tot	40.0	U		ng/L	40		86.2%	40.0		40	34.4989	34.5	1	40	34.4989	10/28/11	11:36 PM
critotU	U233 IS	107			%R	0.5					0.5	107.04803	107	1	0.5	107.04803	10/28/11	11:36 PM
ccv	U-tot	7910			ng/L	40		103.1%	7670		40	7913.37443	7910	1	40	7913.37443	10/28/11	11:39 PM
ccv	U233 IS	106			%R	0.5					0.5	106.49597	106	1	0.5	106.49597	10/28/11	11:39 PM
ccb	U-tot	40.0	U		ng/L	40					40	-3.23964	-3.24	1	40	-3.23964	10/28/11	11:41 PM
ccb	U233 IS	108			%R	0.5					0.5	108.4622	108	1	0.5	108.4622	10/28/11	11:41 PM
474401d14	U-tot	64400			ng/L	160				4349	40	64414.9046	64400	4	160	16103.72615	10/28/11	11:44 PM
474401d14	U233 IS	103			%R	0.5					0.5	103.25174	103	4	0.5	103.25174	10/28/11	11:44 PM
474401d14d	U-tot	63600			ng/L	160	1.3%			4296	40	63628.5174	63600	4	160	15907.12934	10/28/11	11:46 PM
474401d14d	U233 IS	101			%R	0.5					0.5	101.33094	101	4	0.5	101.33094	10/28/11	11:46 PM
474402d14	U-tot	33000			ng/L	80				2227	40	32983.9067	33000	2	80	16491.95336	10/28/11	11:48 PM
474402d14	U233 IS	101			%R	0.5					0.5	101.05114	101	2	0.5	101.05114	10/28/11	11:48 PM
474402d14L	U-tot	33700			ng/L	400	-2.1%			2281	40	33657.1111	33700	10	400	3365.71111	10/28/11	11:51 PM
474402d14L	U233 IS	96.2			%R	0.5					0.5	96.21897	96.2	10	0.5	96.21897	10/28/11	11:51 PM
474402d14D	U-tot	32700			ng/L	80	0.9%			2208	40	32711.9504	32700	2	80	16355.97519	10/28/11	11:53 PM
474402d14D	U233 IS	97.9			%R	0.5					0.5	97.88261	97.9	2	0.5	97.88261	10/28/11	11:53 PM
474402d14AS	U-tot	73900			ng/L	80		100.0%	40900	4989	40	73915.9391	73900	2	80	36957.96953	10/28/11	11:55 PM
474402d14AS	U233 IS	105			%R	0.5					0.5	105.45994	105	2	0.5	105.45994	10/28/11	11:55 PM
zzz	U-tot	40.0	U		ng/L	40					40	-4.01695	-4.02	1	40	-4.01695	10/28/11	11:58 PM
zzz	U233 IS	108			%R	0.5					0.5	107.53958	108	1	0.5	107.53958	10/28/11	11:58 PM
critotU	U-tot	40.0	U		ng/L	40		81.6%	40.0		40	32.6429	32.6	1	40	32.6429	10/29/11	12:00 AM
critotU	U233 IS	104			%R	0.5					0.5	103.71304	104	1	0.5	103.71304	10/29/11	12:00 AM
ccv	U-tot	8050			ng/L	40		105.0%	7670		40	8054.16798	8050	1	40	8054.16798	10/29/11	12:02 AM
ccv	U233 IS	104			%R	0.5					0.5	104.03822	104	1	0.5	104.03822	10/29/11	12:02 AM
ccb	U-tot	40.0	U		ng/L	40					40	-5.91813	-5.92	1	40	-5.91813	10/29/11	12:05 AM
ccb	U233 IS	107			%R	0.5					0.5	107.1539	107	1	0.5	107.1539	10/29/11	12:05 AM
Blankd21	U-tot	102000			ng/L	160				6853	40	101520.945	102000	4	160	25380.23633	10/29/11	12:07 AM
Blankd21	U233 IS	104			%R	0.5					0.5	104.16677	104	4	0.5	104.16677	10/29/11	12:07 AM
474212d21	U-tot	94200			ng/L	160				6357	40	94168.2873	94200	4	160	23542.07183	10/29/11	12:09 AM
474212d21	U233 IS	100			%R	0.5					0.5	100.37055	100	4	0.5	100.37055	10/29/11	12:09 AM

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Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
1S_00146-15_001S2

Sample ID	Element	Result	Qual (C)	Qual (D)	Units	RL	%RPD	%Recovery	RL	Count	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
474212d21d	U-tot	94000			ng/L	160	0.2%			6347	40	94018.3785	94000	4	160	23504.59463	10/29/11	12:12 AM
474212d21d	U233 IS	94.5			%R	0.5					0.5	94.54778	94.5	4	0.5	94.54778	10/29/11	12:12 AM
474213d21	U-tot	60300			ng/L	160				4070	40	60289.8242	60300	4	160	15072.45605	10/29/11	12:14 AM
474213d21	U233 IS	96.3			%R	0.5					0.5	96.27191	96.3	4	0.5	96.27191	10/29/11	12:14 AM
474213d21d	U-tot	66100			ng/L	160	9.2%			4463	40	66103.3174	66100	4	160	16525.82936	10/29/11	12:16 AM
474213d21d	U233 IS	98.1			%R	0.5					0.5	98.0868	98.1	4	0.5	98.0868	10/29/11	12:16 AM
474214d21	U-tot	24200			ng/L	40				1636	40	24237.0347	24200	1	40	24237.03474	10/29/11	12:19 AM
474214d21	U233 IS	99.0			%R	0.5					0.5	98.99425	99	1	0.5	98.99425	10/29/11	12:19 AM
474214d21d	U-tot	28300			ng/L	40	15.6%			1909	40	28283.4484	28300	1	40	28283.44843	10/29/11	12:21 AM
474214d21d	U233 IS	102			%R	0.5					0.5	101.57293	102	1	0.5	101.57293	10/29/11	12:21 AM
zzz	U-tot	40.0	U		ng/L	40					40	4.81489	4.81	1	40	4.81489	10/29/11	12:23 AM
zzz	U233 IS	109			%R	0.5					0.5	109.10501	109	1	0.5	109.10501	10/29/11	12:23 AM
critotU	U-tot	41.8			ng/L	40		104.4%	40.0		40	41.77547	41.8	1	40	41.77547	10/29/11	12:26 AM
critotU	U233 IS	113			%R	0.5					0.5	112.72746	113	1	0.5	112.72746	10/29/11	12:26 AM
ccv	U-tot	7960			ng/L	40		103.8%	7670		40	7958.58155	7960	1	40	7958.58155	10/29/11	12:28 AM
ccv	U233 IS	112			%R	0.5					0.5	111.86534	112	1	0.5	111.86534	10/29/11	12:28 AM
ccb	U-tot	40.0	U		ng/L	40					40	-2.24932	-2.25	1	40	-2.24932	10/29/11	12:30 AM
ccb	U233 IS	116			%R	0.5					0.5	115.58617	116	1	0.5	115.58617	10/29/11	12:30 AM
474221d21	U-tot	51000			ng/L	160				3443	40	50988.1883	51000	4	160	12747.04708	10/29/11	12:33 AM
474221d21	U233 IS	113			%R	0.5					0.5	113.28709	113	4	0.5	113.28709	10/29/11	12:33 AM
474221d21d	U-tot	49600			ng/L	160	2.8%			3349	40	49598.0426	49600	4	160	12399.51066	10/29/11	12:35 AM
474221d21d	U233 IS	110			%R	0.5					0.5	110.42088	110	4	0.5	110.42088	10/29/11	12:35 AM
474222d21	U-tot	43900			ng/L	160				2961	40	43852.8282	43900	4	160	10963.20704	10/29/11	12:38 AM
474222d21	U233 IS	109			%R	0.5					0.5	108.55295	109	4	0.5	108.55295	10/29/11	12:38 AM
474222d21d	U-tot	33900		*	ng/L	160	25.7%			2289	40	33897.7468	33900	4	160	8474.43671	10/29/11	12:40 AM
474222d21d	U233 IS	109			%R	0.5					0.5	109.08232	109	4	0.5	109.08232	10/29/11	12:40 AM
474300d21	U-tot	87700			ng/L	160				5920	40	87693.2504	87700	4	160	21923.31261	10/29/11	12:42 AM
474300d21	U233 IS	106			%R	0.5					0.5	106.25398	106	4	0.5	106.25398	10/29/11	12:42 AM
474300d21d	U-tot	87000			ng/L	160	0.8%			5876	40	87039.158	87000	4	160	21759.7895	10/29/11	12:45 AM
474300d21d	U233 IS	109			%R	0.5					0.5	109.07476	109	4	0.5	109.07476	10/29/11	12:45 AM
474301d21	U-tot	81600			ng/L	160				5510	40	81627.1696	81600	4	160	20406.79239	10/29/11	12:47 AM
474301d21	U233 IS	105			%R	0.5					0.5	105.12719	105	4	0.5	105.12719	10/29/11	12:47 AM
474301d21d	U-tot	83100			ng/L	160	1.8%			5611	40	83115.3756	83100	4	160	20778.84389	10/29/11	12:49 AM
474301d21d	U233 IS	102			%R	0.5					0.5	101.64099	102	4	0.5	101.64099	10/29/11	12:49 AM
zzz	U-tot	40.0	U		ng/L	40					40	-0.44044	-0.44	1	40	-0.44044	10/29/11	12:51 AM
zzz	U233 IS	106			%R	0.5					0.5	105.5053	106	1	0.5	105.5053	10/29/11	12:51 AM
critotU	U-tot	41.1			ng/L	40		102.7%	40.0		40	41.07856	41.1	1	40	41.07856	10/29/11	12:54 AM
critotU	U233 IS	108			%R	0.5					0.5	107.52446	108	1	0.5	107.52446	10/29/11	12:54 AM
ccv	U-tot	8090			ng/L	40		105.5%	7670		40	8087.45783	8090	1	40	8087.45783	10/29/11	12:56 AM
ccv	U233 IS	105			%R	0.5					0.5	104.66589	105	1	0.5	104.66589	10/29/11	12:56 AM

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Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
1S_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	MRBP	%Recovery	+- 3V	uncert	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
ccb	U-tot	40.0	U		ng/L	40					40	-1.56959	-1.57	1	40	-1.56959	10/29/11	12:59 AM
ccb	U233 IS	112			%R	0.5					0.5	112.03926	112	1	0.5	112.03926	10/29/11	12:59 AM
474302d21	U-tot	78500			ng/L	160				5298	40	78480.2967	78500	4	160	19620.07417	10/29/11	1:01 AM
474302d21	U233 IS	106			%R	0.5					0.5	106.48085	106	4	0.5	106.48085	10/29/11	1:01 AM
474302d21d	U-tot	80900			ng/L	160	3.0%			5463	40	80917.7271	80900	4	160	20229.43177	10/29/11	1:03 AM
474302d21d	U233 IS	108			%R	0.5					0.5	107.95554	108	4	0.5	107.95554	10/29/11	1:03 AM
474340d21	U-tot	3700			ng/L	40				250	40	3699.03585	3700	1	40	3699.03585	10/29/11	1:05 AM
474340d21	U233 IS	100			%R	0.5					0.5	100.41592	100	1	0.5	100.41592	10/29/11	1:05 AM
474340d21d	U-tot	3670			ng/L	40	0.8%			249	40	3669.67177	3670	1	40	3669.67177	10/29/11	1:08 AM
474340d21d	U233 IS	94.9			%R	0.5					0.5	94.91831	94.9	1	0.5	94.91831	10/29/11	1:08 AM
474341d21	U-tot	61900			ng/L	160				4180	40	61920.0778	61900	4	160	15480.01945	10/29/11	1:10 AM
474341d21	U233 IS	101			%R	0.5					0.5	100.58985	101	4	0.5	100.58985	10/29/11	1:10 AM
474341d21d	U-tot	67300			ng/L	160	8.4%			4546	40	67339.9881	67300	4	160	16834.99702	10/29/11	1:12 AM
474341d21d	U233 IS	104			%R	0.5					0.5	104.00797	104	4	0.5	104.00797	10/29/11	1:12 AM
474344d21	U-tot	49900			ng/L	160				3370	40	49918.1586	49900	4	160	12479.53965	10/29/11	1:15 AM
474344d21	U233 IS	106			%R	0.5					0.5	106.29935	106	4	0.5	106.29935	10/29/11	1:15 AM
474344d21d	U-tot	54600			ng/L	160	9.0%			3686	40	54598.8567	54600	4	160	13649.71418	10/29/11	1:17 AM
474344d21d	U233 IS	104			%R	0.5					0.5	103.79624	104	4	0.5	103.79624	10/29/11	1:17 AM
zzz	U-tot	40.0	U		ng/L	40					40	-3.3933	-3.39	1	40	-3.3933	10/29/11	1:19 AM
zzz	U233 IS	108			%R	0.5					0.5	108.28829	108	1	0.5	108.28829	10/29/11	1:19 AM
critotU	U-tot	40.0	U		ng/L	40		95.0%	40.0		40	38.01898	38	1	40	38.01898	10/29/11	1:22 AM
critotU	U233 IS	106			%R	0.5					0.5	106.0876	106	1	0.5	106.0876	10/29/11	1:22 AM
ccv	U-tot	7880			ng/L	40		102.7%	7670		40	7877.61469	7880	1	40	7877.61469	10/29/11	1:24 AM
ccv	U233 IS	110			%R	0.5					0.5	110.43602	110	1	0.5	110.43602	10/29/11	1:24 AM
ccb	U-tot	40.0	U		ng/L	40					40	-2.80568	-2.81	1	40	-2.80568	10/29/11	1:27 AM
ccb	U233 IS	112			%R	0.5					0.5	112.44007	112	1	0.5	112.44007	10/29/11	1:27 AM
474401d21	U-tot	60800			ng/L	160				4104	40	60783.457	60800	4	160	15195.86424	10/29/11	1:29 AM
474401d21	U233 IS	107			%R	0.5					0.5	106.96484	107	4	0.5	106.96484	10/29/11	1:29 AM
474401d21d	U-tot	59600			ng/L	160	2.0%			4025	40	59616.2282	59600	4	160	14904.05705	10/29/11	1:31 AM
474401d21d	U233 IS	104			%R	0.5					0.5	103.53911	104	4	0.5	103.53911	10/29/11	1:31 AM
474402d21	U-tot	30500			ng/L	80				2062	40	30541.5189	30500	2	80	15270.75947	10/29/11	1:34 AM
474402d21	U233 IS	102			%R	0.5					0.5	101.75442	102	2	0.5	101.75442	10/29/11	1:34 AM
474402d21L	U-tot	30000			ng/L	400	1.6%			2038	40	30044.1588	30000	10	400	3004.41588	10/29/11	1:36 AM
474402d21L	U233 IS	105			%R	0.5					0.5	105.1877	105	10	0.5	105.1877	10/29/11	1:36 AM
474402d21D	U-tot	32900			ng/L	80	7.6%			2224	40	32946.6479	32900	2	80	16473.32395	10/29/11	1:38 AM
474402d21D	U233 IS	104			%R	0.5					0.5	104.1441	104	2	0.5	104.1441	10/29/11	1:38 AM
474402d21AS	U-tot	72100			ng/L	80		101.7%	40900	4870	40	72139.0015	72100	2	80	36069.50073	10/29/11	1:41 AM
474402d21AS	U233 IS	104			%R	0.5					0.5	104.07603	104	2	0.5	104.07603	10/29/11	1:41 AM
zzz	U-tot	40.0	U		ng/L	40					40	0.18904	0.189	1	40	0.18904	10/29/11	1:43 AM
zzz	U233 IS	103			%R	0.5					0.5	102.95682	103	1	0.5	102.95682	10/29/11	1:43 AM

Fluor
16526.05.006
110830-12/110831-5/110901-7/110902-3
15_00146-15_00152

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	uncert
critotU	U-tot	40.9			ng/L	40		102.3%	40.0	
critotU	U233 IS	106			%R	0.5				
ccv	U-tot	7950			ng/L	40		103.7%	7670	
ccv	U233 IS	106			%R	0.5				
ccb	U-tot	40.0	U		ng/L	40				
ccb	U233 IS	108			%R	0.5				

rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
40	40.90679	40.9	1	40	40.90679	10/29/11	1:45 AM
0.5	106.04224	106	1	0.5	106.04224	10/29/11	1:45 AM
40	7952.10931	7950	1	40	7952.10931	10/29/11	1:48 AM
0.5	105.72461	106	1	0.5	105.72461	10/29/11	1:48 AM
40	-0.08818	-0.0882	1	40	-0.08818	10/29/11	1:50 AM
0.5	107.89501	108	1	0.5	107.89501	10/29/11	1:50 AM

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Fluor
16526.05.006
110830-12/110831-S/110901-7/110902-3
15_00146-15_00152

Sample Calc 474213dx = (16830, 34482 ng/L) adj 4 = 67,320 ng/L = 67,300 ng/L
11/14/11 DS
11/15/11

Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	Uncert.	ri	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
icv	U-tot	7960			ng/L	40		103.8%	7670		40	7958.83697	7960	1	40	7958.83697	11/10/11	12:15 PM
icv	U233 IS	97.4			%R	0.5					0.5	97.40092	97.4	1	0.5	97.40092	11/10/11	12:15 PM
icb	U-tot	40.0	U		ng/L	40					40	3.52774	3.53	1	40	3.52774	11/10/11	12:17 PM
icb	U233 IS	97.9			%R	0.5					0.5	97.86632	97.9	1	0.5	97.86632	11/10/11	12:17 PM
critotU	U-tot	41.2			ng/L	40		103.0%	40.0		40	41.20156	41.2	1	40	41.20156	11/10/11	12:20 PM
critotU	U233 IS	98.4			%R	0.5					0.5	98.4248	98.4	1	0.5	98.4248	11/10/11	12:20 PM
icsa	U-tot	40.0	U		ng/L	40			0		40	5.64832	5.65	1	40	5.64832	11/10/11	12:22 PM
icsa	U233 IS	87.9			%R	0.5					0.5	87.86413	87.9	1	0.5	87.86413	11/10/11	12:22 PM
icsab	U-tot	20900			ng/L	40		102.5%	20400		40	20918.50489	20900	1	40	20918.50489	11/10/11	12:25 PM
icsab	U233 IS	90.6			%R	0.5					0.5	90.55617	90.6	1	0.5	90.55617	11/10/11	12:25 PM
zzz	U-tot	40.0	U		ng/L	40					40	5.32791	5.33	1	40	5.32791	11/10/11	12:27 PM
zzz	U233 IS	101			%R	0.5					0.5	100.84488	101	1	0.5	100.84488	11/10/11	12:27 PM
ccv	U-tot	7770			ng/L	40		101.3%	7670		40	7768.9512	7770	1	40	7768.9512	11/10/11	12:29 PM
ccv	U233 IS	101			%R	0.5					0.5	101.1098	101	1	0.5	101.1098	11/10/11	12:29 PM
ccb	U-tot	40.0	U		ng/L	40					40	6.90582	6.91	1	40	6.90582	11/10/11	12:32 PM
ccb	U233 I5	101			%R	0.5					0.5	100.716	101	1	0.5	100.716	11/10/11	12:32 PM
BlankdX	U-tot	102000			ng/L	160				6862	40	101646.4453	102000	4	160	25411.61132	11/10/11	12:44 PM
BlankdX	U233 IS	96.6			%R	0.5					0.5	96.62049	96.6	4	0.5	96.62049	11/10/11	12:44 PM
474213dX	U-tot	67300			ng/L	160				4545	40	67321.37928	67300	4	160	16830.34482	11/10/11	12:46 PM
474213dX	U233 IS	92.5			%R	0.5					0.5	92.48211	92.5	4	0.5	92.48211	11/10/11	12:46 PM
474213dXD	U-tot	69900			ng/L	160				4719	40	69895.68468	69900	4	160	17473.92117	11/10/11	12:48 PM
474213dXD	U233 IS	94.0			%R	0.5					0.5	94.00715	94	4	0.5	94.00715	11/10/11	12:48 PM
474214dX	U-tot	29400			ng/L	40				1987	40	29436.68428	29400	1	40	29436.68428	11/10/11	12:51 PM
474214dX	U233 IS	84.2			%R	0.5					0.5	84.19129	84.2	1	0.5	84.19129	11/10/11	12:51 PM
474214dXD	U-tot	29400			ng/L	40	0.0%			1988	40	29449.52865	29400	1	40	29449.52865	11/10/11	12:53 PM
474214dXD	U233 IS	91.5			%R	0.5					0.5	91.53703	91.5	1	0.5	91.53703	11/10/11	12:53 PM
474221dX	U-tot	57300			ng/L	160				3866	40	57268.2892	57300	4	160	14317.0723	11/10/11	12:55 PM
474221dX	U233 IS	96.0			%R	0.5					0.5	96.00476	96	4	0.5	96.00476	11/10/11	12:55 PM
474221dXD	U-tot	53300			ng/L	160	7.2%			3597	40	53274.2872	53300	4	160	13318.5718	11/10/11	12:58 PM
474221dXD	U233 IS	97.7			%R	0.5					0.5	97.70165	97.7	4	0.5	97.70165	11/10/11	12:58 PM
zzz	U-tot	40.0	U		ng/L	40					40	3.56452	3.56	1	40	3.56452	11/10/11	1:00 PM
zzz	U233 IS	104			%R	0.5					0.5	103.95237	104	1	0.5	103.95237	11/10/11	1:00 PM
critotU	U-tot	40.3			ng/L	40		100.8%	40.0		40	40.29898	40.3	1	40	40.29898	11/10/11	1:02 PM
critotU	U233 IS	99.5			%R	0.5					0.5	99.49879	99.5	1	0.5	99.49879	11/10/11	1:02 PM
ccv	U-tot	7810			ng/L	40		101.8%	7670		40	7813.75689	7810	1	40	7813.75689	11/10/11	1:05 PM
ccv	U233 IS	100			%R	0.5					0.5	100.25776	100	1	0.5	100.25776	11/10/11	1:05 PM
ccb	U-tot	40.0	U		ng/L	40					40	1.06448	1.06	1	40	1.06448	11/10/11	1:07 PM
ccb	U233 IS	101			%R	0.5					0.5	100.95228	101	1	0.5	100.95228	11/10/11	1:07 PM
474222dX	U-tot	35500			ng/L	160				2399	40	35520.89936	35500	4	160	8880.22484	11/10/11	1:10 PM
474222dX	U233 IS	96.8			%R	0.5					0.5	96.82813	96.8	4	0.5	96.82813	11/10/11	1:10 PM
474222dXD	U-tot	41800			ng/L	160	16.3%			2821	40	41776.80904	41800	4	160	10444.20226	11/10/11	1:12 PM

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Sample ID	Element	Result	Qual (C)	Qual (Q)	Units	RL	%RPD	%Recovery	TV	Uncert	rl	ng/L	sigwt	Dilution	Calc RL	ng/L	Date	Time
474222dXD	U233 IS	95.7			%R	0.5					0.5	95.67539	95.7	4	0.5	95.67539	11/10/11	1:12 PM
474340dX	U-tot	3440			ng/L	40				233	40	3436.0123	3440	1	40	3436.0123	11/10/11	1:14 PM
474340dX	U233 IS	93.3			%R	0.5					0.5	93.32696	93.3	1	0.5	93.32696	11/10/11	1:14 PM
474340dXL	U-tot	3410			ng/L	200	0.9%			251	40	3412.46855	3410	5	200	682.49371	11/10/11	1:17 PM
474340dXL	U233 IS	100			%R	0.5					0.5	100.42961	100	5	0.5	100.42961	11/10/11	1:17 PM
474340dXD	U-tot	3490			ng/L	40	1.4%			236	40	3490.96439	3490	1	40	3490.96439	11/10/11	1:19 PM
474340dXD	U233 IS	98.2			%R	0.5					0.5	98.16704	98.2	1	0.5	98.16704	11/10/11	1:19 PM
474340dXAS	U-tot	24200			ng/L	40		101.3%	20500	1635	40	24224.86632	24200	1	40	24224.86632	11/10/11	1:21 PM
474340dXAS	U233 IS	97.6			%R	0.5					0.5	97.61572	97.6	1	0.5	97.61572	11/10/11	1:21 PM
zzz	U-tot	40.0	U		ng/L	40					40	8.69193	8.69	1	40	8.69193	11/10/11	1:24 PM
zzz	U233 IS	104			%R	0.5					0.5	104.04548	104	1	0.5	104.04548	11/10/11	1:24 PM
critotU	U-tot	40.0	U		ng/L	40		99.8%	40.0		40	39.90874	39.9	1	40	39.90874	11/10/11	1:26 PM
critotU	U233 IS	104			%R	0.5					0.5	103.8235	104	1	0.5	103.8235	11/10/11	1:26 PM
ccv	U-tot	7920			ng/L	40		103.3%	7670		40	7920.81494	7920	1	40	7920.81494	11/10/11	1:28 PM
ccv	U233 IS	99.8			%R	0.5					0.5	99.82099	99.8	1	0.5	99.82099	11/10/11	1:28 PM
ccb	U-tot	40.0	U		ng/L	40					40	5.35513	5.36	1	40	5.35513	11/10/11	1:31 PM
ccb	U233 IS	102			%R	0.5					0.5	101.96901	102	1	0.5	101.96901	11/10/11	1:31 PM

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☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ICP-MS CALIB. STD. ID's **TVs**

S0 11-099-03
STD. 1 11-091-04 44933 ng/L
I. STD 02-415-08 0.2 ppb
I. STD _____

QC STD. ID's

ICV/CCV 11-099-04 7666 ng/L
UCL _____
CRI 11-099-05 40 ng/L
ICSA 11-099-01 –
ICSAB 11-099-02 20,444 ng/L

ANALYSIS

Total Uranium

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.65.006	Fluor	110830-12	10/28/11	solid	15-00146-15-00152
		110901-7			
		110831-5			
		~~110830-12~~ RE 10/31/11 NS			
		110902-3			

INSTRUMENT: DRCII FILENAME: 111028.rep

Analyst: MSeiler Date: 10 / 28 / 11 ☐ CONVERTED (.DAT)

010161

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Friday, October 28, 2011 10:04:01
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Daily Performance Check.396
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	9688.1	9688.093	111.581	1.2
	In	114.9	32174.0	32174.042	425.103	1.3
	U	238.1	24868.7	24868.702	79.228	0.3
⌈>	Ce	139.9	30224.9	30224.896	164.823	0.5
⌊	CeO	155.9	2148.5	0.071	0.001	1.3
⌈>	Ba	137.9	270135.4	270135.450	2530.104	0.9
⌊	Ba++	69.0	5938.6	0.022	0.000	1.6
	Bkgd	220.0	2.6	2.567	0.962	37.5
	Bkgd	8.5	52.8	52.767	3.517	6.7

Current Optimization File Data

Current Value	Description
1.04	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	4.3	603.0
Co	59	45	5.3	17434.7
In	115	45	6.3	32941.6

010162

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Friday, October 28, 2011 10:04:01
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Daily Performance Check.396
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

MSeiler 10/28/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2773	2020	0.696	
Mg	23.985	23.925	5673	2031	0.676	
Ar2	75.930	75.925	18319	2063	0.685	
In	114.904	114.925	27819	2088	0.692	
Ce	139.905	139.925	33899	2101	0.694	
Pb	207.977	208.025	50482	2146	0.703	
Th	232.038	232.025	56324	2158	0.712	
U	238.050	238.025	57800	2172	0.678	

010163

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Friday, October 28, 2011 11:44:19
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\S-0.419
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	99	80.836	0.000	
	U	235	96	80.795	0.000	
	U	238	110	70.846	0.000	
	U 232	232	86	84.049	0.000	
	U 236	236	82	86.611	0.000	
⌜	U-tot	238	304	76.350	0.000	
⌞>	U233	233	3824	2.214	0.000	
	U233 IS	233	3824	2.214	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	98.667				ng/L
	U	235	95.667				ng/L
	U	238	109.668				ng/L
	U 232	232	85.667				ng/L
	U 236	236	82.001				ng/L
⌜	U-tot	238	0.079				ng/L
⌞>	U233	233	3824.138				ng/L
	U233 IS	233	3824.138	**100.000**	2.21	2.2	%R

010164

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Friday, October 28, 2011 11:46:43
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\S-1.420
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	104	38.594	0.000	
	U	235	6413	0.555	0.000	
	U	238	858789	0.313	0.000	
	U 232	232	51	91.319	0.000	
	U 236	236	230	24.399	0.000	
⌜	U-tot	238	865306	0.305	0.000	
⌞>	U233	233	3833	1.732	0.000	
	U233 IS	233	3833	1.732	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	104.334				ng/L
	U	235	6413.261				ng/L
	U	238	858788.868				ng/L
	U 232	232	51.000				ng/L
	U 236	236	230.336				ng/L
⌜	U-tot	238	225.801	**44933.000**	656.16	1.5	ng/L
⌞>	U233	233	3832.808				ng/L
	U233 IS	233	3832.808	**100.227**	1.74	1.7	%R

010165

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Friday, October 28, 2011 11:49:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icv.421
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	77.183	0.000	
	U	235	1113	2.124	0.000	
	U	238	148617	0.129	0.000	
	U 232	232	19	104.476	0.000	
	U 236	236	107	29.980	0.000	
⌈	U-tot	238	149753	0.112	0.000	
⌊>	U233	233	3847	1.259	0.000	
	U233 IS	233	3847	1.259	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.333				ng/L
	U	235	1113.068				ng/L
	U	238	148616.937				ng/L
	U 232	232	18.667				ng/L
	U 236	236	107.001				ng/L
⌈	U-tot	238	38.930	**7733.821**	98.45	1.3	ng/L
⌊>	U233	233	3847.147				ng/L
	U233 IS	233	3847.147	**100.602**	1.27	1.3	%R

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Friday, October 28, 2011 11:51:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icb.422
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	109.612	0.000	
	U	235	39	96.779	0.000	
	U	238	84	52.381	0.000	
	U 232	232	38	124.491	0.000	
	U 236	236	28	126.091	0.000	
⌈	U-tot	238	168	77.020	0.000	
⌊>	U233	233	3836	1.409	0.000	
	U233 IS	233	3836	1.409	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	38.667				ng/L
	U	238	84.000				ng/L
	U 232	232	38.333				ng/L
	U 236	236	28.333				ng/L
⌈	U-tot	238	0.044	**-6.968**	6.76	97.0	ng/L
⌊>	U233	233	3836.476				ng/L
	U233 IS	233	3836.476	**100.323**	1.41	1.4	%R

010167

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 11:53:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.423
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	32.225	0.000	
	U	235	65	29.693	0.000	
	U	238	840	4.162	0.000	
	U 232	232	54	49.522	0.000	
	U 236	236	62	43.098	0.000	
⌈	U-tot	238	963	7.356	0.000	
⌊>	U233	233	3935	0.581	0.000	
	U233 IS	233	3935	0.581	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.667				ng/L
	U	235	65.334				ng/L
	U	238	839.705				ng/L
	U 232	232	53.667				ng/L
	U 236	236	61.667				ng/L
⌈	U-tot	238	0.245	**33.007**	3.78	11.4	ng/L
⌊>	U233	233	3934.851				ng/L
	U233 IS	233	3934.851	**102.895**	0.60	0.6	%R

010168

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Friday, October 28, 2011 11:56:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icsa.424
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	67	68.169	0.000	
	U	235	72	84.574	0.000	
	U	238	180	34.921	0.000	
	U 232	232	321	16.647	0.000	
	U 236	236	72	87.276	0.000	
⌜	U-tot	238	319	53.076	0.000	
⌞>	U233	233	3883	2.051	0.000	
	U233 IS	233	3883	2.051	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.667				ng/L
	U	235	72.000				ng/L
	U	238	180.002				ng/L
	U 232	232	320.672				ng/L
	U 236	236	72.334				ng/L
⌜	U-tot	238	0.082	**0.641**	8.78	1371.3	ng/L
⌞>	U233	233	3883.163				ng/L
	U233 IS	233	3883.163	**101.543**	2.08	2.1	%R

010169

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Friday, October 28, 2011 11:58:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icsab.425
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	121	61.507	0.000	
	U	235	3172	3.946	0.000	
	U	238	423634	0.484	0.000	
	U 232	232	347	24.664	0.000	
	U 236	236	89	85.873	0.000	
⌜	U-tot	238	426927	0.465	0.000	
⌞>	U233	233	4173	1.384	0.000	
	U233 IS	233	4173	1.384	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	121.334				ng/L
	U	235	3171.887				ng/L
	U	238	423634.014				ng/L
	U 232	232	346.674				ng/L
	U 236	236	88.667				ng/L
⌜	U-tot	238	102.326	**20353.589**	210.35	1.0	ng/L
⌞>	U233	233	4172.624				ng/L
	U233 IS	233	4172.624	**109.113**	1.51	1.4	%R

0110170

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 12:01:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.426
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	12	56.950	0.000	
	U	235	10	106.598	0.000	
	U	238	28	29.599	0.000	
	U 232	232	8	116.907	0.000	
	U 236	236	7	121.244	0.000	
⌈	U-tot	238	51	50.412	0.000	
⌊>	U233	233	4098	2.387	0.000	
	U233 IS	233	4098	2.387	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	12.333				ng/L
	U	235	10.333				ng/L
	U	238	28.333				ng/L
	U 232	232	7.667				ng/L
	U 236	236	6.667				ng/L
⌈	U-tot	238	0.012	**-13.230**	1.23	9.3	ng/L
⌊>	U233	233	4097.924				ng/L
	U233 IS	233	4097.924	**107.159**	2.56	2.4	%R

010171

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 12:03:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.427
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	60	64.679	0.000	
	U	235	1307	1.862	0.000	
	U	238	168526	0.957	0.000	
	U 232	232	44	73.680	0.000	
	U 236	236	150	22.630	0.000	
⌜	U-tot	238	169893	0.918	0.000	
⌞>	U233	233	4377	2.090	0.000	
	U233 IS	233	4377	2.090	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	59.667				ng/L
	U	235	1307.094				ng/L
	U	238	168525.799				ng/L
	U 232	232	44.000				ng/L
	U 236	236	150.335				ng/L
⌜	U-tot	238	38.829	**7713.672**	212.15	2.8	ng/L
⌞>	U233	233	4377.054				ng/L
	U233 IS	233	4377.054	**114.459**	2.39	2.1	%R

010172

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 12:05:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.428
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	28	111.575	0.000	
	U	235	29	140.822	0.000	
	U	238	51	104.835	0.000	
	U 232	232	29	146.420	0.000	
	U 236	236	26	160.050	0.000	
⌈	U-tot	238	108	116.273	0.000	
⌊>	U233	233	4089	1.957	0.000	
	U233 IS	233	4089	1.957	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.000				ng/L
	U	235	29.333				ng/L
	U	238	50.667				ng/L
	U 232	232	29.000				ng/L
	U 236	236	26.333				ng/L
⌈	U-tot	238	0.026	**-10.524**	5.95	56.5	ng/L
⌊>	U233	233	4088.920				ng/L
	U233 IS	233	4088.920	**106.924**	2.09	2.0	%R

010173

Quantitative Analysis - Summary Report

Sample ID: Blank d0 df4

Sample Date/Time: Friday, October 28, 2011 12:08:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Blank d0 df4.429
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	87.204	0.000	
	U	235	1802	2.813	0.000	
	U	238	524747	0.522	0.000	
	U 232	232	50	111.128	0.000	
	U 236	236	131	40.213	0.000	
⌜	U-tot	238	526612	0.505	0.000	
⌞>	U233	233	4099	1.636	0.000	
	U233 IS	233	4099	1.636	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.667				ng/L
	U	235	1802.179				ng/L
	U	238	524746.846				ng/L
	U 232	232	49.667				ng/L
	U 236	236	131.001				ng/L
⌜	U-tot	238	128.502	**25564.366**	496.17	1.9	ng/L
⌞>	U233	233	4098.924				ng/L
	U233 IS	233	4098.924	**107.186**	1.75	1.6	%R

010174

Quantitative Analysis - Summary Report

Sample ID: Blank d7 df4

Sample Date/Time: Friday, October 28, 2011 12:10:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Blank d7 df4.430
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	61.246	0.000	
	U	235	1829	1.921	0.000	
	U	238	522626	0.491	0.000	
	U 232	232	20	94.079	0.000	
	U 236	236	108	18.584	0.000	
⌈	U-tot	238	524495	0.480	0.000	
⌊>	U233	233	4042	1.826	0.000	
	U233 IS	233	4042	1.826	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.333				ng/L
	U	235	1828.851				ng/L
	U	238	522626.414				ng/L
	U 232	232	19.667				ng/L
	U 236	236	108.334				ng/L
⌈	U-tot	238	129.801	**25822.831**	591.30	2.3	ng/L
⌊>	U233	233	4041.899				ng/L
	U233 IS	233	4041.899	**105.694**	1.93	1.8	%R

Quantitative Analysis - Summary Report

010175

Sample ID: 474212d7 df4

Sample Date/Time: Friday, October 28, 2011 12:12:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d7 df4.431
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	30	74.461	0.000	
	U	235	1705	3.434	0.000	
	U	238	480168	0.372	0.000	
	U 232	232	88	26.364	0.000	
	U 236	236	105	27.750	0.000	
⌈	U-tot	238	481903	0.381	0.000	
⌊>	U233	233	4011	2.401	0.000	
	U233 IS	233	4011	2.401	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	30.000				ng/L
	U	235	1704.827				ng/L
	U	238	480168.391				ng/L
	U 232	232	86.334				ng/L
	U 236	236	105.001				ng/L
⌈	U-tot	238	120.192	**23910.169**	545.20	2.3	ng/L
⌊>	U233	233	4010.885				ng/L
	U233 IS	233	4010.885	**104.883**	2.52	2.4	%R

010176

Quantitative Analysis - Summary Report

Sample ID: 474212d7d df4

Sample Date/Time: Friday, October 28, 2011 12:14:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d7d df4.432
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	73.882	0.000	
	U	235	1696	0.742	0.000	
	U	238	474854	0.195	0.000	
	U 232	232	96	19.123	0.000	
	U 236	236	100	15.643	0.000	
⌈	U-tot	238	476585	0.190	0.000	
⌊>	U233	233	3989	2.505	0.000	
	U233 IS	233	3989	2.505	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.000				ng/L
	U	235	1696.492				ng/L
	U	236	474854.482				ng/L
	U 232	232	96.001				ng/L
	U 236	236	100.334				ng/L
⌈	U-tot	238	119.541	**23780.572**	628.40	2.6	ng/L
⌊>	U233	233	3988.542				ng/L
	U233 IS	233	3986.542	**104.299**	2.61	2.5	%R

010177

Quantitative Analysis - Summary Report

Sample ID: 474213d7 df4

Sample Date/Time: Friday, October 28, 2011 12:17:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d7 df4.433
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	28	50.000	0.000	
	U	235	1358	3.657	0.000	
	U	238	373928	0.235	0.000	
	U 232	232	64	27.161	0.000	
	U 236	236	71	20.748	0.000	
⌜	U-tot	238	375313	0.228	0.000	
⌞>	U233	233	3920	0.966	0.000	
	U233 IS	233	3920	0.966	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.000				ng/L
	U	235	1357.768				ng/L
	U	238	373927.592				ng/L
	U 232	232	64.334				ng/L
	U 236	236	71.000				ng/L
⌜	U-tot	238	95.743	**19043.294**	140.25	0.7	ng/L
⌞>	U233	233	3920.178				ng/L
	U233 IS	233	3920.178	**102.511**	0.99	1.0	%R

Quantitative Analysis - Summary Report

010178

Sample ID: 474213d7d df4

Sample Date/Time: Friday, October 28, 2011 12:19:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d7d df4.434
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	77.775	0.000	
	U	235	1326	2.675	0.000	
	U	238	364956	1.254	0.000	
	U 232	232	80	33.899	0.000	
	U 236	236	99	41.746	0.000	
⌜	U-tot	238	366329	1.233	0.000	
⌞>	U233	233	3910	1.650	0.000	
	U233 IS	233	3910	1.650	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.667				ng/L
	U	235	1326.430				ng/L
	U	238	364955.842				ng/L
	U 232	232	79.667				ng/L
	U 236	236	99.001				ng/L
⌜	U-tot	238	93.708	**18638.215**	454.33	2.4	ng/L
⌞>	U233	233	3910.174				ng/L
	U233 IS	233	3910.174	**102.250**	1.69	1.7	%R

010179

Quantitative Analysis - Summary Report

Sample ID: 474214d7

Sample Date/Time: Friday, October 28, 2011 12:21:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d7.435
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandate\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	92	24.752	0.000	
	U	235	2579	1.523	0.000	
	U	238	665876	0.072	0.000	
	U 232	232	461	17.289	0.000	
	U 236	236	180	22.160	0.000	
⌜	U-tot	238	668547	0.070	0.000	
⌞>	U233	233	3919	2.030	0.000	
	U233 IS	233	3919	2.030	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	92.334				ng/L
	U	235	2578.699				ng/L
	U	238	665875.942				ng/L
	U 232	232	461.345				ng/L
	U 236	236	180.002				ng/L
⌜	U-tot	238	170.644	**33953.241**	675.48	2.0	ng/L
⌞>	U233	233	3918.845				ng/L
	U233 IS	233	3918.845	**102.477**	2.08	2.0	%R

010180

Quantitative Analysis - Summary Report

Sample ID: 474214d7d

Sample Date/Time: Friday, October 28, 2011 12:24:09
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d7d.438
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	68	51.701	0.000	
	U	235	2420	1.767	0.000	
	U	238	622421	0.364	0.000	
	U 232	232	420	3.968	0.000	
	U 236	236	168	25.885	0.000	
⌜	U-tot	238	624909	0.353	0.000	
⌞>	U233	233	3937	0.437	0.000	
	U233 IS	233	3937	0.437	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.000				ng/L
	U	235	2420.322				ng/L
	U	238	622420.638				ng/L
	U 232	232	419.676				ng/L
	U 236	236	168.002				ng/L
⌜	U-tot	238	158.748	**31585.224**	146.13	0.5	ng/L
⌞>	U233	233	3936.519				ng/L
	U233 IS	233	3936.519	**102.939**	0.45	0.4	%R

010181

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 12:26:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.437
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	12	65.085	0.000	
	U	235	14	63.487	0.000	
	U	238	165	7.594	0.000	
	U 232	232	45	30.062	0.000	
	U 236	236	6	92.518	0.000	
⌜	U-tot	238	191	14.910	0.000	
⌞>	U233	233	3917	1.956	0.000	
	U233 IS	233	3917	1.956	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	12.000				ng/L
	U	235	14.000				ng/L
	U	238	165.002				ng/L
	U 232	232	45.000				ng/L
	U 236	236	6.333				ng/L
⌜	U-tot	238	0.049	**-6.012**	1.27	21.2	ng/L
⌞>	U233	233	3916.510				ng/L
	U233 IS	233	3916.510	**102.416**	2.00	2.0	%R

010182

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 12:28:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.438
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	33	88.296	0.000	
	U	235	33	126.582	0.000	
	U	238	890	4.340	0.000	
	U 232	232	27	90.026	0.000	
	U 236	236	26	135.082	0.000	
⌜	U-tot	238	956	10.486	0.000	
⌞>	U233	233	4058	1.460	0.000	
	U233 IS	233	4058	1.460	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	33.000				ng/L
	U	235	33.333				ng/L
	U	238	890.044				ng/L
	U 232	232	26.667				ng/L
	U 236	236	26.333				ng/L
⌜	U-tot	238	0.235	**31.165**	4.21	13.5	ng/L
⌞>	U233	233	4058.239				ng/L
	U233 IS	233	4058.239	**106.122**	1.55	1.5	%R

010183

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 12:31:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.439
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	81.258	0.000	
	U	235	1231	2.445	0.000	
	U	238	164046	0.439	0.000	
	U 232	232	30	64.377	0.000	
	U 236	236	126	20.601	0.000	
⌜	U-tot	238	165321	0.466	0.000	
⌞>	U233	233	4143	1.962	0.000	
	U233 IS	233	4143	1.962	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.667				ng/L
	U	235	1230.750				ng/L
	U	238	164045.552				ng/L
	U 232	232	30.000				ng/L
	U 236	236	126.334				ng/L
⌜	U-tot	238	39.914	**7929.635**	192.01	2.4	ng/L
⌞>	U233	233	4143.278				ng/L
	U233 IS	233	4143.278	**108.345**	2.13	2.0	%R

010184

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 12:33:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.440
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	48	79.413	0.000	
	U	235	48	69.313	0.000	
	U	238	76	52.571	0.000	
	U 232	232	37	75.302	0.000	
	U 236	236	49	69.538	0.000	
⌈	U-tot	238	173	64.576	0.000	
⌊>	U233	233	3970	1.811	0.000	
	U233 IS	233	3970	1.811	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	48.000				ng/L
	U	235	48.334				ng/L
	U	238	76.334				ng/L
	U 232	232	37.333				ng/L
	U 236	236	49.000				ng/L
⌈	U-tot	238	0.043	**-7.072**	5.55	78.5	ng/L
⌊>	U233	233	3969.867				ng/L
	U233 IS	233	3969.867	**103.811**	1.88	1.8	%R

010185

Quantitative Analysis - Summary Report

Sample ID: 474221d7 df4

Sample Date/Time: Friday, October 28, 2011 12:36:00
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d7 df4.441
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	71.603	0.000	
	U	235	1012	3.025	0.000	
	U	238	273477	0.814	0.000	
	U 232	232	278	17.763	0.000	
	U 236	236	87	45.806	0.000	
⌈	U-tot	238	274537	0.788	0.000	
⌊>	U233	233	3901	0.843	0.000	
	U233 IS	233	3901	0.843	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.000				ng/L
	U	235	1011.723				ng/L
	U	238	273476.641				ng/L
	U 232	232	278.338				ng/L
	U 236	236	87.334				ng/L
⌈	U-tot	238	70.387	**13995.797**	124.01	0.9	ng/L
⌊>	U233	233	3900.503				ng/L
	U233 IS	233	3900.503	**101.997**	0.86	0.8	%R

010186

Quantitative Analysis - Summary Report

Sample ID: 474221d7d df4

Sample Date/Time: Friday, October 28, 2011 12:38:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d7d df4.442
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	70	66.409	0.000	
	U	235	1048	5.969	0.000	
	U	238	273703	0.952	0.000	
	U 232	232	263	15.438	0.000	
	U 236	236	122	47.723	0.000	
⌜	U-tot	238	274821	0.938	0.000	
⌞>	U233	233	3995	1.973	0.000	
	U233 IS	233	3995	1.973	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	70.000				ng/L
	U	235	1048.061				ng/L
	U	238	273703.034				ng/L
	U 232	232	262.671				ng/L
	U 236	236	122.334				ng/L
⌜	U-tot	238	68.813	**13682.432**	237.82	1.7	ng/L
⌞>	U233	233	3994.544				ng/L
	U233 IS	233	3994.544	**104.456**	2.06	2.0	%R

010187

Quantitative Analysis - Summary Report

Sample ID: 474222d7 df4

Sample Date/Time: Friday, October 28, 2011 12:40:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d7 df4.443
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	114	52.721	0.000	
	U	235	1086	5.060	0.000	
	U	238	266701	0.814	0.000	
	U 232	232	295	19.872	0.000	
	U 236	236	156	31.447	0.000	
⌜	U-tot	238	267901	0.789	0.000	
⌞>	U233	233	3971	0.429	0.000	
	U233 IS	233	3971	0.429	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	114.334				ng/L
	U	235	1085.732				ng/L
	U	238	266701.406				ng/L
	U 232	232	295.338				ng/L
	U 236	236	155.668				ng/L
⌜	U-tot	238	67.463	**13413.774**	161.45	1.2	ng/L
⌞>	U233	233	3971.201				ng/L
	U233 IS	233	3971.201	**103.846**	0.45	0.4	%R

010188

Quantitative Analysis - Summary Report

Sample ID: 474222d7d df4

Sample Date/Time: Friday, October 28, 2011 12:42:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d7d df4.444
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	118.255	0.000	
	U	235	952	10.634	0.000	
	U	238	255117	0.950	0.000	
	U 232	232	459	9.954	0.000	
	U 236	236	74	56.922	0.000	
⌜	U-tot	238	256108	0.889	0.000	
⌞>	U233	233	3975	0.398	0.000	
	U233 IS	233	3975	0.398	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.000				ng/L
	U	235	951.717				ng/L
	U	238	255116.998				ng/L
	U 232	232	458.678				ng/L
	U 236	236	73.667				ng/L
⌜	U-tot	238	64.425	**12809.051**	63.32	0.5	ng/L
⌞>	U233	233	3975.202				ng/L
	U233 IS	233	3975.202	**103.950**	0.41	0.4	%R

010189

Quantitative Analysis - Summary Report

Sample ID: 474300d7 df4

Sample Date/Time: Friday, October 28, 2011 12:45:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d7 df4.445
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	76	111.750	0.000	
	U	235	1613	5.085	0.000	
	U	238	442115	0.923	0.000	
	U 232	232	508	23.325	0.000	
	U 236	236	158	68.814	0.000	
⌜	U-tot	238	443804	0.886	0.000	
⌞>	U233	233	3987	1.565	0.000	
	U233 IS	233	3987	1.565	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	76.001				ng/L
	U	235	1613.143				ng/L
	U	238	442114.969				ng/L
	U 232	232	508.348				ng/L
	U 236	236	158.002				ng/L
⌜	U-tot	238	111.343	**22148.528**	514.33	2.3	ng/L
⌞>	U233	233	3986.874				ng/L
	U233 IS	233	3986.874	**104.256**	1.63	1.6	%R

010190

Quantitative Analysis - Summary Report

Sample ID: 474300d7d df4

Sample Date/Time: Friday, October 28, 2011 12:47:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d7d df4.446
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	101.107	0.000	
	U	235	1519	4.335	0.000	
	U	238	423516	1.198	0.000	
	U 232	232	730	2.069	0.000	
	U 236	236	110	38.193	0.000	
⌜	U-tot	238	425082	1.181	0.000	
⌞>	U233	233	3860	1.614	0.000	
	U233 IS	233	3860	1.614	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.334				ng/L
	U	235	1519.127				ng/L
	U	238	423515.761				ng/L
	U 232	232	730.029				ng/L
	U 236	236	109.667				ng/L
⌜	U-tot	238	110.146	**21910.348**	389.14	1.8	ng/L
⌞>	U233	233	3859.819				ng/L
	U233 IS	233	3859.819	**100.933**	1.63	1.6	%R

010191

Quantitative Analysis - Summary Report

Sample ID: 474301d7 df4

Sample Date/Time: Friday, October 28, 2011 12:49:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d7 df4.447
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	109.336	0.000	
	U	235	1514	5.120	0.000	
	U	238	415057	0.656	0.000	
	U 232	232	164	29.741	0.000	
	U 236	236	110	50.014	0.000	
⌜	U-tot	238	416618	0.625	0.000	
⌞>	U233	233	3983	2.863	0.000	
	U233 IS	233	3983	2.863	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.334				ng/L
	U	235	1514.460				ng/L
	U	238	415057.101				ng/L
	U 232	232	164.002				ng/L
	U 236	236	109.667				ng/L
⌜	U-tot	238	104.680	**20822.202**	716.10	3.4	ng/L
⌞>	U233	233	3982.539				ng/L
	U233 IS	233	3982.539	**104.142**	2.98	2.9	%R

010192

Quantitative Analysis - Summary Report

Sample ID: 474301d7d df4

Sample Date/Time: Friday, October 28, 2011 12:52:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d7d df4.448
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	103	39.330	0.000	
	U	235	1529	4.158	0.000	
	U	238	404516	0.255	0.000	
	U 232	232	193	11.446	0.000	
	U 236	236	170	20.306	0.000	
⌜	U-tot	238	406148	0.230	0.000	
⌞>	U233	233	4033	1.923	0.000	
	U233 IS	233	4033	1.923	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	103.001				ng/L
	U	235	1529.462				ng/L
	U	238	404515.640				ng/L
	U 232	232	192.669				ng/L
	U 236	236	170.335				ng/L
⌜	U-tot	238	100.729	**20035.669**	436.30	2.2	ng/L
⌞>	U233	233	4033.228				ng/L
	U233 IS	233	4033.228	**105.468**	2.03	1.9	%R

010193

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 12:54:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.449
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	79	41.335	0.000	
	U	235	88	26.846	0.000	
	U	238	117	23.825	0.000	
	U 232	232	87	30.215	0.000	
	U 236	236	67	30.411	0.000	
⌈	U-tot	238	284	29.028	0.000	
⌊>	U233	233	4063	1.731	0.000	
	U233 IS	233	4063	1.731	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	76.667				ng/L
	U	235	86.334				ng/L
	U	238	117.001				ng/L
	U 232	232	87.000				ng/L
	U 236	236	87.000				ng/L
⌈	U-tot	238	0.070	**-1.801**	3.98	221.2	ng/L
⌊>	U233	233	4063.241				ng/L
	U233 IS	233	4063.241	**106.252**	1.84	1.7	%R

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 12:56:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.450
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	82.369	0.000	
	U	235	64	74.377	0.000	
	U	238	912	5.222	0.000	
	U 232	232	52	75.663	0.000	
	U 236	236	73	93.847	0.000	
⌈	U-tot	238	1038	14.046	0.000	
⌊>	U233	233	4121	2.406	0.000	
	U233 IS	233	4121	2.406	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.000				ng/L
	U	235	63.667				ng/L
	U	238	912.046				ng/L
	U 232	232	52.000				ng/L
	U 236	236	73.334				ng/L
⌈	U-tot	238	0.252	**34.459**	7.31	21.2	ng/L
⌊>	U233	233	4121.268				ng/L
	U233 IS	233	4121.268	**107.770**	2.59	2.4	%R

010195

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 12:59:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.451
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	122.529	0.000	
	U	235	1270	4.986	0.000	
	U	238	165747	0.638	0.000	
	U 232	232	37	143.206	0.000	
	U 236	236	140	39.324	0.000	
⌈	U-tot	238	167069	0.619	0.000	
⌊>	U233	233	4235	2.050	0.000	
	U233 IS	233	4235	2.050	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	1270.089				ng/L
	U	238	165746.682				ng/L
	U 232	232	37.334				ng/L
	U 236	236	140.335				ng/L
⌈	U-tot	238	39.464	**7840.160**	209.55	2.7	ng/L
⌊>	U233	233	4234.986				ng/L
	U233 IS	233	4234.986	**110.744**	2.27	2.0	%R

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 13:01:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.452
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	51	122.326	0.000	
	U	235	44	131.582	0.000	
	U	238	68	92.570	0.000	
	U 232	232	39	133.793	0.000	
	U 236	236	31	129.956	0.000	
⌜	U-tot	238	163	112.016	0.000	
⌞>	U233	233	4126	1.611	0.000	
	U233 IS	233	4126	1.611	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.667				ng/L
	U	235	43.667				ng/L
	U	238	68.334				ng/L
	U 232	232	38.667				ng/L
	U 236	236	31.000				ng/L
⌜	U-tot	238	0.039	**-7.949**	8.60	108.1	ng/L
⌞>	U233	233	4125.603				ng/L
	U233 IS	233	4125.603	**107.883**	1.74	1.6	%R

0110197

Quantitative Analysis - Summary Report

Sample ID: 474302d7 df4

Sample Date/Time: Friday, October 28, 2011 13:04:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d7 df4.453
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	96	57.106	0.000	
	U	235	1495	6.560	0.000	
	U	238	387637	0.467	0.000	
	U 232	232	404	13.624	0.000	
	U 236	236	160	26.397	0.000	
⌜	U-tot	238	389229	0.466	0.000	
⌞>	U233	233	3910	1.576	0.000	
	U233 IS	233	3910	1.576	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	96.334				ng/L
	U	235	1495.457				ng/L
	U	238	387637.376				ng/L
	U 232	232	404.342				ng/L
	U 236	236	159.668				ng/L
⌜	U-tot	238	99.564	**19803.875**	254.47	1.3	ng/L
⌞>	U233	233	3909.841				ng/L
	U233 IS	233	3909.841	**102.241**	1.61	1.6	%R

010198

Quantitative Analysis - Summary Report

Sample ID: 474302d7d df4

Sample Date/Time: Friday, October 28, 2011 13:06:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d7d df4.454
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	76.773	0.000	
	U	235	1446	4.428	0.000	
	U	238	396907	1.056	0.000	
	U 232	232	361	14.063	0.000	
	U 236	236	111	20.955	0.000	
⌈	U-tot	238	398399	1.040	0.000	
⌊>	U233	233	3832	2.043	0.000	
	U233 IS	233	3832	2.043	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.333				ng/L
	U	235	1445.782				ng/L
	U	238	396906.932				ng/L
	U 232	232	360.674				ng/L
	U 236	236	111.001				ng/L
⌈	U-tot	238	103.994	**20685.660**	603.72	2.9	ng/L
⌊>	U233	233	3832.475				ng/L
	U233 IS	233	3832.475	**100.218**	2.05	2.0	%R

010199

Quantitative Analysis - Summary Report

Sample ID: 474340d7

Sample Date/Time: Friday, October 28, 2011 13:08:33
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d7.455
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	97.050	0.000	
	U	235	489	6.856	0.000	
	U	238	112808	0.603	0.000	
	U 232	232	571	3.619	0.000	
	U 236	236	50	88.882	0.000	
⌜	U-tot	238	113343	0.559	0.000	
⌞>	U233	233	3700	2.512	0.000	
	U233 IS	233	3700	2.512	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.000				ng/L
	U	235	489.347				ng/L
	U	238	112807.606				ng/L
	U 232	232	571.018				ng/L
	U 236	236	50.000				ng/L
⌜	U-tot	238	30.642	**6084.090**	118.77	2.0	ng/L
⌞>	U233	233	3700.086				ng/L
	U233 IS	233	3700.086	**96.756**	2.43	2.5	%R

010200

Quantitative Analysis - Summary Report

Sample ID: 474340d7d

Sample Date/Time: Friday, October 28, 2011 13:10:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d7d.456
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	72	73.401	0.000	
	U	235	486	9.905	0.000	
	U	238	109104	0.562	0.000	
	U 232	232	559	5.778	0.000	
	U 236	236	68	56.008	0.000	
⌈	U-tot	238	109662	0.600	0.000	
⌊>	U233	233	3725	1.989	0.000	
	U233 IS	233	3725	1.989	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	72.000				ng/L
	U	235	486.013				ng/L
	U	238	109103.809				ng/L
	U 232	232	559.351				ng/L
	U 236	236	67.667				ng/L
⌈	U-tot	238	29.444	**5845.540**	82.74	1.4	ng/L
⌊>	U233	233	3725.097				ng/L
	U233 IS	233	3725.097	**97.410**	1.94	2.0	%R

010201

Quantitative Analysis - Summary Report

Sample ID: 474341d7 df4

Sample Date/Time: Friday, October 28, 2011 13:13:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d7 df4.457
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	91.043	0.000	
	U	235	1297	4.376	0.000	
	U	238	348239	0.562	0.000	
	U 232	232	249	22.028	0.000	
	U 236	236	97	67.532	0.000	
⌈	U-tot	238	349583	0.536	0.000	
⌊>	U233	233	4152	1.350	0.000	
	U233 IS	233	4152	1.350	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.000				ng/L
	U	235	1297.426				ng/L
	U	238	348238.643				ng/L
	U 232	232	248.670				ng/L
	U 236	236	97.001				ng/L
⌈	U-tot	238	84.205	**16746.341**	310.47	1.9	ng/L
⌊>	U233	233	4152.282				ng/L
	U233 IS	233	4152.282	**108.581**	1.47	1.4	%R

010202

Quantitative Analysis - Summary Report

Sample ID: 474341d7d df4

Sample Date/Time: Friday, October 28, 2011 13:15:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d7d df4.458
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	91.313	0.000	
	U	235	1292	7.009	0.000	
	U	238	349888	0.337	0.000	
	U 232	232	146	22.541	0.000	
	U 236	236	96	53.227	0.000	
⌈	U-tot	238	351218	0.355	0.000	
⌊>	U233	233	4253	1.582	0.000	
	U233 IS	233	4253	1.582	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.000				ng/L
	U	235	1291.759				ng/L
	U	238	349888.461				ng/L
	U 232	232	146.001				ng/L
	U 236	236	96.001				ng/L
⌈	U-tot	238	82.599	**16426.653**	203.35	1.2	ng/L
⌊>	U233	233	4252.661				ng/L
	U233 IS	233	4252.661	**111.206**	1.76	1.6	%R

010203

Quantitative Analysis - Summary Report

Sample ID: 474344d7 df4

Sample Date/Time: Friday, October 28, 2011 13:17:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d7 df4.459
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	32.752	0.000	
	U	235	989	2.851	0.000	
	U	238	285678	1.223	0.000	
	U 232	232	87	8.347	0.000	
	U 236	236	60	31.111	0.000	
⌜	U-tot	238	286684	1.212	0.000	
⌞>	U233	233	4178	2.572	0.000	
	U233 IS	233	4178	2.572	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.000				ng/L
	U	235	988.720				ng/L
	U	238	285677.980				ng/L
	U 232	232	86.667				ng/L
	U 236	236	60.334				ng/L
⌜	U-tot	238	68.634	**13646.894**	191.20	1.4	ng/L
⌞>	U233	233	4177.960				ng/L
	U233 IS	233	4177.960	**109.252**	2.81	2.6	%R

010204

Quantitative Analysis - Summary Report

Sample ID: 474344d7d df4

Sample Date/Time: Friday, October 28, 2011 13:20:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Procassing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d7d df4.460
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	69	43.205	0.000	
	U	235	1001	5.594	0.000	
	U	238	266889	0.738	0.000	
	U 232	232	176	32.365	0.000	
	U 236	236	106	29.662	0.000	
⌜	U-tot	238	267960	0.720	0.000	
⌞>	U233	233	4180	0.472	0.000	
	U233 IS	233	4180	0.472	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	69.334				ng/L
	U	235	1001.389				ng/L
	U	238	266889.100				ng/L
	U 232	232	175.668				ng/L
	U 236	236	105.667				ng/L
⌜	U-tot	238	64.102	**12744.580**	108.91	0.9	ng/L
⌞>	U233	233	4180.294				ng/L
	U233 IS	233	4180.294	**109.313**	0.52	0.5	%R

010205

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 13:22:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.461
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	70	38.519	0.000	
	U	235	64	34.904	0.000	
	U	238	107	17.831	0.000	
	U 232	232	69	31.784	0.000	
	U 236	236	60	49.622	0.000	
⌜	U-tot	238	241	26.798	0.000	
⌞>	U233	233	4244	1.538	0.000	
	U233 IS	233	4244	1.538	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	70.000				ng/L
	U	235	64.000				ng/L
	U	238	107.001				ng/L
	U 232	232	66.667				ng/L
	U 236	236	60.334				ng/L
⌜	U-tot	238	0.057	**-4.382**	3.13	71.5	ng/L
⌞>	U233	233	4244.324				ng/L
	U233 IS	233	4244.324	**110.988**	1.71	1.5	%R

Quantitative Analysis - Summary Report

010206

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 13:24:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.462
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	69	51.619	0.000	
	U	235	64	46.953	0.000	
	U	238	982	4.215	0.000	
	U 232	232	54	50.281	0.000	
	U 236	236	57	45.758	0.000	
⌜	U-tot	238	1115	9.012	0.000	
⌞>	U233	233	4335	0.597	0.000	
	U233 IS	233	4335	0.597	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.667				ng/L
	U	235	64.000				ng/L
	U	238	982.386				ng/L
	U 232	232	54.334				ng/L
	U 236	236	56.667				ng/L
⌜	U-tot	238	0.257	**35.515**	4.89	13.8	ng/L
⌞>	U233	233	4335.033				ng/L
	U233 IS	233	4335.033	**113.360**	0.68	0.6	%R

010207

Quantitative Analysis - Summary Report

Sample ID: ccv
Sample Date/Time: Friday, October 28, 2011 13:27:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.463
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	80	62.450	0.000	
	U	235	1329	3.642	0.000	
	U	238	172936	0.062	0.000	
	U 232	232	56	77.344	0.000	
	U 236	236	171	11.061	0.000	
⌜	U-tot	238	174345	0.090	0.000	
⌞>	U233	233	4400	2.235	0.000	
	U233 IS	233	4400	2.235	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	80.000				ng/L
	U	235	1326.764				ng/L
	U	238	172936.387				ng/L
	U 232	232	56.000				ng/L
	U 236	236	170.668				ng/L
⌜	U-tot	238	39.639	**7875.025**	173.45	2.2	ng/L
⌞>	U233	233	4399.731				ng/L
	U233 IS	233	4399.731	**115.052**	2.57	2.2	%R

010208

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 13:29:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.464
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	110.772	0.000	
	U	235	31	136.581	0.000	
	U	238	53	88.788	0.000	
	U 232	232	32	143.340	0.000	
	U 236	236	21	173.205	0.000	
⌈	U-tot	238	125	107.599	0.000	
⌊>	U233	233	4323	0.857	0.000	
	U233 IS	233	4323	0.857	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.334				ng/L
	U	235	30.667				ng/L
	U	238	53.334				ng/L
	U 232	232	31.667				ng/L
	U 236	236	21.333				ng/L
⌈	U-tot	238	0.029	**-9.936**	6.21	62.5	ng/L
⌊>	U233	233	4323.028				ng/L
	U233 IS	233	4323.028	**113.046**	0.97	0.9	%R

010209

Quantitative Analysis - Summary Report

Sample ID: 474401d7 df4

Sample Date/Time: Friday, October 28, 2011 13:31:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d7 df4.465
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	38	50.814	0.000	
	U	235	1374	6.369	0.000	
	U	238	368120	0.058	0.000	
	U 232	232	174	9.326	0.000	
	U 236	236	83	48.238	0.000	
⌈	U-tot	238	369532	0.058	0.000	
⌊>	U233	233	4133	1.622	0.000	
	U233 IS	233	4133	1.622	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.667				ng/L
	U	235	1374.104				ng/L
	U	238	368119.937				ng/L
	U 232	232	174.335				ng/L
	U 236	236	83.000				ng/L
⌈	U-tot	238	89.434	**17787.286**	280.28	1.6	ng/L
⌊>	U233	233	4132.606				ng/L
	U233 IS	233	4132.606	**108.066**	1.75	1.6	%R

010210

Quantitative Analysis - Summary Report

Sample ID: 474401d7d df4

Sample Date/Time: Friday, October 28, 2011 13:34:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d7d df4.466
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	71	43.826	0.000	
	U	235	1308	4.264	0.000	
	U	238	340057	0.494	0.000	
	U 232	232	183	9.481	0.000	
	U 236	236	131	21.003	0.000	
⌈	U-tot	238	341437	0.481	0.000	
⌊>	U233	233	4050	0.313	0.000	
	U233 IS	233	4050	0.313	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	71.334				ng/L
	U	235	1308.428				ng/L
	U	238	340057.477				ng/L
	U 232	232	183.002				ng/L
	U 236	236	131.001				ng/L
⌈	U-tot	238	84.302	**16765.699**	127.05	0.8	ng/L
⌊>	U233	233	4050.235				ng/L
	U233 IS	233	4050.235	**105.912**	0.33	0.3	%R

Quantitative Analysis - Summary Report

Sample ID: 474402d7 df

Sample Date/Time: Friday, October 28, 2011 13:36:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d7 df.467
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	33	60.378	0.000	
	U	235	1360	1.785	0.000	
	U	238	381859	0.280	0.000	
	U 232	232	776	3.867	0.000	
	U 236	236	87	31.999	0.000	
⌜	U-tot	238	383252	0.273	0.000	
⌞>	U233	233	3984	0.651	0.000	
	U233 IS	233	3984	0.651	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	33.000				ng/L
	U	235	1360.102				ng/L
	U	238	381859.311				ng/L
	U 232	232	776.367				ng/L
	U 236	236	87.000				ng/L
⌜	U-tot	238	96.205	**19135.146**	176.10	0.9	ng/L
⌞>	U233	233	3983.873				ng/L
	U233 IS	233	3983.873	**104.177**	0.68	0.7	%R

010212

Quantitative Analysis - Summary Report

Sample ID: 474402d7L df10

Sample Date/Time: Friday, October 28, 2011 13:38:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d7L df10.468
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	11	28.364	0.000	
	U	235	287	4.324	0.000	
	U	238	79054	0.821	0.000	
	U 232	232	210	8.198	0.000	
	U 236	236	21	21.819	0.000	
⌜	U-tot	238	79353	0.834	0.000	
⌞>	U233	233	4175	1.205	0.000	
	U233 IS	233	4175	1.205	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	11.333				ng/L
	U	235	287.338				ng/L
	U	238	79054.254				ng/L
	U 232	232	210.336				ng/L
	U 236	236	20.667				ng/L
⌜	U-tot	238	19.008	**3768.023**	64.32	1.7	ng/L
⌞>	U233	233	4175.292				ng/L
	U233 IS	233	4175.292	**109.183**	1.32	1.2	%R

010213

Quantitative Analysis - Summary Report

Sample ID: 474402d7D df2

Sample Date/Time: Friday, October 28, 2011 13:41:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d7D df2.469
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	24	47.115	0.000	
	U	235	1230	4.200	0.000	
	U	238	344981	0.254	0.000	
	U 232	232	951	2.687	0.000	
	U 236	236	75	8.917	0.000	
⌜	U-tot	238	346235	0.265	0.000	
⌞>	U233	233	4080	1.253	0.000	
	U233 IS	233	4080	1.253	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.667				ng/L
	U	235	1230.417				ng/L
	U	238	344980.789				ng/L
	U 232	232	950.716				ng/L
	U 236	236	74.667				ng/L
⌜	U-tot	238	84.873	**16879.333**	228.78	1.4	ng/L
⌞>	U233	233	4079.915				ng/L
	U233 IS	233	4079.915	**106.689**	1.34	1.3	%R

010214

Quantitative Analysis - Summary Report

Sample ID: 474402d7AS df2

Sample Date/Time: Friday, October 28, 2011 13:43:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

spiked 20uL 1° natural uranium @ df 100 (675-Rad-Sol2) (11-064-06) in 10mL

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d7AS df2.470
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

$TV = 20{,}462\ ng/L \times df\ 2 = 40{,}924\ ng/L$

10131111 US

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	67	58.984	0.000	
	U	235	4490	3.584	0.000	
	U	238	789655	2.995	0.000	
	U 232	232	826	3.029	0.000	
	U 236	236	106	43.611	0.000	
⌜	U-tot	238	794213	2.989	0.000	
⌞>	U233	233	4063	3.146	0.000	
	U233 IS	233	4063	3.146	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	67.334				ng/L
	U	235	4490.443				ng/L
	U	238	789655.113				ng/L
	U 232	232	825.704				ng/L
	U 236	236	106.001				ng/L
⌜	U-tot	238	195.506	**38902.395**	714.15	1.8	ng/L
⌞>	U233	233	4062.908				ng/L
	U233 IS	233	4062.908	**106.244**	3.34	3.1	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 13:45:50
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.471
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	68.295	0.000	
	U	235	41	73.784	0.000	
	U	238	106	52.814	0.000	
	U 232	232	94	41.161	0.000	
	U 236	236	47	103.995	0.000	
⌜	U-tot	238	190	60.057	0.000	
⌞>	U233	233	4153	2.720	0.000	
	U233 IS	233	4153	2.720	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.000				ng/L
	U	235	40.667				ng/L
	U	238	105.667				ng/L
	U 232	232	94.001				ng/L
	U 236	236	47.000				ng/L
⌜	U-tot	238	0.045	**-6.658**	5.36	80.5	ng/L
⌞>	U233	233	4152.949				ng/L
	U233 IS	233	4152.949	**108.598**	2.95	2.7	%R

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 13:48:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.472
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	28	124.300	0.000	
	U	235	31	125.972	0.000	
	U	238	941	3.039	0.000	
	U 232	232	36	88.499	0.000	
	U 236	236	25	131.137	0.000	
⌜	U-tot	238	1000	10.153	0.000	
⌞>	U233	233	4237	1.474	0.000	
	U233 IS	233	4237	1.474	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	28.333				ng/L
	U	235	31.000				ng/L
	U	238	940.715				ng/L
	U 232	232	35.667				ng/L
	U 236	236	24.667				ng/L
⌜	U-tot	238	0.236	**31.288**	4.92	15.7	ng/L
⌞>	U233	233	4237.321				ng/L
	U233 IS	233	4237.321	**110.805**	1.63	1.5	%R

010217

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 13:50:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.473
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	115	39.477	0.000	
	U	235	1369	5.978	0.000	
	U	238	171050	0.804	0.000	
	U 232	232	113	59.978	0.000	
	U 236	236	215	22.077	0.000	
⌈	U-tot	238	172534	0.852	0.000	
⌊>	U233	233	4485	1.134	0.000	
	U233 IS	233	4485	1.134	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	115.001				ng/L
	U	235	1369.103				ng/L
	U	238	171050.270				ng/L
	U 232	232	112.668				ng/L
	U 236	236	215.003				ng/L
⌈	U-tot	238	38.468	**7641.834**	88.17	1.2	ng/L
⌊>	U233	233	4485.440				ng/L
	U233 IS	233	4485.440	**117.293**	1.33	1.1	%R

010218

Quantitative Analysis - Summary Report

Sample ID: ccb
Sample Date/Time: Friday, October 28, 2011 13:52:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.474
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	66	70.238	0.000	
	U	235	63	82.553	0.000	
	U	238	81	68.338	0.000	
	U 232	232	60	80.905	0.000	
	U 236	236	54	86.628	0.000	
⌈	U-tot	238	210	72.169	0.000	
⌊>	U233	233	4401	1.537	0.000	
	U233 IS	233	4401	1.537	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.000				ng/L
	U	235	62.667				ng/L
	U	238	81.334				ng/L
	U 232	232	59.667				ng/L
	U 236	236	53.667				ng/L
⌈	U-tot	238	0.048	**-6.210**	6.86	110.4	ng/L
⌊>	U233	233	4401.399				ng/L
	U233 IS	233	4401.399	**115.095**	1.77	1.5	%R

010219

SOUTHWEST RESEARCH INSTITUTE

☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☒ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Total Uranium

IDL Date: 08/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's		TVs
S0	11-099-07	
STD. 1	11-091-04	44933 ng/L
I. STD	02-415-08	0.2 ppb
I. STD		

QC STD. ID's

ICV/CCV	11-099-08	7666 ng/L
UCL		
CRI	11-099-11	40 ng/L
ICSA	11-099-09	—
ICSAB	11-099-10	20,444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16526.05.006	Fluor	110830-12	10/28/11	Solid	15-00146 - 15-00152
		110901-7			
		110831-5			
		110902-3			

INSTRUMENT: DRCII FILENAME: 111028C.rep

Analyst: N. Seiler Date: 10 / 31 / 11 ☐ CONVERTED (.DAT)

010220

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Friday, October 28, 2011 10:04:01
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Daily Performance Check.396
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	9688.1	9688.093	111.581	1.2
	In	114.9	32174.0	32174.042	425.103	1.3
	U	238.1	24868.7	24868.702	79.228	0.3
⌈>	Ce	139.9	30224.9	30224.896	164.823	0.5
⌊	CeO	155.9	2148.5	0.071	0.001	1.3
⌈>	Ba	137.9	270135.4	270135.450	2530.104	0.9
⌊	Ba++	69.0	5938.6	0.022	0.000	1.6
	Bkgd	220.0	2.6	2.567	0.962	37.5
	Bkgd	8.5	52.8	52.767	3.517	6.7

Current Optimization File Data

Current Value	Description
1.04	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	4.3	603.0
Co	59	45	5.3	17434.7
In	115	45	6.3	32941.6

010221

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Friday, October 28, 2011 10:04:01
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Daily Performance Check.396
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

MSeiler 10/28/11

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2773	2020	0.696	
Mg	23.985	23.925	5673	2031	0.676	
Ar2	75.930	75.925	18319	2063	0.685	
In	114.904	114.925	27819	2088	0.692	
Ce	139.905	139.925	33899	2101	0.694	
Pb	207.977	208.025	50482	2146	0.703	
Th	232.038	232.025	56324	2158	0.712	
U	238.050	238.025	57800	2172	0.678	

010222

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Friday, October 28, 2011 20:13:48
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\S-0.560
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	70	35.170	0.000	
	U	235	53	37.118	0.000	
	U	238	98	29.111	0.000	
	U 232	232	54	47.286	0.000	
	U 236	236	61	52.740	0.000	
⌈	U-tot	238	220	30.880	0.000	
⌊>	U233	233	4410	0.557	0.000	
	U233 IS	233	4410	0.557	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	69.667				ng/L
	U	235	53.000				ng/L
	U	238	97.667				ng/L
	U 232	232	54.000				ng/L
	U 236	236	61.334				ng/L
⌈	U-tot	238	0.050				ng/L
⌊>	U233	233	4410.069				ng/L
	U233 IS	233	4410.069	**100.000**	0.56	0.6	%R

010223

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Friday, October 28, 2011 20:16:12
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\S-1.561
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	152	25.104	0.000	
	U	235	7609	2.026	0.000	
	U	238	1028234	0.702	0.000	
	U 232	232	74	28.358	0.000	
	U 236	236	293	20.371	0.000	
⌈	U-tot	238	1035996	0.698	0.000	
⌊>	U233	233	4621	2.234	0.000	
	U233 IS	233	4621	2.234	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	152.001				ng/L
	U	235	7609.184				ng/L
	U	238	1028234.408				ng/L
	U 232	232	74.334				ng/L
	U 236	236	292.672				ng/L
⌈	U-tot	238	224.263	**44933.000**	875.13	1.9	ng/L
⌊>	U233	233	4620.841				ng/L
	U233 IS	233	4620.841	**104.779**	2.34	2.2	%R

010224

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Friday, October 28, 2011 20:18:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icv.562
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	106	15.152	0.000	
	U	235	1388	4.899	0.000	
	U	238	173105	0.397	0.000	
	U 232	232	80	34.292	0.000	
	U 236	236	183	10.426	0.000	
⌜	U-tot	238	174599	0.428	0.000	
⌞>	U233	233	4555	0.774	0.000	
	U233 IS	233	4555	0.774	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	105.667				ng/L
	U	235	1388.440				ng/L
	U	238	173104.559				ng/L
	U 232	232	79.667				ng/L
	U 236	236	183.002				ng/L
⌜	U-tot	238	38.330	**7671.358**	91.97	1.2	ng/L
⌞>	U233	233	4555.474				ng/L
	U233 IS	233	4555.474	**103.297**	0.80	0.8	%R

010225

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Friday, October 28, 2011 20:21:00
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icb.563
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	94	43.972	0.000	
	U	235	92	50.138	0.000	
	U	238	125	36.040	0.000	
	U 232	232	88	52.140	0.000	
	U 236	236	89	55.025	0.000	
⌈	U-tot	238	311	42.553	0.000	
⌊>	U233	233	4568	0.628	0.000	
	U233 IS	233	4568	0.628	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	93.667				ng/L
	U	235	91.667				ng/L
	U	238	125.334				ng/L
	U 232	232	87.667				ng/L
	U 236	236	88.667				ng/L
⌈	U-tot	238	0.068	**3.589**	5.75	160.3	ng/L
⌊>	U233	233	4568.481				ng/L
	U233 IS	233	4568.481	**103.592**	0.65	0.6	%R

010226

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 20:23:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.564
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	99	26.319	0.000	
	U	235	105	28.604	0.000	
	U	238	1012	3.057	0.000	
	U 232	232	75	31.112	0.000	
	U 236	236	102	29.001	0.000	
⌈	U-tot	238	1215	6.629	0.000	
⌊>	U233	233	4598	1.720	0.000	
	U233 IS	233	4598	1.720	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	98.667				ng/L
	U	235	104.667				ng/L
	U	238	1011.723				ng/L
	U 232	232	75.334				ng/L
	U 236	236	101.667				ng/L
⌈	U-tot	238	0.264	**42.911**	2.60	6.1	ng/L
⌊>	U233	233	4597.829				ng/L
	U233 IS	233	4597.829	**104.258**	1.79	1.7	%R

010227

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Friday, October 28, 2011 20:25:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icsa.565
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	54.372	0.000	
	U	235	43	63.642	0.000	
	U	238	174	27.664	0.000	
	U 232	232	269	14.926	0.000	
	U 236	236	40	75.870	0.000	
⌈	U-tot	238	264	37.826	0.000	
⌊>	U233	233	3909	1.056	0.000	
	U233 IS	233	3909	1.056	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	47.333				ng/L
	U	235	42.667				ng/L
	U	238	174.002				ng/L
	U 232	232	269.004				ng/L
	U 236	236	40.000				ng/L
⌈	U-tot	238	0.067	**3.481**	4.96	142.3	ng/L
⌊>	U233	233	3908.840				ng/L
	U233 IS	233	3908.840	**88.634**	0.94	1.1	%R

010228

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Friday, October 28, 2011 20:28:10
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\icsab.566
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	94	47.350	0.000	
	U	235	3148	1.167	0.000	
	U	238	422372	0.256	0.000	
	U 232	232	320	10.565	0.000	
	U 236	236	63	60.750	0.000	
⌈	U-tot	238	425614	0.260	0.000	
⌊>	U233	233	4090	0.676	0.000	
	U233 IS	233	4090	0.676	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	94.001				ng/L
	U	235	3147.545				ng/L
	U	238	422372.184				ng/L
	U 232	232	320.006				ng/L
	U 236	236	63.334				ng/L
⌈	U-tot	238	104.067	**20845.270**	119.45	0.6	ng/L
⌊>	U233	233	4089.920				ng/L
	U233 IS	233	4089.920	**92.740**	0.63	0.7	%R

010229

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 20:30:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.567
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	75	58.690	0.000	
	U	235	71	89.658	0.000	
	U	238	90	61.584	0.000	
	U 232	232	65	63.189	0.000	
	U 236	236	72	76.980	0.000	
⌈	U-tot	238	236	68.989	0.000	
⌊>	U233	233	4390	2.027	0.000	
	U233 IS	233	4390	2.027	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	74.667				ng/L
	U	235	71.334				ng/L
	U	238	90.001				ng/L
	U 232	232	65.334				ng/L
	U 236	236	72.000				ng/L
⌈	U-tot	238	0.054	**0.708**	7.28	1029.5	ng/L
⌊>	U233	233	4389.727				ng/L
	U233 IS	233	4389.727	**99.539**	2.02	2.0	%R

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 20:32:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.568
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	156	21.789	0.000	
	U	235	1384	2.187	0.000	
	U	238	171438	0.638	0.000	
	U 232	232	124	12.312	0.000	
	U 236	236	241	10.595	0.000	
⌜	U-tot	238	172978	0.643	0.000	
⌞>	U233	233	4460	3.488	0.000	
	U233 IS	233	4460	3.488	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	156.335				ng/L
	U	235	1384.105				ng/L
	U	238	171437.776				ng/L
	U 232	232	124.334				ng/L
	U 236	236	241.003				ng/L
⌜	U-tot	238	38.820	**7769.644**	292.78	3.8	ng/L
⌞>	U233	233	4459.761				ng/L
	U233 IS	233	4459.761	**101.127**	3.53	3.5	%R

010231

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 20:35:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.569
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	101	35.366	0.000	
	U	235	108	56.415	0.000	
	U	238	137	39.826	0.000	
	U 232	232	102	34.482	0.000	
	U 236	236	102	48.951	0.000	
⌜	U-tot	238	346	43.206	0.000	
⌞>	U233	233	4498	1.352	0.000	
	U233 IS	233	4498	1.352	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	101.334				ng/L
	U	235	107.667				ng/L
	U	238	137.001				ng/L
	U 232	232	102.001				ng/L
	U 236	236	102.001				ng/L
⌜	U-tot	238	0.077	**5.427**	6.82	125.6	ng/L
⌞>	U233	233	4498.113				ng/L
	U233 IS	233	4498.113	**101.996**	1.38	1.4	%R

010232

Quantitative Analysis - Summary Report

Sample ID: Blankd10

Sample Date/Time: Friday, October 28, 2011 20:37:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Blankd10.570
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	100	50.319	0.000	
	U	235	1957	4.154	0.000	
	U	238	557688	0.475	0.000	
	U 232	232	77	69.331	0.000	
	U 236	236	193	36.227	0.000	
⌜	U-tot	238	559745	0.477	0.000	
⌞>	U233	233	4387	0.127	0.000	
	U233 IS	233	4387	0.127	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	100.001				ng/L
	U	235	1956.878				ng/L
	U	238	557688.396				ng/L
	U 232	232	76.667				ng/L
	U 236	236	193.336				ng/L
⌜	U-tot	238	127.590	**25559.490**	124.49	0.5	ng/L
⌞>	U233	233	4387.058				ng/L
	U233 IS	233	4387.058	**99.478**	0.13	0.1	%R

010233

Quantitative Analysis - Summary Report

Sample ID: 474212d10 df4

Sample Date/Time: Friday, October 28, 2011 20:39:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d10 df4.571
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	100	72.971	0.000	
	U	235	1839	2.851	0.000	
	U	238	510323	0.759	0.000	
	U 232	232	146	56.792	0.000	
	U 236	236	163	21.838	0.000	
⌜	U-tot	238	512263	0.733	0.000	
⌞>	U233	233	4404	0.694	0.000	
	U233 IS	233	4404	0.694	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	100.334				ng/L
	U	235	1839.186				ng/L
	U	238	510323.081				ng/L
	U 232	232	146.335				ng/L
	U 236	236	163.002				ng/L
⌜	U-tot	238	116.307	**23298.333**	74.90	0.3	ng/L
⌞>	U233	233	4404.400				ng/L
	U233 IS	233	4404.400	**99.871**	0.69	0.7	%R

010234

Quantitative Analysis - Summary Report

Sample ID: 474212d10d df4

Sample Date/Time: Friday, October 28, 2011 20:42:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d10d df4.572
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	35.625	0.000	
	U	235	1765	1.589	0.000	
	U	238	515185	1.021	0.000	
	U 232	232	163	4.614	0.000	
	U 236	236	109	21.846	0.000	
⌜	U-tot	238	516991	1.014	0.000	
⌞>	U233	233	4345	1.632	0.000	
	U233 IS	233	4345	1.632	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.667				ng/L
	U	235	1764.838				ng/L
	U	238	515184.881				ng/L
	U 232	232	162.668				ng/L
	U 236	236	109.001				ng/L
⌜	U-tot	238	119.002	**23838.295**	155.14	0.7	ng/L
⌞>	U233	233	4344.705				ng/L
	U233 IS	233	4344.705	**98.518**	1.61	1.6	%R

0110235

Quantitative Analysis - Summary Report

Sample ID: 474213d10 df4

Sample Date/Time: Friday, October 28, 2011 20:44:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d10 df4.573
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	60.007	0.000	
	U	235	1499	4.703	0.000	
	U	238	390693	0.874	0.000	
	U 232	232	118	34.734	0.000	
	U 236	236	117	44.550	0.000	
⌜	U-tot	238	392254	0.850	0.000	
⌞>	U233	233	4399	0.725	0.000	
	U233 IS	233	4399	0.725	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	61.667				ng/L
	U	235	1499.457				ng/L
	U	238	390692.708				ng/L
	U 232	232	118.334				ng/L
	U 236	236	117.334				ng/L
⌜	U-tot	238	89.180	**17861.878**	251.04	1.4	ng/L
⌞>	U233	233	4398.731				ng/L
	U233 IS	233	4398.731	**99.743**	0.72	0.7	%R

010236

Quantitative Analysis - Summary Report

Sample ID: 474213d10d df4

Sample Date/Time: Friday, October 28, 2011 20:46:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d10d df4.574
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	114	53.291	0.000	
	U	235	1546	0.712	0.000	
	U	238	396767	0.742	0.000	
	U 232	232	129	35.612	0.000	
	U 236	236	164	28.678	0.000	
⌜	U-tot	238	398428	0.721	0.000	
⌞>	U233	233	4397	2.260	0.000	
	U233 IS	233	4397	2.260	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	114.334				ng/L
	U	235	1546.131				ng/L
	U	238	396767.396				ng/L
	U 232	232	129.334				ng/L
	U 236	236	164.002				ng/L
⌜	U-tot	238	90.642	**18154.955**	498.48	2.7	ng/L
⌞>	U233	233	4397.397				ng/L
	U233 IS	233	4397.397	**99.713**	2.25	2.3	%R

010237

Quantitative Analysis - Summary Report

Sample ID: 474214d10

Sample Date/Time: Friday, October 28, 2011 20:49:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d10.575
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	130	30.473	0.000	
	U	235	2453	2.703	0.000	
	U	238	613914	0.732	0.000	
	U 232	232	379	15.382	0.000	
	U 236	236	230	22.854	0.000	
⌈	U-tot	238	616498	0.714	0.000	
⌊>	U233	233	4155	2.535	0.000	
	U233 IS	233	4155	2.535	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	130.334				ng/L
	U	235	2453.331				ng/L
	U	238	613914.268				ng/L
	U 232	232	378.675				ng/L
	U 236	236	230.003				ng/L
⌈	U-tot	238	148.471	**29744.053**	975.48	3.3	ng/L
⌊>	U233	233	4154.616				ng/L
	U233 IS	233	4154.616	**94.208**	2.39	2.5	%R

010238

Quantitative Analysis - Summary Report

Sample ID: 474214d10d

Sample Date/Time: Friday, October 28, 2011 20:51:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d10d.576
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	2.174	0.000	
	U	235	2388	1.496	0.000	
	U	238	622320	0.328	0.000	
	U 232	232	662	3.281	0.000	
	U 236	236	130	15.152	0.000	
⌈	U-tot	238	624754	0.331	0.000	
⌊>	U233	233	4001	1.908	0.000	
	U233 IS	233	4001	1.908	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.000				ng/L
	U	235	2387.980				ng/L
	U	238	622320.414				ng/L
	U 232	232	662.357				ng/L
	U 236	236	130.001				ng/L
⌈	U-tot	238	156.185	**31290.049**	490.36	1.6	ng/L
⌊>	U233	233	4000.880				ng/L
	U233 IS	233	4000.880	**90.721**	1.73	1.9	%R

010239

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 20:53:40
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.577
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	35	20.000	0.000	
	U	235	36	11.459	0.000	
	U	238	164	4.159	0.000	
	U 232	232	87	7.507	0.000	
	U 236	236	30	25.300	0.000	
⌜	U-tot	238	235	4.739	0.000	
⌞>	U233	233	4134	0.450	0.000	
	U233 IS	233	4134	0.450	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	35.000				ng/L
	U	235	36.333				ng/L
	U	238	163.668				ng/L
	U 232	232	86.667				ng/L
	U 236	236	29.667				ng/L
⌜	U-tot	238	0.057	**1.373**	0.58	42.5	ng/L
⌞>	U233	233	4134.273				ng/L
	U233 IS	233	4134.273	**93.746**	0.42	0.4	%R

010240

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 20:56:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.578
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	19	2.986	0.000	
	U	235	21	11.175	0.000	
	U	238	833	2.232	0.000	
	U 232	232	21	12.599	0.000	
	U 236	236	10	29.863	0.000	
⌜	U-tot	238	873	2.405	0.000	
⌞>	U233	233	4010	2.142	0.000	
	U233 IS	233	4010	2.142	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	19.333				ng/L
	U	235	20.667				ng/L
	U	238	832.705				ng/L
	U 232	232	21.000				ng/L
	U 236	236	9.667				ng/L
⌜	U-tot	238	0.218	**33.600**	0.86	2.6	ng/L
⌞>	U233	233	4009.884				ng/L
	U233 IS	233	4009.884	**90.926**	1.95	2.1	%R

010241

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 20:58:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.579
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibretion File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	85	25.963	0.000	
	U	235	1238	1.984	0.000	
	U	238	158507	0.778	0.000	
	U 232	232	74	43.848	0.000	
	U 236	236	176	9.255	0.000	
⌈	U-tot	238	159830	0.759	0.000	
⌊>	U233	233	4045	1.319	0.000	
	U233 IS	233	4045	1.319	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	85.000				ng/L
	U	235	1238.084				ng/L
	U	238	158506.618				ng/L
	U 232	232	74.334				ng/L
	U 236	236	175.668				ng/L
⌈	U-tot	238	39.521	**7910.134**	164.21	2.1	ng/L
⌊>	U233	233	4044.900				ng/L
	U233 IS	233	4044.900	**91.720**	1.21	1.3	%R

010242

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 21:00:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.580
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	68	23.657	0.000	
	U	235	58	12.433	0.000	
	U	238	92	25.358	0.000	
	U 232	232	61	32.947	0.000	
	U 236	236	61	11.220	0.000	
⌜	U-tot	238	218	18.170	0.000	
⌞>	U233	233	4174	2.166	0.000	
	U233 IS	233	4174	2.166	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.334				ng/L
	U	235	58.000				ng/L
	U	238	91.667				ng/L
	U 232	232	61.334				ng/L
	U 236	236	60.667				ng/L
⌜	U-tot	238	0.052	**0.431**	1.75	406.6	ng/L
⌞>	U233	233	4174.292				ng/L
	U233 IS	233	4174.292	**94.654**	2.05	2.2	%R

010243

Quantitative Analysis - Summary Report

Sample ID: 474221d10 df4

Sample Date/Time: Friday, October 28, 2011 21:03:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d10 df4.581
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	84	29.629	0.000	
	U	235	1067	6.238	0.000	
	U	238	271318	1.350	0.000	
	U 232	232	116	25.750	0.000	
	U 236	236	120	37.084	0.000	
⌜	U-tot	238	272470	1.312	0.000	
⌞>	U233	233	4182	0.940	0.000	
	U233 IS	233	4182	0.940	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	84.334				ng/L
	U	235	1067.063				ng/L
	U	238	271318.359				ng/L
	U 232	232	116.334				ng/L
	U 236	236	119.668				ng/L
⌜	U-tot	238	65.147	**13045.708**	73.49	0.6	ng/L
⌞>	U233	233	4182.295				ng/L
	U233 IS	233	4182.295	**94.835**	0.89	0.9	%R

0110244

Quantitative Analysis - Summary Report

Sample ID: 474221d10d df4

Sample Date/Time: Friday, October 28, 2011 21:05:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d10d df4.582
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	60.603	0.000	
	U	235	1095	3.223	0.000	
	U	238	278325	1.033	0.000	
	U 232	232	86	30.300	0.000	
	U 236	236	93	44.246	0.000	
⌈	U-tot	238	279482	1.009	0.000	
⌊>	U233	233	4116	0.993	0.000	
	U233 IS	233	4116	0.993	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.667				ng/L
	U	235	1094.733				ng/L
	U	238	278324.605				ng/L
	U 232	232	86.000				ng/L
	U 236	236	93.334				ng/L
⌈	U-tot	238	67.901	**13597.602**	187.24	1.4	ng/L
⌊>	U233	233	4116.265				ng/L
	U233 IS	233	4116.265	**93.338**	0.93	1.0	%R

010245

Quantitative Analysis - Summary Report

Sample ID: 474222d10 df4

Sample Date/Time: Friday, October 28, 2011 21:07:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d10 df4.583
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	40.537	0.000	
	U	235	1086	2.500	0.000	
	U	238	282509	0.250	0.000	
	U 232	232	279	3.927	0.000	
	U 236	236	53	18.211	0.000	
⌈	U-tot	238	283611	0.252	0.000	
⌊>	U233	233	4068	1.590	0.000	
	U233 IS	233	4068	1.590	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.667				ng/L
	U	235	1086.398				ng/L
	U	238	282508.806				ng/L
	U 232	232	279.338				ng/L
	U 236	236	53.333				ng/L
⌈	U-tot	238	69.732	**13964.586**	253.03	1.8	ng/L
⌊>	U233	233	4067.910				ng/L
	U233 IS	233	4067.910	**92.241**	1.47	1.6	%R

010246

Quantitative Analysis - Summary Report

Sample ID: 474222d10d df4

Sample Date/Time: Friday, October 28, 2011 21:10:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Duel
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d10d df4.584
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	84.428	0.000	
	U	235	756	6.713	0.000	
	U	238	193769	1.051	0.000	
	U 232	232	391	13.096	0.000	
	U 236	236	82	61.474	0.000	
⌈	U-tot	238	194572	1.036	0.000	
⌊>	U233	233	4101	1.592	0.000	
	U233 IS	233	4101	1.592	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.667				ng/L
	U	235	756.032				ng/L
	U	238	193769.434				ng/L
	U 232	232	391.342				ng/L
	U 236	236	82.000				ng/L
⌈	U-tot	238	47.453	**9499.740**	224.23	2.4	ng/L
⌊>	U233	233	4101.258				ng/L
	U233 IS	233	4101.258	**92.998**	1.48	1.6	%R

010247

Quantitative Analysis - Summary Report

Sample ID: 474300d10 df4

Sample Date/Time: Friday, October 28, 2011 21:12:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d10 df4.585
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	85.639	0.000	
	U	235	1645	2.075	0.000	
	U	238	452184	0.861	0.000	
	U 232	232	684	7.225	0.000	
	U 236	236	99	45.857	0.000	
⌈	U-tot	238	453871	0.852	0.000	
⌊>	U233	233	4021	1.967	0.000	
	U233 IS	233	4021	1.967	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	42.333				ng/L
	U	235	1644.815				ng/L
	U	238	452184.162				ng/L
	U 232	232	684.359				ng/L
	U 236	236	99.001				ng/L
⌈	U-tot	238	112.910	**22617.564**	520.88	2.3	ng/L
⌊>	U233	233	4020.889				ng/L
	U233 IS	233	4020.889	**91.175**	1.79	2.0	%R

010248

Quantitative Analysis - Summary Report

Sample ID: 474300d10d df4

Sample Date/Time: Friday, October 28, 2011 21:14:46
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d10d df4.586
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	45.945	0.000	
	U	235	1648	2.216	0.000	
	U	238	459829	0.774	0.000	
	U 232	232	993	1.504	0.000	
	U 236	236	128	26.555	0.000	
⌈	U-tot	238	461532	0.759	0.000	
⌊>	U233	233	4159	0.125	0.000	
	U233 IS	233	4159	0.125	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.334				ng/L
	U	235	1648.149				ng/L
	U	238	459828.918				ng/L
	U 232	232	993.054				ng/L
	U 236	236	128.334				ng/L
⌈	U-tot	238	110.973	**22229.359**	158.93	0.7	ng/L
⌊>	U233	233	4158.951				ng/L
	U233 IS	233	4158.951	**94.306**	0.12	0.1	%R

010249

Quantitative Analysis - Summary Report

Sample ID: 474301d10 df4

Sample Date/Time: Friday, October 28, 2011 21:17:01
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d10 df4.587
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	72.905	0.000	
	U	235	1410	4.319	0.000	
	U	238	376530	0.926	0.000	
	U 232	232	205	18.246	0.000	
	U 236	236	93	24.731	0.000	
⌈	U-tot	238	377984	0.939	0.000	
⌊>	U233	233	4050	0.737	0.000	
	U233 IS	233	4050	0.737	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.000				ng/L
	U	235	1410.109				ng/L
	U	238	376529.822				ng/L
	U 232	232	205.002				ng/L
	U 236	236	93.000				ng/L
⌈	U-tot	238	93.333	**18694.161**	153.61	0.8	ng/L
⌊>	U233	233	4049.902				ng/L
	U233 IS	233	4049.902	**91.833**	0.68	0.7	%R

Quantitative Analysis - Summary Report

010250

Sample ID: 474301d10d df4

Sample Date/Time: Friday, October 28, 2011 21:19:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d10d df4.588
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	63.666	0.000	
	U	235	1392	2.096	0.000	
	U	238	386963	0.632	0.000	
	U 232	232	240	16.971	0.000	
	U 236	236	83	17.956	0.000	
⌜	U-tot	238	388395	0.629	0.000	
⌞>	U233	233	4150	2.925	0.000	
	U233 IS	233	4150	2.925	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.667				ng/L
	U	235	1391.773				ng/L
	U	238	386962.963				ng/L
	U 232	232	240.003				ng/L
	U 236	236	82.667				ng/L
⌜	U-tot	238	93.632	**18754.161**	429.05	2.3	ng/L
⌞>	U233	233	4149.948				ng/L
	U233 IS	233	4149.948	**94.102**	2.75	2.9	%R

0210251

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 21:21:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.589
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	77.694	0.000	
	U	235	51	79.949	0.000	
	U	238	91	42.126	0.000	
	U 232	232	62	42.306	0.000	
	U 236	236	48	81.333	0.000	
⌜	U-tot	238	195	60.965	0.000	
⌞>	U233	233	4107	2.904	0.000	
	U233 IS	233	4107	2.904	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	51.334				ng/L
	U	238	91.334				ng/L
	U 232	232	62.000				ng/L
	U 236	236	48.334				ng/L
⌜	U-tot	238	0.047	**-0.580**	5.65	974.0	ng/L
⌞>	U233	233	4106.928				ng/L
	U233 IS	233	4106.928	**93.126**	2.70	2.9	%R

010252

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 21:23:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.590
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	62.606	0.000	
	U	235	57	61.038	0.000	
	U	238	913	0.936	0.000	
	U 232	232	53	48.976	0.000	
	U 236	236	48	53.562	0.000	
⌜	U-tot	238	1023	6.228	0.000	
⌞>	U233	233	4252	1.977	0.000	
	U233 IS	233	4252	1.977	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	53.000				ng/L
	U	235	56.667				ng/L
	U	238	913.046				ng/L
	U 232	232	52.667				ng/L
	U 236	236	48.000				ng/L
⌜	U-tot	238	0.241	**38.193**	2.97	7.8	ng/L
⌞>	U233	233	4251.661				ng/L
	U233 IS	233	4251.661	**96.408**	1.91	2.0	%R

010253

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 21:26:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.591
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	45	36.985	0.000	
	U	235	1264	2.759	0.000	
	U	238	165259	0.499	0.000	
	U 232	232	38	71.056	0.000	
	U 236	236	142	21.128	0.000	
⌜	U-tot	238	166568	0.469	0.000	
⌞>	U233	233	4222	2.445	0.000	
	U233 IS	233	4222	2.445	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.000				ng/L
	U	235	1264.088				ng/L
	U	238	165258.906				ng/L
	U 232	232	37.667				ng/L
	U 236	236	142.334				ng/L
⌜	U-tot	238	39.473	**7900.435**	211.69	2.7	ng/L
⌞>	U233	233	4221.647				ng/L
	U233 IS	233	4221.647	**95.727**	2.34	2.4	%R

010254

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 21:28:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.592
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	14.752	0.000	
	U	235	29	16.485	0.000	
	U	238	60	17.567	0.000	
	U 232	232	38	23.390	0.000	
	U 236	236	32	27.243	0.000	
⌜	U-tot	238	126	15.047	0.000	
⌞>	U233	233	4374	2.074	0.000	
	U233 IS	233	4374	2.074	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.333				ng/L
	U	235	28.667				ng/L
	U	238	60.334				ng/L
	U 232	232	38.000				ng/L
	U 236	236	32.000				ng/L
⌜	U-tot	238	0.029	**-4.225**	0.92	21.7	ng/L
⌞>	U233	233	4374.386				ng/L
	U233 IS	233	4374.386	**99.191**	2.06	2.1	%R

010255

Quantitative Analysis - Summary Report

Sample ID: 474302d10 df4

Sample Date/Time: Friday, October 28, 2011 21:31:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d10 df4.593
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	62.155	0.000	
	U	235	1502	0.580	0.000	
	U	238	414087	0.872	0.000	
	U 232	232	188	11.371	0.000	
	U 236	236	101	12.773	0.000	
⌜	U-tot	238	415631	0.864	0.000	
⌞>	U233	233	4099	1.015	0.000	
	U233 IS	233	4099	1.015	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	42.333				ng/L
	U	235	1502.124				ng/L
	U	238	414086.848				ng/L
	U 232	232	188.002				ng/L
	U 236	236	100.667				ng/L
⌜	U-tot	238	101.401	**20311.149**	58.90	0.3	ng/L
⌞>	U233	233	4098.924				ng/L
	U233 IS	233	4098.924	**92.945**	0.94	1.0	%R

010256

Quantitative Analysis - Summary Report

Sample ID: 474302d10d df4

Sample Date/Time: Friday, October 28, 2011 21:33:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d10d df4.594
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	92.121	0.000	
	U	235	1400	1.567	0.000	
	U	238	397980	0.386	0.000	
	U 232	232	157	24.031	0.000	
	U 236	236	97	34.657	0.000	
⌜	U-tot	238	399414	0.385	0.000	
⌞>	U233	233	4073	2.580	0.000	
	U233 IS	233	4073	2.580	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.000				ng/L
	U	235	1400.108				ng/L
	U	238	397979.821				ng/L
	U 232	232	156.668				ng/L
	U 236	236	96.667				ng/L
⌜	U-tot	238	98.095	**19648.503**	429.70	2.2	ng/L
⌞>	U233	233	4073.246				ng/L
	U233 IS	233	4073.246	**92.362**	2.38	2.6	%R

010257

Quantitative Analysis - Summary Report

Sample ID: 474340d10

Sample Date/Time: Friday, October 28, 2011 21:35:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d10.595
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	100	4.359	0.000	
	U	235	401	4.120	0.000	
	U	238	80642	0.510	0.000	
	U 232	232	665	3.071	0.000	
	U 236	236	115	12.527	0.000	
⌈	U-tot	238	81143	0.486	0.000	
⌊>	U233	233	4013	1.182	0.000	
	U233 IS	233	4013	1.182	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	100.001				ng/L
	U	235	401.009				ng/L
	U	238	80642.100				ng/L
	U 232	232	665.358				ng/L
	U 236	236	114.667				ng/L
⌈	U-tot	238	20.225	**4043.081**	62.60	1.5	ng/L
⌊>	U233	233	4012.552				ng/L
	U233 IS	233	4012.552	**90.986**	1.08	1.2	%R

Quantitative Analysis - Summary Report

Sample ID: 474340d10d

Sample Date/Time: Friday, October 28, 2011 21:37:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d10d.596
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	67	13.266	0.000	
	U	235	441	2.016	0.000	
	U	238	100774	0.909	0.000	
	U 232	232	526	2.093	0.000	
	U 236	236	64	2.062	0.000	
⌜	U-tot	238	101282	0.898	0.000	
⌞>	U233	233	4194	0.650	0.000	
	U233 IS	233	4194	0.650	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	67.000				ng/L
	U	235	441.011				ng/L
	U	238	100773.830				ng/L
	U 232	232	526.349				ng/L
	U 236	236	84.000				ng/L
⌜	U-tot	238	24.153	**4830.309**	74.70	1.5	ng/L
⌞>	U233	233	4193.634				ng/L
	U233 IS	233	4193.634	**95.092**	0.62	0.6	%R

010259

Quantitative Analysis - Summary Report

Sample ID: 474341d10 df4

Sample Date/Time: Friday, October 28, 2011 21:40:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d10 df4.597
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	83	16.513	0.000	
	U	235	1370	2.821	0.000	
	U	238	362386	0.577	0.000	
	U 232	232	223	8.549	0.000	
	U 236	236	126	16.546	0.000	
⌜	U-tot	238	363838	0.580	0.000	
⌞>	U233	233	4336	1.428	0.000	
	U233 IS	233	4336	1.428	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	82.667				ng/L
	U	235	1369.770				ng/L
	U	238	362385.796				ng/L
	U 232	232	222.669				ng/L
	U 236	236	125.668				ng/L
⌜	U-tot	238	83.926	**16809.071**	334.42	2.0	ng/L
⌞>	U233	233	4336.034				ng/L
	U233 IS	233	4336.034	**98.321**	1.40	1.4	%R

010260

Quantitative Analysis - Summary Report

Sample ID: 474341d10d df4

Sample Date/Time: Friday, October 28, 2011 21:42:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d10d df4.598
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	71	71.659	0.000	
	U	235	1354	3.472	0.000	
	U	238	377074	0.273	0.000	
	U 232	232	291	21.277	0.000	
	U 236	236	117	40.752	0.000	
⌈	U-tot	238	378499	0.246	0.000	
⌊>	U233	233	4419	0.896	0.000	
	U233 IS	233	4419	0.896	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	70.667				ng/L
	U	235	1354.434				ng/L
	U	238	377073.979				ng/L
	U 232	232	291.338				ng/L
	U 236	236	117.334				ng/L
⌈	U-tot	238	85.664	**17157.240**	196.29	1.1	ng/L
⌊>	U233	233	4418.740				ng/L
	U233 IS	233	4418.740	**100.197**	0.90	0.9	%R

010261

Quantitative Analysis - Summary Report

Sample ID: 474344d10 df4

Sample Date/Time: Friday, October 28, 2011 21:44:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d10 df4.599
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	111	46.968	0.000	
	U	235	1106	4.507	0.000	
	U	238	285168	0.953	0.000	
	U 232	232	232	23.036	0.000	
	U 236	236	148	46.288	0.000	
⌜	U-tot	238	286386	0.914	0.000	
⌞>	U233	233	4547	1.004	0.000	
	U233 IS	233	4547	1.004	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	111.334				ng/L
	U	235	1106.401				ng/L
	U	238	285168.174				ng/L
	U 232	232	232.336				ng/L
	U 236	236	148.001				ng/L
⌜	U-tot	238	62.984	**12612.191**	225.08	1.8	ng/L
⌞>	U233	233	4547.470				ng/L
	U233 IS	233	4547.470	**103.116**	1.04	1.0	%R

010262

Quantitative Analysis - Summary Report

Sample ID: 474344d10d df4

Sample Date/Time: Friday, October 28, 2011 21:47:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d10d df4.600
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	126.509	0.000	
	U	235	969	6.202	0.000	
	U	238	270162	0.959	0.000	
	U 232	232	195	29.960	0.000	
	U 236	236	89	75.395	0.000	
⌜	U-tot	238	271183	0.911	0.000	
⌞>	U233	233	4502	2.872	0.000	
	U233 IS	233	4502	2.872	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	51.867				ng/L
	U	235	969.385				ng/L
	U	238	270161.767				ng/L
	U 232	232	194.669				ng/L
	U 236	236	89.334				ng/L
⌜	U-tot	238	60.273	**12068.987**	453.47	3.8	ng/L
⌞>	U233	233	4502.449				ng/L
	U233 IS	233	4502.449	**102.095**	2.93	2.9	%R

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 21:49:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.601
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	111.130	0.000	
	U	235	51	128.989	0.000	
	U	238	89	81.721	0.000	
	U 232	232	51	95.235	0.000	
	U 236	236	43	133.929	0.000	
⌈	U-tot	238	192	102.206	0.000	
⌊>	U233	233	4368	1.554	0.000	
	U233 IS	233	4368	1.554	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.334				ng/L
	U	235	51.334				ng/L
	U	238	88.667				ng/L
	U 232	232	51.000				ng/L
	U 236	236	42.667				ng/L
⌈	U-tot	238	0.044	**-1.210**	8.95	739.2	ng/L
⌊>	U233	233	4368.049				ng/L
	U233 IS	233	4368.049	**99.047**	1.54	1.6	%R

Quantitative Analysis - Summary Report

010264

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 21:51:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.602
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	79	88.145	0.000	
	U	235	82	80.861	0.000	
	U	238	975	6.908	0.000	
	U 232	232	70	89.705	0.000	
	U 236	236	72	102.179	0.000	
⌜	U-tot	238	1136	17.814	0.000	
⌞>	U233	233	4530	2.342	0.000	
	U233 IS	233	4530	2.342	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	79.001				ng/L
	U	235	82.334				ng/L
	U	238	974.719				ng/L
	U 232	232	70.000				ng/L
	U 236	236	71.667				ng/L
⌜	U-tot	238	0.251	**40.291**	9.17	22.8	ng/L
⌞>	U233	233	4529.795				ng/L
	U233 IS	233	4529.795	**102.715**	2.41	2.3	%R

Quantitative Analysis - Summary Report

010265

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 21:54:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.603
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	114	82.747	0.000	
	U	235	1374	5.736	0.000	
	U	238	171700	1.478	0.000	
	U 232	232	95	107.590	0.000	
	U 236	236	207	42.104	0.000	
⌈	U-tot	238	173188	1.382	0.000	
⌊>	U233	233	4402	2.133	0.000	
	U233 IS	233	4402	2.133	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	113.668				ng/L
	U	235	1374.437				ng/L
	U	238	171700.180				ng/L
	U 232	232	95.001				ng/L
	U 236	236	207.003				ng/L
⌈	U-tot	238	39.359	**7877.737**	280.40	3.6	ng/L
⌊>	U233	233	4402.399				ng/L
	U233 IS	233	4402.399	**99.826**	2.13	2.1	%R

010266

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 21:56:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.604
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	88	20.007	0.000	
	U	235	81	13.655	0.000	
	U	238	113	7.024	0.000	
	U 232	232	83	20.903	0.000	
	U 236	236	81	19.378	0.000	
⌜	U-tot	238	282	9.542	0.000	
⌞>	U233	233	4542	2.985	0.000	
	U233 IS	233	4542	2.985	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	88.334				ng/L
	U	235	80.667				ng/L
	U	238	113.001				ng/L
	U 232	232	83.000				ng/L
	U 236	236	80.667				ng/L
⌜	U-tot	238	0.062	**2.445**	1.45	59.1	ng/L
⌞>	U233	233	4541.802				ng/L
	U233 IS	233	4541.802	**102.987**	3.07	3.0	%R

010267

Quantitative Analysis - Summary Report

Sample ID: 474401d10 df4

Sample Date/Time: Friday, October 28, 2011 21:59:03
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d10 df4.605
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	90.436	0.000	
	U	235	1340	5.847	0.000	
	U	238	354951	0.707	0.000	
	U 232	232	122	27.025	0.000	
	U 236	236	81	48.082	0.000	
⌜	U-tot	238	356331	0.711	0.000	
⌞>	U233	233	4425	2.793	0.000	
	U233 IS	233	4425	2.793	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.333				ng/L
	U	235	1340.432				ng/L
	U	238	354951.337				ng/L
	U 232	232	122.001				ng/L
	U 236	236	80.667				ng/L
⌜	U-tot	238	80.560	**16134.394**	449.66	2.8	ng/L
⌞>	U233	233	4425.411				ng/L
	U233 IS	233	4425.411	**100.348**	2.80	2.8	%R

010263

Quantitative Analysis - Summary Report

Sample ID: 474401d10d df4

Sample Date/Time: Friday, October 28, 2011 22:01:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d10d df4.606
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	64	61.479	0.000	
	U	235	1459	3.849	0.000	
	U	238	371231	0.797	0.000	
	U 232	232	130	34.247	0.000	
	U 236	236	114	34.513	0.000	
⌜	U-tot	238	372754	0.817	0.000	
⌞>	U233	233	4394	0.528	0.000	
	U233 IS	233	4394	0.528	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	64.334				ng/L
	U	235	1458.784				ng/L
	U	238	371230.643				ng/L
	U 232	232	130.334				ng/L
	U 236	236	114.001				ng/L
⌜	U-tot	238	84.838	**16991.742**	106.84	0.6	ng/L
⌞>	U233	233	4393.728				ng/L
	U233 IS	233	4393.728	**99.629**	0.53	0.5	%R

010269

Quantitative Analysis - Summary Report

Sample ID: 474402d10 df2

Sample Date/Time: Friday, October 28, 2011 22:03:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandate\DataSet\11 Oct 3\474402d10 df2.607
Tuning File: C:\Elandate\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	60	64.961	0.000	
	U	235	1309	0.176	0.000	
	U	238	361897	0.690	0.000	
	U 232	232	535	9.505	0.000	
	U 236	236	123	36.588	0.000	
⌈	U-tot	238	363266	0.684	0.000	
⌊>	U233	233	4359	1.303	0.000	
	U233 IS	233	4359	1.303	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	59.667				ng/L
	U	235	1308.761				ng/L
	U	238	361897.300				ng/L
	U 232	232	534.682				ng/L
	U 236	236	122.668				ng/L
⌈	U-tot	238	83.334	**16690.493**	117.98	0.7	ng/L
⌊>	U233	233	4359.378				ng/L
	U233 IS	233	4359.378	**98.851**	1.29	1.3	%R

010270

Quantitative Analysis - Summary Report

Sample ID: 474402d10L df10

Sample Date/Time: Friday, October 28, 2011 22:06:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d10L df10.608
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	82	71.900	0.000	
	U	235	337	17.686	0.000	
	U	238	74189	0.406	0.000	
	U 232	232	202	21.715	0.000	
	U 236	236	85	65.555	0.000	
⌜	U-tot	238	74609	0.247	0.000	
⌞>	U233	233	4485	2.356	0.000	
	U233 IS	233	4485	2.356	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	82.334				ng/L
	U	235	336.673				ng/L
	U	238	74189.498				ng/L
	U 232	232	202.336				ng/L
	U 236	236	85.334				ng/L
⌜	U-tot	238	16.643	**3325.235**	86.23	2.6	ng/L
⌞>	U233	233	4484.773				ng/L
	U233 IS	233	4484.773	**101.694**	2.40	2.4	%R

010271

Quantitative Analysis - Summary Report

Sample ID: 474402d10D df2

Sample Date/Time: Friday, October 28, 2011 22:08:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swr\\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d10D df2.609
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	80	62.257	0.000	
	U	235	1354	4.034	0.000	
	U	238	356405	0.481	0.000	
	U 232	232	401	8.275	0.000	
	U 236	236	137	36.078	0.000	
⌜	U-tot	238	357839	0.455	0.000	
⌞>	U233	233	4249	1.326	0.000	
	U233 IS	233	4249	1.326	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	80.334				ng/L
	U	235	1353.768				ng/L
	U	238	356405.140				ng/L
	U 232	232	401.009				ng/L
	U 236	236	137.001				ng/L
⌜	U-tot	238	84.232	**16870.286**	181.20	1.1	ng/L
⌞>	U233	233	4248.659				ng/L
	U233 IS	233	4248.659	**96.340**	1.28	1.3	%R

010272

Quantitative Analysis - Summary Report

Sample ID: 474402d10AS df2

Sample Date/Time: Friday, October 28, 2011 22:10:51
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

spiked 20uL 1°natural uranium @ df100(0.75-Rad-Soil (11-064-06) in 10mL

TV = 20,462 ng/L x df2 = 40,924 ng

10/31/11 WS

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d10AS df2.610
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	106	11.593	0.000	
	U	235	4544	0.798	0.000	
	U	238	793803	0.960	0.000	
	U 232	232	562	6.801	0.000	
	U 236	236	139	16.259	0.000	
⌜	U-tot	238	798454	0.954	0.000	
⌞>	U233	233	4196	2.516	0.000	
	U233 IS	233	4196	2.516	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	106.001				ng/L
	U	235	4544.469				ng/L
	U	238	793803.212				ng/L
	U 232	232	562.017				ng/L
	U 236	236	138.668				ng/L
⌜	U-tot	238	190.371	**38140.888**	1018.25	2.7	ng/L
⌞>	U233	233	4195.969				ng/L
	U233 IS	233	4195.969	**95.145**	2.39	2.5	%R

010273

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 22:13:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.611
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	36	69.100	0.000	
	U	235	32	75.195	0.000	
	U	238	87	35.072	0.000	
	U 232	232	75	35.874	0.000	
	U 236	236	28	89.286	0.000	
⌈	U-tot	238	155	50.299	0.000	
⌊>	U233	233	4133	1.489	0.000	
	U233 IS	233	4133	1.489	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.333				ng/L
	U	235	32.000				ng/L
	U	238	87.000				ng/L
	U 232	232	75.334				ng/L
	U 236	236	28.000				ng/L
⌈	U-tot	238	0.038	**-2.474**	3.81	153.9	ng/L
⌊>	U233	233	4132.606				ng/L
	U233 IS	233	4132.606	**93.708**	1.40	1.5	%R

010274

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 22:15:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.612
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	73.430	0.000	
	U	235	56	60.494	0.000	
	U	238	912	3.318	0.000	
	U 232	232	65	54.899	0.000	
	U 236	236	45	71.630	0.000	
⌈	U-tot	238	1019	9.678	0.000	
⌊>	U233	233	4334	0.970	0.000	
	U233 IS	233	4334	0.970	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.000				ng/L
	U	235	56.334				ng/L
	U	238	912.379				ng/L
	U 232	232	64.667				ng/L
	U 236	236	45.000				ng/L
⌈	U-tot	238	0.235	**37.087**	4.56	12.3	ng/L
⌊>	U233	233	4334.033				ng/L
	U233 IS	233	4334.033	**98.276**	0.95	1.0	%R

010275

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 22:17:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.613
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	78.442	0.000	
	U	235	1285	3.294	0.000	
	U	238	168530	0.341	0.000	
	U 232	232	38	69.026	0.000	
	U 236	236	147	24.775	0.000	
⌜	U-tot	238	169864	0.309	0.000	
⌞>	U233	233	4257	1.773	0.000	
	U233 IS	233	4257	1.773	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	48.667				ng/L
	U	235	1285.424				ng/L
	U	238	168529.791				ng/L
	U 232	232	38.000				ng/L
	U 236	236	147.335				ng/L
⌜	U-tot	238	39.915	**7989.045**	160.68	2.0	ng/L
⌞>	U233	233	4256.663				ng/L
	U233 IS	233	4256.663	**96.521**	1.71	1.8	%R

010276

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 22:20:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.614
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	61.783	0.000	
	U	235	39	63.484	0.000	
	U	238	53	63.897	0.000	
	U 232	232	33	74.659	0.000	
	U 236	236	39	89.751	0.000	
⌈	U-tot	238	136	62.744	0.000	
⌊>	U233	233	4347	1.144	0.000	
	U233 IS	233	4347	1.144	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.000				ng/L
	U	235	39.000				ng/L
	U	238	53.334				ng/L
	U 232	232	33.000				ng/L
	U 236	236	38.667				ng/L
⌈	U-tot	238	0.031	**-3.740**	3.95	105.7	ng/L
⌊>	U233	233	4346.706				ng/L
	U233 IS	233	4346.706	**98.563**	1.13	1.1	%R

010277

Quantitative Analysis - Summary Report

Sample ID: Blankd14 dil 4 (RE) NS10131/11
Sample Date/Time: Friday, October 28, 2011 22:22:43
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Blankd14.615
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	72.981	0.000	
	U	235	1802	2.037	0.000	
	U	238	528619	0.774	0.000	
	U 232	232	23	86.630	0.000	
	U 236	236	113	30.519	0.000	
⌈	U-tot	238	530460	0.783	0.000	
⌊>	U233	233	4258	1.902	0.000	
	U233 IS	233	4258	1.902	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.667				ng/L
	U	235	1801.845				ng/L
	U	238	528619.464				ng/L
	U 232	232	23.000				ng/L
	U 236	236	113.334				ng/L
⌈	U-tot	238	124.607	**24961.636**	277.34	1.1	ng/L
⌊>	U233	233	4257.664				ng/L
	U233 IS	233	4257.664	**96.544**	1.84	1.9	%R

010278

Quantitative Analysis - Summary Report

Sample ID: 474212d14 df4

Sample Date/Time: Friday, October 28, 2011 22:24:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d14 df4.616
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	52	54.462	0.000	
	U	235	1907	3.515	0.000	
	U	238	533425	0.617	0.000	
	U 232	232	304	11.072	0.000	
	U 236	236	127	25.280	0.000	
⌜	U-tot	238	535384	0.616	0.000	
⌞>	U233	233	4671	0.514	0.000	
	U233 IS	233	4671	0.514	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.334				ng/L
	U	235	1906.867				ng/L
	U	238	533425.140				ng/L
	U 232	232	303.672				ng/L
	U 236	236	126.668				ng/L
⌜	U-tot	238	114.623	**22960.764**	124.09	0.5	ng/L
⌞>	U233	233	4670.866				ng/L
	U233 IS	233	4670.866	**105.914**	0.54	0.5	%R

0110279

Quantitative Analysis - Summary Report

Sample ID: 474212d14d df4

Sample Date/Time: Friday, October 28, 2011 22:27:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d14d df4.617
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	88.309	0.000	
	U	235	1780	3.055	0.000	
	U	238	497136	0.894	0.000	
	U 232	232	105	22.752	0.000	
	U 236	236	114	39.593	0.000	
⌜	U-tot	238	498957	0.899	0.000	
⌞>	U233	233	4368	1.071	0.000	
	U233 IS	233	4368	1.071	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.333				ng/L
	U	235	1779.508				ng/L
	U	238	497136.169				ng/L
	U 232	232	105.334				ng/L
	U 236	236	113.667				ng/L
⌜	U-tot	238	114.235	**22883.018**	255.92	1.1	ng/L
⌞>	U233	233	4368.049				ng/L
	U233 IS	233	4368.049	**99.047**	1.06	1.1	%R

010280

Quantitative Analysis - Summary Report

Sample ID: 474213d14 df4

Sample Date/Time: Friday, October 28, 2011 22:29:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d14 df4.618
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	60	27.739	0.000	
	U	235	1503	2.605	0.000	
	U	238	402752	0.213	0.000	
	U 232	232	123	11.265	0.000	
	U 236	236	126	13.209	0.000	
⌈	U-tot	238	404315	0.212	0.000	
⌊>	U233	233	4609	2.765	0.000	
	U233 IS	233	4609	2.765	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.000				ng/L
	U	235	1503.124				ng/L
	U	238	402752.198				ng/L
	U 232	232	123.001				ng/L
	U 236	236	126.001				ng/L
⌈	U-tot	238	87.778	**17580.979**	495.86	2.8	ng/L
⌊>	U233	233	4608.502				ng/L
	U233 IS	233	4608.502	**104.500**	2.89	2.8	%R

010281

Quantitative Analysis - Summary Report

Sample ID: 474213d14d df4

Sample Date/Time: Friday, October 28, 2011 22:31:48
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d14d df4.619
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	75	43.349	0.000	
	U	235	1528	0.165	0.000	
	U	238	398226	0.242	0.000	
	U 232	232	140	19.350	0.000	
	U 236	236	128	21.740	0.000	
⌈	U-tot	238	399829	0.243	0.000	
⌊>	U233	233	4533	0.584	0.000	
	U233 IS	233	4533	0.584	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	75.000				ng/L
	U	235	1528.462				ng/L
	U	238	398225.869				ng/L
	U 232	232	140.334				ng/L
	U 236	236	127.668				ng/L
⌈	U-tot	238	88.203	**17666.117**	62.12	0.4	ng/L
⌊>	U233	233	4533.130				ng/L
	U233 IS	233	4533.130	**102.790**	0.60	0.6	%R

010282

Quantitative Analysis - Summary Report

Sample ID: 474214d14

Sample Date/Time: Friday, October 28, 2011 22:34:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d14.620
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	79.697	0.000	
	U	235	2565	3.361	0.000	
	U	238	654219	0.687	0.000	
	U 232	232	392	6.764	0.000	
	U 236	236	147	40.652	0.000	
⌜	U-tot	238	656837	0.665	0.000	
⌞>	U233	233	4380	2.734	0.000	
	U233 IS	233	4380	2.734	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	53.667				ng/L
	U	235	2564.695				ng/L
	U	238	654218.500				ng/L
	U 232	232	392.008				ng/L
	U 236	236	147.001				ng/L
⌜	U-tot	238	150.051	**30060.643**	991.21	3.3	ng/L
⌞>	U233	233	4380.055				ng/L
	U233 IS	233	4380.055	**99.319**	2.72	2.7	%R

010283

Quantitative Analysis - Summary Report

Sample ID: 474214d14d

Sample Date/Time: Friday, October 28, 2011 22:36:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d14d.621
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	106	14.175	0.000	
	U	235	2573	1.118	0.000	
	U	238	635807	0.533	0.000	
	U 232	232	425	2.545	0.000	
	U 236	236	202	5.621	0.000	
⌜	U-tot	238	638486	0.536	0.000	
⌞>	U233	233	4347	1.344	0.000	
	U233 IS	233	4347	1.344	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	105.667				ng/L
	U	235	2572.697				ng/L
	U	238	635807.280				ng/L
	U 232	232	425.010				ng/L
	U 236	236	202.336				ng/L
⌜	U-tot	238	146.891	**29427.414**	304.51	1.0	ng/L
⌞>	U233	233	4347.039				ng/L
	U233 IS	233	4347.039	**98.571**	1.32	1.3	%R

010284

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 22:38:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.622
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	11.247	0.000	
	U	235	78	13.040	0.000	
	U	238	283	3.287	0.000	
	U 232	232	106	14.671	0.000	
	U 236	236	83	7.233	0.000	
⌈	U-tot	238	438	5.905	0.000	
⌊>	U233	233	4530	0.723	0.000	
	U233 IS	233	4530	0.723	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.000				ng/L
	U	235	78.334				ng/L
	U	238	282.671				ng/L
	U 232	232	105.667				ng/L
	U 236	236	83.334				ng/L
⌈	U-tot	238	0.097	**9.358**	1.14	12.1	ng/L
⌊>	U233	233	4529.795				ng/L
	U233 IS	233	4529.795	**102.715**	0.74	0.7	%R

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 22:41:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.623
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	79	24.063	0.000	
	U	235	92	31.058	0.000	
	U	238	1002	3.755	0.000	
	U 232	232	77	37.530	0.000	
	U 236	236	70	22.253	0.000	
⌈	U-tot	238	1173	7.210	0.000	
⌊>	U233	233	4630	1.136	0.000	
	U233 IS	233	4630	1.136	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	78.667				ng/L
	U	235	92.334				ng/L
	U	238	1002.389				ng/L
	U 232	232	77.334				ng/L
	U 236	236	69.667				ng/L
⌈	U-tot	238	0.253	**40.751**	3.10	7.6	ng/L
⌊>	U233	233	4629.512				ng/L
	U233 IS	233	4629.512	**104.976**	1.19	1.1	%R

010286

Quantitative Analysis - Summary Report

Sample ID: ccv
Sample Date/Time: Friday, October 28, 2011 22:43:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.624
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	64.938	0.000	
	U	235	1371	3.224	0.000	
	U	238	177110	0.215	0.000	
	U 232	232	49	81.115	0.000	
	U 236	236	160	25.871	0.000	
⌜	U-tot	238	178543	0.179	0.000	
⌞>	U233	233	4544	1.491	0.000	
	U233 IS	233	4544	1.491	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.000				ng/L
	U	235	1371.103				ng/L
	U	238	177109.931				ng/L
	U 232	232	49.334				ng/L
	U 236	236	159.668				ng/L
⌜	U-tot	238	39.297	**7865.232**	124.28	1.6	ng/L
⌞>	U233	233	4544.136				ng/L
	U233 IS	233	4544.136	**103.040**	1.54	1.5	%R

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 22:45:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.625
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	28.994	0.000	
	U	235	24	44.096	0.000	
	U	238	57	21.271	0.000	
	U 232	232	23	56.899	0.000	
	U 236	236	25	83.511	0.000	
⌈	U-tot	238	110	25.351	0.000	
⌊>	U233	233	4706	2.813	0.000	
	U233 IS	233	4706	2.813	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	29.333				ng/L
	U	235	24.000				ng/L
	U	238	57.000				ng/L
	U 232	232	22.667				ng/L
	U 236	236	24.667				ng/L
⌈	U-tot	238	0.023	**-5.321**	1.19	22.4	ng/L
⌊>	U233	233	4706.218				ng/L
	U233 IS	233	4706.218	**106.715**	3.00	2.8	%R

010288

Quantitative Analysis - Summary Report

Sample ID: 474221d14 df4

Sample Date/Time: Friday, October 28, 2011 22:48:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d14 df4.626
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	82	30.634	0.000	
	U	235	1299	1.195	0.000	
	U	238	326425	0.655	0.000	
	U 232	232	139	15.828	0.000	
	U 236	236	130	25.739	0.000	
⌈	U-tot	238	327806	0.644	0.000	
⌊>	U233	233	4803	0.173	0.000	
	U233 IS	233	4803	0.173	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	82.000				ng/L
	U	235	1299.093				ng/L
	U	238	326424.894				ng/L
	U 232	232	139.334				ng/L
	U 236	236	130.334				ng/L
⌈	U-tot	238	68.252	**13667.860**	108.85	0.8	ng/L
⌊>	U233	233	4802.935				ng/L
	U233 IS	233	4802.935	**108.908**	0.19	0.2	%R

010289

Quantitative Analysis - Summary Report

Sample ID: 474221d14d df4

Sample Date/Time: Friday, October 28, 2011 22:50:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d14d df4.627
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	38.575	0.000	
	U	235	1292	2.722	0.000	
	U	238	331708	0.147	0.000	
	U 232	232	169	15.247	0.000	
	U 236	236	100	35.916	0.000	
⌜	U-tot	238	333058	0.158	0.000	
⌞>	U233	233	4693	1.418	0.000	
	U233 IS	233	4693	1.418	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.334				ng/L
	U	235	1291.758				ng/L
	U	238	331708.250				ng/L
	U 232	232	168.668				ng/L
	U 236	236	99.667				ng/L
⌜	U-tot	238	70.975	**14213.514**	181.40	1.3	ng/L
⌞>	U233	233	4693.211				ng/L
	U233 IS	233	4693.211	**106.420**	1.51	1.4	%R

0110290

Quantitative Analysis - Summary Report

Sample ID: 474222d14 df4

Sample Date/Time: Friday, October 28, 2011 22:52:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d14 df4.628
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	74	26.956	0.000	
	U	235	715	3.292	0.000	
	U	238	176727	0.596	0.000	
	U 232	232	420	7.955	0.000	
	U 236	236	102	17.761	0.000	
⌜	U-tot	238	177516	0.596	0.000	
⌞>	U233	233	4634	1.623	0.000	
	U233 IS	233	4634	1.623	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	73.667				ng/L
	U	235	715.361				ng/L
	U	236	176727.293				ng/L
	U 232	232	419.676				ng/L
	U 236	236	102.334				ng/L
⌜	U-tot	236	38.315	**7668.418**	168.45	2.2	ng/L
⌞>	U233	233	4634.181				ng/L
	U233 IS	233	4634.181	**105.082**	1.71	1.6	%R

010291

Quantitative Analysis - Summary Report

Sample ID: 474222d14d df4

Sample Date/Time: Friday, October 28, 2011 22:55:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d14d df4.629
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	62	34.641	0.000	
	U	235	1007	4.826	0.000	
	U	238	263926	0.617	0.000	
	U 232	232	333	13.049	0.000	
	U 236	236	93	45.200	0.000	
⌜	U-tot	238	264995	0.593	0.000	
⌞>	U233	233	4607	2.096	0.000	
	U233 IS	233	4607	2.096	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	61.667				ng/L
	U	235	1007.056				ng/L
	U	238	263926.420				ng/L
	U 232	232	332.673				ng/L
	U 236	236	93.001				ng/L
⌜	U-tot	238	57.538	**11520.782**	290.18	2.5	ng/L
⌞>	U233	233	4607.167				ng/L
	U233 IS	233	4607.167	**104.469**	2.19	2.1	%R

010292

Quantitative Analysis - Summary Report

Sample ID: 474300d14 df4

Sample Date/Time: Friday, October 28, 2011 22:57:32
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d14 df4.630
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	102	29.034	0.000	
	U	235	1813	3.191	0.000	
	U	238	485203	1.052	0.000	
	U 232	232	906	5.233	0.000	
	U 236	236	177	18.224	0.000	
⌈	U-tot	238	487118	1.035	0.000	
⌊>	U233	233	4418	1.436	0.000	
	U233 IS	233	4418	1.436	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	102.001				ng/L
	U	235	1812.848				ng/L
	U	238	485202.860				ng/L
	U 232	232	906.379				ng/L
	U 236	236	177.335				ng/L
⌈	U-tot	238	110.277	**22089.923**	358.52	1.6	ng/L
⌊>	U233	233	4417.740				ng/L
	U233 IS	233	4417.740	**100.174**	1.44	1.4	%R

010293

Quantitative Analysis - Summary Report

Sample ID: 474300d14d df4

Sample Date/Time: Friday, October 28, 2011 22:59:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d14d df4.631
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	76	44.941	0.000	
	U	235	1854	0.592	0.000	
	U	238	505694	0.570	0.000	
	U 232	232	834	4.242	0.000	
	U 236	236	150	18.961	0.000	
⌜	U-tot	238	507623	0.560	0.000	
⌞>	U233	233	4490	1.812	0.000	
	U233 IS	233	4490	1.812	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	75.667				ng/L
	U	235	1853.522				ng/L
	U	238	505693.608				ng/L
	U 232	232	834.372				ng/L
	U 236	236	149.668				ng/L
⌜	U-tot	238	113.091	**22653.720**	486.88	2.1	ng/L
⌞>	U233	233	4489.775				ng/L
	U233 IS	233	4489.775	**101.807**	1.85	1.8	%R

010294

Quantitative Analysis - Summary Report

Sample ID: 474301d14 df4

Sample Date/Time: Friday, October 28, 2011 23:02:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d14 df4.632
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	27.702	0.000	
	U	235	1621	2.538	0.000	
	U	238	458244	0.689	0.000	
	U 232	232	175	6.306	0.000	
	U 236	236	113	5.423	0.000	
⌜	U-tot	238	459906	0.687	0.000	
⌞>	U233	233	4364	1.172	0.000	
	U233 IS	233	4364	1.172	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.000				ng/L
	U	235	1621.478				ng/L
	U	238	458243.715				ng/L
	U 232	232	174.668				ng/L
	U 236	236	112.867				ng/L
⌜	U-tot	238	105.393	**21111.190**	253.20	1.2	ng/L
⌞>	U233	233	4364.047				ng/L
	U233 IS	233	4364.047	**98.956**	1.16	1.2	%R

010295

Quantitative Analysis - Summary Report

Sample ID: 474301d14d df4

Sample Date/Time: Friday, October 28, 2011 23:04:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d14d df4.633
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	43.666	0.000	
	U	235	1568	2.105	0.000	
	U	238	421045	0.808	0.000	
	U 232	232	150	24.571	0.000	
	U 236	236	114	16.040	0.000	
⌈	U-tot	238	422667	0.807	0.000	
⌊>	U233	233	4169	2.043	0.000	
	U233 IS	233	4169	2.043	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.000				ng/L
	U	235	1568.469				ng/L
	U	238	421044.706				ng/L
	U 232	232	149.668				ng/L
	U 236	236	114.334				ng/L
⌈	U-tot	238	101.418	**20314.452**	405.69	2.0	ng/L
⌊>	U233	233	4166.622				ng/L
	U233 IS	233	4168.622	**94.525**	1.93	2.0	%R

010296

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 23:06:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.634
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	22.012	0.000	
	U	235	58	34.996	0.000	
	U	238	93	18.748	0.000	
	U 232	232	69	37.138	0.000	
	U 236	236	56	28.476	0.000	
⌜	U-tot	238	209	24.024	0.000	
⌞>	U233	233	4153	0.903	0.000	
	U233 IS	233	4153	0.903	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.000				ng/L
	U	235	58.000				ng/L
	U	238	93.000				ng/L
	U 232	232	68.667				ng/L
	U 236	236	56.334				ng/L
⌜	U-tot	238	0.050	**0.053**	2.34	4418.1	ng/L
⌞>	U233	233	4152.615				ng/L
	U233 IS	233	4152.615	**94.162**	0.85	0.9	%R

010297

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 23:09:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.635
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	30.476	0.000	
	U	235	49	30.816	0.000	
	U	238	879	0.920	0.000	
	U 232	232	45	34.198	0.000	
	U 236	236	43	41.288	0.000	
⌜	U-tot	238	977	3.853	0.000	
⌞>	U233	233	4159	0.804	0.000	
	U233 IS	233	4159	0.804	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.000				ng/L
	U	235	49.000				ng/L
	U	238	878.709				ng/L
	U 232	232	44.667				ng/L
	U 236	236	42.667				ng/L
⌜	U-tot	238	0.235	**37.036**	1.44	3.9	ng/L
⌞>	U233	233	4158.951				ng/L
	U233 IS	233	4158.951	**94.306**	0.76	0.8	%R

010298

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 23:11:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.636
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	66	29.223	0.000	
	U	235	1286	4.380	0.000	
	U	238	165421	0.338	0.000	
	U 232	232	44	74.184	0.000	
	U 236	236	144	30.614	0.000	
⌈	U-tot	238	166773	0.379	0.000	
⌊>	U233	233	4265	1.865	0.000	
	U233 IS	233	4265	1.865	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.000				ng/L
	U	235	1286.091				ng/L
	U	238	165421.137				ng/L
	U 232	232	43.667				ng/L
	U 236	236	143.668				ng/L
⌈	U-tot	238	39.107	**7827.122**	115.27	1.5	ng/L
⌊>	U233	233	4265.334				ng/L
	U233 IS	233	4265.334	**96.718**	1.80	1.9	%R

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Friday, October 28, 2011 23:13:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\totel u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.637
Tuning File: C:\Elandate\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	34.979	0.000	
	U	235	55	55.477	0.000	
	U	238	86	50.967	0.000	
	U 232	232	59	52.842	0.000	
	U 236	236	54	58.269	0.000	
⌈	U-tot	238	199	42.696	0.000	
⌊>	U233	233	4349	1.672	0.000	
	U233 IS	233	4349	1.672	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.334				ng/L
	U	235	55.000				ng/L
	U	238	85.667				ng/L
	U 232	232	59.000				ng/L
	U 236	236	54.334				ng/L
⌈	U-tot	238	0.046	**-0.814**	4.01	492.3	ng/L
⌊>	U233	233	4349.374				ng/L
	U233 IS	233	4349.374	**98.624**	1.65	1.7	%R

010300

Quantitative Analysis - Summary Report

Sample ID: 474302d14 df4

Sample Date/Time: Friday, October 28, 2011 23:16:18
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d14 df4.638
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	95	36.661	0.000	
	U	235	1559	5.635	0.000	
	U	238	432353	0.927	0.000	
	U 232	232	196	19.121	0.000	
	U 236	236	143	18.063	0.000	
⌜	U-tot	238	434007	0.911	0.000	
⌞>	U233	233	4279	0.623	0.000	
	U233 IS	233	4279	0.623	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	95.001				ng/L
	U	235	1559.134				ng/L
	U	238	432353.192				ng/L
	U 232	232	196.336				ng/L
	U 236	236	143.334				ng/L
⌜	U-tot	238	101.418	**20314.501**	64.26	0.3	ng/L
⌞>	U233	233	4279.340				ng/L
	U233 IS	233	4279.340	**97.036**	0.60	0.6	%R

Quantitative Analysis - Summary Report

Sample ID: 474302d14d df4

Sample Date/Time: Friday, October 28, 2011 23:18:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d14d df4.639
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	37.409	0.000	
	U	235	1588	1.129	0.000	
	U	238	434317	0.702	0.000	
	U 232	232	190	7.547	0.000	
	U 236	236	120	20.235	0.000	
⌜	U-tot	238	435968	0.695	0.000	
⌞>	U233	233	4089	2.021	0.000	
	U233 IS	233	4089	2.021	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.334				ng/L
	U	235	1587.805				ng/L
	U	238	434316.644				ng/L
	U 232	232	190.335				ng/L
	U 236	236	119.667				ng/L
⌜	U-tot	238	106.644	**21361.847**	487.51	2.3	ng/L
⌞>	U233	233	4089.253				ng/L
	U233 IS	233	4089.253	**92.725**	1.87	2.0	%R

010302

Quantitative Analysis - Summary Report

Sample ID: 474340d14

Sample Date/Time: Friday, October 28, 2011 23:20:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d14.640
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	37.054	0.000	
	U	235	258	1.569	0.000	
	U	238	57157	1.141	0.000	
	U 232	232	890	2.577	0.000	
	U 236	236	55	46.229	0.000	
⌜	U-tot	238	57461	1.137	0.000	
⌞>	U233	233	3925	0.912	0.000	
	U233 IS	233	3925	0.912	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	45.667				ng/L
	U	235	257.670				ng/L
	U	238	57157.469				ng/L
	U 232	232	890.377				ng/L
	U 236	236	55.334				ng/L
⌜	U-tot	238	14.640	**2923.942**	20.54	0.7	ng/L
⌞>	U233	233	3924.847				ng/L
	U233 IS	233	3924.847	**88.997**	0.81	0.9	%R

010303

Quantitative Analysis - Summary Report

Sample ID: 474340d14d

Sample Date/Time: Friday, October 28, 2011 23:23:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d14d.641
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	36	57.619	0.000	
	U	235	325	10.663	0.000	
	U	238	77934	0.261	0.000	
	U 232	232	668	5.149	0.000	
	U 236	236	42	42.415	0.000	
⌜	U-tot	238	78294	0.190	0.000	
⌞>	U233	233	3895	3.468	0.000	
	U233 IS	233	3895	3.468	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	35.667				ng/L
	U	235	325.006				ng/L
	U	238	77933.627				ng/L
	U 232	232	668.025				ng/L
	U 236	236	41.667				ng/L
⌜	U-tot	238	20.121	**4022.277**	148.23	3.7	ng/L
⌞>	U233	233	3894.501				ng/L
	U233 IS	233	3894.501	**88.309**	3.06	3.5	%R

010304

Quantitative Analysis - Summary Report

Sample ID: 474341d14 df4

Sample Date/Time: Friday, October 28, 2011 23:25:22
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d14 df4.642
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	56.041	0.000	
	U	235	1340	4.422	0.000	
	U	238	369181	0.371	0.000	
	U 232	232	213	10.189	0.000	
	U 236	236	90	27.510	0.000	
⌈	U-tot	238	370571	0.382	0.000	
⌊>	U233	233	4419	2.122	0.000	
	U233 IS	233	4419	2.122	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.333				ng/L
	U	235	1340.099				ng/L
	U	238	369181.091				ng/L
	U 232	232	213.003				ng/L
	U 236	236	90.000				ng/L
⌈	U-tot	238	83.884	**16800.604**	291.33	1.7	ng/L
⌊>	U233	233	4418.741				ng/L
	U233 IS	233	4418.741	**100.197**	2.13	**2.1**	%R

010305

Quantitative Analysis - Summary Report

Sample ID: 474341d14d df4

Sample Date/Time: Friday, October 28, 2011 23:27:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d14d df4.643
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	56	41.606	0.000	
	U	235	1353	4.472	0.000	
	U	238	371826	0.534	0.000	
	U 232	232	205	16.489	0.000	
	U 236	236	105	26.362	0.000	
⌜	U-tot	238	373235	0.520	0.000	
⌞>	U233	233	4379	0.971	0.000	
	U233 IS	233	4379	0.971	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	56.334				ng/L
	U	235	1353.101				ng/L
	U	238	371825.739				ng/L
	U 232	232	205.336				ng/L
	U 236	236	104.667				ng/L
⌜	U-tot	238	85.239	**17072.131**	226.64	1.3	ng/L
⌞>	U233	233	4379.054				ng/L
	U233 IS	233	4379.054	**99.297**	0.96	1.0	%R

010306

Quantitative Analysis - Summary Report

Sample ID: 474344d14 df4

Sample Date/Time: Friday, October 28, 2011 23:29:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d14 df4.644
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	66	53.160	0.000	
	U	235	1068	4.289	0.000	
	U	238	286710	0.245	0.000	
	U 232	232	259	5.235	0.000	
	U 236	236	101	28.950	0.000	
⌜	U-tot	238	287844	0.268	0.000	
⌞>	U233	233	4587	0.893	0.000	
	U233 IS	233	4587	0.893	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	66.000				ng/L
	U	235	1067.729				ng/L
	U	238	286710.317				ng/L
	U 232	232	259.337				ng/L
	U 236	236	100.667				ng/L
⌜	U-tot	238	62.752	**12565.766**	81.07	0.6	ng/L
⌞>	U233	233	4587.157				ng/L
	U233 IS	233	4587.157	**104.016**	0.93	0.9	%R

010307

Quantitative Analysis - Summary Report

Sample ID: 474344d14d df4

Sample Date/Time: Friday, October 28, 2011 23:32:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d14d df4.645
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	59	50.258	0.000	
	U	235	1112	2.423	0.000	
	U	238	301910	3.341	0.000	
	U 232	232	272	20.646	0.000	
	U 236	236	115	30.769	0.000	
⌜	U-tot	238	303081	3.314	0.000	
⌞>	U233	233	4821	2.190	0.000	
	U233 IS	233	4821	2.190	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.667				ng/L
	U	235	1112.401				ng/L
	U	238	301909.893				ng/L
	U 232	232	272.338				ng/L
	U 236	236	115.001				ng/L
⌜	U-tot	238	62.853	**12585.922**	144.71	1.1	ng/L
⌞>	U233	233	4821.279				ng/L
	U233 IS	233	4821.279	**109.324**	2.39	2.2	%R

010308

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 23:34:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.646
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	53.061	0.000	
	U	235	40	49.938	0.000	
	U	238	74	44.787	0.000	
	U 232	232	59	43.335	0.000	
	U 236	236	39	63.787	0.000	
⌜	U-tot	238	163	48.155	0.000	
⌞>	U233	233	4634	1.943	0.000	
	U233 IS	233	4634	1.943	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.000				ng/L
	U	235	40.000				ng/L
	U	238	74.334				ng/L
	U 232	232	58.667				ng/L
	U 236	236	38.667				ng/L
⌜	U-tot	238	0.035	**-2.946**	3.45	117.2	ng/L
⌞>	U233	233	4633.848				ng/L
	U233 IS	233	4633.848	**105.074**	2.04	1.9	%R

010309

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Friday, October 28, 2011 23:36:57
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.647
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	46	64.011	0.000	
	U	235	50	40.885	0.000	
	U	238	953	3.551	0.000	
	U 232	232	43	77.586	0.000	
	U 236	236	41	69.971	0.000	
⌈	U-tot	238	1048	7.944	0.000	
⌊>	U233	233	4721	2.037	0.000	
	U233 IS	233	4721	2.037	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.000				ng/L
	U	235	49.667				ng/L
	U	238	952.717				ng/L
	U 232	232	43.333				ng/L
	U 236	236	41.000				ng/L
⌈	U-tot	238	0.222	**34.499**	3.67	10.6	ng/L
⌊>	U233	233	4720.892				ng/L
	U233 IS	233	4720.892	**107.048**	2.18	2.0	%R

010310

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Friday, October 28, 2011 23:39:20
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.648
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	42.988	0.000	
	U	235	1392	1.785	0.000	
	U	238	184235	0.297	0.000	
	U 232	232	39	49.121	0.000	
	U 236	236	170	25.633	0.000	
⌜	U-tot	238	185683	0.320	0.000	
⌞>	U233	233	4697	0.866	0.000	
	U233 IS	233	4697	0.866	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.000				ng/L
	U	235	1392.440				ng/L
	U	238	184235.126				ng/L
	U 232	232	39.000				ng/L
	U 236	236	170.335				ng/L
⌜	U-tot	238	39.537	**7913.374**	43.48	0.5	ng/L
⌞>	U233	233	4696.546				ng/L
	U233 IS	233	4696.546	**106.496**	0.92	0.9	%R

010311

Quantitative Analysis - Summary Report

Sample ID: ccb
Sample Date/Time: Friday, October 28, 2011 23:41:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.649
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	55.399	0.000	
	U	235	44	45.188	0.000	
	U	238	76	51.259	0.000	
	U 232	232	42	55.686	0.000	
	U 236	236	34	57.249	0.000	
⌈	U-tot	238	161	49.932	0.000	
⌊>	U233	233	4783	1.109	0.000	
	U233 IS	233	4783	1.109	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.333				ng/L
	U	235	44.333				ng/L
	U	238	75.667				ng/L
	U 232	232	42.000				ng/L
	U 236	236	34.333				ng/L
⌈	U-tot	238	0.034	**-3.240**	3.45	106.5	ng/L
⌊>	U233	233	4783.258				ng/L
	U233 IS	233	4783.258	**108.462**	1.20	1.1	%R

Quantitative Analysis - Summary Report

Sample ID: 474401d14 df4

Sample Date/Time: Friday, October 28, 2011 23:44:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d14 df4.650
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	65	28.063	0.000	
	U	235	1426	3.834	0.000	
	U	238	364615	0.242	0.000	
	U 232	232	141	23.058	0.000	
	U 236	236	104	20.340	0.000	
⌈	U-tot	238	366106	0.224	0.000	
⌊>	U233	233	4553	1.016	0.000	
	U233 IS	233	4553	1.016	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	64.667				ng/L
	U	235	1426.112				ng/L
	U	238	364615.211				ng/L
	U 232	232	141.001				ng/L
	U 236	236	104.334				ng/L
⌈	U-tot	238	80.407	**16103.726**	154.17	1.0	ng/L
⌊>	U233	233	4553.474				ng/L
	U233 IS	233	4553.474	**103.252**	1.05	1.0	%R

010313

Quantitative Analysis - Summary Report

Sample ID: 474401d14d df4

Sample Date/Time: Friday, October 28, 2011 23:46:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d14d df4.651
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	65	40.966	0.000	
	U	235	1363	2.596	0.000	
	U	238	353432	0.159	0.000	
	U 232	232	300	9.770	0.000	
	U 236	236	114	32.669	0.000	
⌈	U-tot	238	354860	0.149	0.000	
⌊>	U233	233	4469	1.734	0.000	
	U233 IS	233	4469	1.734	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	65.334				ng/L
	U	235	1363.436				ng/L
	U	238	353431.606				ng/L
	U 232	232	300.005				ng/L
	U 236	236	114.001				ng/L
⌈	U-tot	238	79.426	**15907.129**	286.82	1.8	ng/L
⌊>	U233	233	4468.765				ng/L
	U233 IS	233	4468.765	**101.331**	1.76	1.7	%R

010314

Quantitative Analysis - Summary Report

Sample ID: 474402d14 df2

Sample Date/Time: Friday, October 28, 2011 23:48:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d14 df2.652
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	41.381	0.000	
	U	235	1368	3.941	0.000	
	U	238	365457	0.662	0.000	
	U 232	232	732	1.026	0.000	
	U 236	236	104	14.512	0.000	
⌈	U-tot	238	366878	0.679	0.000	
⌊>	U233	233	4456	1.576	0.000	
	U233 IS	233	4456	1.576	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	53.000				ng/L
	U	235	1367.770				ng/L
	U	238	365456.857				ng/L
	U 232	232	731.696				ng/L
	U 236	236	103.667				ng/L
⌈	U-tot	238	82.344	**16491.953**	355.26	2.2	ng/L
⌊>	U233	233	4456.426				ng/L
	U233 IS	233	4456.426	**101.051**	1.59	1.6	%R

010315

Quantitative Analysis - Summary Report

Sample ID: 474402d14L df10

Sample Date/Time: Friday, October 28, 2011 23:51:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swrl\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d14L df10.653
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	41.245	0.000	
	U	235	281	12.467	0.000	
	U	238	71140	0.894	0.000	
	U 232	232	203	13.525	0.000	
	U 236	236	46	50.657	0.000	
⌈	U-tot	238	71462	0.962	0.000	
⌊>	U233	233	4243	1.602	0.000	
	U233 IS	233	4243	1.602	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.667				ng/L
	U	235	280.671				ng/L
	U	238	71140.281				ng/L
	U 232	232	203.336				ng/L
	U 236	236	46.000				ng/L
⌈	U-tot	238	16.845	**3365.711**	75.30	2.2	ng/L
⌊>	U233	233	4243.324				ng/L
	U233 IS	233	4243.324	**96.219**	1.54	1.6	%R

010316

Quantitative Analysis - Summary Report

Sample ID: 474402d14D df2

Sample Date/Time: Friday, October 28, 2011 23:53:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d14D df2.654
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	60	46.818	0.000	
	U	235	1300	2.502	0.000	
	U	238	351165	0.735	0.000	
	U 232	232	1376	3.280	0.000	
	U 236	236	111	38.490	0.000	
⌜	U-tot	238	352525	0.725	0.000	
⌞>	U233	233	4317	0.271	0.000	
	U233 IS	233	4317	0.271	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	59.667				ng/L
	U	235	1300.426				ng/L
	U	238	351165.149				ng/L
	U 232	232	1376.104				ng/L
	U 236	236	110.667				ng/L
⌜	U-tot	238	81.665	**16355.975**	93.27	0.6	ng/L
⌞>	U233	233	4316.691				ng/L
	U233 IS	233	4316.691	**97.883**	0.26	0.3	%R

010317

Quantitative Analysis - Summary Report

Sample ID: 474402d14AS df2

Sample Date/Time: Friday, October 28, 2011 23:55:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d14AS df2.655
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20uL 1° natural uranium @ df 100 (075-Rad-Sol 2 (11-064-06) in 10 mL

TU = 20,462 ng/L x df 2 = 40,924 ng/L

10131111 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	91	28.342	0.000	
	U	235	4905	0.487	0.000	
	U	238	852649	0.568	0.000	
	U 232	232	827	9.026	0.000	
	U 236	236	94	37.867	0.000	
⌈	U-tot	238	857644	0.567	0.000	
⌊>	U233	233	4651	2.187	0.000	
	U233 IS	233	4651	2.187	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	90.667				ng/L
	U	235	4904.656				ng/L
	U	238	852646.813				ng/L
	U 232	232	827.038				ng/L
	U 236	236	94.001				ng/L
⌈	U-tot	238	184.468	**36957.970**	882.40	2.4	ng/L
⌊>	U233	233	4650.856				ng/L
	U233 IS	233	4650.856	**105.460**	2.31	2.2	%R

010318

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Friday, October 28, 2011 23:58:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.656
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	31	64.758	0.000	
	U	235	27	78.869	0.000	
	U	238	85	35.353	0.000	
	U 232	232	113	6.894	0.000	
	U 236	236	24	80.364	0.000	
⌈	U-tot	238	143	49.793	0.000	
⌊>	U233	233	4743	1.882	0.000	
	U233 IS	233	4743	1.882	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	31.000				ng/L
	U	235	26.667				ng/L
	U	238	85.000				ng/L
	U 232	232	112.667				ng/L
	U 236	236	24.000				ng/L
⌈	U-tot	238	0.030	**-4.017**	2.90	72.1	ng/L
⌊>	U233	233	4742.570				ng/L
	U233 IS	233	4742.570	**107.540**	2.02	1.9	%R

010319

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Saturday, October 29, 2011 00:00:29
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.657
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	79.900	0.000	
	U	235	25	60.856	0.000	
	U	238	932	1.744	0.000	
	U 232	232	35	39.693	0.000	
	U 236	236	16	119.242	0.000	
⌜	U-tot	238	974	4.526	0.000	
⌞>	U233	233	4574	0.951	0.000	
	U233 IS	233	4574	0.951	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.667				ng/L
	U	235	24.667				ng/L
	U	238	932.381				ng/L
	U 232	232	35.000				ng/L
	U 236	236	16.000				ng/L
⌜	U-tot	238	0.213	**32.643**	1.85	5.7	ng/L
⌞>	U233	233	4573.817				ng/L
	U233 IS	233	4573.817	**103.713**	0.99	1.0	%R

010320

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Saturday, October 29, 2011 00:02:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.658
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	45.583	0.000	
	U	235	1377	2.484	0.000	
	U	238	183182	0.097	0.000	
	U 232	232	42	52.094	0.000	
	U 236	236	151	16.044	0.000	
⌈	U-tot	238	184612	0.103	0.000	
⌊>	U233	233	4588	1.022	0.000	
	U233 IS	233	4588	1.022	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	1377.438				ng/L
	U	238	183182.156				ng/L
	U 232	232	42.333				ng/L
	U 236	236	150.668				ng/L
⌈	U-tot	238	40.240	**8054.168**	91.05	1.1	ng/L
⌊>	U233	233	4588.158				ng/L
	U233 IS	233	4588.158	**104.038**	1.06	1.0	%R

010321

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Saturday, October 29, 2011 00:05:16
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.659
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	30	95.278	0.000	
	U	235	22	100.156	0.000	
	U	238	45	47.192	0.000	
	U 232	232	25	95.105	0.000	
	U 236	236	17	117.500	0.000	
⌜	U-tot	238	97	74.148	0.000	
⌞>	U233	233	4726	1.042	0.000	
	U233 IS	233	4726	1.042	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	30.000				ng/L
	U	235	22.333				ng/L
	U	238	44.667				ng/L
	U 232	232	24.667				ng/L
	U 236	236	17.000				ng/L
⌜	U-tot	238	0.020	**-5.918**	3.01	50.9	ng/L
⌞>	U233	233	4725.561				ng/L
	U233 IS	233	4725.561	**107.154**	1.12	1.0	%R

010322

Quantitative Analysis - Summary Report

Sample ID: Blankd21 d64 (RE) 10/31/11 NS
Sample Date/Time: Saturday, October 29, 2011 00:07:37
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\totel u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\Blankd21.660
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	37.128	0.000	
	U	235	1973	2.468	0.000	
	U	238	580000	0.402	0.000	
	U 232	232	31	34.126	0.000	
	U 236	236	114	7.885	0.000	
⌈	U-tot	238	582009	0.394	0.000	
⌊>	U233	233	4594	0.333	0.000	
	U233 IS	233	4594	0.333	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	36.667				ng/L
	U	235	1972.881				ng/L
	U	238	579999.518				ng/L
	U 232	232	31.333				ng/L
	U 236	236	113.667				ng/L
⌈	U-tot	238	126.696	**25380.236**	183.85	0.7	ng/L
⌊>	U233	233	4593.827				ng/L
	U233 IS	233	4593.827	**104.167**	0.35	0.3	%R

010323

Quantitative Analysis - Summary Report

Sample ID: 474212d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:09:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d21 df4.661
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	41	63.555	0.000	
	U	235	1770	3.589	0.000	
	U	238	518361	0.564	0.000	
	U 232	232	39	49.842	0.000	
	U 236	236	117	25.459	0.000	
⌈	U-tot	238	520172	0.546	0.000	
⌊>	U233	233	4426	1.151	0.000	
	U233 IS	233	4426	1.151	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	41.000				ng/L
	U	235	1769.506				ng/L
	U	238	518361.036				ng/L
	U 232	232	39.333				ng/L
	U 236	236	117.334				ng/L
⌈	U-tot	238	117.523	**23542.072**	237.74	1.0	ng/L
⌊>	U233	233	4426.411				ng/L
	U233 IS	233	4426.411	**100.371**	1.16	1.2	%R

010324

Quantitative Analysis - Summary Report

Sample ID: 474212d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:12:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474212d21d df4.662
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	57.268	0.000	
	U	235	1676	5.202	0.000	
	U	238	487522	0.614	0.000	
	U 232	232	69	72.768	0.000	
	U 236	236	104	26.877	0.000	
⌜	U-tot	238	489236	0.634	0.000	
⌞>	U233	233	4170	0.624	0.000	
	U233 IS	233	4170	0.624	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	38.667				ng/L
	U	235	1676.155				ng/L
	U	238	487521.523				ng/L
	U 232	232	69.000				ng/L
	U 236	236	104.334				ng/L
⌜	U-tot	238	117.336	**23504.595**	205.41	0.9	ng/L
⌞>	U233	233	4169.623				ng/L
	U233 IS	233	4169.623	**94.548**	0.59	0.6	%R

010325

Quantitative Analysis - Summary Report

Sample ID: 474213d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:14:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandate\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d21 df4.663
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	75.008	0.000	
	U	235	1200	5.753	0.000	
	U	238	318214	1.101	0.000	
	U 232	232	74	46.260	0.000	
	U 236	236	96	47.358	0.000	
⌈	U-tot	238	319468	1.108	0.000	
⌊>	U233	233	4246	1.551	0.000	
	U233 IS	233	4246	1.551	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.667				ng/L
	U	235	1199.746				ng/L
	U	238	318213.937				ng/L
	U 232	232	73.667				ng/L
	U 236	236	96.334				ng/L
⌈	U-tot	238	75.261	**15072.456**	324.86	2.2	ng/L
⌊>	U233	233	4245.658				ng/L
	U233 IS	233	4245.658	**96.272**	1.49	1.6	%R

010326

Quantitative Analysis - Summary Report

Sample ID: 474213d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:16:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474213d21d df4.664
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	97	55.046	0.000	
	U	235	1421	6.820	0.000	
	U	238	355245	0.759	0.000	
	U 232	232	135	40.944	0.000	
	U 236	236	157	41.923	0.000	
⌈	U-tot	238	356763	0.762	0.000	
⌊>	U233	233	4326	2.825	0.000	
	U233 IS	233	4326	2.825	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	97.001				ng/L
	U	235	1421.445				ng/L
	U	238	355244.841				ng/L
	U 232	232	135.334				ng/L
	U 236	236	157.002				ng/L
⌈	U-tot	238	82.513	**16525.829**	414.35	2.5	ng/L
⌊>	U233	233	4325.696				ng/L
	U233 IS	233	4325.696	**98.087**	2.77	2.8	%R

010327

Quantitative Analysis - Summary Report

Sample ID: 474214d21

Sample Date/Time: Saturday, October 29, 2011 00:19:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d21.665
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	55	41.619	0.000	
	U	235	2075	7.504	0.000	
	U	238	525935	0.244	0.000	
	U 232	232	328	9.076	0.000	
	U 236	236	119	18.385	0.000	
⌈	U-tot	238	528066	0.224	0.000	
⌊>	U233	233	4366	2.033	0.000	
	U233 IS	233	4366	2.033	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.334				ng/L
	U	235	2074.904				ng/L
	U	238	525935.469				ng/L
	U 232	232	327.673				ng/L
	U 236	236	119.334				ng/L
⌈	U-tot	238	120.991	**24237.035**	503.14	2.1	ng/L
⌊>	U233	233	4365.715				ng/L
	U233 IS	233	4365.715	**98.994**	2.01	2.0	%R

010328

Quantitative Analysis - Summary Report

Sample ID: 474214d21d

Sample Date/Time: Saturday, October 29, 2011 00:21:28
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474214d21d.666
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	57	25.416	0.000	
	U	235	2520	3.116	0.000	
	U	238	629614	0.667	0.000	
	U 232	232	239	12.497	0.000	
	U 236	236	131	14.548	0.000	
⌈	U-tot	238	632192	0.665	0.000	
⌊>	U233	233	4479	1.999	0.000	
	U233 IS	233	4479	1.999	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.334				ng/L
	U	235	2520.350				ng/L
	U	238	629614.295				ng/L
	U 232	232	239.003				ng/L
	U 236	236	130.668				ng/L
⌈	U-tot	238	141.183	**28283.448**	761.05	2.7	ng/L
⌊>	U233	233	4479.437				ng/L
	U233 IS	233	4479.437	**101.573**	2.03	2.0	%R

010329

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Saturday, October 29, 2011 00:23:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.667
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	23	13.093	0.000	
	U	235	24	13.210	0.000	
	U	238	308	30.241	0.000	
	U 232	232	38	6.565	0.000	
	U 236	236	17	61.414	0.000	
⌜	U-tot	238	355	25.023	0.000	
⌞>	U233	233	4812	1.378	0.000	
	U233 IS	233	4812	1.378	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	23.333				ng/L
	U	235	24.333				ng/L
	U	238	307.672				ng/L
	U 232	232	38.333				ng/L
	U 236	236	17.000				ng/L
⌜	U-tot	238	0.074	**4.815**	3.93	81.6	ng/L
⌞>	U233	233	4811.606				ng/L
	U233 IS	233	4811.606	**109.105**	1.50	1.4	%R

010330

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Saturday, October 29, 2011 00:26:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.668
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	72	24.817	0.000	
	U	235	79	26.124	0.000	
	U	238	1133	4.521	0.000	
	U 232	232	62	20.210	0.000	
	U 236	236	65	28.737	0.000	
⌜	U-tot	238	1283	5.272	0.000	
⌞>	U233	233	4971	2.253	0.000	
	U233 IS	233	4971	2.253	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	71.667				ng/L
	U	235	78.667				ng/L
	U	238	1133.071				ng/L
	U 232	232	62.000				ng/L
	U 236	236	64.667				ng/L
⌜	U-tot	238	0.258	**41.775**	3.94	9.4	ng/L
⌞>	U233	233	4971.359				ng/L
	U233 IS	233	4971.359	**112.727**	2.54	2.3	%R

011331

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Saturday, October 29, 2011 00:28:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.669
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	68	32.423	0.000	
	U	235	1523	2.991	0.000	
	U	238	194408	0.495	0.000	
	U 232	232	62	44.266	0.000	
	U 236	236	206	10.906	0.000	
⌜	U-tot	238	195999	0.493	0.000	
⌞>	U233	233	4933	3.337	0.000	
	U233 IS	233	4933	3.337	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	67.667				ng/L
	U	235	1522.794				ng/L
	U	238	194408.413				ng/L
	U 232	232	62.334				ng/L
	U 236	236	206.336				ng/L
⌜	U-tot	238	39.763	**7958.582**	300.62	3.8	ng/L
⌞>	U233	233	4933.339				ng/L
	U233 IS	233	4933.339	**111.865**	3.73	3.3	%R

010332

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Saturday, October 29, 2011 00:30:58
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.670
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	54.391	0.000	
	U	235	55	66.133	0.000	
	U	238	90	44.194	0.000	
	U 232	232	42	60.351	0.000	
	U 236	236	51	55.556	0.000	
⌈	U-tot	238	198	52.405	0.000	
⌊>	U233	233	5097	4.257	0.000	
	U233 IS	233	5097	4.257	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	53.000				ng/L
	U	235	55.000				ng/L
	U	238	89.667				ng/L
	U 232	232	41.667				ng/L
	U 236	236	50.667				ng/L
⌈	U-tot	238	0.039	**-2.249**	4.11	182.9	ng/L
⌊>	U233	233	5097.430				ng/L
	U233 IS	233	5097.430	**115.586**	4.92	4.3	%R

010333

Quantitative Analysis - Summary Report

Sample ID: 474221d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:33:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d21 df4.671
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	68	48.123	0.000	
	U	235	1237	6.646	0.000	
	U	238	316694	0.506	0.000	
	U 232	232	154	36.364	0.000	
	U 236	236	106	36.790	0.000	
⌜	U-tot	238	318000	0.535	0.000	
⌞>	U233	233	4996	1.482	0.000	
	U233 IS	233	4996	1.482	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.334				ng/L
	U	235	1237.418				ng/L
	U	238	316693.878				ng/L
	U 232	232	154.001				ng/L
	U 236	236	106.334				ng/L
⌜	U-tot	238	63.657	**12747.047**	140.07	1.1	ng/L
⌞>	U233	233	4996.039				ng/L
	U233 IS	233	4996.039	**113.287**	1.68	1.5	%R

Quantitative Analysis - Summary Report

Sample ID: 474221d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:35:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474221d21d df4.672
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	57	59.027	0.000	
	U	235	1186	2.195	0.000	
	U	238	300286	0.462	0.000	
	U 232	232	121	24.195	0.000	
	U 236	236	96	28.340	0.000	
⌜	U-tot	238	301529	0.441	0.000	
⌞>	U233	233	4870	0.987	0.000	
	U233 IS	233	4870	0.987	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	57.000				ng/L
	U	235	1185.744				ng/L
	U	238	300285.929				ng/L
	U 232	232	120.667				ng/L
	U 236	236	96.334				ng/L
⌜	U-tot	238	61.923	**12399.511**	86.41	0.7	ng/L
⌞>	U233	233	4869.637				ng/L
	U233 IS	233	4869.637	**110.421**	1.09	1.0	%R

010335

Quantitative Analysis - Summary Report

Sample ID: 474222d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:38:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d21 df4.673
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	34	38.235	0.000	
	U	235	935	3.529	0.000	
	U	238	261064	0.410	0.000	
	U 232	232	432	15.577	0.000	
	U 236	236	59	36.730	0.000	
⌜	U-tot	238	262033	0.402	0.000	
⌞>	U233	233	4787	2.521	0.000	
	U233 IS	233	4787	2.521	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	34.000				ng/L
	U	235	935.381				ng/L
	U	238	261063.800				ng/L
	U 232	232	432.010				ng/L
	U 236	236	58.667				ng/L
⌜	U-tot	238	54.756	**10963.207**	241.58	2.2	ng/L
⌞>	U233	233	4787.261				ng/L
	U233 IS	233	4787.261	**108.553**	2.74	2.5	%R

010336

Quantitative Analysis - Summary Report

Sample ID: 474222d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:40:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474222d21d df4.674
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	48	59.767	0.000	
	U	235	754	5.986	0.000	
	U	238	202812	0.351	0.000	
	U 232	232	275	2.745	0.000	
	U 236	236	69	44.228	0.000	
⌜	U-tot	238	203614	0.315	0.000	
⌞>	U233	233	4811	1.866	0.000	
	U233 IS	233	4811	1.866	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	48.000				ng/L
	U	235	754.031				ng/L
	U	238	202812.368				ng/L
	U 232	232	275.004				ng/L
	U 236	236	69.334				ng/L
⌜	U-tot	238	42.337	**8474.437**	174.43	2.1	ng/L
⌞>	U233	233	4810.606				ng/L
	U233 IS	233	4810.606	**109.082**	2.04	1.9	%R

010337

Quantitative Analysis - Summary Report

Sample ID: 474300d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:42:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d21 df4.675
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	68	29.608	0.000	
	U	235	1828	4.758	0.000	
	U	238	510825	0.435	0.000	
	U 232	232	1152	8.465	0.000	
	U 236	236	142	14.067	0.000	
⌜	U-tot	238	512722	0.447	0.000	
⌞>	U233	233	4686	1.716	0.000	
	U233 IS	233	4686	1.716	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	68.334				ng/L
	U	235	1828.184				ng/L
	U	238	510825.478				ng/L
	U 232	232	1152.073				ng/L
	U 236	236	142.001				ng/L
⌜	U-tot	238	109.446	**21923.313**	478.24	2.2	ng/L
⌞>	U233	233	4685.874				ng/L
	U233 IS	233	4685.874	**106.254**	1.82	1.7	%R

010338

Quantitative Analysis - Summary Report

Sample ID: 474300d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:45:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474300d21d df4.676
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	76	20.888	0.000	
	U	235	1948	1.029	0.000	
	U	238	520483	1.433	0.000	
	U 232	232	693	3.904	0.000	
	U 236	236	157	10.334	0.000	
⌜	U-tot	238	522507	1.430	0.000	
⌞>	U233	233	4810	1.900	0.000	
	U233 IS	233	4810	1.900	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	76.000				ng/L
	U	235	1947.875				ng/L
	U	238	520482.853				ng/L
	U 232	232	693.026				ng/L
	U 236	236	157.335				ng/L
⌜	U-tot	238	108.630	**21759.789**	121.72	0.6	ng/L
⌞>	U233	233	4810.273				ng/L
	U233 IS	233	4810.273	**109.075**	2.07	1.9	%R

010339

Quantitative Analysis - Summary Report

Sample ID: 474301d21 df4

Sample Date/Time: Saturday, October 29, 2011 00:47:21
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d21 df4.677
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	94	19.121	0.000	
	U	235	1766	2.476	0.000	
	U	238	470467	0.361	0.000	
	U 232	232	235	16.694	0.000	
	U 236	236	161	14.654	0.000	
⌜	U-tot	238	472327	0.360	0.000	
⌞>	U233	233	4636	0.368	0.000	
	U233 IS	233	4636	0.368	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	94.334				ng/L
	U	235	1766.172				ng/L
	U	238	470466.681				ng/L
	U 232	232	235.003				ng/L
	U 236	236	160.668				ng/L
⌜	U-tot	238	101.879	**20406.792**	32.24	0.2	ng/L
⌞>	U233	233	4636.182				ng/L
	U233 IS	233	4636.182	**105.127**	0.39	0.4	%R

010340

Quantitative Analysis - Summary Report

Sample ID: 474301d21d df4

Sample Date/Time: Saturday, October 29, 2011 00:49:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474301d21d df4.678
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	20.872	0.000	
	U	235	1730	3.809	0.000	
	U	238	463094	0.632	0.000	
	U 232	232	163	18.791	0.000	
	U 236	236	134	5.811	0.000	
⌈	U-tot	238	464885	0.645	0.000	
⌊>	U233	233	4482	1.787	0.000	
	U233 IS	233	4482	1.787	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.667				ng/L
	U	235	1730.165				ng/L
	U	238	463094.434				ng/L
	U 232	232	162.668				ng/L
	U 236	236	133.668				ng/L
⌈	U-tot	238	103.735	**20778.844**	403.22	1.9	ng/L
⌊>	U233	233	4482.438				ng/L
	U233 IS	233	4482.438	**101.641**	1.82	1.8	%R

010341

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Saturday, October 29, 2011 00:51:55
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.679
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	21.895	0.000	
	U	235	62	9.802	0.000	
	U	238	99	14.237	0.000	
	U 232	232	67	7.089	0.000	
	U 236	236	67	17.385	0.000	
⌜	U-tot	238	222	12.238	0.000	
⌞>	U233	233	4653	0.686	0.000	
	U233 IS	233	4653	0.686	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	61.334				ng/L
	U	235	62.334				ng/L
	U	238	98.667				ng/L
	U 232	232	66.667				ng/L
	U 236	236	66.667				ng/L
⌜	U-tot	238	0.048	**-0.440**	1.20	273.4	ng/L
⌞>	U233	233	4652.857				ng/L
	U233 IS	233	4652.857	**105.505**	0.72	0.7	%R

010342

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Saturday, October 29, 2011 00:54:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.680
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	72	50.740	0.000	
	U	235	84	52.703	0.000	
	U	238	1052	6.103	0.000	
	U 232	232	73	71.123	0.000	
	U 236	236	75	48.332	0.000	
⌜	U-tot	238	1208	11.516	0.000	
⌞>	U233	233	4742	2.030	0.000	
	U233 IS	233	4742	2.030	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	71.667				ng/L
	U	235	83.667				ng/L
	U	238	1052.394				ng/L
	U 232	232	73.334				ng/L
	U 236	236	74.667				ng/L
⌜	U-tot	238	0.255	**41.079**	6.56	16.0	ng/L
⌞>	U233	233	4741.903				ng/L
	U233 IS	233	4741.903	**107.524**	2.18	2.0	%R

010343

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Saturday, October 29, 2011 00:56:41
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.681
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	58	51.837	0.000	
	U	235	1438	3.200	0.000	
	U	238	184980	0.253	0.000	
	U 232	232	42	54.917	0.000	
	U 236	236	150	14.953	0.000	
⌜	U-tot	238	186476	0.279	0.000	
⌞>	U233	233	4616	1.570	0.000	
	U233 IS	233	4616	1.570	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.334				ng/L
	U	235	1437.780				ng/L
	U	238	184980.362				ng/L
	U 232	232	42.000				ng/L
	U 236	236	150.335				ng/L
⌜	U-tot	238	40.406	**8087.458**	129.08	1.6	ng/L
⌞>	U233	233	4615.838				ng/L
	U233 IS	233	4615.838	**104.666**	1.64	1.6	%R

010344

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Saturday, October 29, 2011 00:59:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.682
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	13.576	0.000	
	U	235	61	25.179	0.000	
	U	238	86	15.726	0.000	
	U 232	232	54	18.239	0.000	
	U 236	236	65	14.368	0.000	
⌜	U-tot	238	208	17.256	0.000	
⌞>	U233	233	4941	0.340	0.000	
	U233 IS	233	4941	0.340	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	61.334				ng/L
	U	235	60.667				ng/L
	U	238	86.334				ng/L
	U 232	232	54.000				ng/L
	U 236	236	64.667				ng/L
⌜	U-tot	238	0.042	**-1.570**	1.46	93.1	ng/L
⌞>	U233	233	4941.009				ng/L
	U233 IS	233	4941.009	**112.039**	0.38	0.3	%R

010345

Quantitative Analysis - Summary Report

Sample ID: 474302d21 df4

Sample Date/Time: Saturday, October 29, 2011 01:01:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d21 df4.683
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	50.014	0.000	
	U	235	1784	2.687	0.000	
	U	238	458032	0.148	0.000	
	U 232	232	120	46.689	0.000	
	U 236	236	121	38.836	0.000	
⌜	U-tot	238	459878	0.149	0.000	
⌞>	U233	233	4696	1.764	0.000	
	U233 IS	233	4696	1.764	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	62.667				ng/L
	U	235	1783.508				ng/L
	U	238	458032.118				ng/L
	U 232	232	120.001				ng/L
	U 236	236	121.334				ng/L
⌜	U-tot	238	97.953	**19620.074**	352.09	1.8	ng/L
⌞>	U233	233	4695.879				ng/L
	U233 IS	233	4695.879	**106.481**	1.88	1.8	%R

010346

Quantitative Analysis - Summary Report

Sample ID: 474302d21d df4

Sample Date/Time: Saturday, October 29, 2011 01:03:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474302d21d df4.684
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	74	28.314	0.000	
	U	235	1740	3.987	0.000	
	U	238	478726	1.217	0.000	
	U 232	232	281	8.659	0.000	
	U 236	236	142	12.946	0.000	
⌈	U-tot	238	480540	1.226	0.000	
⌊>	U233	233	4761	3.604	0.000	
	U233 IS	233	4761	3.604	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	74.000				ng/L
	U	235	1740.167				ng/L
	U	238	478725.934				ng/L
	U 232	232	281.004				ng/L
	U 236	236	141.668				ng/L
⌈	U-tot	238	100.994	**20229.432**	498.30	2.5	ng/L
⌊>	U233	233	4760.914				ng/L
	U233 IS	233	4760.914	**107.956**	3.89	3.6	%R

010347

Quantitative Analysis - Summary Report

Sample ID: 474340d21

Sample Date/Time: Saturday, October 29, 2011 01:05:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d21.685
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	47	26.448	0.000	
	U	235	341	1.617	0.000	
	U	238	81563	0.298	0.000	
	U 232	232	1218	2.375	0.000	
	U 236	236	66	28.015	0.000	
⌜	U-tot	238	81951	0.277	0.000	
⌞>	U233	233	4428	1.443	0.000	
	U233 IS	233	4428	1.443	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	46.667				ng/L
	U	235	340.673				ng/L
	U	238	81563.259				ng/L
	U 232	232	1217.748				ng/L
	U 236	236	66.334				ng/L
⌜	U-tot	238	18.508	**3699.036**	48.91	1.3	ng/L
⌞>	U233	233	4428.412				ng/L
	U233 IS	233	4428.412	**100.416**	1.45	1.4	%R

010348

Quantitative Analysis - Summary Report

Sample ID: 474340d21d

Sample Date/Time: Saturday, October 29, 2011 01:08:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474340d21d.686
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	56	19.869	0.000	
	U	235	334	11.655	0.000	
	U	238	76469	0.566	0.000	
	U 232	232	1030	0.646	0.000	
	U 236	236	65	10.751	0.000	
⌈	U-tot	238	76858	0.626	0.000	
⌊>	U233	233	4186	0.518	0.000	
	U233 IS	233	4186	0.518	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	55.667				ng/L
	U	235	333.673				ng/L
	U	238	76468.939				ng/L
	U 232	232	1030.392				ng/L
	U 236	236	65.334				ng/L
⌈	U-tot	238	18.361	**3669.672**	34.83	0.9	ng/L
⌊>	U233	233	4185.964				ng/L
	U233 IS	233	4185.964	**94.918**	0.49	0.5	%R

010349

Quantitative Analysis - Summary Report

Sample ID: 474341d21 df4

Sample Date/Time: Saturday, October 29, 2011 01:10:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474341d21 df4.687
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	58.052	0.000	
	U	235	1229	5.175	0.000	
	U	238	341542	0.554	0.000	
	U 232	232	287	13.070	0.000	
	U 236	236	107	39.513	0.000	
⌜	U-tot	238	342832	0.575	0.000	
⌞>	U233	233	4436	1.503	0.000	
	U233 IS	233	4436	1.503	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.667				ng/L
	U	235	1229.417				ng/L
	U	238	341542.306				ng/L
	U 232	232	287.338				ng/L
	U 236	236	106.667				ng/L
⌜	U-tot	238	77.294	**15480.019**	248.09	1.6	ng/L
⌞>	U233	233	4436.082				ng/L
	U233 IS	233	4436.082	**100.590**	1.51	1.5	%R

010350

Quantitative Analysis - Summary Report

Sample ID: 474341d21d df4

Sample Date/Time: Saturday, October 29, 2011 01:12:53
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandate\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DateSet\11 Oct 3\474341d21d df4.688
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	53	59.933	0.000	
	U	235	1376	4.365	0.000	
	U	238	384073	0.398	0.000	
	U 232	232	210	24.692	0.000	
	U 236	236	96	18.139	0.000	
⌜	U-tot	238	385502	0.420	0.000	
⌞>	U233	233	4587	1.340	0.000	
	U233 IS	233	4587	1.340	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	52.667				ng/L
	U	235	1376.438				ng/L
	U	238	384072.729				ng/L
	U 232	232	210.336				ng/L
	U 236	236	96.334				ng/L
⌜	U-tot	238	84.056	**16834.997**	236.99	1.4	ng/L
⌞>	U233	233	4586.824				ng/L
	U233 IS	233	4586.824	**104.008**	1.39	1.3	%R

0110351

Quantitative Analysis - Summary Report

Sample ID: 474344d21 df4

Sample Date/Time: Saturday, October 29, 2011 01:15:12
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d21 df4.689
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	34.791	0.000	
	U	235	1086	3.686	0.000	
	U	238	290964	0.391	0.000	
	U 232	232	169	7.095	0.000	
	U 236	236	89	33.103	0.000	
⌈	U-tot	238	292104	0.395	0.000	
⌊>	U233	233	4688	1.890	0.000	
	U233 IS	233	4688	1.890	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.334				ng/L
	U	235	1085.732				ng/L
	U	238	290963.663				ng/L
	U 232	232	169.335				ng/L
	U 236	236	89.000				ng/L
⌈	U-tot	238	62.322	**12479.540**	184.97	1.5	ng/L
⌊>	U233	233	4687.875				ng/L
	U233 IS	233	4687.875	**106.299**	2.01	1.9	%R

010352

Quantitative Analysis - Summary Report

Sample ID: 474344d21d df4

Sample Date/Time: Saturday, October 29, 2011 01:17:31
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474344d21d df4.690
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	56	76.952	0.000	
	U	235	1146	7.189	0.000	
	U	238	310639	0.194	0.000	
	U 232	232	132	41.616	0.000	
	U 236	236	87	55.424	0.000	
⌜	U-tot	238	311842	0.230	0.000	
⌞>	U233	233	4577	2.844	0.000	
	U233 IS	233	4577	2.844	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	56.000				ng/L
	U	235	1146.406				ng/L
	U	238	310639.178				ng/L
	U 232	232	131.668				ng/L
	U 236	236	87.001				ng/L
⌜	U-tot	238	68.161	**13649.714**	383.43	2.8	ng/L
⌞>	U233	233	4577.486				ng/L
	U233 IS	233	4577.486	**103.796**	2.95	2.8	%R

010353

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Saturday, October 29, 2011 01:19:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.691
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	37	98.210	0.000	
	U	235	42	116.525	0.000	
	U	238	81	51.557	0.000	
	U 232	232	40	105.830	0.000	
	U 236	236	35	120.119	0.000	
⌈	U-tot	238	161	79.465	0.000	
⌊>	U233	233	4776	4.306	0.000	
	U233 IS	233	4776	4.306	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	37.333				ng/L
	U	235	42.334				ng/L
	U	238	81.000				ng/L
	U 232	232	40.000				ng/L
	U 236	236	35.333				ng/L
⌈	U-tot	238	0.033	**-3.393**	5.06	149.1	ng/L
⌊>	U233	233	4775.589				ng/L
	U233 IS	233	4775.589	**108.288**	4.66	4.3	%R

010354

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Saturday, October 29, 2011 01:22:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.692
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	65	55.321	0.000	
	U	235	62	48.244	0.000	
	U	238	994	1.088	0.000	
	U 232	232	53	57.497	0.000	
	U 236	236	61	68.488	0.000	
⌜	U-tot	238	1122	6.576	0.000	
⌞>	U233	233	4679	1.050	0.000	
	U233 IS	233	4679	1.050	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	65.334				ng/L
	U	235	62.334				ng/L
	U	238	994.054				ng/L
	U 232	232	53.334				ng/L
	U 236	236	60.667				ng/L
⌜	U-tot	238	0.240	**38.019**	2.89	7.6	ng/L
⌞>	U233	233	4678.537				ng/L
	U233 IS	233	4678.537	**106.088**	1.11	1.0	%R

010355

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Saturday, October 29, 2011 01:24:38
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.693
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	59	60.896	0.000	
	U	235	1426	3.932	0.000	
	U	238	190102	0.040	0.000	
	U 232	232	43	91.564	0.000	
	U 236	238	165	23.303	0.000	
⌈	U-tot	238	191588	0.071	0.000	
⌊>	U233	233	4870	2.856	0.000	
	U233 IS	233	4870	2.856	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	58.667				ng/L
	U	235	1426.445				ng/L
	U	238	190102.407				ng/L
	U 232	232	43.333				ng/L
	U 236	236	165.335				ng/L
⌈	U-tot	238	39.359	**7877.615**	220.13	2.8	ng/L
⌊>	U233	233	4870.305				ng/L
	U233 IS	233	4870.305	**110.436**	3.15	2.9	%R

010356

Quantitative Analysis - Summary Report

Sample ID: ccb
Sample Date/Time: Saturday, October 29, 2011 01:27:02
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.694
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	63.105	0.000	
	U	235	45	79.536	0.000	
	U	238	84	59.861	0.000	
	U 232	232	46	93.171	0.000	
	U 236	236	43	90.981	0.000	
⌈	U-tot	238	178	65.424	0.000	
⌊>	U233	233	4959	0.271	0.000	
	U233 IS	233	4959	0.271	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.667				ng/L
	U	235	45.000				ng/L
	U	238	83.667				ng/L
	U 232	232	45.667				ng/L
	U 236	236	43.333				ng/L
⌈	U-tot	238	0.036	**-2.806**	4.73	168.6	ng/L
⌊>	U233	233	4958.685				ng/L
	U233 IS	233	4958.685	**112.440**	0.30	0.3	%R

010357

Quantitative Analysis - Summary Report

Sample ID: 474401d21 df4

Sample Date/Time: Saturday, October 29, 2011 01:29:24
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d21 df4.695
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	105.660	0.000	
	U	235	1349	5.502	0.000	
	U	238	356394	0.521	0.000	
	U 232	232	125	51.692	0.000	
	U 236	236	85	48.445	0.000	
⌜	U-tot	238	357793	0.489	0.000	
⌞>	U233	233	4717	2.174	0.000	
	U233 IS	233	4717	2.174	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.000				ng/L
	U	235	1349.434				ng/L
	U	238	356393.723				ng/L
	U 232	232	125.334				ng/L
	U 236	236	84.667				ng/L
⌜	U-tot	238	75.876	**15195.864**	391.30	2.6	ng/L
⌞>	U233	233	4717.224				ng/L
	U233 IS	233	4717.224	**106.965**	2.33	2.2	%R

010358

Quantitative Analysis - Summary Report

Sample ID: 474401d21d df4

Sample Date/Time: Saturday, October 29, 2011 01:31:45
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474401d21d df4.696
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	54	73.166	0.000	
	U	235	1317	3.803	0.000	
	U	238	338371	0.398	0.000	
	U 232	232	191	9.697	0.000	
	U 236	236	87	36.548	0.000	
⌈	U-tot	238	339742	0.423	0.000	
⌊>	U233	233	4566	1.955	0.000	
	U233 IS	233	4566	1.955	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	54.000				ng/L
	U	235	1316.762				ng/L
	U	238	338370.895				ng/L
	U 232	232	191.002				ng/L
	U 236	236	87.000				ng/L
⌈	U-tot	238	74.420	**14904.057**	247.73	1.7	ng/L
⌊>	U233	233	4566.147				ng/L
	U233 IS	233	4566.147	**103.539**	2.02	2.0	%R

0110359

Quantitative Analysis - Summary Report

Sample ID: 474402d21 df2

Sample Date/Time: Saturday, October 29, 2011 01:34:05
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d21 df2.697
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	86.198	0.000	
	U	235	1233	4.154	0.000	
	U	238	340879	0.669	0.000	
	U 232	232	285	28.493	0.000	
	U 236	236	88	43.316	0.000	
⌜	U-tot	238	342157	0.682	0.000	
⌞>	U233	233	4487	1.021	0.000	
	U233 IS	233	4487	1.021	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.333				ng/L
	U	235	1233.417				ng/L
	U	238	340879.155				ng/L
	U 232	232	285.338				ng/L
	U 236	236	88.000				ng/L
⌜	U-tot	238	76.250	**15270.759**	94.13	0.6	ng/L
⌞>	U233	233	4487.441				ng/L
	U233 IS	233	4487.441	**101.754**	1.04	1.0	%R

Quantitative Analysis - Summary Report

Sample ID: 474402d21L df10

Sample Date/Time: Saturday, October 29, 2011 01:36:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d21L df10.698
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	82.376	0.000	
	U	235	267	5.751	0.000	
	U	238	69439	0.632	0.000	
	U 232	232	77	20.883	0.000	
	U 236	236	42	74.037	0.000	
⌜	U-tot	238	69748	0.700	0.000	
⌞>	U233	233	4639	2.878	0.000	
	U233 IS	233	4639	2.878	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	42.000				ng/L
	U	235	267.337				ng/L
	U	238	69438.525				ng/L
	U 232	232	76.667				ng/L
	U 236	236	42.333				ng/L
⌜	U-tot	238	15.042	**3004.416**	65.31	2.2	ng/L
⌞>	U233	233	4638.851				ng/L
	U233 IS	233	4638.851	**105.188**	3.03	2.9	%R

010361

Quantitative Analysis - Summary Report

Sample ID: 474402d21D df2

Sample Date/Time: Saturday, October 29, 2011 01:38:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d21D df2.699
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	61	55.296	0.000	
	U	235	1396	5.138	0.000	
	U	238	376152	0.618	0.000	
	U 232	232	978	4.075	0.000	
	U 236	236	113	19.146	0.000	
⌈	U-tot	238	377609	0.590	0.000	
⌊>	U233	233	4593	2.367	0.000	
	U233 IS	233	4593	2.367	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	60.667				ng/L
	U	235	1396.107				ng/L
	U	238	376151.744				ng/L
	U 232	232	978.053				ng/L
	U 236	236	112.667				ng/L
⌈	U-tot	238	82.251	**16473.324**	439.03	2.7	ng/L
⌊>	U233	233	4592.827				ng/L
	U233 IS	233	4592.827	**104.144**	2.47	2.4	%R

010362

Quantitative Analysis - Summary Report

Sample ID: 474402d21AS df2

Sample Date/Time: Saturday, October 29, 2011 01:41:07
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

spiked 20 uL 1° natural uranium @ df 100 (075-Rad-Sol2 (11-064-06) in 10 mL

TU = 20,462 ng/L x df 2 = 40,924 ng

10131111 WS

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\474402d21AS df2.700
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	102	22.589	0.000	
	U	235	4889	2.498	0.000	
	U	238	821038	1.120	0.000	
	U 232	232	305	13.845	0.000	
	U 236	236	121	12.989	0.000	
⌈	U-tot	238	826030	1.115	0.000	
⌊>	U233	233	4590	2.044	0.000	
	U233 IS	233	4590	2.044	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	102.334				ng/L
	U	235	4888.981				ng/L
	U	238	821038.195				ng/L
	U 232	232	305.005				ng/L
	U 236	236	121.001				ng/L
⌈	U-tot	238	180.035	**36069.501**	1015.61	2.8	ng/L
⌊>	U233	233	4589.825				ng/L
	U233 IS	233	4589.825	**104.076**	2.13	2.0	%R

010363

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Saturday, October 29, 2011 01:43:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\zzz.701
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	50	94.226	0.000	
	U	235	53	99.794	0.000	
	U	238	130	39.321	0.000	
	U 232	232	61	84.534	0.000	
	U 236	236	51	100.354	0.000	
⌈	U-tot	238	233	64.623	0.000	
⌊>	U233	233	4540	1.774	0.000	
	U233 IS	233	4540	1.774	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	50.334				ng/L
	U	235	52.667				ng/L
	U	238	130.001				ng/L
	U 232	232	61.000				ng/L
	U 236	236	50.667				ng/L
⌈	U-tot	238	0.051	**0.189**	6.44	3407.7	ng/L
⌊>	U233	233	4540.467				ng/L
	U233 IS	233	4540.467	**102.957**	1.83	1.8	%R

010364

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Saturday, October 29, 2011 01:45:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\critotU.702
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	17.180	0.000	
	U	235	94	15.447	0.000	
	U	238	1018	5.267	0.000	
	U 232	232	82	28.384	0.000	
	U 236	236	85	16.833	0.000	
⌜	U-tot	238	1189	6.601	0.000	
⌞>	U233	233	4677	2.256	0.000	
	U233 IS	233	4677	2.256	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.000				ng/L
	U	235	93.667				ng/L
	U	238	1018.390				ng/L
	U 232	232	81.667				ng/L
	U 236	236	85.334				ng/L
⌜	U-tot	238	0.254	**40.907**	2.39	5.8	ng/L
⌞>	U233	233	4676.536				ng/L
	U233 IS	233	4676.536	**106.042**	2.39	2.3	%R

010365

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Saturday, October 29, 2011 01:48:11
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccv.703
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	77	30.719	0.000	
	U	235	1417	4.921	0.000	
	U	238	183746	0.649	0.000	
	U 232	232	68	34.582	0.000	
	U 236	236	179	12.099	0.000	
⌈	U-tot	238	185241	0.650	0.000	
⌊>	U233	233	4663	0.441	0.000	
	U233 IS	233	4663	0.441	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	77.334				ng/L
	U	235	1417.111				ng/L
	U	238	183746.083				ng/L
	U 232	232	68.000				ng/L
	U 236	236	179.002				ng/L
⌈	U-tot	238	39.731	**7952.109**	75.55	1.0	ng/L
⌊>	U233	233	4662.529				ng/L
	U233 IS	233	4662.529	**105.725**	0.47	0.4	%R

0110366

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Saturday, October 29, 2011 01:50:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Oct 3\ccb.704
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	63	21.548	0.000	
	U	235	72	20.050	0.000	
	U	238	101	24.662	0.000	
	U 232	232	68	43.326	0.000	
	U 236	236	78	36.645	0.000	
⌈	U-tot	238	236	22.229	0.000	
⌊>	U233	233	4758	0.401	0.000	
	U233 IS	233	4758	0.401	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	82.667				ng/L
	U	235	72.334				ng/L
	U	238	100.667				ng/L
	U 232	232	68.000				ng/L
	U 236	236	78.000				ng/L
⌈	U-tot	238	0.050	**-0.088**	2.24	2545.6	ng/L
⌊>	U233	233	4758.245				ng/L
	U233 IS	233	4758.245	**107.895**	0.43	0.4	%R

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010367

☐ 200.8 TAP No. 01-0406-107 Rev 6/Jan 11

☑ 6020 TAP No. 01-0406-046 Rev15/Sep 11

☐ 6020a TAP No. 01-0406-046 Rev15/Sep 11

☐ TAP No. 01-0406-148 Rev 2/Dec 10

☐ Other_____

ANALYSIS

Utotal

IDL Date: 11/10/2011
STD's IV, CCS 1-6 expire 10/1/12
STD's Spex, ME 1-4 expire 9/15/12

ICP-MS CALIB. STD. ID's		TVs
S0	11-099-07	
STD. 1	11-091-04	44933 ng/L
I. STD	02-415-08	0.2ppb
I. STD		

QC STD. ID's

ICV/CCV	11-100-06	7666 ng/L
UCL		
CRI	11-100-07	40 ng/L
ICSA	11-100-04	-
ICSAB	11-100-05	20,444 ng/L

PROJECT#	CLIENT	TO#	DATE	MATRIX	LOGBK PG
16586.05.006	Fluor	110830-12	11/10/11	solid	15/00146 - 15/00150
		110831-5			
		110901-7			
		110902-3			

INSTRUMENT: DRCII FILENAME: 111110.seq

Analyst: M. Seiler Date: 11 / 11 / 11 ☐ CONVERTED (.DAT)

010368

Daily Performance Report

Sample ID: Daily Performance Check
Sample Date/Time: Thursday, November 10, 2011 08:57:44
Sample Description:
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\Daily Performance Check.258
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

11/10/11 NS

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Mg	24.0	8322.3	8322.274	70.479	0.8
	In	114.9	32234.9	32234.920	317.288	1.0
	U	238.1	27782.3	27782.321	90.838	0.3
⌈>	Ce	139.9	29024.0	29023.995	305.898	1.1
⌊	CeO	155.9	1603.8	0.055	0.002	3.3
⌈>	Ba	137.9	255789.6	255789.635	1845.876	0.7
⌊	Ba++	69.0	4456.7	0.017	0.000	1.5
	Bkgd	220.0	0.9	0.867	0.431	49.8
	Bkgd	8.5	38.2	38.233	2.548	6.7

Current Optimization File Data

Current Value	Description
1.02	Nebulizer Gas Flow [NEB]
1.00	Auxiliary Gas Flow
14.25	Plasma Gas Flow
7.50	Lens Voltage
1100.00	ICP RF Power
-1850.00	Analog Stage Voltage
1100.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset Std [QRO]
-11.00	Cell Rod Offset Std [CRO]
70.00	Discriminator Threshold
-17.00	Cell Path Voltage Std [CPV]
0.00	RPa
0.25	RPq
0.90	DRC Mode NEB
-7.50	DRC Mode QRO
-2.00	DRC Mode CRO
-15.00	DRC Mode CPV
0.00	Cell Gas A

11/10/11

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	45	5.0	699.0
Co	59	45	6.3	16217.5
In	115	45	7.0	32112.6

010389

Instrument Mass Calibration Report

File Name: Default.tun
File Path: C:\Elandata\Tuning\Default.tun

11/10/11 NS

Sample ID: Daily Performance Check
Sample Acquistion Date/Time: Thursday, November 10, 2011 08:57:44
Method File: C:\Elandata\Method\Daily Performance.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\Daily Performance Check.258
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 55
Current Dead Time (ns): 55

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
C	12.000	12.025	2776	2022	0.688	
Mg	23.985	24.025	5697	2033	0.671	
Ar2	75.930	75.925	18323	2063	0.687	
In	114.904	114.925	27809	2090	0.694	
Ce	139.905	139.925	33903	2103	0.695	
Pb	207.977	207.975	50478	2148	0.700	
Th	232.038	232.025	56333	2158	0.700	
U	238.050	238.025	57792	2169	0.699	

010370

Quantitative Analysis - Summary Report

Sample ID: S-0

Sample Date/Time: Thursday, November 10, 2011 12:10:40
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\S-0.269
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	9	33.309	0.000	
	U	235	5	40.000	0.000	
	U	238	22	5.329	0.000	
	U 232	232	7	28.386	0.000	
	U 236	236	4	68.635	0.000	
⌜	U-tot	238	35	7.122	0.000	
⌞>	U233	233	4658	2.009	0.000	
	U233 IS	233	4658	2.009	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	8.667				ng/L
	U	235	5.000				ng/L
	U	238	21.667				ng/L
	U 232	232	7.333				ng/L
	U 236	236	3.667				ng/L
⌜	U-tot	238	0.008				ng/L
⌞>	U233	233	4657.860				ng/L
	U233 IS	233	4657.860	**100.000**	2.01	2.0	%R

010371

Quantitative Analysis - Summary Report

Sample ID: S-1

Sample Date/Time: Thursday, November 10, 2011 12:13:04
Sample Description:
Solution Type: Standard
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\S-1.270
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	64	20.499	0.000	
	U	235	7619	2.149	0.000	
	U	238	1017082	0.482	0.000	
	U 232	232	6	16.667	0.000	
	U 236	236	203	6.267	0.000	
⌜	U-tot	238	1024765	0.463	0.000	
⌞>	U233	233	4745	2.968	0.000	
	U233 IS	233	4745	2.968	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	63.667				ng/L
	U	235	7618.859				ng/L
	U	238	1017082.084				ng/L
	U 232	232	6.000				ng/L
	U 236	236	202.669				ng/L
⌜	U-tot	238	216.077	**44933.000**	1287.00	2.9	ng/L
⌞>	U233	233	4745.239				ng/L
	U233 IS	233	4745.239	**101.876**	3.02	3.0	%R

010372

Quantitative Analysis - Summary Report

Sample ID: icv

Sample Date/Time: Thursday, November 10, 2011 12:15:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\icv.271
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	21	23.593	0.000	
	U	235	1336	1.572	0.000	
	U	238	172302	0.325	0.000	
	U 232	232	13	19.868	0.000	
	U 236	236	113	1.770	0.000	
⌈	U-tot	238	173659	0.330	0.000	
⌊>	U233	233	4537	0.809	0.000	
	U233 IS	233	4537	0.809	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	21.333				ng/L
	U	235	1336.098				ng/L
	U	238	172301.512				ng/L
	U 232	232	12.667				ng/L
	U 236	236	113.001				ng/L
⌈	U-tot	238	38.279	**7958.837**	59.44	0.7	ng/L
⌊>	U233	233	4536.798				ng/L
	U233 IS	233	4536.798	**97.401**	0.79	0.8	%R

010373

Quantitative Analysis - Summary Report

Sample ID: icb

Sample Date/Time: Thursday, November 10, 2011 12:17:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\icb.272
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	10	29.863	0.000	
	U	235	10	31.109	0.000	
	U	238	92	6.522	0.000	
	U 232	232	8	36.661	0.000	
	U 236	236	3	88.192	0.000	
⌜	U-tot	238	112	10.527	0.000	
⌞>	U233	233	4558	1.224	0.000	
	U233 IS	233	4558	1.224	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	9.667				ng/L
	U	235	10.333				ng/L
	U	238	92.000				ng/L
	U 232	232	8.333				ng/L
	U 236	236	3.000				ng/L
⌜	U-tot	238	0.025	**3.528**	0.47	13.4	ng/L
⌞>	U233	233	4558.476				ng/L
	U233 IS	233	4558.476	**97.866**	1.20	1.2	%R

010374

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, November 10, 2011 12:20:15
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\critotU.273
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	12	21.571	0.000	
	U	235	15	3.765	0.000	
	U	238	916	2.622	0.000	
	U 232	232	11	24.052	0.000	
	U 236	236	3	17.321	0.000	
⌈	U-tot	238	943	2.761	0.000	
⌊>	U233	233	4584	1.580	0.000	
	U233 IS	233	4584	1.580	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	11.667				ng/L
	U	235	15.333				ng/L
	U	238	915.713				ng/L
	U 232	232	11.000				ng/L
	U 236	236	3.333				ng/L
⌈	U-tot	238	0.206	**41.202**	1.78	4.3	ng/L
⌊>	U233	233	4584.489				ng/L
	U233 IS	233	4584.489	**98.425**	1.56	1.6	%R

010375

Quantitative Analysis - Summary Report

Sample ID: icsa

Sample Date/Time: Thursday, November 10, 2011 12:22:39
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\icsa.274
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	8	30.199	0.000	
	U	235	5	20.000	0.000	
	U	238	129	9.993	0.000	
	U 232	232	334	1.305	0.000	
	U 236	236	1	114.564	0.000	
⌜	U-tot	238	142	7.999	0.000	
⌞>	U233	233	4093	2.338	0.000	
	U233 IS	233	4093	2.338	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	8.333				ng/L
	U	235	5.000				ng/L
	U	238	128.668				ng/L
	U 232	232	334.006				ng/L
	U 236	236	1.333				ng/L
⌜	U-tot	238	0.035	**5.648**	0.73	12.9	ng/L
⌞>	U233	233	4092.588				ng/L
	U233 IS	233	4092.588	**87.864**	2.05	2.3	%R

010376

Quantitative Analysis - Summary Report

Sample ID: icsab

Sample Date/Time: Thursday, November 10, 2011 12:25:04
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\icsab.275
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	44	12.423	0.000	
	U	235	3192	1.918	0.000	
	U	238	420653	0.433	0.000	
	U 232	232	317	7.708	0.000	
	U 236	236	3	45.826	0.000	
⌜	U-tot	238	423889	0.425	0.000	
⌞>	U233	233	4218	4.037	0.000	
	U233 IS	233	4218	4.037	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	44.333				ng/L
	U	235	3192.227				ng/L
	U	238	420652.896				ng/L
	U 232	232	317.006				ng/L
	U 236	236	3.333				ng/L
⌜	U-tot	238	100.598	**20918.505**	798.28	3.8	ng/L
⌞>	U233	233	4217.979				ng/L
	U233 IS	233	4217.979	**90.556**	3.66	4.0	%R

010377

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, November 10, 2011 12:27:27
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\zzz.276
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	19	41.611	0.000	
	U	235	14	32.733	0.000	
	U	238	123	5.752	0.000	
	U 232	232	21	12.599	0.000	
	U 236	236	10	62.217	0.000	
⌜	U-tot	238	156	5.088	0.000	
⌞>	U233	233	4697	0.333	0.000	
	U233 IS	233	4697	0.333	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	18.667				ng/L
	U	235	14.000				ng/L
	U	238	123.334				ng/L
	U 232	232	21.000				ng/L
	U 236	236	10.333				ng/L
⌜	U-tot	238	0.033	**5.328**	0.33	6.2	ng/L
⌞>	U233	233	4697.213				ng/L
	U233 IS	233	4697.213	**100.845**	0.34	0.3	%R

010378

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, November 10, 2011 12:29:49
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccv.277
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	40	12.230	0.000	
	U	235	1339	1.688	0.000	
	U	238	174603	1.483	0.000	
	U 232	232	36	11.111	0.000	
	U 236	236	142	6.454	0.000	
⌈	U-tot	238	175982	1.487	0.000	
⌊>	U233	233	4710	1.214	0.000	
	U233 IS	233	4710	1.214	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	40.333				ng/L
	U	235	1338.765				ng/L
	U	238	174602.692				ng/L
	U 232	232	36.000				ng/L
	U 236	236	142.001				ng/L
⌈	U-tot	238	37.366	**7768.951**	22.19	0.3	ng/L
⌊>	U233	233	4709.553				ng/L
	U233 IS	233	4709.553	**101.110**	1.23	1.2	%R

010379

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, November 10, 2011 12:32:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccb.278
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	43	16.694	0.000	
	U	235	50	15.100	0.000	
	U	238	98	1.767	0.000	
	U 232	232	44	22.939	0.000	
	U 236	236	32	4.824	0.000	
⌜	U-tot	238	191	8.497	0.000	
⌞>	U233	233	4691	1.927	0.000	
	U233 IS	233	4691	1.927	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	43.333				ng/L
	U	235	50.000				ng/L
	U	238	98.001				ng/L
	U 232	232	43.667				ng/L
	U 236	236	31.667				ng/L
⌜	U-tot	238	0.041	**6.906**	0.74	10.6	ng/L
⌞>	U233	233	4691.210				ng/L
	U233 IS	233	4691.210	**100.716**	1.94	1.9	%R

010380

Quantitative Analysis - Summary Report

Sample ID: BlankdX 4/4 (EE) N 11/14/11

Sample Date/Time: Thursday, November 10, 2011 12:44:25
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\BlankdX.279
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	49	7.674	0.000	
	U	235	1892	1.431	0.000	
	U	238	547990	0.532	0.000	
	U 232	232	35	14.803	0.000	
	U 236	236	130	6.572	0.000	
⌜	U-tot	238	549932	0.528	0.000	
⌞>	U233	233	4500	1.051	0.000	
	U233 IS	233	4500	1.051	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	49.333				ng/L
	U	235	1892.197				ng/L
	U	238	547990.190				ng/L
	U 232	232	34.667				ng/L
	U 236	236	130.001				ng/L
⌜	U-tot	238	122.204	**25411.611**	312.74	1.2	ng/L
⌞>	U233	233	4500.447				ng/L
	U233 IS	233	4500.447	**96.620**	1.02	1.1	%R

010381

Quantitative Analysis - Summary Report

Sample ID: 474213dX df4

Sample Date/Time: Thursday, November 10, 2011 12:46:42
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474213dX df4.280
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	24.249	0.000	
	U	235	1277	3.214	0.000	
	U	238	347346	0.266	0.000	
	U 232	232	83	15.741	0.000	
	U 236	236	65	14.032	0.000	
⌈	U-tot	238	348640	0.254	0.000	
⌊>	U233	233	4308	0.895	0.000	
	U233 IS	233	4308	0.895	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.667				ng/L
	U	235	1277.090				ng/L
	U	238	347346.013				ng/L
	U 232	232	82.667				ng/L
	U 236	236	64.667				ng/L
⌈	U-tot	238	80.940	**16830.345**	189.04	1.1	ng/L
⌊>	U233	233	4307.687				ng/L
	U233 IS	233	4307.687	**92.482**	0.83	0.9	%R

010382

Quantitative Analysis - Summary Report

Sample ID: 474213dX df4 D JR 11/17/11

Sample Date/Time: Thursday, November 10, 2011 12:48:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474213dX df4.281
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	17	12.010	0.000	
	U	235	1348	1.820	0.000	
	U	238	366500	0.190	0.000	
	U 232	232	84	18.836	0.000	
	U 236	236	72	8.448	0.000	
⌜	U-tot	238	367866	0.182	0.000	
⌞>	U233	233	4379	1.969	0.000	
	U233 IS	233	4379	1.969	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	17.333				ng/L
	U	235	1348.433				ng/L
	U	238	366500.449				ng/L
	U 232	232	84.334				ng/L
	U 236	236	72.000				ng/L
⌜	U-tot	238	84.034	**17473.921**	353.61	2.0	ng/L
⌞>	U233	233	4378.721				ng/L
	U233 IS	233	4378.721	**94.007**	1.85	2.0	%R

D ✓ JR 11/17/11

010383

Quantitative Analysis - Summary Report

Sample ID: 474214dX

Sample Date/Time: Thursday, November 10, 2011 12:51:17
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474214dX.282
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	32	9.375	0.000	
	U	235	2134	2.054	0.000	
	U	238	552910	0.289	0.000	
	U 232	232	341	2.993	0.000	
	U 236	236	94	8.013	0.000	
⌜	U-tot	238	555075	0.279	0.000	
⌞>	U233	233	3922	1.200	0.000	
	U233 IS	233	3922	1.200	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	32.000				ng/L
	U	235	2133.917				ng/L
	U	238	552909.520				ng/L
	U 232	232	341.340				ng/L
	U 236	236	93.667				ng/L
⌜	U-tot	238	141.560	**29436.684**	362.98	1.2	ng/L
⌞>	U233	233	3921.512				ng/L
	U233 IS	233	3921.512	**84.191**	1.01	1.2	%R

Quantitative Analysis - Summary Report

010384

Sample ID: 474214dXD

Sample Date/Time: Thursday, November 10, 2011 12:53:35
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474214dXD.283
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	29	12.907	0.000	
	U	235	2395	0.364	0.000	
	U	238	601119	0.903	0.000	
	U 232	232	528	5.670	0.000	
	U 236	236	98	10.657	0.000	
⌜	U-tot	238	603543	0.898	0.000	
⌞>	U233	233	4264	2.828	0.000	
	U233 IS	233	4264	2.828	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	29.333				ng/L
	U	235	2395.316				ng/L
	U	238	601118.503				ng/L
	U 232	232	528.349				ng/L
	U 236	236	97.667				ng/L
⌜	U-tot	238	141.622	**29449.529**	774.75	2.6	ng/L
⌞>	U233	233	4263.667				ng/L
	U233 IS	233	4263.667	**91.537**	2.59	2.8	%R

010385

Quantitative Analysis - Summary Report

Sample ID: 474221dX df4

Sample Date/Time: Thursday, November 10, 2011 12:55:54
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swn\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474221dX df4.284
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	19.500	0.000	
	U	235	1168	3.091	0.000	
	U	238	306382	0.779	0.000	
	U 232	232	139	1.815	0.000	
	U 236	236	54	6.968	0.000	
⌈	U-tot	238	307566	0.773	0.000	
⌊>	U233	233	4472	3.672	0.000	
	U233 IS	233	4472	3.672	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.667				ng/L
	U	235	1168.408				ng/L
	U	238	306381.815				ng/L
	U 232	232	138.668				ng/L
	U 236	236	54.333				ng/L
⌈	U-tot	238	68.854	**14317.072**	636.85	4.4	ng/L
⌊>	U233	233	4471.767				ng/L
	U233 IS	233	4471.767	**96.005**	3.53	3.7	%R

010386

Quantitative Analysis - Summary Report

Sample ID: 474221dXD df4

Sample Date/Time: Thursday, November 10, 2011 12:58:13
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474221dXD df4.285
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	19	5.263	0.000	
	U	235	1085	4.314	0.000	
	U	238	290239	0.177	0.000	
	U 232	232	135	13.598	0.000	
	U 236	236	58	5.511	0.000	
⌜	U-tot	238	291343	0.161	0.000	
⌞>	U233	233	4551	2.705	0.000	
	U233 IS	233	4551	2.705	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	19.000				ng/L
	U	235	1085.398				ng/L
	U	238	290238.662				ng/L
	U 232	232	135.001				ng/L
	U 236	236	58.334				ng/L
⌜	U-tot	238	64.053	**13318.572**	375.57	2.8	ng/L
⌞>	U233	233	4550.806				ng/L
	U233 IS	233	4550.806	**97.702**	2.64	2.7	%R

010387

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, November 10, 2011 13:00:34
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\zzz.286
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	9	13.323	0.000	
	U	235	7	37.749	0.000	
	U	238	104	22.052	0.000	
	U 232	232	10	43.589	0.000	
	U 236	236	2	124.900	0.000	
⌜	U-tot	238	120	17.214	0.000	
⌞>	U233	233	4842	0.648	0.000	
	U233 IS	233	4842	0.648	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	8.667				ng/L
	U	235	6.667				ng/L
	U	238	104.334				ng/L
	U 232	232	10.000				ng/L
	U 236	236	1.667				ng/L
⌜	U-tot	238	0.025	**3.565**	0.91	25.5	ng/L
⌞>	U233	233	4841.956				ng/L
	U233 IS	233	4841.956	**103.952**	0.67	0.6	%R

010388

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, November 10, 2011 13:02:56
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\critotU.287
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	10	11.945	0.000	
	U	235	10	30.000	0.000	
	U	238	913	2.640	0.000	
	U 232	232	11	10.189	0.000	
	U 236	236	4	68.635	0.000	
⌈	U-tot	238	933	2.351	0.000	
⌊>	U233	233	4635	1.058	0.000	
	U233 IS	233	4635	1.058	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	9.667				ng/L
	U	235	10.000				ng/L
	U	238	913.379				ng/L
	U 232	232	11.333				ng/L
	U 236	236	3.667				ng/L
⌈	U-tot	238	0.201	**40.299**	1.42	3.5	ng/L
⌊>	U233	233	4634.514				ng/L
	U233 IS	233	4634.514	**99.499**	1.05	1.1	%R

010389

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, November 10, 2011 13:05:19
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccv.288
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	26.357	0.000	
	U	235	1309	1.653	0.000	
	U	238	174121	0.428	0.000	
	U 232	232	8	15.061	0.000	
	U 236	236	109	8.408	0.000	
⌈	U-tot	238	175445	0.433	0.000	
⌊>	U233	233	4670	1.983	0.000	
	U233 IS	233	4670	1.983	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	1309.094				ng/L
	U	238	174121.033				ng/L
	U 232	232	7.667				ng/L
	U 236	236	109.001				ng/L
⌈	U-tot	238	37.582	**7813.757**	187.65	2.4	ng/L
⌊>	U233	233	4669.866				ng/L
	U233 IS	233	4669.866	**100.258**	1.99	2.0	%R

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, November 10, 2011 13:07:44
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccb.289
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	8	19.924	0.000	
	U	235	4	35.251	0.000	
	U	238	48	12.293	0.000	
	U 232	232	12	35.686	0.000	
	U 236	236	2	98.974	0.000	
⌜	U-tot	238	60	14.254	0.000	
⌞>	U233	233	4702	1.347	0.000	
	U233 IS	233	4702	1.347	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	7.667				ng/L
	U	235	4.333				ng/L
	U	238	47.667				ng/L
	U 232	232	11.667				ng/L
	U 236	236	2.333				ng/L
⌜	U-tot	238	0.013	**1.064**	0.41	38.3	ng/L
⌞>	U233	233	4702.216				ng/L
	U233 IS	233	4702.216	**100.952**	1.36	1.3	%R

010391

Quantitative Analysis - Summary Report

Sample ID: 474222dX df4

Sample Date/Time: Thursday, November 10, 2011 13:10:06
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474222dX df4.290
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	12.745	0.000	
	U	235	708	7.160	0.000	
	U	238	191886	0.748	0.000	
	U 232	232	224	12.380	0.000	
	U 236	236	33	10.497	0.000	
⌜	U-tot	238	192610	0.751	0.000	
⌞>	U233	233	4510	1.519	0.000	
	U233 IS	233	4510	1.519	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	16.333				ng/L
	U	235	708.361				ng/L
	U	238	191885.697				ng/L
	U 232	232	224.003				ng/L
	U 236	236	33.000				ng/L
⌜	U-tot	238	42.710	**8880.225**	80.71	0.9	ng/L
⌞>	U233	233	4510.119				ng/L
	U233 IS	233	4510.119	**96.828**	1.47	1.5	%R

010392

Quantitative Analysis - Summary Report

Sample ID: 474222dXD df4

Sample Date/Time: Thursday, November 10, 2011 13:12:26
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474222dXD df4.291
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	13	26.339	0.000	
	U	235	826	3.070	0.000	
	U	238	222970	0.924	0.000	
	U 232	232	304	31.188	0.000	
	U 236	236	41	9.938	0.000	
⌜	U-tot	238	223809	0.929	0.000	
⌞>	U233	233	4456	1.705	0.000	
	U233 IS	233	4456	1.705	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	13.333				ng/L
	U	235	826.038				ng/L
	U	238	222969.709				ng/L
	U 232	232	303.672				ng/L
	U 236	236	40.667				ng/L
⌜	U-tot	238	50.231	**10444.202**	189.59	1.8	ng/L
⌞>	U233	233	4456.426				ng/L
	U233 IS	233	4456.426	**95.675**	1.63	1.7	%R

010393

Quantitative Analysis - Summary Report

Sample ID: 474340dX

Sample Date/Time: Thursday, November 10, 2011 13:14:47
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474340dX.292
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	11	27.273	0.000	
	U	235	280	4.326	0.000	
	U	238	71556	0.837	0.000	
	U 232	232	984	4.092	0.000	
	U 236	236	12	52.755	0.000	
⌈	U-tot	238	71847	0.838	0.000	
⌊>	U233	233	4347	1.812	0.000	
	U233 IS	233	4347	1.812	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	11.000				ng/L
	U	235	279.671				ng/L
	U	238	71556.192				ng/L
	U 232	232	984.053				ng/L
	U 236	236	12.333				ng/L
⌈	U-tot	238	16.530	**3436.012**	49.64	1.4	ng/L
⌊>	U233	233	4347.039				ng/L
	U233 IS	233	4347.039	**93.327**	1.69	1.8	%R

010394

Quantitative Analysis - Summary Report

Sample ID: 474340dXL df5

Sample Date/Time: Thursday, November 10, 2011 13:17:08
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474340dXL df5.293
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	14	4.225	0.000	
	U	235	69	5.020	0.000	
	U	238	15299	0.928	0.000	
	U 232	232	237	5.611	0.000	
	U 236	236	5	21.651	0.000	
⌜	U-tot	238	15381	0.927	0.000	
⌞>	U233	233	4678	2.888	0.000	
	U233 IS	233	4678	2.888	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	13.667				ng/L
	U	235	69.000				ng/L
	U	238	15298.529				ng/L
	U 232	232	236.670				ng/L
	U 236	236	5.333				ng/L
⌜	U-tot	238	3.289	**682.494**	16.08	2.4	ng/L
⌞>	U233	233	4677.871				ng/L
	U233 IS	233	4677.871	**100.430**	2.90	2.9	%R

010395

Quantitative Analysis - Summary Report

Sample ID: 474340dXD

Sample Date/Time: Thursday, November 10, 2011 13:19:30
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474340dXD.294
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	16	14.741	0.000	
	U	235	315	3.849	0.000	
	U	238	76445	0.482	0.000	
	U 232	232	1005	4.481	0.000	
	U 236	236	14	32.733	0.000	
⌈	U-tot	238	76776	0.473	0.000	
⌊>	U233	233	4572	1.782	0.000	
	U233 IS	233	4572	1.782	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.667				ng/L
	U	235	315.005				ng/L
	U	238	76445.407				ng/L
	U 232	232	1005.056				ng/L
	U 236	236	14.000				ng/L
⌈	U-tot	238	16.795	**3490.964**	66.71	1.9	ng/L
⌊>	U233	233	4572.463				ng/L
	U233 IS	233	4572.483	**98.167**	1.75	1.8	%R

010396

Quantitative Analysis - Summary Report

Sample ID: 474340dXAS

Sample Date/Time: Thursday, November 10, 2011 13:21:52
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\474340dXAS.295
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

spiked 20uL 10 natural uranium @ df 100 (075-Rad-S 11-064-06) in 10mL

TV = 20,462 ng/L

11/11/11 NS

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	42	27.276	0.000	
	U	235	3623	2.740	0.000	
	U	238	525920	0.419	0.000	
	U 232	232	1074	11.031	0.000	
	U 236	236	17	20.377	0.000	
⌜	U-tot	238	529585	0.429	0.000	
⌞>	U233	233	4547	1.658	0.000	
	U233 IS	233	4547	1.658	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	42.333				ng/L
	U	235	3623.389				ng/L
	U	238	525919.703				ng/L
	U 232	232	1074.397				ng/L
	U 236	236	17.000				ng/L
⌜	U-tot	238	116.498	**24224.866**	453.67	1.9	ng/L
⌞>	U233	233	4546.804				ng/L
	U233 IS	233	4546.804	**97.616**	1.62	1.7	%R

010397

Quantitative Analysis - Summary Report

Sample ID: zzz

Sample Date/Time: Thursday, November 10, 2011 13:24:14
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\zzz.296
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	11	28.364	0.000	
	U	235	8	33.072	0.000	
	U	238	220	4.336	0.000	
	U 232	232	20	15.025	0.000	
	U 236	236	2	124.900	0.000	
⌜	U-tot	238	239	3.745	0.000	
⌞>	U233	233	4846	3.666	0.000	
	U233 IS	233	4846	3.666	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	11.333				ng/L
	U	235	8.000				ng/L
	U	238	220.003				ng/L
	U 232	232	20.333				ng/L
	U 236	236	1.667				ng/L
⌜	U-tot	238	0.049	**8.692**	0.02	0.2	ng/L
⌞>	U233	233	4846.293				ng/L
	U233 IS	233	4846.293	**104.045**	3.81	3.7	%R

010398

Quantitative Analysis - Summary Report

Sample ID: critotU

Sample Date/Time: Thursday, November 10, 2011 13:26:36
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\critotU.297
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	15	19.924	0.000	
	U	235	16	12.500	0.000	
	U	238	933	2.437	0.000	
	U 232	232	17	17.625	0.000	
	U 236	236	7	34.317	0.000	
⌜	U-tot	238	965	2.330	0.000	
⌞>	U233	233	4836	2.427	0.000	
	U233 IS	233	4836	2.427	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	15.333				ng/L
	U	235	16.000				ng/L
	U	238	933.381				ng/L
	U 232	232	17.333				ng/L
	U 236	236	7.333				ng/L
⌜	U-tot	238	0.199	**39.909**	0.40	1.0	ng/L
⌞>	U233	233	4835.953				ng/L
	U233 IS	233	4835.953	**103.823**	2.52	2.4	%R

610399

Quantitative Analysis - Summary Report

Sample ID: ccv

Sample Date/Time: Thursday, November 10, 2011 13:28:59
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccv.298
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	30	13.623	0.000	
	U	235	1312	2.832	0.000	
	U	238	175785	0.673	0.000	
	U 232	232	19	23.890	0.000	
	U 236	236	126	7.521	0.000	
⌈	U-tot	238	177127	0.647	0.000	
⌊>	U233	233	4650	0.657	0.000	
	U233 IS	233	4650	0.657	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	**Conc. Mean**	Conc. SD	Conc. RSD	Sample Unit
	U	234	29.667				ng/L
	U	235	1312.428				ng/L
	U	238	175784.622				ng/L
	U 232	232	19.333				ng/L
	U 236	236	125.668				ng/L
⌈	U-tot	238	38.096	**7920.815**	60.16	0.8	ng/L
⌊>	U233	233	4649.522				ng/L
	U233 IS	233	4649.522	**99.821**	0.66	0.7	%R

010400

Quantitative Analysis - Summary Report

Sample ID: ccb

Sample Date/Time: Thursday, November 10, 2011 13:31:23
Sample Description:
Solution Type: Sample
Blank File:
Number of Replicates: 3
Peak Processing Mode: Average
Signal Profile Processing Mode: Average
Dual Detector Mode: Dual
Dead Time (ns): 55

Sample File: C:\Elandata\Sample\Fluor_leach_totU_rerun.sam
Method File: C:\Elandata\Method\swri\total u only u233 is.mth
Dataset File: C:\Elandata\DataSet\11 Nov 1\ccb.299
Tuning File: C:\Elandata\Tuning\Default.tun
Optimization File: C:\Elandata\Optimize\Default.dac
Calibration File:
Calibration Type: External Calibration

Summary

Intensities

	Analyte	Mass	Meas. Intens. Mean	Meas. Intens. RSD	Blank Intensity	Blank Intens. RSD
	U	234	39	13.568	0.000	
	U	235	47	10.786	0.000	
	U	238	73	7.579	0.000	
	U 232	232	38	29.667	0.000	
	U 236	236	37	36.564	0.000	
⌈	U-tot	238	158	2.553	0.000	
⌊>	U233	233	4750	1.362	0.000	
	U233 IS	233	4750	1.362	0.000	

Concentration Results

	Analyte	Mass	Net Intens. Mean	Conc. Mean	Conc. SD	Conc. RSD	Sample Unit
	U	234	39.000				ng/L
	U	235	46.667				ng/L
	U	238	72.667				ng/L
	U 232	232	38.333				ng/L
	U 236	236	37.333				ng/L
⌈	U-tot	238	0.033	**5.355**	0.18	3.4	ng/L
⌊>	U233	233	4749.574				ng/L
	U233 IS	233	4749.574	**101.969**	1.39	1.4	%R

010401

Standard Logs and Certificates of Analysis

010402

ERA

A Waters Company

Certificate of Analysis

Lot No. S159-779

PotableWatR™ pH

Catalog No. 779
Issue Date: January 6, 2010
Revision Date: Original

Certification

Parameter	Certified Value [1] (s.u.)	Uncertainty [2]	QC PALs™ [3] (s.u.)	PT PALs™ [4] (s.u.)
pH	7.97	1.6%	7.83 - 8.11	7.77 - 8.17

Analytical Verification

Parameter	Round Robin Data [5] Mean (s.u.)	Recovery (%)	n	NIST Traceability SRM Number	Recovery (%)
pH	7.97	100%	123	SRM 187e	100%

Please see footnotes on back

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 10/05/09
DATE EXPIRED: 03/01/13
DATE OPENED: 07/01/10 SGH
INORG: 8294 PO: PE sample

010403

ERA
A Waters Company

1. The **Certified Value** is the actual "made-to" concentration confirmed by ERA analytical verification.

2. The stated **Uncertainty** is the total propagated uncertainty at the 95% confidence interval. The uncertainty is based on the preparation and internal analytical verification of the product by ERA, multiplied by a coverage factor which is equal to the Student t factor at a 95% confidence interval at n-1 degrees of freedom. The uncertainty applies to the product as supplied and does not take into account any required or optional dilution and/or preparations the laboratory may perform while using this product.

3. The **QC Performance Acceptance Limits (QC PALs™)** are based on actual historical data collected in ERA's Proficiency Testing program. The **QC PALs™** reflect any inherent biases in the methods used to establish the limits and closely approximate a 95% confidence interval of the performance that experienced laboratories should achieve using accepted environmental methods. Use the **QC PALs™** to realistically evaluate your performance against your peers.

4. The **PT Performance Acceptance Limits (PT PALs™)** are calculated using the regression equations and fixed acceptance criteria specified in the NELAC proficiency testing requirements. Use the **PT PALs™** when analyzing this QC standard alongside USEPA and NELAC compliant PT standards. Please note that many PT study acceptance limits are concentration dependent (some non-linearly) and, therefore, the acceptance limits of this QC standard and any PT standard may differ relative to their difference in concentrations.

5. The **Analytical Verification** data include the mean value, percent recovery and number of data points reported by the laboratories in our Proficiency Testing study compared to the Certified Values. In addition, where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed.

Traceability Recovery (%) = [(% recovery certified standard)/(% recovery NIST SRM)]*100

The traceability data shown were compiled by analyzing the ERA standards or their associated stock solutions against the applicable NIST SRMs.

6. This standard **expires 2/2013.** The certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or email to info@eraqc.com.

Certifying Officer: Tom Widera

010404

ERA

A Waters Company

Certificate of Analysis

Lot No. S147-779

PotableWatR™ pH

Catalog No. 779
Issue Date: January 19, 2009
Revision Date: Original

Certification

Parameter	Certified Value [1] (s.u.)	Uncertainty [2]	QC PALs™ [3] (s.u.)	PT PALs™ [4] (s.u.)
pH	7.52	1.0%	7.43 - 7.61	7.32 - 7.72

Analytical Verification

Parameter	Round Robin Data [5] Mean (s.u.)	Recovery (%)	n	NIST Traceability SRM Number	Recovery (%)
pH	7.52	100%	118	SRM 187e	100%

Please see footnotes on back

INORGANIC LABS/RADCHEM LABS
DATE RECEIVED: 01/19/09
DATE EXPIRED: 02/01/2012
DATE OPENED: 07/01/10 JGH
INORG: 8325 PO: 7/19/11 JGH B PE

010405

ERA

A Waters Company

1. The **Certified Value** is the actual "made-to" concentration confirmed by ERA analytical verification.

2. The stated **Uncertainty** is the total propagated uncertainty at the 95% confidence interval. The uncertainty is based on the preparation and internal analytical verification of the product by ERA, times a coverage factor which is equal to the student t factor at a 95% confidence interval at n-1 degrees of freedom.

3. The **QC Performance Acceptance Limits (QC PALs™)** are based on actual historical data collected in ERA's Proficiency Testing program. The **QC PALs™** reflect any inherent biases in the methods used to establish the limits and closely approximate a 95% confidence interval of the performance that experienced laboratories should achieve using accepted environmental methods. Use the **QC PALs™** to realistically evaluate your performance against your peers.

4. The **PT Performance Acceptance Limits (PT PALs™)** are calculated using the regression equations and fixed acceptance criteria specified in the NELAC proficiency testing requirements. Use the **PT PALs™** when analyzing this QC standard alongside USEPA and NELAC compliant PT standards. Please note that many PT study acceptance limits are concentration dependent (some non-linearity) and, therefore, the acceptance limits of this QC standard and any PT standard may differ relative to their difference in concentrations.

5. The **Analytical Verification** data include the mean value, percent recovery and number of data points reported by the laboratories in our Proficiency Testing study compared to the Certified Values. In addition, where NIST Standard Reference Materials (SRMs) are available, each analyte has been analytically traced to the NIST SRM listed.

Traceability Recovery (%) = [(% recovery certified standard)/(% recovery NIST SRM)]*100

The traceability data shown were compiled by analyzing the ERA standards or their associated stock solutions against the applicable NIST SRMs.

6. This standard **expires 2/2012.** The certified values are monitored and purchasers will be notified of any significant changes resulting in recertification or withdrawal of this certified reference material during the period of validity of this certificate.

If you have any questions or need technical assistance, please call ERA technical assistance at 1-800-372-0122 or email to info@eraqc.com.

Certifying Officer: Tom Wildera

010406

BOOK / PAGE 03 0038 Book I.D: 10-0406-017

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard : 034RadSOL3

Vendor(s) : NIST

Radionuclide(s) : Tc99

Source I.D. : SRM4298a
034RadSOL1

Dilution : Secondary

Procedure :

20mL of 034RadSOL1 was diluted to a final volume of 200mL with 2.5% nitric acid (Inorg #9052, exp: 11/2013).

$\frac{20\text{mL} \times 9993.1\ \text{pCi/mL}}{200\text{mL}} = 999.31\ \text{pCi/mL}$

WAN 07/07/11

Final Activity :	999.31 pCi/mL	Reference Date :	08/27/2004
Date Prepared :	07/07/11	Certification Date :	07/08/11
Prepared By :	WAN	Re-Certification Date :	07/08/12
Reviewed By :		Date:	07/11/11

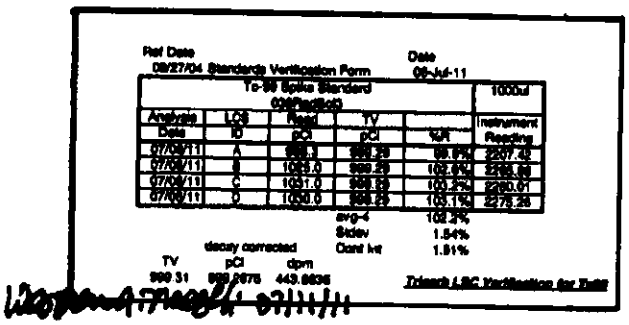
010407

BOOK / PAGE__03 0039_____ Book I.D:_10-0406-017____

Southwest Research Institute®
6220 Culebra Rd.
San Antonio, Texas 78238

Radioactive Standards Log

Standard Verification(s) :



Ref Date
08/27/04 Standards Verification Form
Date
06-Jul-11

Tc-99 Spike Standard
(Calibration)

1000ul

Analysis Date	LOT ID	Ref pCi	TV pCi	%R	Instrument Reading
07/06/11	A	1061.0	999.31	98.9%	2207.48
07/06/11	B	1061.0	999.31	102.6%	2286.88
07/06/11	C	1061.0	999.31	100.2%	2280.01
07/06/11	D	1060.0	999.31	105.1%	2278.25
			avg-4	102.3%	
			Stdev	1.54%	
			Coef Var	1.51%	

decay corrected

TV	pCi	dpm
999.31	999.0976	449.8636

Triloach LSC Verification for Tc99

07/11/11

0110408

For 034-Rad-Soil 01 035

Calculations: 32.61 KBq/g — 09/01/1996
3.261x10⁴ KBq/g = 3.261x10⁴Bq/g x27 =
(dilution) = 8.80470⁵pCi/g x 1.135g
= 9993.3pCi/g 9/1/1996
= 9993.1pCi/g 8/27/2004

Final activity after dilution: 9993.1 pCi/g **Reference Date:** 8/27/04
- 9993 pCi/g Sig Sig2

Comments: Date Correction Decay
Tc-99 T½ = 2.111e⁵y
- 0.5^((8/27/04 − 9/1/1996)/(2.111e5 * 365.25))
= 0.999974 (Decay Correction factor)
= 0.999974 x 9993.3pCi/g

Date Prepared: 8/27/04 **Expires:** 9/01/2006

Prepared By: T. Spain

secondary recert 038RadSol3 07/06/11

Reviewed By: [signature] **Date:** 8-27-2004

secondary recert 012RadSol3 05/20/10 [signature illegible] 06/10/11

Ref Date 08/27/04 Standards Verification Form Date 06-Jan-10

Tc-99 Spike Standard 034-Rad-Sol1 100uL

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
01/06/10	A	978.78	999.29	97.9%	2172.90
01/06/10	B	1000.09	999.29	100.1%	2220.20
01/06/10	C	1004.62	999.29	100.5%	2230.25
01/06/10	D	1002.15	999.29	100.3%	2224.78
			avg-4	99.7%	
			Stdev	1.19%	
			Conf Int	1.17%	

TV 999.31 decay corrected 999.2224 2218.429

Tolerance LBC Verification for Tc99

[signature illegible] 01/13/10

Ref Date 08/27/04 Standards Verification Form Date 06-Jun-11

Tc-99 Spike Standard 034RadSol1 200ul

Analysis Date	LCS ID	Read pCi	TV pCi	%R	Instrument Reading
06/06/11	A	2006.68	1998.58	100.4%	4464.78
06/06/11	B	2007.50	1998.58	100.4%	4458.84
06/06/11	C	2025.85	1998.58	101.4%	4496.94
06/06/11	D	2007.93	1998.58	100.5%	4457.60
			avg-4	100.7%	
			Stdev	0.46%	
			Conf Int	0.45%	

decay corrected
TV 9993.10 pCi 9992.878 dpm 4436.936

Tolerance LBC Verification for Tc99

010409

01 034

Southwest Research Institute
San Antonio, TX 78288-0510

Radioactive Standards Logbook

Solution# 034-Red-Soil

Radionuclide: Tc-99

Vendor name: N.I.S.T
SRM# 4288A
Primary Solution# Inorg # 3082

Dilution#

~~Procedure~~
Procedure:

1) Weighed 6.135g of Tc-99 Inorg #3082 into 125ml Nalgene
2) Added ~50 ml Di H_2O followed by 10mls Conc HNO_3 (c.)
3) Diluted to ~~F.V. Tot~~ 8/27/04, Final weight 105.1g w/ Di H_2O.

Note: 10% HNO_3 in Di H_2O = 105g

010410

National Institute of Standards & Technology

Certificate

Standard Reference Material 4288A
Technetium-99 Radioactivity Standard

DATE RECEIVED: 8/25/98 OK
DATE EXPIRED: Sept 2006
DATE OPENED: 10/1/98 Initial
INITIAL: 3082 PO#: Client Supplied

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1996 (Text only revised November 1997)

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

010411

Recommended Procedure for Opening the SRM Ampoule

1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.

2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.

3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.

4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.

5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.

6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.

7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.

8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.

9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]*.

*Notes and references are on pages 5 and 6.

010412

PROPERTIES OF SRM 4288A
(Certified values are shown in bold type)

Source identification number	**NIST SRM 4288A**		
Physical Properties:			
Source description	**Liquid in flame-sealed NIST borosilicate-glass ampoule**		
Ampoule specifications	**Body outside diameter** **Wall Thickness** **Barium content** **Lead-oxide content** **Other heavy elements**	**(16.5 ± 0.5) mm** **(0.60 ± 0.04) mm** **Less than 2.5%** **Less than 0.02%** **Trace quantities**	
Solution density	**(0.998 ± 0.002) g·mL^{-1} at 21 °C [b]***		
Solution mass	**(4.998 ± 0.002) g [b]**		
Chemical Properties:			
Solution composition	**Chemical Formula**	**Concentration (mol·L^{-1})**	**Mass Fraction (g·g^{-1})**
	H_2O **KOH** **$K^{99}TcO_4$**	**55** **0.001** **0.0005**	**1.00** **0.00006** **0.0001**
Radiological Properties:			
Radionuclide	**Technetium-99**		
Reference time	**1200 EST, 1 September 1996**		
Massic activity of the solution [c]	**32.61 kBq·g^{-1}**		
Relative expanded uncertainty (k=2)	**1.14% [d] [e]**		
Photon-emitting impurities	**None detected [f]**		
Half lives used in the decay corrections	**Cobalt-60: (5.2714 ± 0.0005) a [g]** **Technetium-99: (2.111 ± 0.012) × 10^5 a [g]**		
Measuring instrument	**NIST 4πβ(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.**		

***Notes and references are on pages 5 and 6.**

010413

EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]*

Input Quantity x_i, the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$, the standard uncertainty of x_i (A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$, (%) [h]	Relative Sensitivity Factor, $\lvert\partial y/\partial x_i\rvert \cdot (x_i/y)$ [i]	Relative Uncertainty Of Output Quantity, $u_i(y)/y$, (%) [j]
Extrapolated massic liquid-scintillation count rate of the Tc-99 solution, corrected for background, Co-60 tracer count rate, and decay.	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	0.10	1.0	0.10
Half life of Co-60 Half life of Tc-99	Standard uncertainty of the half life (A)	0.01 [k] 0.6 [k]	0.01 [m] 0.000005	0.0001 0.000003
Decay scheme data	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Estimated (B)	0.40	1.0	0.40
Calibration of the Co-60 tracer solution using the $4\pi\beta$(LS)-γ-anticoincidence counting system	Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live time [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.00004	0.004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$, (%)				0.57
Coverage Factor, k				x 2.
Relative Expanded Uncertainty of the Output Quantity, U/y, (%)				1.14

*Notes and references are on pages 5 and 6.

NOTES

[a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.

Distance from Ampoule (cm):	1	30	100
Approximate Dose Rate (μSv/h):	<0.1		(Not detectable)

[b] The stated uncertainty is two times the standard uncertainty.

[c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].

[d] The reported value, y, of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \ldots x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.

The value, x_i, used for each input quantity i has a standard uncertainty, $u(x_i)$, that generates a corresponding uncertainty in y, $u_i(y) = |\partial y/\partial x_i| \cdot u(x_i)$, called a component of combined standard uncertainty of y.

The combined standard uncertainty of y, $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.

The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U, the expanded uncertainty of y.

Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.

For further information on the expression of uncertainties, see references [2] and [3].

[e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).

[f] Estimated limits of detection for photon-emitting impurities are:
2×10^{-4} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 20 and 85 keV,
2×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 93 and 503 keV,
1×10^{-5} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 519 and 1457 keV, and
5×10^{-6} $\gamma \cdot s^{-1} \cdot g^{-1}$ for energies between 1465 and 3250 keV.

[g] The stated uncertainty is the standard uncertainty. See reference [5].

010415

[h] Relative standard uncertainty of the input quantity x_i.

[i] The relative change in the output quantity y divided by the relative change in the input quantity x_i. If $|\partial y/\partial x_i| \cdot (x_i/y) = 1.0$, then a 1% change in x_i results in a 1% change in y. If $|\partial y/\partial x_i| \cdot (x_i/y) = 0.05$, then a 1% change in x_i results in a 0.05% change in y.

[j] Relative component of combined standard uncertainty of output quantity y, rounded to two significant figures or less. The relative component of combined standard uncertainty of y is given by $u_i(y)/y = |\partial y/\partial x_i| \cdot u(x_i)/y = |\partial y/\partial x_i| \cdot (x_i/y) \cdot u(x_i)/x_i$. The numerical values of $u(x_i)/x_i$, $|\partial y/\partial x_i| \cdot (x_i/y)$, and $u_i(y)/y$, all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.

[k] The relative standard uncertainty of $\lambda \cdot t$ is determined by the relative standard uncertainty of λ (i.e., of the half life). The relative standard uncertainty of t is negligible.

[m] $|\partial y/\partial x_i| \cdot (x_i/y) = |\lambda \cdot t|$, multiplied by other sensitivity factors where appropriate.

[n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.

[p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e. $u(x_i)/x_i = 100\%$. $|\partial y/\partial x_i| \cdot (x_i/y) = \{$(response per Bq of impurity)/(response per Bq of Tc-99)$\} \cdot \{$(Bq of impurity)/(Bq of Tc-99)$\}$. Thus $u_i(y)/y$ is the relative change in y if the impurity were present with a mass activity equal to the estimated limit of detection.

REFERENCES

[1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.

[2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)

[3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, U.S.A.

[4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.

[5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

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MINERALOGY REPORT FOR FLUOR-B&W PORTSMOUTH LLC
PREPARED BY SOUTHWEST RESEARCH INSTITUTE
SWRI PROJECT #: 16526.05.00X

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Mineralogy Report

Analytical Report
Southwest Research Institute

Prepared by
Mike Dammann
Radonna Spies

Prepared for
Fluor-B&W Portsmouth LLC
SOW FXP02234L04

SwRI Project #: 16526.05.00X
SwRI TO#s: 111109-3 and 111213-14

INTRODUCTION

Four soil (SO) and six bedrock (BR) samples received under SOW FXP02234L04 were selected for additional analyses defined in Fluor Change Order No. 5, 6 and 7. Upon receipt, the samples were initially logged into SwRI's Laboratory Information Management System (LIMS) and were assigned to multiple sample receipt reports (SRR). The additional tests were assigned to two task orders (TO). Table 1 contains the sample information.

Table 1 Sample Information

SwRI System ID	Customer Sample ID	Date Received	SRR No.	TO No.	Matrix
473043	WDSB21-07-19.5	08/12/2011	45412	111213-14	SO
473757	WDSB02-07-24.5	08/25/2011	45511	111109-3	SO
474302	WDSB29-07-4.5	08/31/2011	45562	111109-3	SO
474340	WDSB31-07-2.0	09/01/2011	45570	111213-14	SO
475582	WDMW03B-07-BE10	09/13/2011	45629	111109-3	BR
475583	WDMW03B-07-CU10	09/13/2011	45629	111109-3	BR
475584	WDMW03B-07-SU10	09/13/2011	45629	111109-3	BR
475304	WDMW04B-07-BE10	09/20/2011	45690	111109-3	BR
475305	WDMW04B-07-CU10	09/20/2011	45690	111109-3	BR
475306	WDMW04B-07-SU10	09/20/2011	45690	111109-3	BR

EXPERIMENTAL

Whole Rock including LOI Majors

The samples were readied for analysis using three techniques. The first technique was a closed vessel digestion using concentrated nitric, hydrochloric and hydrofluoric acids (Prep Method "Rock"). Boron was reported from this digestion. The second technique was a lithium metaborate/tetraborate fusion (Prep Method "80/20 Fusion"). Aluminum, barium, calcium, chromium, iron, magnesium, manganese, silicon, titanium, vanadium (for samples on SwRI Task Order 111213-14), and zirconium were reported from this fusion technique. Some of the resulting fusion solutions contained residue. The residues were separated, dried, and fused with a mixture of lithium metaborate/tetraborate. Both preps were analyzed. Zirconium was detected in the initial 80/20 Fusion preps and in the 80/20 Fusion residue preps for one or more of the samples. Therefore, those reported results are the combinations (or sums) of the results obtained from both preps, and are identified as "Combined" in the Prep Method and Date Analyzed columns of the Sample Analysis Data Sheets. The third technique (Prep Method "Teflon") was performed using concentrated nitric, perchloric, hydrofluoric and hydrochloric acids in an open vessel. The resulting digestates contained residue. The residues were separated, dried, and fused with a lithium metaborate/tetraborate mixture. Both preps were analyzed. The remaining metals (plus vanadium for samples on SwRI Task Order 111109-3) were reported from either the Teflon digestion only or the combination of the two. Lanthanum, molybdenum, nickel, phosphorus, potassium, sodium, strontium, vanadium, yttrium, and zinc were detected in both the Teflon

digestates and the Teflon residue fusions for one or more of the samples. Therefore, those reported results are the combinations (or sums) of the results obtained from both preps, and are identified as "Combined" in the Prep Method and Date Analyzed columns of the Sample Analysis Data Sheets which are located in Appendix A.

TIC/TOC (SW 846 9060M)

The samples were analyzed for total organic carbon (TOC) and total inorganic carbon (TIC) using a carbon analyzer following a modified SW 846 Method 9060. The analyzer combusts the sample in an oxygen atmosphere and converts the carbon to CO2 which is detected by non-dispersive infrared (NDIR). Initially, the sample is for total carbon (TC), which includes both TIC and TOC. Another fraction of the sample is treated with sulfurous acid to remove the TIC present and combusted to determine the amount of TOC. The amount of TIC is then determined by subtracting the TOC result from the TC result. Results can be found on the Sample Analysis Data Sheets in Appendix B.

Bulk Density and Particle Density

The bulk density and particle density were only determined on the four soil samples (SO). The Fluor project manager concurred that the bulk density and the particle density of the bedrocks could be calculated from the core data obtained during the sampling activities. The bulk density of the samples was determined from a direct mass per volume ratio using MOSA Chapter 13 as guidance, and the particle density was determined using the Pycnometer method as described in Chapter 14. Results can be found on the Sample Analysis Data Sheets in Appendix B.

Surface area

The surface area was determined using an automated analyzer utilizing the volumetric nitrogen sorption technique (BET) described in MOSA Chapter 16. Two of the bedrock sample appeared to be oil shale and had to be heated to 600 ^{o}C for several hours prior to the surface area analysis. Results can be found on the Sample Analysis Data Sheets in Appendix B.

Particle size

Particle size analysis was only conducted on the four soil samples (SO). The Fluor project manager concurred that particle size was not applicable to the bedrocks since they were received as core samples. Particle size analysis was performed using a laser diffraction particle size analyzer according to ASTM B822 *Standard Test Method for Particle Size Distribution of Metal Powders and Related Compounds by Light Scattering.* Due to the maximum particle size limitation of the instrument, the samples were sieved prior to the instrumental analysis. The sieves used were: 3/8 in, No. 4, No. 10 and No. 20 which correspond to 9525, 4750, 2000 and 850 micron. The fraction passing the No. 20 sieve was then analyzed by laser diffraction. The results from the particle size analyzer were corrected for the fraction passing the No. 20 and combined with the weight retained on each sieve to construct the particle size distribution graphs located in Appendix C.

Clay Mineralogy

Clay minerals were determined via X-ray diffraction (XRD) according to *Methods of Soil Analysis* (MOSA) Chapter 12. The samples were pretreated according to Chapter 5 to remove soluble salts, carbonates, organic matter, and free iron oxides prior to particle size separation. The clay fraction (<2 μm) was separated using the centrifugation. The clay fractions were exchange-saturated with magnesium (Mg) and potassium (K) prior to preparing glass plate oriented aggregate mounts for XRD analysis. To further aid in the identifications, the Mg-saturated clays were solvated with glycerol and the K-saturated mounts were heated to 550 ^{o}C for 2 hours then submitted for additional XRD analysis. In the Mg-saturated mounts, most of the samples showed peaks at d-spacings of approximately 14, 10 and 7.2 angstroms. These peaks correspond to Smectite, Vermiculite, Chlorite, Mica, Halloysite, Metahalloysite and Serpentine. Using the XRD criteria found in Table 12-1 and Figure 12-5 in MOSA Chapter 12, the process of elimination based on the d-spacing in the Mg-saturated mount in conjunction to the presence/absence or shifting of the peak in the Mg-saturated glycerol solvated, K-saturated, and heated K-saturated mounts was used to identify the clays present.

The peak at a d-spacing of 14 angstroms in the Mg saturated mount could be caused by Chlorite, Vermiculite, or Smectite. If the peak is due to Smectite, the peak shifts to 18 angstroms in the glycerol solvated Mg-saturated mount and 12 angstroms in the K-saturated mount. If the peak is due to Chlorite, it will neither shift in the Mg and K-saturated mounts. Lastly, the Vermiculite will not shift in the Mg-saturated mount but will shift to 10 angstroms in the K-saturated mount. The peak at a d-spacing of 10 angstroms in the Mg saturated mount could be caused by Halloysite or Mica (Illite). Halloysite is eliminated from consideration when the peak in the glycerol solvated Mg-saturated sample does not shift and the peak is still present in the K-saturated, 550^{o} C heated sample, indicative of Mica (Illite). The third diagnostic peak in the 7.1-7.5 angstrom region in the Mg-saturated mount could be caused by Serpentine, Kaolinite, Metahalloysite, or a second order peak from Chlorite. Metahalloysite is eliminated by the close agreement of the d-spacing to Kaolinite at 7.15 angstroms not closer to 7.5 angstroms for Metahalloysite in the Mg-saturated, glycerol solvated Mg and K-saturated sample mounts. Serpentine and Chlorite are eliminated from consideration by the fact that the peak disappears in the potassium saturated, 550^{o} C heated sample, indicative of Kaolinite not Serpentine or second order Chlorite.

Relative abundances of the identified clay minerals were calculated using the ratio of their respective peak heights from the Mg-saturated oriented mounts. Table 2 contains the approximate relative composition of each clay mineral. The individual oriented mount XRD patterns can be found in Appendix D.

Petrology (XRD/XRF/Microscopy)

To aid in the petrographic description of the samples, several techniques were used including: x-ray diffraction (XRD), energy dispersive spectrometry x-ray fluorescence (EDS-XRF) using a scanning electron microscope (SEM) and optical microscopy.

The bulk elemental composition of the samples was determined by EDS-XRF. The analysis limited to the first 10 to 100 micron depth of the material. The XRF only quantitates elements of

atomic numbers greater than 11 (sodium and higher) and is normalized to 100% on a weight basis. The energy dispersive spectra with the quantitation table for each sample are located in Appendix E.

Bulk minerals and silt fraction minerals (5-200 μm) were determined via random mount x-ray diffraction (XRD). A small amount of each sample was carefully ground to a nominal 100-mesh particle size and analyzed utilizing a random mount orientation. The XRD spectrum obtained for each sample and XRD library pattern matches for the material are presented in Appendices F and G for the bulk sample and silt fractions, respectively. Table 2 contains approximate mineral composition of each fraction.

A petrographic microscope was used for the examination of the minerals present in the sand and silt fractions of each sample using MOSA Chapter 8 as guidance. The sand fraction consisted of particles greater than 200 mesh (74 micron) and the silt fraction consisted of the particles from 5 to 74 micron. Although the sample was fractionated into the sand and the silt, each fraction contained agglomerations of smaller particles. The grains were mounted onto glass slides using Canada Balsam and examined under crossed polarized light. A gypsum compensator plate was also inserted to aid in the identification. See Appendix H for the photomicrographs of the samples and Table 3 for a table of the primary minerals identified.

Table 2 Approximate Composition of Bulk, Silt and Clay Fractions

SwRI ID	Customer ID	Approximate Composition		
		Bulk	Silt	Clay
473757	WDSB02-07-24.5	93% Quartz 5% Siderite (Calcite) 2% Feldspar	90% Quartz 4% Feldspar 2% Mica 2% Siderite (Calcite) 2% Pyrope	68% Mica 27% Metahalloysite 3% Chlorite 2% Vermiculite
474302	WDSB29-07-4.5	87% Quartz 5% Mica 4% Feldspar 2% Zeolite 2% Smectite	89% Quartz 5% Mica 4% Feldspar 2% Pyrope (Garnet) trace of Siderite (Calcite)	64% Mica 36% Metahalloysite
475304	WDMW04B-07-BE10	94% Quartz 4% Feldspar 2% Dolomite mineral	93% Quartz 7% Feldspar trace Pyrope	53% Metahalloysite 45% Mica 2% Vermiculite
475305	WDMW04B-07-CU10	82% Quartz 10% Siderite (Calcite) 4% Mica 2% Zeolite 2% Kaolinite	94% Quartz 2% Feldspar 2% Pyrope 2% Siderite (Calcite) trace Mica	58% Mica 38% Metahalloysite 3% Chlorite 1% Vermiculite
475306	WDMW04B-07-SU10	79% Quartz 10% Feldspar 7% Mica 2% Pyrite 2% Chlorite	91% Quartz 5% Mica 4% Feldspar trace Pyrope	88% Mica 11% Metahalloysite 2% Vermiculite
475582	WDMW03B-07-BE10	94% Quartz 4% Feldspar 2% Dolomite mineral	96% Quartz 4% Feldspar trace Diopside	54% Mica 31% Metahalloysite 12% Serpentine
475583	WDMW03B-07-CU10	94% Quartz 4% Mica 2% Feldspar 2% Chlorite	92% Quartz 4% Feldspar 2% Mica 2% Serpentine trace Pyrope and Siderite	59% Mica 39% Metahalloysite 2% Vermiculite
475584	WDMW03B-07-SU10	92% Quartz 4% Mica 2% Feldspar 2% Pyrite	86% Quartz 5% Mica 5% Pyrope 4% Feldspar trace Kaliophilite	89% Mica 11% Metahalloysite
473043	WDSB21-07-19.5	93% Quartz 5% Mica 2% Feldspar	94% Quartz 2% Mica 2% Feldspar 2% Pyrope	96% Mica 4% Metahalloysite
474340	WDSB31-07-2.0	94% Quartz 4% Feldspar 2% Mica	92% Quartz 4% Feldspar 2% Mica 2% Pyrope	57% Mica 36% Metahalloysite 7% Vermiculite

Table 3 Petrographic Description from Microscopic Evaluation

Customer ID	Sand Fraction	Silt Fraction
WDSB02-07-24.5	Predominately quartz with 5-10% of a carbonate mineral (high birefringence). Agglomeration of irregular shaped quartz. Brown material coating agglomerates appear to be organic matter, however does not appear to be the "cement" in the agglomerated quartz.	Primarily quartz. Small amount of carbonate mineral (high birefringence). Also, some organic material coating particles and small agglomerates.
WDSB29-07-4.5	Primarily quartz with a small amount of garnet (pyrope)	Primarily small or irregular shaped quartz with a small amount of garnet (pyrope)
WDMW04B-07-BE10	Primarily large particle of smoother quartz, small amount of carbonate mineral.	Primarily large particle of smoother quartz with carbonate mineral.
WDMW04B-07-CU10	Mainly quartz. Some larger agglomerates made up of fine quartz particles. Organic materials coating some particles and agglomerates. Organic material also appears to be the binder in the agglomerates. Small amount of pyrope (isotropic) and carbonate mineral.	Primarily quartz. Small amount of pyrope (isotropic).
WDMW04B-07-SU10	Mainly Quartz. Large agglomerations of fine particles cemented with organic material.	Again, agglomeration of fine particles cemented with organic material. Bulk of particles is quartz but other material appears to be micas.
WDMW03B-07-BE10	Mainly quartz. Moderate amount of large flat carbonate minerals.	Primarily quartz with a small amount of a carbonate mineral.
WDMW03B-07-CU10	Mainly fine quartz particles with large agglomerates covered in organic material. Organic material appears to "glue" agglomerates	Predominately quartz with some agglomerates with an organic binder material
WDMW03B-07-SU10	Irregular shaped quartz with a significant amount of organic material binding agglomerates together.	Irregular shaped quartz. Also, a significant amount of agglomerates "cemented" by organic material.
WDSB31-07-2	Irregular shaped quartz. Flat plates of agglomerated quartz.	Irregular shaped quartz. Moderate amount of mica.
WDSB21-07-19.5	Mainly irregular shaped quartz and agglomerates of quartz particles.	Primarily quartz.

Appendix A
Metals Results

Client: Fluor - B&W Portsmouth LLC
SDG: 473757
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 111109-3, 111213-14

METALS ANALYSIS

The samples were readied for analysis using three techniques. The first technique was a closed vessel digestion using concentrated nitric, hydrochloric and hydrofluoric acids (Prep Method "Rock"). Boron was reported from this digestion.

The second technique was a lithium metaborate/tetraborate fusion (Prep Method "80/20 Fusion"). Aluminum, barium, calcium, chromium, iron, magnesium, manganese, silicon, titanium, vanadium (for samples on SwRI Task Order 111213-14), and zirconium were reported from this fusion technique. Some of the resulting fusion solutions contained residue. The residues were separated, dried, and fused with a mixture of lithium metaborate/tetraborate. Both preps were analyzed. Zirconium was detected in the initial 80/20 Fusion preps and in the 80/20 Fusion residue preps for one or more of the samples. Therefore, those reported results are the combinations (or sums) of the results obtained from both preps, and are identified as "Combined" in the Prep Method and Date Analyzed columns of the Sample Analysis Data Sheets.

The third technique (Prep Method "Teflon") was performed using concentrated nitric, perchloric, hydrofluoric and hydrochloric acids in an open vessel. The resulting digestates contained residue. The residues were separated, dried, and fused with a lithium metaborate/tetraborate mixture. Both preps were analyzed. The remaining metals (plus vanadium for samples on SwRI Task Order 111109-3) were reported from either the Teflon digestion only or the combination of the two. Lanthanum, molybdenum, nickel, phosphorus, potassium, sodium, strontium, vanadium, yttrium, and zinc were detected in both the Teflon digestates and the Teflon residue fusions for one or more of the samples. Therefore, those reported results are the combinations (or sums) of the results obtained from both preps, and are identified as "Combined" in the Prep Method and Date Analyzed columns of the Sample Analysis Data Sheets.

All analytes were determined by ICP SW-846 Method 6010B. Also, any analyte sample concentration greater than 0.05% was converted and reported as an oxide. Loss on ignition (LOI) at 1000°C was determined. The reported "SUM" was calculated by adding any oxide concentrations and the LOI.

All instrument QC criteria were met. The percent recoveries were within 90-110% for the initial and continuing calibration verifications. No analytes were detected above SwRI's reporting limits in the initial and continuing calibration blanks. The CRDL standard recoveries for the spiked analytes were within 50-150%. The percent recoveries for the spiked analytes in the interference check samples ICSAB were within 80-120%.

Description of "Qualifier": "U" indicates that an analyte was not detected above SwRI's reporting limit. "N" indicates that the matrix spike and/or matrix spike duplicate recovery was not within 75-125%.

No analytes were detected in the Prep Blanks above SwRI's reporting limits. Two solid laboratory control samples (NIST SRM 278 Obsidian Rock and NIST SRM 688 Basalt Rock) were utilized

Client: Fluor - B&W Portsmouth LLC
SDG: 473757
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 111109-3, 111213-14

during the sample preparation techniques. The recoveries were within 80-120% for analytes with certified values with the exceptions of potassium (for Lab Control 2 – SRM 278 and Lab Control 8 – SRM 278), and lead (for Lab Control 3 – SRM 278). Please note that the lead SRM certified value is not greater than 10 times the reporting limit for Pb in the associated prep. For potassium, both SRM 278 Lab Controls were prepared with Teflon residue fusion batches. Since the residues are fused in their entirety, none remained to re-prepare. Aqueous laboratory control samples (Sample IDs: Lab Control, Lab Control 2, Lab Control 3) were also digested during the "Teflon" Prep Methods. The recoveries were within 80-120% for the spiked analytes.

SwRI system id 475584 was QC'd. The duplicate RPDs were less than 20%. Due to the nature of the sample preparation techniques utilized, matrix spikes were prepared during the "Teflon" Prep Methods only. The results are "N" flagged for arsenic, beryllium, cadmium, lead, selenium, silver, sodium, and zinc due to the MS and/or MSD recoveries not being within 75-125%. The MS/MSD recoveries were not within 75-125% for potassium and vanadium. However, the original sample results were greater than 4 times the spike added amounts, and are therefore not "N" flagged for K and V. Analytical spikes were performed and reported. The recoveries were within 75-125% for the spiked analytes.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Manager
Group Leader

10/2/12
Date

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB02-07-24.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 08/25/11

Task Order #: 111109-3

SRR #: 45511

Lab System ID: 473757

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	37200		471	Al2O	7.025%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	7.33	U	7.33			Teflon	ICP 6010B	11/30/11
Arsenic	14.7	N	0.489			Teflon	ICP 6010B	11/30/11
Barium	293		47.1	BaO	0.0327%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	1.08	N	0.244			Teflon	ICP 6010B	11/30/11
Bismuth	9.77	U	9.77			Teflon	ICP 6010B	11/30/11
Boron	307	U	307			Rock	ICP 6010B	12/01/11
Cadmium	1.54	N	0.244			Teflon	ICP 6010B	11/30/11
Calcium	5960		471	CaO	0.835%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	54.3		36.5			80/20 Fusion	ICP 6010B	12/02/11
Cobalt	15.7		2.44			Teflon	ICP 6010B	11/30/11
Copper	16.8		2.44			Teflon	ICP 6010B	11/30/11
Iron	89200		471	Fe2O3	12.749%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	21.9		2.69			Combined	ICP 6010B	Combined
Lead	19.8	N	0.489			Teflon	ICP 6010B	11/30/11
Lithium	24.5		0.489			Teflon	ICP 6010B	11/30/11
Magnesium	3130		471	MgO	0.520%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	1530		47.1	MnO	0.198%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	7.96		0.244			Teflon	ICP 6010B	11/30/11
Nickel	40.5		2.69			Combined	ICP 6010B	Combined
Palladium	12.2	U	12.2			Teflon	ICP 6010B	11/30/11
Phosphorus	237		9.77	P2O5	0.0544%	Teflon	ICP 6010B	11/30/11
Potassium	11700		440	K2O	1.409%	Combined	ICP 6010B	Combined
Selenium	2.02	N	0.489			Teflon	ICP 6010B	11/30/11
Silicon	311000		1890	SiO2	66.515%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.489	UN	0.489			Teflon	ICP 6010B	11/30/11
Sodium	1870	N	366	Na2O	0.252%	Combined	ICP 6010B	Combined
Strontium	40.0		2.69			Combined	ICP 6010B	Combined
Sulfur	3080		12.2			Teflon	ICP 6010B	11/30/11
Thallium	12.2	U	12.2			Teflon	ICP 6010B	11/30/11
Thorium	24.4	U	24.4			Teflon	ICP 6010B	11/30/11
Tin	4.89	U	4.89			Teflon	ICP 6010B	11/30/11
Titanium	3250		47.1	TiO2	0.541%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	1.59		0.489			Teflon	ICP 6010B	11/30/11
Uranium	48.9	U	48.9			Teflon	ICP 6010B	11/30/11
Vanadium	96.8		7.33	V2O5	0.0173%	Combined	ICP 6010B	Combined
Yttrium	20.0		2.69			Combined	ICP 6010B	Combined
Zinc	110	N	0.489			Teflon	ICP 6010B	11/30/11
Zirconium	285		36.5	ZrO2	0.0385%	80/20 Fusion	ICP 6010B	12/02/11
LOI @ 1000°C	10.08%			SUM	100.27%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB29-07-4.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 08/31/11

Task Order #: 111109-3

SRR #: 45562

Lab System ID: 474302

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	85200		4510	Al2O3	16.102%	80/20 Fusion	ICP 6010B	02/09/12
Antimony	7.43	U	7.43			Teflon	ICP 6010B	11/30/11
Arsenic	23.6	N	0.495			Teflon	ICP 6010B	11/30/11
Barium	553		45.1	BaO	0.0618%	80/20 Fusion	ICP 6010B	02/09/12
Beryllium	2.32	N	0.248			Teflon	ICP 6010B	11/30/11
Bismuth	9.91	U	9.91			Teflon	ICP 6010B	11/30/11
Boron	394	U	394			Rock	ICP 6010B	12/01/11
Cadmium	0.248	UN	0.248			Teflon	ICP 6010B	11/30/11
Calcium	1160		451	CaO	0.162%	80/20 Fusion	ICP 6010B	02/09/12
Chromium	86.1		48.2			80/20 Fusion	ICP 6010B	12/02/11
Cobalt	17.0		2.48			Teflon	ICP 6010B	11/30/11
Copper	24.4		2.48			Teflon	ICP 6010B	11/30/11
Iron	39100		451	Fe2O3	5.593%	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum	32.6		0.248			Teflon	ICP 6010B	11/30/11
Lead	17.7	N	0.495			Teflon	ICP 6010B	11/30/11
Lithium	124		0.495			Teflon	ICP 6010B	11/30/11
Magnesium	5370		451	MgO	0.891%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	293		45.1	MnO	0.0378%	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	0.248	U	0.248			Teflon	ICP 6010B	11/30/11
Nickel	44.9		2.72			Combined	ICP 6010B	Combined
Palladium	12.4	U	12.4			Teflon	ICP 6010B	11/30/11
Phosphorus	233		9.91	P2O5	0.0535%	Teflon	ICP 6010B	11/30/11
Potassium	27000		446	K2O	3.250%	Combined	ICP 6010B	Combined
Selenium	0.978	N	0.495			Teflon	ICP 6010B	11/30/11
Silicon	256000		1810	SiO2	54.778%	80/20 Fusion	ICP 6010B	02/09/12
Silver	0.495	UN	0.495			Teflon	ICP 6010B	11/30/11
Sodium	2700	N	372	Na2O	0.364%	Combined	ICP 6010B	Combined
Strontium	79.2		2.72			Combined	ICP 6010B	Combined
Sulfur	47.6		12.4			Teflon	ICP 6010B	11/30/11
Thallium	12.4	U	12.4			Teflon	ICP 6010B	11/30/11
Thorium	24.8	U	24.8			Teflon	ICP 6010B	11/30/11
Tin	4.95	U	4.95			Teflon	ICP 6010B	11/30/11
Titanium	5100		45.1	TiO2	0.850%	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	0.790		0.495			Teflon	ICP 6010B	11/30/11
Uranium	49.5	U	49.5			Teflon	ICP 6010B	11/30/11
Vanadium	166		7.43	V2O5	0.0297%	Combined	ICP 6010B	Combined
Yttrium	26.6		2.72			Combined	ICP 6010B	Combined
Zinc	73.4	N	0.495			Teflon	ICP 6010B	11/30/11
Zirconium	175		45.1	ZrO2	0.0236%	80/20 Fusion	ICP 6010B	02/09/12
LOI @ 1000°C	18.47%			SUM	100.67%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-BE10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475304

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	20500		497	Al2O	3.864%	80/20 Fusion	ICP 6010B	11/30/11
Antimony	6.67	U	6.67			Teflon	ICP 6010B	01/17/12
Arsenic	9.59	N	0.444			Teflon	ICP 6010B	11/30/11
Barium	149		49.7	BaO	0.0167%	80/20 Fusion	ICP 6010B	12/01/11
Beryllium	0.370	N	0.222			Teflon	ICP 6010B	01/17/12
Bismuth	8.89	U	8.89			Teflon	ICP 6010B	11/30/11
Boron	334	U	334			Rock	ICP 6010B	11/30/11
Cadmium	0.222	UN	0.222			Teflon	ICP 6010B	01/17/12
Calcium	9400		497	CaO	1.315%	80/20 Fusion	ICP 6010B	11/30/11
Chromium	48.3	U	48.3			80/20 Fusion	ICP 6010B	11/30/11
Cobalt	4.16		2.22			Teflon	ICP 6010B	12/02/11
Copper	5.18		2.22			Teflon	ICP 6010B	11/30/11
Iron	12100		497	Fe2O3	1.731%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	16.2		0.222			Teflon	ICP 6010B	11/30/11
Lead	8.59	N	0.444			Teflon	ICP 6010B	11/30/11
Lithium	8.16		0.444			Teflon	ICP 6010B	11/30/11
Magnesium	3060		497	MgO	0.507%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	208		49.7	MnO	0.0269%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	0.222	U	0.222			Teflon	ICP 6010B	11/30/11
Nickel	12.0		2.44			Combined	ICP 6010B	Combined
Palladium	11.1	U	11.1			Teflon	ICP 6010B	11/30/11
Phosphorus	135		8.89	P2O5	0.0310%	Teflon	ICP 6010B	11/30/11
Potassium	8070		400	K2O	0.972%	Combined	ICP 6010B	Combined
Selenium	0.603	N	0.444			Teflon	ICP 6010B	11/30/11
Silicon	377000		1990	SiO2	80.738%	80/20 Fusion	ICP 6010B	11/30/11
Silver	0.444	UN	0.444			Teflon	ICP 6010B	11/30/11
Sodium	4400	N	333	Na2O	0.593%	Combined	ICP 6010B	Combined
Strontium	40.0		2.44			Combined	ICP 6010B	Combined
Sulfur	4390		11.1			Teflon	ICP 6010B	11/30/11
Thallium	11.1	U	11.1			Teflon	ICP 6010B	11/30/11
Thorium	22.2	U	22.2			Teflon	ICP 6010B	11/30/11
Tin	4.44	U	4.44			Teflon	ICP 6010B	01/17/12
Titanium	2530		49.7	TiO2	0.423%	80/20 Fusion	ICP 6010B	11/30/11
Tungsten	0.580		0.444			Teflon	ICP 6010B	11/30/11
Uranium	44.4	U	44.4			Teflon	ICP 6010B	11/30/11
Vanadium	25.3		2.22	V2O5	0.0045%	Teflon	ICP 6010B	11/30/11
Yttrium	16.0		2.44			Combined	ICP 6010B	Combined
Zinc	8.65	N	0.444			Teflon	ICP 6010B	11/30/11
Zirconium	396		48.3	ZrO2	0.0535%	80/20 Fusion	ICP 6010B	12/02/11
LOI @ 1000°C	9.72%			SUM	100.00%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-CU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475305

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	95900		486	Al2O	18.127%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	6.75	U	6.75			Teflon	ICP 6010B	11/30/11
Arsenic	20.8	N	0.45			Teflon	ICP 6010B	11/30/11
Barium	633		48.6	BaO	0.0707%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	2.66	N	0.225			Teflon	ICP 6010B	11/30/11
Bismuth	9.00	U	9			Teflon	ICP 6010B	11/30/11
Boron	391	U	391			Rock	ICP 6010B	12/01/11
Cadmium	0.225	UN	0.225			Teflon	ICP 6010B	11/30/11
Calcium	2740		486	CaO	0.384%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	98.3		41.7			80/20 Fusion	ICP 6010B	12/02/11
Cobalt	16.6		2.25			Teflon	ICP 6010B	11/30/11
Copper	28.4		2.25			Teflon	ICP 6010B	11/30/11
Iron	43600		486	Fe2O3	6.236%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	40.1		2.48			Combined	ICP 6010B	Combined
Lead	20.2	N	0.45			Teflon	ICP 6010B	11/30/11
Lithium	142		0.45			Teflon	ICP 6010B	11/30/11
Magnesium	8650		486	MgO	1.434%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	521		48.6	MnO	0.0673%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	0.225	U	0.225			Teflon	ICP 6010B	11/30/11
Nickel	46.5		2.48			Combined	ICP 6010B	Combined
Palladium	11.3	U	11.3			Teflon	ICP 6010B	11/30/11
Phosphorus	1100		99.0	P2O5	0.251%	Combined	ICP 6010B	Combined
Potassium	29800		405	K2O	3.594%	Combined	ICP 6010B	Combined
Selenium	0.611	N	0.45			Teflon	ICP 6010B	11/30/11
Silicon	278000		1950	SiO2	59.468%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.450	UN	0.45			Teflon	ICP 6010B	11/30/11
Sodium	3570	N	338	Na2O	0.481%	Combined	ICP 6010B	Combined
Strontium	128		2.48			Combined	ICP 6010B	Combined
Sulfur	2630		11.3			Teflon	ICP 6010B	11/30/11
Thallium	11.3	U	11.3			Teflon	ICP 6010B	11/30/11
Thorium	22.5	U	22.5			Teflon	ICP 6010B	11/30/11
Tin	4.69		4.5			Teflon	ICP 6010B	11/30/11
Titanium	5830		48.6	TiO2	0.972%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	1.81		0.45			Teflon	ICP 6010B	11/30/11
Uranium	45.0	U	45			Teflon	ICP 6010B	11/30/11
Vanadium	163		6.75	V2O5	0.0290%	Combined	ICP 6010B	Combined
Yttrium	38.6		2.48			Combined	ICP 6010B	Combined
Zinc	73.4	N	0.45			Teflon	ICP 6010B	11/30/11
Zirconium	181		41.7	ZrO2	0.0244%	80/20 Fusion	ICP 6010B	12/02/11
LOI @ 1000°C	10.50%			SUM	101.64%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475306

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	83400		468	Al2O	15.759%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	8.38		7.19			Teflon	ICP 6010B	11/30/11
Arsenic	35.8	N	0.479			Teflon	ICP 6010B	11/30/11
Barium	481		46.8	BaO	0.0537%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	2.71	N	0.24			Teflon	ICP 6010B	11/30/11
Bismuth	9.58	U	9.58			Teflon	ICP 6010B	11/30/11
Boron	322	U	322			Rock	ICP 6010B	12/01/11
Cadmium	7.01	N	0.24			Teflon	ICP 6010B	11/30/11
Calcium	2330		468	CaO	0.326%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	126		47.4			80/20 Fusion	ICP 6010B	12/02/11
Cobalt	14.8		2.4			Teflon	ICP 6010B	11/30/11
Copper	97.4		2.4			Teflon	ICP 6010B	11/30/11
Iron	43700		468	Fe2O3	6.242%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	25.7		2.63			Combined	ICP 6010B	Combined
Lead	33.1	N	0.479			Teflon	ICP 6010B	11/30/11
Lithium	45.6		0.479			Teflon	ICP 6010B	11/30/11
Magnesium	9270		468	MgO	1.537%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	178		46.8	MnO	0.0229%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	158		0.24			Teflon	ICP 6010B	11/30/11
Nickel	174		2.63			Combined	ICP 6010B	Combined
Palladium	12.0	U	12			Teflon	ICP 6010B	11/30/11
Phosphorus	286		9.58	P2O5	0.0656%	Teflon	ICP 6010B	11/30/11
Potassium	32000		431	K2O	3.858%	Combined	ICP 6010B	Combined
Selenium	9.51	N	0.479			Teflon	ICP 6010B	11/30/11
Silicon	237000		1870	SiO2	50.724%	80/20 Fusion	ICP 6010B	01/17/12
Silver	1.18	N	0.479			Teflon	ICP 6010B	11/30/11
Sodium	2950	N	359	Na2O	0.398%	Combined	ICP 6010B	Combined
Strontium	124		2.63			Combined	ICP 6010B	Combined
Sulfur	22000		12			Teflon	ICP 6010B	11/30/11
Thallium	12.0	U	12			Teflon	ICP 6010B	11/30/11
Thorium	24.0	U	24			Teflon	ICP 6010B	11/30/11
Tin	4.79	U	4.79			Teflon	ICP 6010B	11/30/11
Titanium	4120		46.8	TiO2	0.687%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	5.23		0.479			Teflon	ICP 6010B	11/30/11
Uranium	47.9	U	47.9			Teflon	ICP 6010B	11/30/11
Vanadium	746		7.19	V2O5	0.133%	Combined	ICP 6010B	Combined
Yttrium	25.0		2.63			Combined	ICP 6010B	Combined
Zinc	417	N	0.24			Combined	ICP 6010B	Combined
Zirconium	137		47.4	ZrO2	0.0185%	80/20 Fusion	ICP 6010B	12/02/11
LOI @ 1000°C	20.79%			SUM	100.62%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-BE10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475582

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	17900		463	Al2O	3.382%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	7.10	U	7.1			Teflon	ICP 6010B	12/15/11
Arsenic	23.2	N	0.473			Teflon	ICP 6010B	12/15/11
Barium	147		46.3	BaO	0.0164%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	0.376	N	0.237			Teflon	ICP 6010B	12/15/11
Bismuth	9.46	U	9.46			Teflon	ICP 6010B	12/15/11
Boron	342	U	342			Rock	ICP 6010B	12/15/11
Cadmium	0.237	UN	0.237			Teflon	ICP 6010B	12/15/11
Calcium	14800		463	CaO	2.068%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	68.7		48			80/20 Fusion	ICP 6010B	01/09/12
Cobalt	6.09		2.37			Teflon	ICP 6010B	12/15/11
Copper	6.35		2.37			Teflon	ICP 6010B	12/15/11
Iron	18000		463	Fe2O3	2.568%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	48.5		0.237			Teflon	ICP 6010B	12/15/11
Lead	9.83	N	0.473			Teflon	ICP 6010B	12/15/11
Lithium	9.01		0.473			Teflon	ICP 6010B	12/15/11
Magnesium	4260		463	MgO	0.707%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	303		46.3	MnO	0.0392%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	2.51		0.237			Teflon	ICP 6010B	12/15/11
Nickel	11.8		2.37			Teflon	ICP 6010B	12/15/11
Palladium	11.8	U	11.8			Teflon	ICP 6010B	12/15/11
Phosphorus	180		9.46	P2O5	0.0412%	Teflon	ICP 6010B	12/15/11
Potassium	7330		284	K2O	0.883%	Combined	ICP 6010B	Combined
Selenium	0.641	N	0.473			Teflon	ICP 6010B	12/15/11
Silicon	372000		1850	SiO2	79.640%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.710	UN	0.71			Teflon	ICP 6010B	12/15/11
Sodium	3200	N	237	Na2O	0.431%	Combined	ICP 6010B	Combined
Strontium	40.8		2.37			Teflon	ICP 6010B	12/15/11
Sulfur	6510		11.8			Teflon	ICP 6010B	12/15/11
Thallium	11.8	U	11.8			Teflon	ICP 6010B	12/15/11
Thorium	23.7	U	23.7			Teflon	ICP 6010B	12/15/11
Tin	4.73	U	4.73			Teflon	ICP 6010B	12/15/11
Titanium	3490		46.3	TiO2	0.582%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	0.766		0.473			Teflon	ICP 6010B	12/20/11
Uranium	47.3	U	47.3			Teflon	ICP 6010B	12/15/11
Vanadium	30.9		0.237	V2O5	0.0055%	Teflon	ICP 6010B	12/15/11
Yttrium	41.2		2.60			Combined	ICP 6010B	Combined
Zinc	8.86	N	0.473			Teflon	ICP 6010B	12/15/11
Zirconium	2310		48	ZrO2	0.312%	80/20 Fusion	ICP 6010B	01/09/12
LOI @ 1000°C	10.19%			SUM	100.87%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-CU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475583

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	98100		472	Al2O	18.537%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	7.26	U	7.26			Teflon	ICP 6010B	12/15/11
Arsenic	15.5	N	0.484			Teflon	ICP 6010B	12/15/11
Barium	649		47.2	BaO	0.0725%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	2.90	N	0.242			Teflon	ICP 6010B	12/15/11
Bismuth	9.68	U	9.68			Teflon	ICP 6010B	12/15/11
Boron	391	U	391			Rock	ICP 6010B	12/15/11
Cadmium	0.242	UN	0.242			Teflon	ICP 6010B	12/15/11
Calcium	787		472	CaO	0.110%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	125		43			80/20 Fusion	ICP 6010B	01/09/12
Cobalt	18.0		2.42			Teflon	ICP 6010B	12/15/11
Copper	26.1		2.42			Teflon	ICP 6010B	12/15/11
Iron	30800		472	Fe2O3	4.404%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	39.1		5.08			Combined	ICP 6010B	Combined
Lead	15.8	N	0.484			Teflon	ICP 6010B	12/15/11
Lithium	148		0.484			Teflon	ICP 6010B	12/15/11
Magnesium	7960		472	MgO	1.320%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	235		47.2	MnO	0.0303%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	2.35		0.242			Teflon	ICP 6010B	12/15/11
Nickel	39.9		2.42			Teflon	ICP 6010B	12/15/11
Palladium	12.1	U	12.1			Teflon	ICP 6010B	12/15/11
Phosphorus	187		9.68	P2O5	0.0429%	Teflon	ICP 6010B	12/15/11
Potassium	28100		290	K2O	3.386%	Combined	ICP 6010B	Combined
Selenium	0.786	N	0.484			Teflon	ICP 6010B	12/15/11
Silicon	284000		1890	SiO2	60.738%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.484	UN	0.484			Teflon	ICP 6010B	12/15/11
Sodium	2880	N	121	Na2O	0.388%	Teflon	ICP 6010B	12/15/11
Strontium	93.1		4.84			Combined	ICP 6010B	Combined
Sulfur	1100		12.1			Teflon	ICP 6010B	12/15/11
Thallium	12.1	U	12.1			Teflon	ICP 6010B	12/15/11
Thorium	24.2	U	24.2			Teflon	ICP 6010B	12/15/11
Tin	4.84	U	4.84			Teflon	ICP 6010B	12/15/11
Titanium	6230		47.2	TiO2	1.040%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	2.21		0.484			Teflon	ICP 6010B	12/20/11
Uranium	48.4	U	48.4			Teflon	ICP 6010B	12/15/11
Vanadium	188		2.66	V2O5	0.0335%	Combined	ICP 6010B	Combined
Yttrium	27.3		2.66			Combined	ICP 6010B	Combined
Zinc	106	N	0.484			Teflon	ICP 6010B	12/15/11
Zirconium	331		64.5	ZrO2	0.0448%	Combined	ICP 6010B	Combined
LOI @ 1000°C	10.81%			SUM	100.96%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	79900		486	Al2O	15.105%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	7.32	U	7.32			Teflon	ICP 6010B	12/15/11
Arsenic	13.5	N	0.488			Teflon	ICP 6010B	12/15/11
Barium	478		48.6	BaO	0.0533%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	2.64	N	0.244			Teflon	ICP 6010B	12/15/11
Bismuth	9.76	U	9.76			Teflon	ICP 6010B	12/15/11
Boron	395	U	395			Rock	ICP 6010B	12/15/11
Cadmium	0.763	N	0.244			Teflon	ICP 6010B	12/15/11
Calcium	1950		486	CaO	0.273%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	84.9		43.1			80/20 Fusion	ICP 6010B	01/09/12
Cobalt	20.3		2.44			Teflon	ICP 6010B	12/15/11
Copper	67.1		2.44			Teflon	ICP 6010B	12/15/11
Iron	45800		486	Fe2O3	6.552%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	31.8		5.12			Combined	ICP 6010B	Combined
Lead	18.1	N	0.488			Teflon	ICP 6010B	12/15/11
Lithium	45.5		0.488			Teflon	ICP 6010B	12/15/11
Magnesium	9150		486	MgO	1.518%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	187		48.6	MnO	0.0242%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	46.1		0.244			Teflon	ICP 6010B	12/15/11
Nickel	94.9		2.44			Teflon	ICP 6010B	12/15/11
Palladium	12.2	U	12.2			Teflon	ICP 6010B	12/15/11
Phosphorus	271		9.76	P2O5	0.0621%	Teflon	ICP 6010B	12/15/11
Potassium	28100		293	K2O	3.387%	Combined	ICP 6010B	Combined
Selenium	3.95	N	0.488			Teflon	ICP 6010B	12/15/11
Silicon	238000		1950	SiO2	50.913%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.488	UN	0.488			Teflon	ICP 6010B	12/15/11
Sodium	2760	N	122	Na2O	0.372%	Teflon	ICP 6010B	12/15/11
Strontium	126		4.88			Combined	ICP 6010B	Combined
Sulfur	26000		122			Teflon	ICP 6010B	01/09/12
Thallium	12.2	U	12.2			Teflon	ICP 6010B	12/15/11
Thorium	24.4	U	24.4			Teflon	ICP 6010B	12/15/11
Tin	4.88	U	4.88			Teflon	ICP 6010B	12/15/11
Titanium	3920		48.6	TiO2	0.654%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	3.56		0.488			Teflon	ICP 6010B	12/20/11
Uranium	48.8	U	48.8			Teflon	ICP 6010B	12/15/11
Vanadium	243		2.68	V2O5	0.0433%	Combined	ICP 6010B	Combined
Yttrium	31.4		2.68			Combined	ICP 6010B	Combined
Zinc	91.7	N	0.488			Teflon	ICP 6010B	12/15/11
Zirconium	98.6		43.1	ZrO2	0.0133%	80/20 Fusion	ICP 6010B	01/09/12
LOI @ 1000°C	21.87%			SUM	100.84%			

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584D

Analysis	Duplicate Result (mg/Kg)	Qualifier	RPD	Oxide	Duplicate Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	79900		0.00%	Al2O	15.106%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	6.29	U	0.00%			Teflon	ICP 6010B	12/15/11
Arsenic	12.9		4.55%			Teflon	ICP 6010B	12/15/11
Barium	481		0.63%	BaO	0.0537%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	2.61		1.14%			Teflon	ICP 6010B	12/15/11
Bismuth	8.39	U	0.00%			Teflon	ICP 6010B	12/15/11
Boron	370	U	0.00%			Rock	ICP 6010B	12/15/11
Cadmium	0.871		13.2%			Teflon	ICP 6010B	12/15/11
Calcium	1960		0.51%	CaO	0.275%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	85.4		0.59%			80/20 Fusion	ICP 6010B	01/09/12
Cobalt	20.3		0.00%			Teflon	ICP 6010B	12/15/11
Copper	68.5		2.06%			Teflon	ICP 6010B	12/15/11
Iron	45400		0.88%	Fe2O3	6.493%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	33.1		4.01%			Combined	ICP 6010B	Combined
Lead	18.1		0.00%			Teflon	ICP 6010B	12/15/11
Lithium	45.6		0.22%			Teflon	ICP 6010B	12/15/11
Magnesium	9170		0.22%	MgO	1.521%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	184		1.62%	MnO	0.0238%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	45.5		1.31%			Teflon	ICP 6010B	12/15/11
Nickel	96.0		1.15%			Teflon	ICP 6010B	12/15/11
Palladium	10.5	U	0.00%			Teflon	ICP 6010B	12/15/11
Phosphorus	269		0.74%	P2O5	0.0618%	Teflon	ICP 6010B	12/15/11
Potassium	27800		1.07%	K2O	3.350%	Combined	ICP 6010B	Combined
Selenium	3.69		6.81%			Teflon	ICP 6010B	12/15/11
Silicon	234000		1.69%	SiO2	50.135%	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.420	U	0.00%			Teflon	ICP 6010B	12/15/11
Sodium	2750		0.36%	Na2O	0.370%	Teflon	ICP 6010B	12/15/11
Strontium	122		3.23%			Combined	ICP 6010B	Combined
Sulfur	25700		1.16%			Teflon	ICP 6010B	01/09/12
Thallium	10.5	U	0.00%			Teflon	ICP 6010B	12/15/11
Thorium	21.0	U	0.00%			Teflon	ICP 6010B	12/15/11
Tin	4.20	U	0.00%			Teflon	ICP 6010B	12/15/11
Titanium	3920		0.00%	TiO2	0.654%	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	3.15		12.2%			Teflon	ICP 6010B	12/20/11
Uranium	42.0	U	0.00%			Teflon	ICP 6010B	12/15/11
Vanadium	245		0.82%	V2O5	0.0437%	Combined	ICP 6010B	Combined
Yttrium	31.4		0.00%			Combined	ICP 6010B	Combined
Zinc	93.0		1.41%			Teflon	ICP 6010B	12/15/11
Zirconium	97.3		1.33%	ZrO2	0.0131%	80/20 Fusion	ICP 6010B	01/09/12
LOI @ 1000°C	21.82%			SUM	99.92%			

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SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE SUMMARY

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584S

Analysis	Spike Result (mg/Kg)	Qualifier	Spike Added (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony	26.0		24.5	106.1%	Teflon	ICP 6010B	12/15/11
Arsenic	115		97.8	103.8%	Teflon	ICP 6010B	12/15/11
Beryllium	5.17		2.45	103.3%	Teflon	ICP 6010B	12/15/11
Bismuth	9.78	U	NA	NA	Teflon	ICP 6010B	12/15/11
Cadmium	3.21		2.45	99.9%	Teflon	ICP 6010B	12/15/11
Cobalt	44.1		24.5	97.1%	Teflon	ICP 6010B	12/15/11
Copper	80.8		12.2	112.3%	Teflon	ICP 6010B	12/15/11
Lanthanum	32.2		NA	NA	Combined	ICP 6010B	Combined
Lead	40.2		24.5	90.2%	Teflon	ICP 6010B	12/15/11
Lithium	47.1		NA	NA	Teflon	ICP 6010B	12/15/11
Molybdenum	46.9		NA	NA	Teflon	ICP 6010B	12/15/11
Nickel	120		24.5	102.4%	Teflon	ICP 6010B	12/15/11
Palladium	12.2	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	278		NA	NA	Teflon	ICP 6010B	12/15/11
Potassium	32300		978	429.4%	Combined	ICP 6010B	Combined
Selenium	105		97.8	103.3%	Teflon	ICP 6010B	12/15/11
Silver	2.33		2.45	95.1%	Teflon	ICP 6010B	12/15/11
Sodium	4090	N	978	136.0%	Teflon	ICP 6010B	12/15/11
Strontium	126		NA	NA	Combined	ICP 6010B	Combined
Sulfur	25300		NA	NA	Teflon	ICP 6010B	01/09/12
Thallium	99.8		97.8	102.0%	Teflon	ICP 6010B	12/15/11
Thorium	24.5	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tin	4.89	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tungsten	3.23		NA	NA	Teflon	ICP 6010B	12/20/11
Uranium	48.9	U	NA	NA	Teflon	ICP 6010B	12/15/11
Vanadium	274		24.5	126.5%	Combined	ICP 6010B	Combined
Yttrium	31.9		NA	NA	Combined	ICP 6010B	Combined
Zinc	109	N	24.5	70.6%	Teflon	ICP 6010B	12/15/11

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
MATRIX SPIKE DUPLICATE SUMMARY

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584SD

Analysis	Spike Result (mg/Kg)	Qualifier	Spike Added (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony	27.6		24.9	110.8%	Teflon	ICP 6010B	12/15/11
Arsenic	150	N	99.7	136.9%	Teflon	ICP 6010B	12/15/11
Beryllium	6.75	N	2.49	165.1%	Teflon	ICP 6010B	12/15/11
Bismuth	9.97	U	NA	NA	Teflon	ICP 6010B	12/15/11
Cadmium	4.16	N	2.49	136.4%	Teflon	ICP 6010B	12/15/11
Cobalt	44.1		24.9	95.6%	Teflon	ICP 6010B	12/15/11
Copper	81.7		12.5	116.8%	Teflon	ICP 6010B	12/15/11
Lanthanum	37.2		NA	NA	Combined	ICP 6010B	Combined
Lead	52.3	N	24.9	137.3%	Teflon	ICP 6010B	12/15/11
Lithium	60.3		NA	NA	Teflon	ICP 6010B	12/15/11
Molybdenum	60.3		NA	NA	Teflon	ICP 6010B	12/15/11
Nickel	121		24.9	104.8%	Teflon	ICP 6010B	12/15/11
Palladium	12.5	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	351		NA	NA	Teflon	ICP 6010B	12/15/11
Potassium	29600		997	150.5%	Combined	ICP 6010B	Combined
Selenium	136	N	99.7	132.4%	Teflon	ICP 6010B	12/15/11
Silver	3.17	N	2.49	127.3%	Teflon	ICP 6010B	12/15/11
Sodium	3740		997	98.3%	Teflon	ICP 6010B	12/15/11
Strontium	126		NA	NA	Combined	ICP 6010B	Combined
Sulfur	26400		NA	NA	Teflon	ICP 6010B	01/09/12
Thallium	98.4		99.7	98.7%	Teflon	ICP 6010B	12/15/11
Thorium	24.9	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tin	4.98	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tungsten	3.88		NA	NA	Teflon	ICP 6010B	12/20/11
Uranium	49.8	U	NA	NA	Teflon	ICP 6010B	12/15/11
Vanadium	354		24.9	445.8%	Combined	ICP 6010B	Combined
Yttrium	36.8		NA	NA	Combined	ICP 6010B	Combined
Zinc	148	N	24.9	226.1%	Teflon	ICP 6010B	12/15/11

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
ANALYTICAL SPIKE SUMMARY

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584A

Analysis	Spike Result (mg/Kg)	Qualifier	Spike Added (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	101000		19500	108.2%	80/20 Fusion	ICP 6010B	01/17/12
Antimony	249		244	102.0%	Teflon	ICP 6010B	12/15/11
Arsenic	114		97.6	103.0%	Teflon	ICP 6010B	12/15/11
Barium	20600		19500	103.2%	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	5.04		2.44	98.4%	Teflon	ICP 6010B	12/15/11
Bismuth	9.76	U	NA	NA	Teflon	ICP 6010B	12/15/11
Boron	395	U	NA	NA	Rock	ICP 6010B	12/15/11
Cadmium	3.21		2.44	100.3%	Teflon	ICP 6010B	12/15/11
Calcium	208000		195000	105.7%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	1840		1720	102.0%	80/20 Fusion	ICP 6010B	01/09/12
Cobalt	267		244	101.1%	Teflon	ICP 6010B	12/15/11
Copper	194		122	104.0%	Teflon	ICP 6010B	12/15/11
Iron	56200		9730	106.9%	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	31.5		NA	NA	Combined	ICP 6010B	Combined
Lead	41.4		24.4	95.5%	Teflon	ICP 6010B	12/15/11
Lithium	45.3		NA	NA	Teflon	ICP 6010B	12/15/11
Magnesium	211000		195000	103.5%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	5490		4860	109.1%	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	45.0		NA	NA	Teflon	ICP 6010B	12/15/11
Nickel	339		244	100.0%	Teflon	ICP 6010B	12/15/11
Palladium	12.2	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	267		NA	NA	Teflon	ICP 6010B	12/15/11
Potassium	48700		19520	105.5%	Combined	ICP 6010B	Combined
Selenium	103		97.6	101.5%	Teflon	ICP 6010B	12/15/11
Silicon	241000		NA	NA	80/20 Fusion	ICP 6010B	01/17/12
Silver	2.26		2.44	92.6%	Teflon	ICP 6010B	12/15/11
Sodium	12800		9760	102.9%	Teflon	ICP 6010B	12/15/11
Strontium	129		NA	NA	Combined	ICP 6010B	Combined
Sulfur	26300		NA	NA	Teflon	ICP 6010B	01/09/12
Thallium	1010		976	103.5%	Teflon	ICP 6010B	12/15/11
Thorium	24.4	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tin	4.88	U	NA	NA	Teflon	ICP 6010B	12/15/11
Titanium	3970		NA	NA	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	3.62		NA	NA	Teflon	ICP 6010B	12/20/11
Uranium	48.8	U	NA	NA	Teflon	ICP 6010B	12/15/11
Vanadium	514		268.4	101.0%	Combined	ICP 6010B	Combined
Yttrium	31.0		NA	NA	Combined	ICP 6010B	Combined
Zinc	114		24.4	91.4%	Teflon	ICP 6010B	12/15/11
Zirconium	124		NA	NA	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB11L22DG1 / 11L21DG2 / 11L28DG1 / 12A17KE1

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Aluminum	500	U	500	80/20 Fusion	ICP 6010B	01/17/12
Antimony	0.750	U	0.750	Teflon	ICP 6010B	11/30/11
Arsenic	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Barium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/17/12
Beryllium	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Bismuth	1.00	U	1.00	Teflon	ICP 6010B	11/30/11
Boron	400	U	400	Rock	ICP 6010B	12/01/11
Cadmium	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Calcium	500	U	500	80/20 Fusion	ICP 6010B	01/17/12
Chromium	50.0	U	50.0	80/20 Fusion	ICP 6010B	12/02/11
Cobalt	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Copper	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Iron	500	U	500	80/20 Fusion	ICP 6010B	01/17/12
Lanthanum	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Lead	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Lithium	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Magnesium	500	U	500	80/20 Fusion	ICP 6010B	01/17/12
Manganese	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/17/12
Molybdenum	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Nickel	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Palladium	1.25	U	1.25	Teflon	ICP 6010B	11/30/11
Phosphorus	10.0	U	10.0	Teflon	ICP 6010B	11/30/11
Potassium	15.0	U	15.0	Teflon	ICP 6010B	12/01/11
Selenium	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Silicon	2000	U	2000	80/20 Fusion	ICP 6010B	01/17/12
Silver	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Sodium	12.5	U	12.5	Teflon	ICP 6010B	12/01/11
Strontium	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Sulfur	12.5	U	12.5	Teflon	ICP 6010B	11/30/11
Thallium	1.25	U	1.25	Teflon	ICP 6010B	11/30/11
Thorium	2.50	U	2.50	Teflon	ICP 6010B	11/30/11
Tin	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Titanium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/17/12
Tungsten	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Uranium	5.00	U	5.00	Teflon	ICP 6010B	11/30/11
Vanadium	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Yttrium	0.250	U	0.250	Teflon	ICP 6010B	11/30/11
Zinc	0.500	U	0.500	Teflon	ICP 6010B	11/30/11
Zirconium	50.0	U	50.0	80/20 Fusion	ICP 6010B	12/02/11

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 2

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB11M02DG1TF / 12B08KE1 / 11M02DG1RK

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Aluminum	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Antimony	0.750	U	0.750	Teflon	ICP 6010B	12/15/11
Arsenic	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Barium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Beryllium	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Bismuth	1.00	U	1.00	Teflon	ICP 6010B	12/15/11
Boron	400	U	400	Rock	ICP 6010B	12/15/11
Cadmium	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Calcium	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Cobalt	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Copper	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Iron	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Lead	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Lithium	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Magnesium	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Manganese	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Nickel	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Palladium	1.25	U	1.25	Teflon	ICP 6010B	12/15/11
Phosphorus	10.0	U	10.0	Teflon	ICP 6010B	12/15/11
Potassium	15.0	U	15.0	Teflon	ICP 6010B	12/15/11
Selenium	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Silicon	2000	U	2000	80/20 Fusion	ICP 6010B	02/09/12
Silver	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Sodium	12.5	U	12.5	Teflon	ICP 6010B	12/15/11
Strontium	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Sulfur	12.5	U	12.5	Teflon	ICP 6010B	12/15/11
Thallium	1.25	U	1.25	Teflon	ICP 6010B	12/15/11
Thorium	2.50	U	2.50	Teflon	ICP 6010B	12/15/11
Tin	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Titanium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	0.500	U	0.500	Teflon	ICP 6010B	01/16/12
Uranium	5.00	U	5.00	Teflon	ICP 6010B	12/15/11
Vanadium	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Yttrium	0.250	U	0.250	Teflon	ICP 6010B	12/15/11
Zinc	0.500	U	0.500	Teflon	ICP 6010B	12/15/11
Zirconium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 3

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB11M06DG2

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Lanthanum	5.00	U	5.00	Teflon Res	ICP 6010B	01/09/12
Potassium	150	U	150	Teflon Res	ICP 6010B	01/09/12
Sodium	125	U	125	Teflon Res	ICP 6010B	01/09/12
Strontium	2.50	U	2.50	Teflon Res	ICP 6010B	01/09/12
Vanadium	2.50	U	2.50	Teflon Res	ICP 6010B	01/09/12
Yttrium	2.50	U	2.50	Teflon Res	ICP 6010B	01/09/12
Zirconium	25.0	U	25.0	80/20 Fus Res	ICP 6010B	01/16/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 4

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB12A07KE3

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Chromium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/09/12
Zirconium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB11M02DG2

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Chromium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/09/12
Zirconium	50.0	U	50.0	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 6

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: PB11L29DG1

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Lanthanum	2.50	U	2.50	Teflon Res	ICP 6010B	12/01/11
Nickel	2.50	U	2.50	Teflon Res	ICP 6010B	12/01/11
Phosphorus	100	U	100	Teflon Res	ICP 6010B	12/01/11
Potassium	1500	U	1500	Teflon Res	ICP 6010B	01/09/12
Sodium	1250	U	1250	Teflon Res	ICP 6010B	01/09/12
Strontium	2.50	U	2.50	Teflon Res	ICP 6010B	12/01/11
Vanadium	5.00	U	5.00	Teflon Res	ICP 6010B	12/01/11
Yttrium	2.50	U	2.50	Teflon Res	ICP 6010B	12/01/11
Zinc	5.00	U	5.00	Teflon Res	ICP 6010B	12/01/11

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: LCS11L22DG1TF

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony	51.6		50.0	103.2%	Teflon	ICP 6010B	11/30/11
Arsenic	203		200	101.5%	Teflon	ICP 6010B	11/30/11
Beryllium	5.16		5.00	103.2%	Teflon	ICP 6010B	11/30/11
Bismuth	1.00	U	NA	NA	Teflon	ICP 6010B	11/30/11
Cadmium	5.08		5.00	101.6%	Teflon	ICP 6010B	11/30/11
Cobalt	48.4		50.0	96.8%	Teflon	ICP 6010B	11/30/11
Copper	25.1		25.0	100.4%	Teflon	ICP 6010B	11/30/11
Lanthanum	0.250	U	NA	NA	Teflon	ICP 6010B	11/30/11
Lead	48.8		50.0	97.6%	Teflon	ICP 6010B	11/30/11
Lithium	0.500	U	NA	NA	Teflon	ICP 6010B	11/30/11
Molybdenum	0.250	U	NA	NA	Teflon	ICP 6010B	11/30/11
Nickel	48.7		50.0	97.4%	Teflon	ICP 6010B	11/30/11
Palladium	1.25	U	NA	NA	Teflon	ICP 6010B	11/30/11
Phosphorus	10.0	U	NA	NA	Teflon	ICP 6010B	11/30/11
Potassium	997		1000	99.7%	Teflon	ICP 6010B	12/01/11
Selenium	211		200	105.5%	Teflon	ICP 6010B	11/30/11
Silver	5.01		5.00	100.2%	Teflon	ICP 6010B	11/30/11
Sodium	1030		1000	103.0%	Teflon	ICP 6010B	12/01/11
Strontium	0.250	U	NA	NA	Teflon	ICP 6010B	11/30/11
Sulfur	12.5	U	NA	NA	Teflon	ICP 6010B	11/30/11
Thallium	210		200	105.0%	Teflon	ICP 6010B	11/30/11
Thorium	2.50	U	NA	NA	Teflon	ICP 6010B	11/30/11
Tin	0.500	U	NA	NA	Teflon	ICP 6010B	11/30/11
Tungsten	0.500	U	NA	NA	Teflon	ICP 6010B	11/30/11
Uranium	5.00	U	NA	NA	Teflon	ICP 6010B	11/30/11
Vanadium	49.4		50.0	98.8%	Teflon	ICP 6010B	11/30/11
Yttrium	0.250	U	NA	NA	Teflon	ICP 6010B	11/30/11
Zinc	50.2		50.0	100.4%	Teflon	ICP 6010B	11/30/11

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID
Lab Control 2

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: LCS11M02DG1TF

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony	49.9		50.0	99.8%	Teflon	ICP 6010B	12/15/11
Arsenic	202		200	101.0%	Teflon	ICP 6010B	12/15/11
Beryllium	5.00		5.00	100.0%	Teflon	ICP 6010B	12/15/11
Bismuth	1.00	U	NA	NA	Teflon	ICP 6010B	12/15/11
Cadmium	5.13		5.00	102.6%	Teflon	ICP 6010B	12/15/11
Cobalt	49.7		50.0	99.4%	Teflon	ICP 6010B	12/15/11
Copper	24.1		25.0	96.4%	Teflon	ICP 6010B	12/15/11
Lanthanum	0.250	U	NA	NA	Teflon	ICP 6010B	12/15/11
Lead	48.6		50.0	97.2%	Teflon	ICP 6010B	12/15/11
Lithium	0.500	U	NA	NA	Teflon	ICP 6010B	12/15/11
Molybdenum	0.250	U	NA	NA	Teflon	ICP 6010B	12/15/11
Nickel	49.2		50.0	98.4%	Teflon	ICP 6010B	12/15/11
Palladium	1.25	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	10.0	U	NA	NA	Teflon	ICP 6010B	12/15/11
Potassium	961		1000	96.1%	Teflon	ICP 6010B	12/15/11
Selenium	204		200	102.0%	Teflon	ICP 6010B	12/15/11
Silver	4.91		5.00	98.2%	Teflon	ICP 6010B	12/15/11
Sodium	1000		1000	100.0%	Teflon	ICP 6010B	12/15/11
Strontium	0.250	U	NA	NA	Teflon	ICP 6010B	12/15/11
Sulfur	12.5	U	NA	NA	Teflon	ICP 6010B	12/15/11
Thallium	204		200	102.0%	Teflon	ICP 6010B	12/15/11
Thorium	2.50	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tin	0.500	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tungsten	0.500	U	NA	NA	Teflon	ICP 6010B	01/16/12
Uranium	5.00	U	NA	NA	Teflon	ICP 6010B	12/15/11
Vanadium	49.3		50.0	98.6%	Teflon	ICP 6010B	12/15/11
Yttrium	0.250	U	NA	NA	Teflon	ICP 6010B	12/15/11
Zinc	52.3		50.0	104.6%	Teflon	ICP 6010B	12/15/11

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS11L21DG2RK / 11L22DG2TF / 11L28DG1

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony - xx	6.35	U	1.5	NA	Teflon	ICP 6010B	11/30/11
Arsenic - xx	4.23	U	4.5	NA	Teflon	ICP 6010B	11/30/11
Beryllium - xx	2.67		2	133.5%	Teflon	ICP 6010B	11/30/11
Bismuth	8.47	U	NA	NA	Teflon	ICP 6010B	11/30/11
Boron - xx	351	U	25	NA	Rock	ICP 6010B	12/01/11
Cadmium - xx	2.12	U	0.18	NA	Teflon	ICP 6010B	11/30/11
Chromium - xx	48.8	U	6.1	NA	80/20 Fusion	ICP 6010B	12/02/11
Cobalt - xx	2.12		1.5	141.3%	Teflon	ICP 6010B	11/30/11
Copper	6.61		5.9	112.0%	Teflon	ICP 6010B	11/30/11
Lanthanum - xx	29.2		33	88.5%	Teflon	ICP 6010B	11/30/11
Lead	13.5		16.4	82.3%	Teflon	ICP 6010B	11/30/11
Lithium - xx	46.0		47	97.9%	Teflon	ICP 6010B	11/30/11
Molybdenum - xx	4.54		3	151.3%	Teflon	ICP 6010B	11/30/11
Nickel	3.01		3.6	83.6%	Teflon	ICP 6010B	11/30/11
Palladium	10.6	U	NA	NA	Teflon	ICP 6010B	11/30/11
Phosphorus	162		157	103.2%	Teflon	ICP 6010B	11/30/11
Potassium	36500		34500	105.8%	Teflon	ICP 6010B	12/01/11
Selenium	4.23	U	NA	NA	Teflon	ICP 6010B	11/30/11
Silver	4.23	U	NA	NA	Teflon	ICP 6010B	11/30/11
Sodium	38700		35900	107.8%	Teflon	ICP 6010B	12/01/11
Strontium	66.9		63.5	105.4%	Teflon	ICP 6010B	11/30/11
Sulfur - xx	106	U	18	NA	Teflon	ICP 6010B	11/30/11
Thallium	10.6	U	0.54	NA	Teflon	ICP 6010B	11/30/11
Thorium	21.2	U	12.4	NA	Teflon	ICP 6010B	11/30/11
Tin	42.3	U	NA	NA	Teflon	ICP 6010B	11/30/11
Tungsten	4.23	U	NA	NA	Teflon	ICP 6010B	11/30/11
Uranium	42.3	U	4.58	NA	Teflon	ICP 6010B	11/30/11
Vanadium - xx	6.78		15	45.2%	Teflon	ICP 6010B	11/30/11
Yttrium - xx	36.8		41	89.8%	Teflon	ICP 6010B	11/30/11
Zinc - xx	49.3		55	89.6%	Teflon	ICP 6010B	11/30/11
Zirconium - xx	267		295	90.5%	80/20 Fusion	ICP 6010B	12/02/11

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS11L21DG3RK / 11L22DG3TF / LCS11L28DG2

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony - xx	7.26	U	0.3	NA	Teflon	ICP 6010B	11/30/11
Arsenic - xx	4.84	U	2.5	NA	Teflon	ICP 6010B	11/30/11
Beryllium - xx	2.42	U	0.7	NA	Teflon	ICP 6010B	11/30/11
Bismuth	9.68	U	NA	NA	Teflon	ICP 6010B	11/30/11
Boron - xx	368	U	1.3	NA	Rock	ICP 6010B	12/01/11
Cadmium	2.42	U	NA	NA	Teflon	ICP 6010B	11/30/11
Chromium	353		332	106.3%	80/20 Fusion	ICP 6010B	12/02/11
Cobalt - xx	44.5		49.7	89.5%	Teflon	ICP 6010B	11/30/11
Copper - xx	97.5		96	101.6%	Teflon	ICP 6010B	11/30/11
Lanthanum - xx	4.79		5.3	90.4%	Teflon	ICP 6010B	11/30/11
Lead	4.84	U	3.3	NA	Teflon	ICP 6010B	11/30/11
Lithium - xx	8.18		7	116.9%	Teflon	ICP 6010B	11/30/11
Molybdenum	2.42	U	NA	NA	Teflon	ICP 6010B	11/30/11
Nickel - xx	150		150	100.0%	Teflon	ICP 6010B	11/30/11
Palladium	12.1	U	NA	NA	Teflon	ICP 6010B	11/30/11
Phosphorus	624		585	106.7%	Teflon	ICP 6010B	11/30/11
Potassium	2900	U	1550	NA	Teflon	ICP 6010B	12/01/11
Selenium	4.84	U	NA	NA	Teflon	ICP 6010B	11/30/11
Silver	4.84	U	NA	NA	Teflon	ICP 6010B	11/30/11
Sodium	16500		15900	103.8%	Teflon	ICP 6010B	12/01/11
Strontium	182		169	107.7%	Teflon	ICP 6010B	11/30/11
Sulfur - xx	138		117	117.9%	Teflon	ICP 6010B	11/30/11
Thallium	12.1	U	NA	NA	Teflon	ICP 6010B	11/30/11
Thorium	24.2	U	0.33	NA	Teflon	ICP 6010B	11/30/11
Tin	48.4	U	NA	NA	Teflon	ICP 6010B	11/30/11
Tungsten	4.84	U	NA	NA	Teflon	ICP 6010B	11/30/11
Uranium - xx	48.4	U	0.37	NA	Teflon	ICP 6010B	11/30/11
Vanadium - xx	254		250	101.6%	Teflon	ICP 6010B	11/30/11
Yttrium - xx	18.6		17	109.4%	Teflon	ICP 6010B	11/30/11
Zinc - xx	73.3		58	126.4%	Teflon	ICP 6010B	11/30/11
Zirconium - xx	59.4		61	97.4%	80/20 Fusion	ICP 6010B	12/02/11

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 2 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS11L29DG1TFF

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Lanthanum - xx	45.0	U	33	NA	Teflon Res	ICP 6010B	12/01/11
Nickel	45.0	U	3.6	NA	Teflon Res	ICP 6010B	12/01/11
Phosphorus	1800	U	157	NA	Teflon Res	ICP 6010B	12/01/11
Potassium	21700		34500	62.9%	Teflon Res	ICP 6010B	01/09/12
Sodium	31100		35900	86.6%	Teflon Res	ICP 6010B	01/09/12
Strontium	73.7		63.5	116.1%	Teflon Res	ICP 6010B	12/01/11
Vanadium - xx	89.9	U	15	NA	Teflon Res	ICP 6010B	12/01/11
Yttrium - xx	45.0	U	41	NA	Teflon Res	ICP 6010B	12/01/11
Zinc - xx	89.9	U	55	NA	Teflon Res	ICP 6010B	12/01/11

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 2 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS11L29DG2TFF

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Lanthanum - xx	41.8	U	5.3	NA	Teflon Res	ICP 6010B	12/01/11
Nickel - xx	197		150	131.3%	Teflon Res	ICP 6010B	12/01/11
Phosphorus	1670	U	585	NA	Teflon Res	ICP 6010B	12/01/11
Potassium	2510	U	1550	NA	Teflon Res	ICP 6010B	01/09/12
Sodium	15300		16000	95.6%	Teflon Res	ICP 6010B	01/09/12
Strontium	189		169	111.8%	Teflon Res	ICP 6010B	12/01/11
Vanadium - xx	274		250	109.6%	Teflon Res	ICP 6010B	12/01/11
Yttrium - xx	41.8	U	17	NA	Teflon Res	ICP 6010B	12/01/11
Zinc - xx	83.6	U	58	NA	Teflon Res	ICP 6010B	12/01/11

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 3 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS11M02DG2TF / 11M02DG4 / 11M02DG1RK

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony - xx	7.35	U	1.5	NA	Teflon	ICP 6010B	12/15/11
Arsenic - xx	4.90	U	4.5	NA	Teflon	ICP 6010B	12/15/11
Beryllium - xx	2.49		2	124.5%	Teflon	ICP 6010B	12/15/11
Bismuth	9.80	U	NA	NA	Teflon	ICP 6010B	12/15/11
Boron - xx	352	U	NA	NA	Rock	ICP 6010B	12/15/11
Cadmium - xx	2.45	U	0.18	NA	Teflon	ICP 6010B	12/15/11
Chromium - xx	41.8	U	6.1	NA	80/20 Fusion	ICP 6010B	01/09/12
Cobalt - xx	2.45	U	1.5	NA	Teflon	ICP 6010B	12/15/11
Copper	5.31		5.9	90.0%	Teflon	ICP 6010B	12/15/11
Lanthanum - xx	24.8		33	75.2%	Teflon	ICP 6010B	12/15/11
Lead	12.0		16.4	73.2%	Teflon	ICP 6010B	12/15/11
Lithium - xx	41.9		47	89.1%	Teflon	ICP 6010B	12/15/11
Molybdenum - xx	3.56		3	118.7%	Teflon	ICP 6010B	12/15/11
Nickel	3.73		3.6	103.6%	Teflon	ICP 6010B	12/15/11
Palladium	12.3	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	138		157	87.9%	Teflon	ICP 6010B	12/15/11
Potassium	30000		34500	87.0%	Teflon	ICP 6010B	12/15/11
Selenium	4.90	U	NA	NA	Teflon	ICP 6010B	12/15/11
Silver	4.90	U	NA	NA	Teflon	ICP 6010B	12/15/11
Sodium	32400		35900	90.3%	Teflon	ICP 6010B	12/15/11
Strontium	58.3		63.5	91.8%	Teflon	ICP 6010B	12/15/11
Sulfur - xx	123	U	18	NA	Teflon	ICP 6010B	12/15/11
Thallium	12.3	U	0.54	NA	Teflon	ICP 6010B	12/15/11
Thorium	24.5	U	12.4	NA	Teflon	ICP 6010B	12/15/11
Tin	4.90	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tungsten	4.90	U	NA	NA	Teflon	ICP 6010B	12/20/11
Uranium	49.0	U	4.58	NA	Teflon	ICP 6010B	12/15/11
Vanadium - xx	5.92		15	39.5%	Teflon	ICP 6010B	12/15/11
Yttrium - xx	32.7		41	79.8%	Teflon	ICP 6010B	12/15/11
Zinc - xx	44.2		55	80.4%	Teflon	ICP 6010B	12/15/11
Zirconium - xx	259		295	87.8%	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 3 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS11M02DG3TF / 11M02DG5 / 11M02DG2RK

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony - xx	6.19	U	0.3	NA	Teflon	ICP 6010B	12/15/11
Arsenic - xx	4.13	U	2.5	NA	Teflon	ICP 6010B	12/15/11
Beryllium - xx	2.06	U	0.7	NA	Teflon	ICP 6010B	12/15/11
Bismuth	8.26	U	NA	NA	Teflon	ICP 6010B	12/15/11
Boron - xx	331	U	1.3	NA	Rock	ICP 6010B	12/15/11
Cadmium	2.06	U	NA	NA	Teflon	ICP 6010B	12/15/11
Chromium	375		332	113.0%	80/20 Fusion	ICP 6010B	01/09/12
Cobalt - xx	44.3		49.7	89.1%	Teflon	ICP 6010B	12/15/11
Copper - xx	93.8		96	97.7%	Teflon	ICP 6010B	12/15/11
Lanthanum - xx	4.33		5.3	81.7%	Teflon	ICP 6010B	12/15/11
Lead	4.13	U	3.3	NA	Teflon	ICP 6010B	12/15/11
Lithium - xx	11.2		7	160.0%	Teflon	ICP 6010B	12/15/11
Molybdenum	2.06	U	NA	NA	Teflon	ICP 6010B	12/15/11
Nickel - xx	147		150	98.0%	Teflon	ICP 6010B	12/15/11
Palladium	10.3	U	NA	NA	Teflon	ICP 6010B	12/15/11
Phosphorus	584		585	99.8%	Teflon	ICP 6010B	12/15/11
Potassium	1740		1550	112.3%	Teflon	ICP 6010B	12/15/11
Selenium	4.13	U	NA	NA	Teflon	ICP 6010B	12/15/11
Silver	4.13	U	NA	NA	Teflon	ICP 6010B	12/15/11
Sodium	17000		15900	106.9%	Teflon	ICP 6010B	12/15/11
Strontium	178		169	105.3%	Teflon	ICP 6010B	12/15/11
Sulfur - xx	155		117	132.5%	Teflon	ICP 6010B	12/15/11
Thallium	10.3	U	NA	NA	Teflon	ICP 6010B	12/15/11
Thorium	20.6	U	0.33	NA	Teflon	ICP 6010B	12/15/11
Tin	4.13	U	NA	NA	Teflon	ICP 6010B	12/15/11
Tungsten	4.13	U	NA	NA	Teflon	ICP 6010B	12/20/11
Uranium - xx	41.3	U	0.37	NA	Teflon	ICP 6010B	12/15/11
Vanadium - xx	247		250	98.8%	Teflon	ICP 6010B	12/15/11
Yttrium - xx	17.6		17	103.5%	Teflon	ICP 6010B	12/15/11
Zinc - xx	70.5		58	121.6%	Teflon	ICP 6010B	12/15/11
Zirconium - xx	45.5	U	61	NA	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 4 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS11M06DG2

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Lanthanum - xx	91.9	U	33	NA	Teflon Res	ICP 6010B	01/09/12
Potassium	29200		34500	84.6%	Teflon Res	ICP 6010B	01/09/12
Sodium	36800		35900	102.5%	Teflon Res	ICP 6010B	01/09/12
Strontium	73.8		63.5	116.2%	Teflon Res	ICP 6010B	01/09/12
Vanadium - xx	46.0	U	15	NA	Teflon Res	ICP 6010B	01/09/12
Yttrium - xx	46.0	U	41	NA	Teflon Res	ICP 6010B	01/09/12
Zirconium - xx	183		295	62.0%	80/20 Fus Res	ICP 6010B	01/16/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 4 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS11M06DG3

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Lanthanum - xx	95.6	U	5.3	NA	Teflon Res	ICP 6010B	01/09/12
Potassium	2870	U	1550	NA	Teflon Res	ICP 6010B	01/09/12
Sodium	16500		15900	103.8%	Teflon Res	ICP 6010B	01/09/12
Strontium	180		169	106.5%	Teflon Res	ICP 6010B	01/09/12
Vanadium - xx	269		250	107.6%	Teflon Res	ICP 6010B	01/09/12
Yttrium - xx	47.8	U	17	NA	Teflon Res	ICP 6010B	01/09/12
Zirconium - xx	44.0		61	72.1%	80/20 Fus Res	ICP 6010B	01/16/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 5 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS12A17KE1 / 12A07KE3

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	73800		74900	98.5%	80/20 Fusion	ICP 6010B	01/17/12
Barium - xx	918		1140	80.5%	80/20 Fusion	ICP 6010B	01/17/12
Calcium	7440		7030	105.8%	80/20 Fusion	ICP 6010B	01/17/12
Chromium - xx	48.3	U	6.1	NA	80/20 Fusion	ICP 6010B	01/09/12
Iron	14900		14300	104.2%	80/20 Fusion	ICP 6010B	01/17/12
Magnesium - xx	1520		1390	109.4%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	414		403	102.7%	80/20 Fusion	ICP 6010B	01/17/12
Silicon	343000		341000	100.6%	80/20 Fusion	ICP 6010B	01/17/12
Titanium	1400		1450	96.6%	80/20 Fusion	ICP 6010B	01/17/12
Zirconium - xx	250		295	84.7%	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 5 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS12A17KE2 / 12A07KE4

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	92400		91900	100.5%	80/20 Fusion	ICP 6010B	01/17/12
Barium - xx	185		200	92.5%	80/20 Fusion	ICP 6010B	01/17/12
Calcium - xx	90800		87000	104.4%	80/20 Fusion	ICP 6010B	01/17/12
Chromium	328		332	98.8%	80/20 Fusion	ICP 6010B	01/09/12
Iron	74400		72400	102.8%	80/20 Fusion	ICP 6010B	01/17/12
Magnesium - xx	52000		50700	102.6%	80/20 Fusion	ICP 6010B	01/17/12
Manganese	1350		1290	104.7%	80/20 Fusion	ICP 6010B	01/17/12
Silicon	229000		226000	101.3%	80/20 Fusion	ICP 6010B	01/17/12
Titanium	6970		6930	100.6%	80/20 Fusion	ICP 6010B	01/17/12
Zirconium - xx	49.4	U	61	NA	80/20 Fusion	ICP 6010B	01/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 6 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 278 - Obsidian Rock - LCS12B08KE1

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	75700		74900	101.1%	80/20 Fusion	ICP 6010B	02/09/12
Barium - xx	877		1140	76.9%	80/20 Fusion	ICP 6010B	02/09/12
Calcium	6810		7030	96.9%	80/20 Fusion	ICP 6010B	02/09/12
Iron	13800		14300	96.5%	80/20 Fusion	ICP 6010B	02/09/12
Magnesium - xx	1380		1390	99.3%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	394		403	97.8%	80/20 Fusion	ICP 6010B	02/09/12
Silicon	334000		341000	97.9%	80/20 Fusion	ICP 6010B	02/09/12
Titanium	1400		1450	96.6%	80/20 Fusion	ICP 6010B	02/09/12
Zirconium - xx	253		295	85.8%	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 6 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111109-3

SRR #: 45511, 45562, 45629, 45690

Lab System ID: SRM 688 - Basalt Rock - LCS12B08KE2

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	93500		91900	101.7%	80/20 Fusion	ICP 6010B	02/09/12
Barium - xx	167		200	83.5%	80/20 Fusion	ICP 6010B	02/09/12
Calcium - xx	83300		87000	95.7%	80/20 Fusion	ICP 6010B	02/09/12
Iron	69600		72400	96.1%	80/20 Fusion	ICP 6010B	02/09/12
Magnesium - xx	48500		50700	95.7%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	1280		1290	99.2%	80/20 Fusion	ICP 6010B	02/09/12
Silicon	225000		226000	99.6%	80/20 Fusion	ICP 6010B	02/09/12
Titanium	6970		6930	100.6%	80/20 Fusion	ICP 6010B	02/09/12
Zirconium - xx	48.4	U	61	NA	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB21-07-19.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/12/11

Task Order #: 111213-14

SRR #: 45412

Lab System ID: 473043

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	91100		4780	Al2O3	17.217%	80/20 Fusion	ICP 6010B	02/09/12
Antimony	45.4		0.743			Teflon	ICP 6010B	01/26/12
Arsenic	110	N	0.495			Teflon	ICP 6010B	01/29/12
Barium	498		47.8	BaO	0.0556%	80/20 Fusion	ICP 6010B	02/09/12
Beryllium	0.931	N	0.248			Teflon	ICP 6010B	01/29/12
Bismuth	9.90	U	9.9			Teflon	ICP 6010B	02/08/12
Boron	179	U	179			rock	ICP 6010B	01/29/12
Cadmium	1.90	N	0.248			Teflon	ICP 6010B	01/29/12
Calcium	2190		478	CaO	0.306%	80/20 Fusion	ICP 6010B	02/09/12
Chromium	136		47.8			80/20 Fusion	ICP 6010B	02/09/12
Cobalt	1.36		0.248			Teflon	ICP 6010B	01/26/12
Copper	66.1		2.48			Teflon	ICP 6010B	01/26/12
Iron	64000		478	Fe2O3	9.156%	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum	10.2		0.248			Teflon	ICP 6010B	01/29/12
Lead	28.0	N	0.495			Teflon	ICP 6010B	01/29/12
Lithium	31.2		0.495			Teflon	ICP 6010B	01/27/12
Magnesium	7420		478	MgO	1.231%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	58.4		47.8	MnO	0.0075%	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	520		7.43	MoO3	0.0780%	Combined	ICP 6010B	Combined
Nickel	23.9		2.48			Teflon	ICP 6010B	01/26/12
Palladium	12.4	U	12.4			Teflon	ICP 6010B	01/26/12
Phosphorus	220		99	P2O5	0.0504%	Teflon	ICP 6010B	01/26/12
Potassium	32400		297	K2O	3.902%	Combined	ICP 6010B	Combined
Selenium	11.5	N	0.495			Teflon	ICP 6010B	01/26/12
Silicon	272000		1910	SiO2	58.241%	80/20 Fusion	ICP 6010B	02/09/12
Silver	1.65	N	0.495			Teflon	ICP 6010B	01/29/12
Sodium	1360	N	136	Na2O	0.184%	Combined	ICP 6010B	Combined
Strontium	82.0		4.95			Combined	ICP 6010B	Combined
Sulfur	199		1.24			Teflon	ICP 6010B	01/26/12
Thallium	12.4	U	12.4			Teflon	ICP 6010B	01/26/12
Thorium	32.2	U	32.2			Teflon	ICP 6010B	01/26/12
Tin	6.15		0.495			Teflon	ICP 6010B	01/29/12
Titanium	4530		47.8	TiO2	0.755%	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	2.48	U	2.48			Teflon	ICP 6010B	01/29/12
Uranium	49.5	U	49.5			Teflon	ICP 6010B	02/08/12
Vanadium	1800		47.8	V2O5	0.321%	80/20 Fusion	ICP 6010B	02/09/12
Yttrium	25.8		2.72			Combined	ICP 6010B	Combined
Zinc	107	N	7.43			Teflon	ICP 6010B	01/26/12
Zirconium	107		47.8	ZrO2	0.0145%	80/20 Fusion	ICP 6010B	02/09/12
LOI @ 1000°C	8.61%			SUM	100.13%			

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB31-07-2.0

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 09/01/11

Task Order #: 111213-14

SRR #: 45570

Lab System ID: 474340

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Oxide	Concentration	Prep Method	Instrument	Date Analyzed
Aluminum	69000		4830	Al2O3	13.034%	80/20 Fusion	ICP 6010B	02/09/12
Antimony	1.05		0.747			Teflon	ICP 6010B	01/27/12
Arsenic	17.3	N	0.498			Teflon	ICP 6010B	01/29/12
Barium	450		48.3	BaO	0.0503%	80/20 Fusion	ICP 6010B	02/09/12
Beryllium	1.16	N	0.249			Teflon	ICP 6010B	01/29/12
Bismuth	9.96	U	9.96			Teflon	ICP 6010B	02/08/12
Boron	192	U	192			rock	ICP 6010B	01/29/12
Cadmium	0.249	UN	0.249			Teflon	ICP 6010B	01/29/12
Calcium	854		483	CaO	0.120%	80/20 Fusion	ICP 6010B	02/09/12
Chromium	99.2		48.3			80/20 Fusion	ICP 6010B	02/09/12
Cobalt	6.23		0.249			Teflon	ICP 6010B	01/27/12
Copper	19.7		2.49			Teflon	ICP 6010B	01/26/12
Iron	35600		483	Fe2O3	5.083%	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum	7.92		0.249			Teflon	ICP 6010B	01/29/12
Lead	19.4	N	0.498			Teflon	ICP 6010B	01/29/12
Lithium	67.4		0.498			Teflon	ICP 6010B	01/27/12
Magnesium	3720		483	MgO	0.617%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	202		48.3	MnO	0.0261%	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	16.0		2.49			Teflon	ICP 6010B	01/26/12
Nickel	20.7		2.49			Teflon	ICP 6010B	01/26/12
Palladium	12.5	U	12.5			Teflon	ICP 6010B	01/26/12
Phosphorus	181		99.6	P2O5	0.0414%	Teflon	ICP 6010B	01/26/12
Potassium	17500		299	K2O	2.103%	Combined	ICP 6010B	Combined
Selenium	2.53	N	0.498			Teflon	ICP 6010B	01/27/12
Silicon	332000		1930	SiO2	71.064%	80/20 Fusion	ICP 6010B	02/09/12
Silver	0.498	UN	0.498			Teflon	ICP 6010B	01/29/12
Sodium	3400	N	137	Na2O	0.459%	Combined	ICP 6010B	Combined
Strontium	69.6		4.98			Combined	ICP 6010B	Combined
Sulfur	69.5		1.25			Teflon	ICP 6010B	01/27/12
Thallium	12.5	U	12.5			Teflon	ICP 6010B	01/26/12
Thorium	32.4	U	32.4			Teflon	ICP 6010B	01/26/12
Tin	8.54		0.498			Teflon	ICP 6010B	01/29/12
Titanium	5950		48.3	TiO2	0.992%	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	2.49	U	2.49			Teflon	ICP 6010B	01/29/12
Uranium	49.8	U	49.8			Teflon	ICP 6010B	02/08/12
Vanadium	144		48.3	V2O5	0.0258%	80/20 Fusion	ICP 6010B	02/09/12
Yttrium	25.0		2.74			Combined	ICP 6010B	Combined
Zinc	57.5	N	7.47			Teflon	ICP 6010B	01/26/12
Zirconium	335		48.3	ZrO2	0.0453%	80/20 Fusion	ICP 6010B	02/09/12
LOI @ 1000°C	6.38%			SUM	100.04%			

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 7

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: PB11M14DG1TF / 12B08KE1 / 11M14DG1RK

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Aluminum	5000	U	5000	80/20 Fusion	ICP 6010B	02/09/12
Antimony	0.750	U	0.750	Teflon	ICP 6010B	01/26/12
Arsenic	0.500	U	0.500	Teflon	ICP 6010B	01/29/12
Barium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Beryllium	0.250	U	0.250	Teflon	ICP 6010B	01/29/12
Bismuth	1.00	U	1.00	Teflon	ICP 6010B	02/08/12
Boron	200	U	200	rock	ICP 6010B	01/29/12
Cadmium	0.250	U	0.250	Teflon	ICP 6010B	01/29/12
Calcium	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Chromium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Cobalt	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Copper	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Iron	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum	0.250	U	0.250	Teflon	ICP 6010B	01/29/12
Lead	0.500	U	0.500	Teflon	ICP 6010B	01/29/12
Lithium	0.500	U	0.500	Teflon	ICP 6010B	01/27/12
Magnesium	500	U	500	80/20 Fusion	ICP 6010B	02/09/12
Manganese	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Nickel	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Palladium	1.25	U	1.25	Teflon	ICP 6010B	01/26/12
Phosphorus	10.0	U	10.0	Teflon	ICP 6010B	01/26/12
Potassium	15.0	U	15.0	Teflon	ICP 6010B	02/09/12
Selenium	0.500	U	0.500	Teflon	ICP 6010B	01/26/12
Silicon	2000	U	2000	80/20 Fusion	ICP 6010B	02/09/12
Silver	0.500	U	0.500	Teflon	ICP 6010B	01/29/12
Sodium	12.5	U	12.5	Teflon	ICP 6010B	01/27/12
Strontium	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Sulfur	1.25	U	1.25	Teflon	ICP 6010B	01/26/12
Thallium	1.25	U	1.25	Teflon	ICP 6010B	01/26/12
Thorium	3.25	U	3.25	Teflon	ICP 6010B	01/26/12
Tin	0.500	U	0.500	Teflon	ICP 6010B	01/29/12
Titanium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	2.50	U	2.50	Teflon	ICP 6010B	01/29/12
Uranium	5.00	U	5.00	Teflon	ICP 6010B	02/08/12
Vanadium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12
Yttrium	0.250	U	0.250	Teflon	ICP 6010B	01/26/12
Zinc	0.750	U	0.750	Teflon	ICP 6010B	01/26/12
Zirconium	50.0	U	50.0	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
BLANK SUMMARY

Sample ID: Prep Blank 8

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: PB11M15DG2

Analysis	Sample Result (mg/Kg)	Qualifier	Reporting Limit (mg/Kg)	Prep Method	Instrument	Date Analyzed
Molybdenum	5.00	U	5.00	Teflon Res	ICP 6010B	01/27/12
Potassium	150	U	150	Teflon Res	ICP 6010B	02/09/12
Sodium	125	U	125	Teflon Res	ICP 6010B	01/27/12
Strontium	2.50	U	2.50	Teflon Res	ICP 6010B	01/27/12
Yttrium	2.50	U	2.50	Teflon Res	ICP 6010B	01/27/12

NA - Not Applicable
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 3

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: LCS11M14DG1

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Antimony	45.8		50.0	91.6%	Teflon	ICP 6010B	01/26/12
Arsenic	185		200	92.5%	Teflon	ICP 6010B	01/29/12
Beryllium	4.50		5.00	90.0%	Teflon	ICP 6010B	01/29/12
Bismuth	1.00	U	NA	NA	Teflon	ICP 6010B	02/08/12
Cadmium	4.57		5.00	91.4%	Teflon	ICP 6010B	01/29/12
Cobalt	44.6		50.0	89.2%	Teflon	ICP 6010B	01/26/12
Copper	21.7		25.0	86.8%	Teflon	ICP 6010B	01/26/12
Lanthanum	0.250	U	NA	NA	Teflon	ICP 6010B	01/29/12
Lead	42.6		50.0	85.2%	Teflon	ICP 6010B	01/29/12
Lithium	0.500	U	NA	NA	Teflon	ICP 6010B	01/27/12
Molybdenum	0.250	U	NA	NA	Teflon	ICP 6010B	01/26/12
Nickel	44.0		50.0	88.0%	Teflon	ICP 6010B	01/26/12
Palladium	1.25	U	NA	NA	Teflon	ICP 6010B	01/26/12
Phosphorus	10.0	U	NA	NA	Teflon	ICP 6010B	01/26/12
Potassium	886		1000	88.6%	Teflon	ICP 6010B	02/09/12
Selenium	191		200	95.5%	Teflon	ICP 6010B	01/26/12
Silver	4.67		5.00	93.4%	Teflon	ICP 6010B	01/29/12
Sodium	934		1000	93.4%	Teflon	ICP 6010B	01/27/12
Strontium	0.250	U	NA	NA	Teflon	ICP 6010B	01/26/12
Sulfur	2.76		NA	NA	Teflon	ICP 6010B	01/26/12
Thallium	185		200	92.5%	Teflon	ICP 6010B	01/26/12
Thorium	3.25	U	NA	NA	Teflon	ICP 6010B	01/26/12
Tin	0.500	U	NA	NA	Teflon	ICP 6010B	01/29/12
Tungsten	2.50	U	NA	NA	Teflon	ICP 6010B	01/29/12
Uranium	5.00	U	NA	NA	Teflon	ICP 6010B	02/08/12
Yttrium	0.250	U	NA	NA	Teflon	ICP 6010B	01/26/12
Zinc	47.3		50.0	94.6%	Teflon	ICP 6010B	01/26/12

NA - Not Applicable

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 7 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: SRM 278 - Obsidian Rock - LCS11M14DG1 / 11M14DG2 / 12B08KE1

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	75700		74900	101.1%	80/20 Fusion	ICP 6010B	02/09/12
Antimony - xx	6.44	U	1.5	NA	Teflon	ICP 6010B	01/26/12
Arsenic - xx	4.29	U	4.5	NA	Teflon	ICP 6010B	01/29/12
Barium - xx	877		1140	76.9%	80/20 Fusion	ICP 6010B	02/09/12
Beryllium - xx	2.20		2	NA	Teflon	ICP 6010B	01/29/12
Bismuth	8.58	U	NA	NA	Teflon	ICP 6010B	02/08/12
Boron - xx	194	U	NA	NA	rock	ICP 6010B	01/29/12
Cadmium - xx	2.15	U	0.18	NA	Teflon	ICP 6010B	01/29/12
Calcium	6810		7030	96.9%	80/20 Fusion	ICP 6010B	02/09/12
Chromium - xx	48.6	U	6.1	NA	80/20 Fusion	ICP 6010B	02/09/12
Cobalt - xx	2.15	U	1.5	NA	Teflon	ICP 6010B	01/26/12
Copper	5.22		5.9	88.5%	Teflon	ICP 6010B	01/26/12
Iron	13800		14300	96.5%	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum - xx	26.3		33	79.7%	Teflon	ICP 6010B	01/29/12
Lead	14.8		16.4	90.2%	Teflon	ICP 6010B	01/29/12
Lithium - xx	44.0		47	93.6%	Teflon	ICP 6010B	01/27/12
Magnesium - xx	1380		1390	99.3%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	394		403	97.8%	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum - xx	3.60		3	120.0%	Teflon	ICP 6010B	01/26/12
Nickel	3.96		3.6	110.0%	Teflon	ICP 6010B	01/26/12
Palladium	10.7	U	NA	NA	Teflon	ICP 6010B	01/26/12
Phosphorus	144		157	91.7%	Teflon	ICP 6010B	01/26/12
Potassium	29900		34500	86.7%	Teflon	ICP 6010B	02/09/12
Selenium	4.29	U	NA	NA	Teflon	ICP 6010B	01/26/12
Silicon	334000		341000	97.9%	80/20 Fusion	ICP 6010B	02/09/12
Silver	4.29	U	NA	NA	Teflon	ICP 6010B	01/29/12
Sodium	31400		35900	87.5%	Teflon	ICP 6010B	01/27/12
Strontium	65.4		63.5	103.0%	Teflon	ICP 6010B	01/26/12
Sulfur - xx	23.7		18	131.7%	Teflon	ICP 6010B	01/26/12
Thallium	10.7	U	0.54	NA	Teflon	ICP 6010B	01/26/12
Thorium	27.9	U	12.4	NA	Teflon	ICP 6010B	01/26/12
Tin	4.29	U	NA	NA	Teflon	ICP 6010B	01/29/12
Titanium	1400		1450	96.6%	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	21.5	U	NA	NA	Teflon	ICP 6010B	01/29/12
Uranium	42.9	U	4.58	NA	Teflon	ICP 6010B	02/08/12
Vanadium - xx	48.6	U	15	NA	80/20 Fusion	ICP 6010B	02/09/12
Yttrium - xx	32.9		41	80.2%	Teflon	ICP 6010B	01/26/12
Zinc - xx	51.0		55	92.7%	Teflon	ICP 6010B	01/26/12
Zirconium - xx	253		295	85.8%	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 7 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: SRM 688 - Basalt Rock - LCS11M14DG2 / 11M14DG3 / 12B08KE2

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Aluminum	93500		91900	101.7%	80/20 Fusion	ICP 6010B	02/09/12
Antimony - xx	7.12	U	0.3	NA	Teflon	ICP 6010B	01/26/12
Arsenic - xx	4.74	U	2.5	NA	Teflon	ICP 6010B	01/29/12
Barium - xx	167		200	83.5%	80/20 Fusion	ICP 6010B	02/09/12
Beryllium - xx	2.37	U	0.7	NA	Teflon	ICP 6010B	01/29/12
Bismuth	9.49	U	NA	NA	Teflon	ICP 6010B	02/08/12
Boron - xx	173	U	25	NA	rock	ICP 6010B	01/29/12
Cadmium	2.37	U	NA	NA	Teflon	ICP 6010B	01/29/12
Calcium - xx	83300		87000	95.7%	80/20 Fusion	ICP 6010B	02/09/12
Chromium	341		332	102.7%	80/20 Fusion	ICP 6010B	02/09/12
Cobalt - xx	42.9		49.7	86.3%	Teflon	ICP 6010B	01/26/12
Copper - xx	85.4		96	89.0%	Teflon	ICP 6010B	01/26/12
Iron	69600		72400	96.1%	80/20 Fusion	ICP 6010B	02/09/12
Lanthanum - xx	5.34		5.3	100.8%	Teflon	ICP 6010B	01/29/12
Lead	4.74	U	3.3	NA	Teflon	ICP 6010B	01/29/12
Lithium - xx	11.1		7	158.6%	Teflon	ICP 6010B	01/27/12
Magnesium - xx	48500		50700	95.7%	80/20 Fusion	ICP 6010B	02/09/12
Manganese	1280		1290	99.2%	80/20 Fusion	ICP 6010B	02/09/12
Molybdenum	2.37	U	NA	NA	Teflon	ICP 6010B	01/26/12
Nickel - xx	149		150	99.3%	Teflon	ICP 6010B	01/26/12
Palladium	11.9	U	NA	NA	Teflon	ICP 6010B	01/26/12
Phosphorus	556		585	95.0%	Teflon	ICP 6010B	01/26/12
Potassium	1360		1550	87.7%	Teflon	ICP 6010B	02/09/12
Selenium	4.74	U	NA	NA	Teflon	ICP 6010B	01/26/12
Silicon	225000		226000	99.6%	80/20 Fusion	ICP 6010B	02/09/12
Silver	4.74	U	NA	NA	Teflon	ICP 6010B	01/29/12
Sodium	14200		15900	89.3%	Teflon	ICP 6010B	01/27/12
Strontium	175		169	103.6%	Teflon	ICP 6010B	01/26/12
Sulfur - xx	119		117	101.7%	Teflon	ICP 6010B	01/26/12
Thallium	11.9	U	NA	NA	Teflon	ICP 6010B	01/26/12
Thorium	30.8	U	0.33	NA	Teflon	ICP 6010B	01/26/12
Tin	7.56		NA	NA	Teflon	ICP 6010B	01/29/12
Titanium	6970		6930	100.6%	80/20 Fusion	ICP 6010B	02/09/12
Tungsten	23.7	U	NA	NA	Teflon	ICP 6010B	01/29/12
Uranium - xx	47.4	U	0.37	NA	Teflon	ICP 6010B	02/08/12
Vanadium - xx	256		250	102.4%	80/20 Fusion	ICP 6010B	02/09/12
Yttrium - xx	16.6		17	97.6%	Teflon	ICP 6010B	01/26/12
Zinc - xx	71.3		58	122.9%	Teflon	ICP 6010B	01/26/12
Zirconium - xx	48.4	U	61	NA	80/20 Fusion	ICP 6010B	02/09/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 8 - SRM 278

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: SRM 278 - Obsidian Rock - LCS11M15DG3

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Molybdenum - xx	97.5	U	3	NA	Teflon Res	ICP 6010B	01/27/12
Potassium	27100		34500	78.6%	Teflon Res	ICP 6010B	02/09/12
Sodium	32700		35900	91.1%	Teflon Res	ICP 6010B	01/27/12
Strontium	72.4		63.5	114.0%	Teflon Res	ICP 6010B	01/27/12
Yttrium - xx	48.7	U	41	NA	Teflon Res	ICP 6010B	01/27/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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SOUTHWEST RESEARCH INSTITUTE
LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 8 - SRM 688

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: Solid

Date Received: NA

Task Order #: 111213-14

SRR #: 45412, 45570

Lab System ID: SRM 688 - Basalt Rock - LCS11M15DG4

Analysis	Sample Result (mg/Kg)	Qualifier	True Value (mg/Kg)	Recovery	Prep Method	Instrument	Date Analyzed
Molybdenum	91.6	U	NA	NA	Teflon Res	ICP 6010B	01/27/12
Potassium	2750	U	1550	NA	Teflon Res	ICP 6010B	02/09/12
Sodium	14800		15900	93.1%	Teflon Res	ICP 6010B	01/27/12
Strontium	181		169	107.1%	Teflon Res	ICP 6010B	01/27/12
Yttrium - xx	45.8	U	17	NA	Teflon Res	ICP 6010B	01/27/12

NA - Not Applicable
xx - True Values listed are reference values only - not certified values.

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Appendix B

TIC/TOC, Bulk & Particle Density and Surface Area Results

Client: Fluor-B&W Portsmouth LLC
SDG: 473757
SwRI Project Number: 16526.05.00X
SwRI Task Order Number: 111109-3, 111213-14

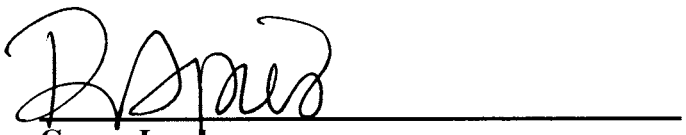
Samples were analyzed for the following:

TIC/TOC – SW 846 9060M
Particle Density – MOSA Chapter 14M
Bulk Density – MOSA Chapter 13
BET Surface Area – MOSA Chapter 16

QC:

All applicable procedure blanks were less than the reporting limit, and all laboratory control samples were within 80-120%. Sample duplicate RPDs were within 20% with the exception of the TIC. The TIC's 200% RPD resulted from one result being less than the reporting limit and the other result was two times higher than the reporting limit. Matrix spike is only applicable to the TOC analysis; the recovery was 127%.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."



Group Leader

09/25/12
Date

SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB02-07-24.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/25/11

Task Order #: 111109-3

SRR #: 45511

Lab System ID: 473757

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	1233	U	1233	mg/kg	12/14/11	SW846 9060M
TOC	24300		1102	mg/kg	12/14/11	SW846 9060M
Particle Density	2.51		---	g/mL	01/10/12	MOSA Ch14-3.2
Bulk Density	1.682		---	g/mL	01/10/12	MOSA Ch13M
BET Surface Area	8.398		---	m^2/g	12/19/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID: WDSB02-07-24.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/25/11

Task Order #: 111109-3

SRR #: 45511

Lab System ID: 473757D

Analysis	Duplicate Result	Q	RPD	Units	Date Analyzed	Method
TIC	2350		200%	mg/kg	03/02/12	SW846 9060M
TOC	22500		7.69%	mg/kg	12/14/11	SW846 9060M

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SOUTHWEST RESEARCH INSTITUTE

MATRIX SPIKE SUMMARY

Sample ID: WDSB02-07-24.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/25/11

Task Order #: 111109-3

SRR #: 45511

Lab System ID: 473757S

Analysis	Spike Result	Q	Spike Added	Recovery	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA	NA
TOC	40300		12600	127%	mg/kg	12/14/11	SW846 9060M

NA - Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB29-07-4.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/31/11

Task Order #: 111109-3

SRR #: 45562

Lab System ID: 474302

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	385	U	385	mg/kg	12/14/11	SW846 9060M
TOC	2013		384	mg/kg	12/05/11	SW846 9060M
Particle Density	2.36		---	g/mL	01/10/12	MOSA Ch14-3.2
Bulk Density	1.428		---	g/mL	01/10/12	MOSA Ch13M
BET Surface Area	25.1309		---	m^2/g	12/19/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID: WDSB29-07-4.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/31/11

Task Order #: 111109-3

SRR #: 45562

Lab System ID: 474302D

Analysis	Duplicate Result	Q	RPD	Units	Date Analyzed	Method
TIC	388	U	0.00%	mg/kg	12/14/11	SW846 9060M
TOC	1835		9.25%	mg/kg	12/05/11	SW846 9060M
Particle Density	2.34		0.85%	g/mL	01/10/12	MOSA Ch14-3.2

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-BE10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475304

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	520		220	mg/kg	12/14/11	SW846 9060M
TOC	3880		214	mg/kg	12/06/11	SW846 9060M
BET Surface Area	1.5015		---	m^2/g	12/19/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-CU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475305

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	603	U	603	mg/kg	12/14/11	SW846 9060M
TOC	11750		391	mg/kg	12/05/11	SW846 9060M
BET Surface Area	12.1175		---	m^2/g	12/19/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW04B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/20/11

Task Order #: 111109-3

SRR #: 45690

Lab System ID: 475306

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	9800		5175	mg/kg	12/14/11	SW846 9060M
TOC	93700		2433	mg/kg	12/14/11	SW846 9060M
BET Surface Area	9.7025		---	m^2/g	03/12/12	MOSA Ch16

NOTE: Sample was oil shale; therefore, samples were heated to 600^{o}C to remove carbonaceous material prior to BET analyses.

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-BE10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475582

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	1655		419	mg/kg	12/14/11	SW846 9060M
TOC	6730		195	mg/kg	12/06/11	SW846 9060M
BET Surface Area	1.3311		---	m^2/g	12/12/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-CU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475583

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	585	U	585	mg/kg	12/14/11	SW846 9060M
TOC	12700		403	mg/kg	12/05/11	SW846 9060M
BET Surface Area	12.4262		---	m^2/g	12/12/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDMW03B-07-SU10

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: BR

Date Received: 09/13/11

Task Order #: 111109-3

SRR #: 45629

Lab System ID: 475584

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	11550		5475	mg/kg	12/14/11	SW846 9060M
TOC	97950		3392	mg/kg	03/02/12	SW846 9060M
BET Surface Area	8.4987		---	m^2/g	03/12/12	MOSA Ch16

NOTE: Sample was oil shale; therefore, samples were heated to 600^{o}C to remove carbonaceous material prior to BET analyses.

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB21-07-19.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/12/11

Task Order #: 111213-14

SRR #: 45412

Lab System ID: 473043

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	970	U	970	mg/kg	12/14/11	SW846 9060M
TOC	10900		867	mg/kg	12/14/11	SW846 9060M
Particle Density	2.32		---	g/mL	01/10/12	MOSA Ch14-3.2
Bulk Density	1.235		---	g/mL	01/10/12	MOSA Ch13M
BET Surface Area	27.9344		---	m^2/g	12/16/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SUMMARY

Sample ID: WDSB21-07-19.5

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 08/12/11

Task Order #: 111213-14

SRR #: 45412

Lab System ID: 473043D

Analysis	Duplicate Result	Q	RPD	Units	Date Analyzed	Method
Bulk Density	1.246		0.89%	g/mL	01/10/12	MOSA Ch13M

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SOUTHWEST RESEARCH INSTITUTE
SAMPLE ANALYSIS DATA SHEET

Sample ID: WDSB31-07-2.0

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO

Date Received: 09/01/11

Task Order #: 111213-14

SRR #: 45570

Lab System ID: 474340

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	440	U	440	mg/kg	12/14/11	SW846 9060M
TOC	7885		438	mg/kg	12/14/11	SW846 9060M
Particle Density	2.47		---	g/mL	01/10/12	MOSA Ch14-3.2
Bulk Density	1.291		---	g/mL	01/10/12	MOSA Ch13M
BET Surface Area	41.2848		---	m^2/g	12/16/11	MOSA Ch16

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

Sample ID
Prep Blank

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: ICB

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA
TOC	100	U	100	mg/L	12/05/11	SW846 9060M
Particle Density	NA		NA	NA	NA	NA
Bulk Density	NA		NA	NA	NA	NA
BET Surface Area	NA		NA	NA	NA	NA

NA - Not Applicable

Comments:
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID
Lab Control

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: LCS

Analysis	Sample Result	Q	True Value	Recovery	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA	NA
TOC	3790		3200	118%	mg/kg	12/05/11	TOC 9060M
Particle Density	0.998		0.998	100%	g/mL	01/10/12	MOSA Ch14-3.2
Bulk Density	1.00		1.00	100%	g/mL	01/10/12	MOSA Ch13M
BET Surface Area	0.7354		0.780	94.3%	m^2/g	12/16/11	MOSA Ch16

NA - Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

Sample ID: Prep Blank 2

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: ICB

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA
TOC	100	U	100	mg/L	12/14/11	SW846 9060M

NA - Not Applicable

Comments:
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 2

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: LCS

Analysis	Sample Result	Q	True Value	Recovery	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA	NA
TOC	3950		3200	123%	mg/kg	12/14/11	TOC 9060M

NA - Not Applicable.

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SOUTHWEST RESEARCH INSTITUTE

BLANK SUMMARY

Sample ID: Prep Blank 3

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: ICB

Analysis	Sample Result	Q	Reporting Limit	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA
TOC	100	U	100	mg/L	03/02/12	SW846 9060M

NA - Not Applicable

Comments:
"U" in the Q (qualifier) column indicates undetected.

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SOUTHWEST RESEARCH INSTITUTE

LABORATORY CONTROL SAMPLE

Sample ID: Lab Control 3

Lab Name: Southwest Research Institute

Client: Fluor-B&W Portsmouth LLC

Lab Code: SwRI

Project No.: 16526.05.00X

Matrix: SO / BR

Date Received: NA

Task Order #: 111109-3, 111213-14

SRR #: 45511, 45562, 45629, 45690, 45412, 45570

Lab System ID: LCS

Analysis	Sample Result	Q	True Value	Recovery	Units	Date Analyzed	Method
TIC	NA		NA	NA	NA	NA	NA
TOC	3320		2980	111%	mg/kg	03/02/12	TOC 9060M

NA - Not Applicable.

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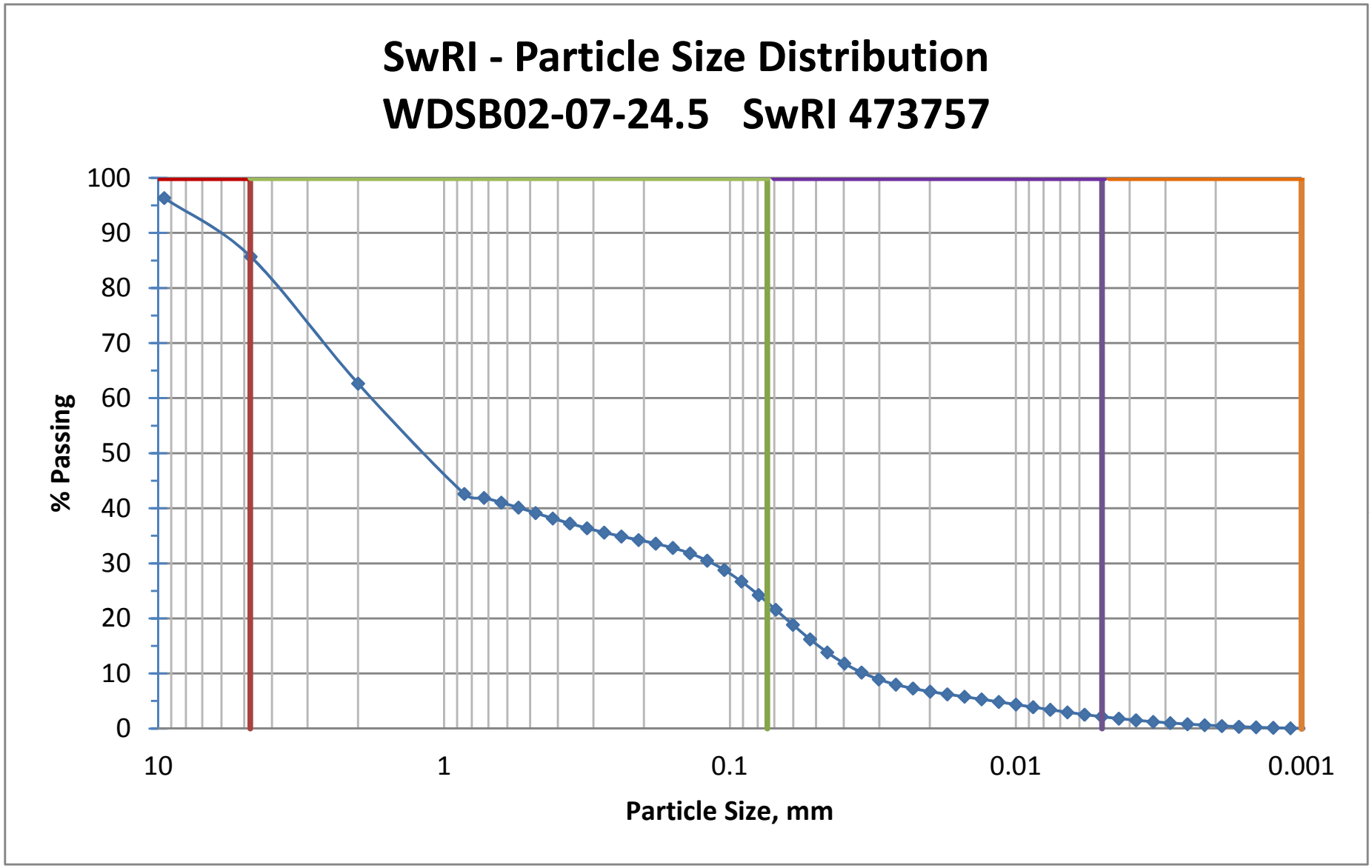
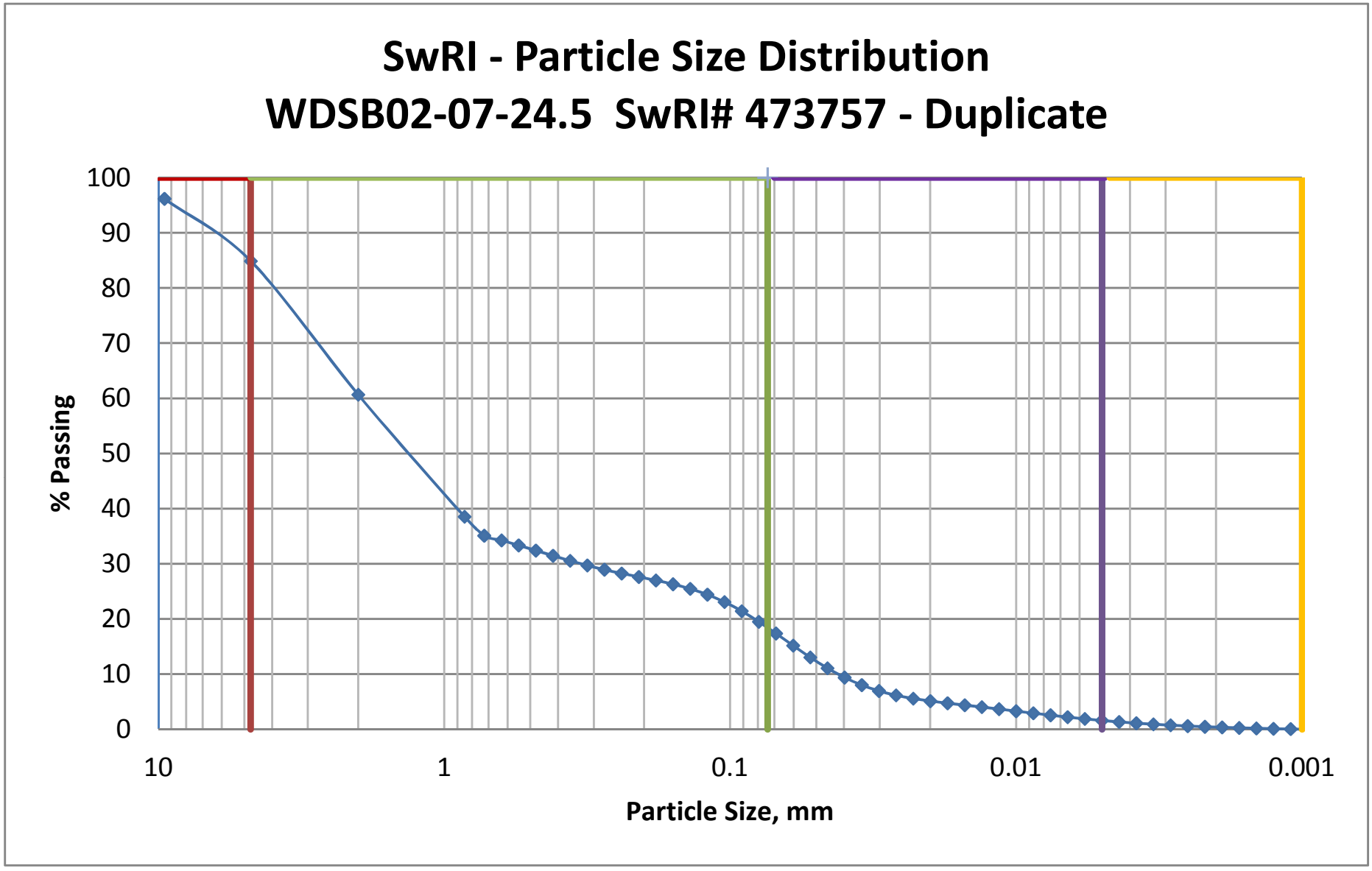
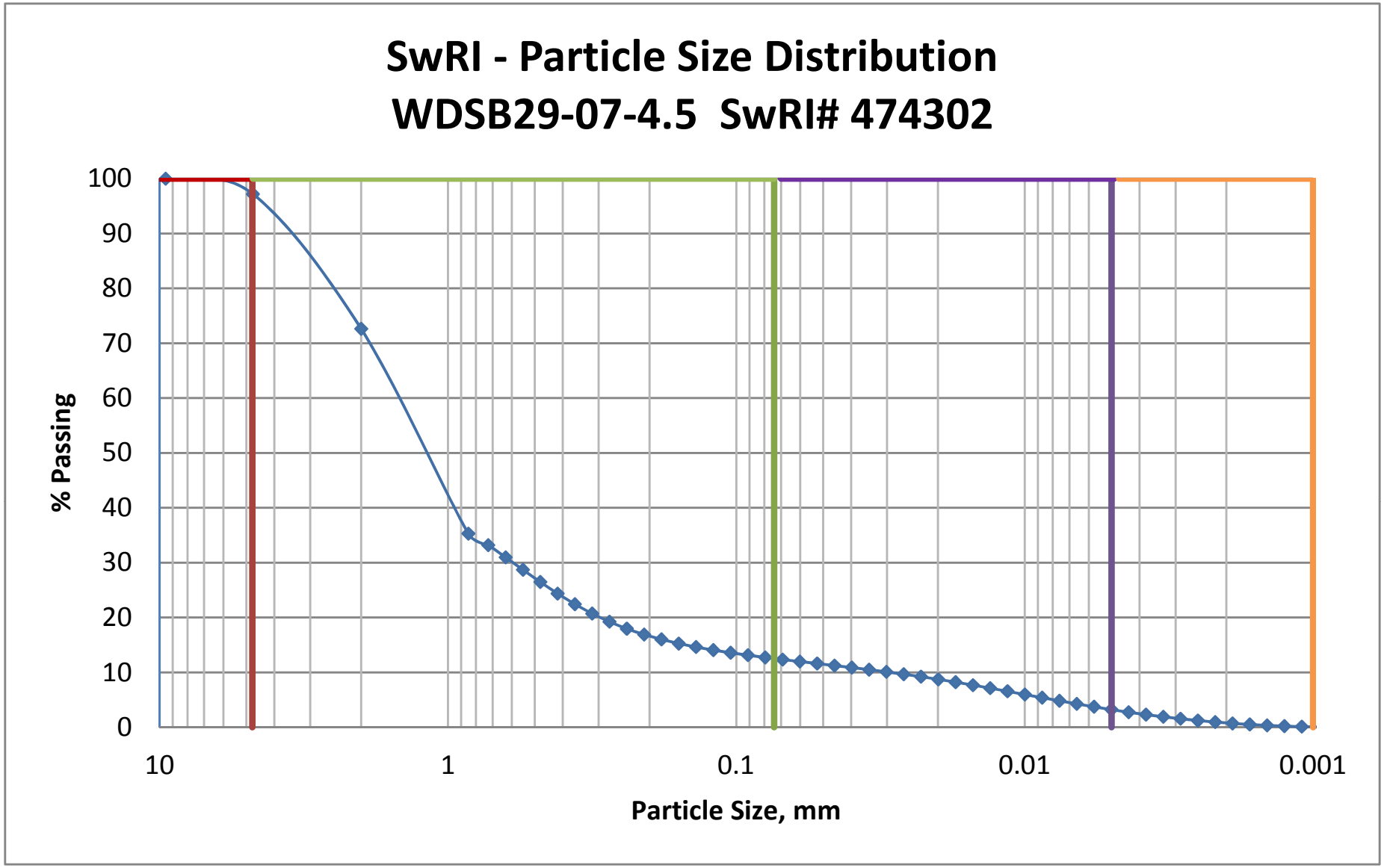
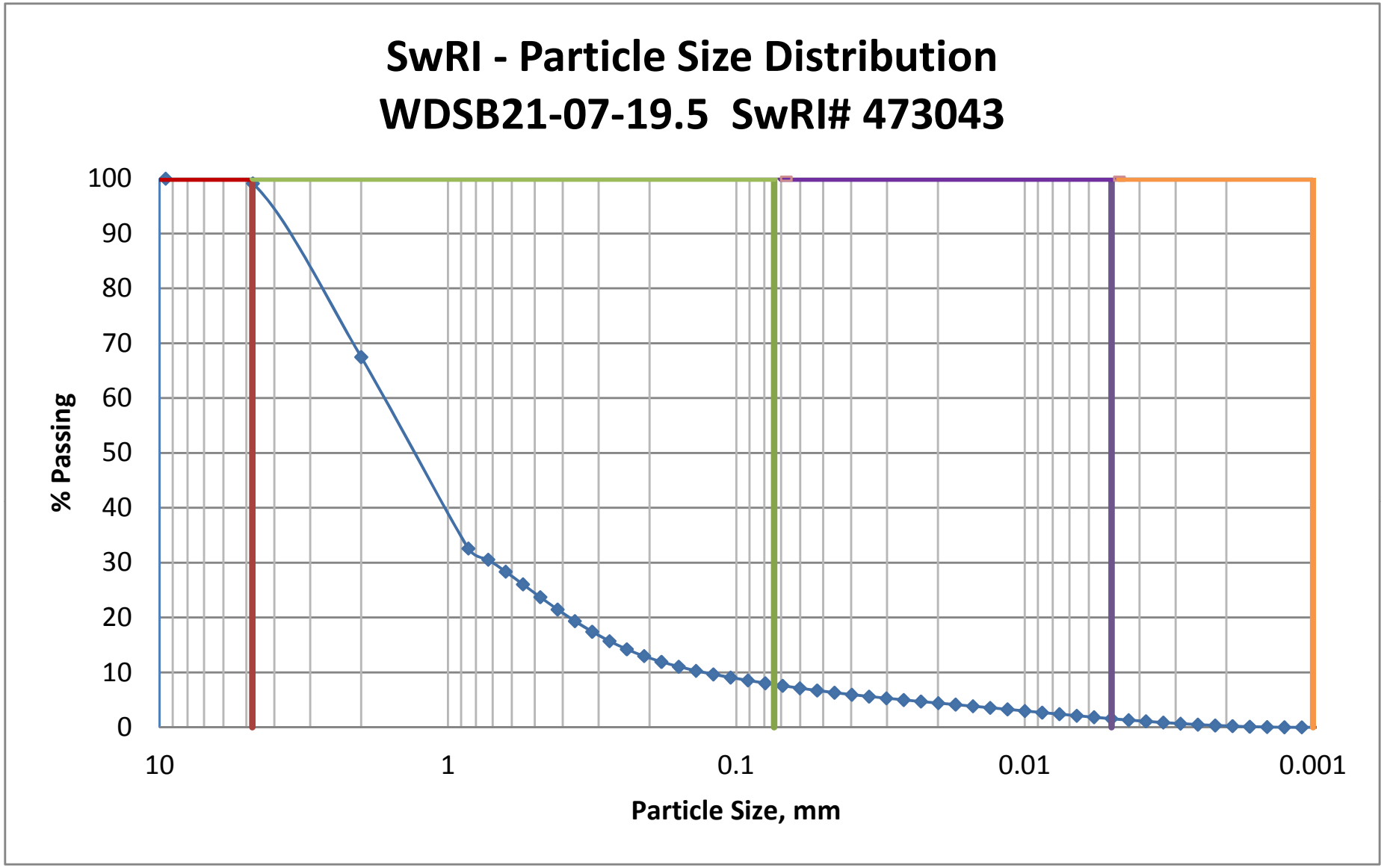
Appendix C

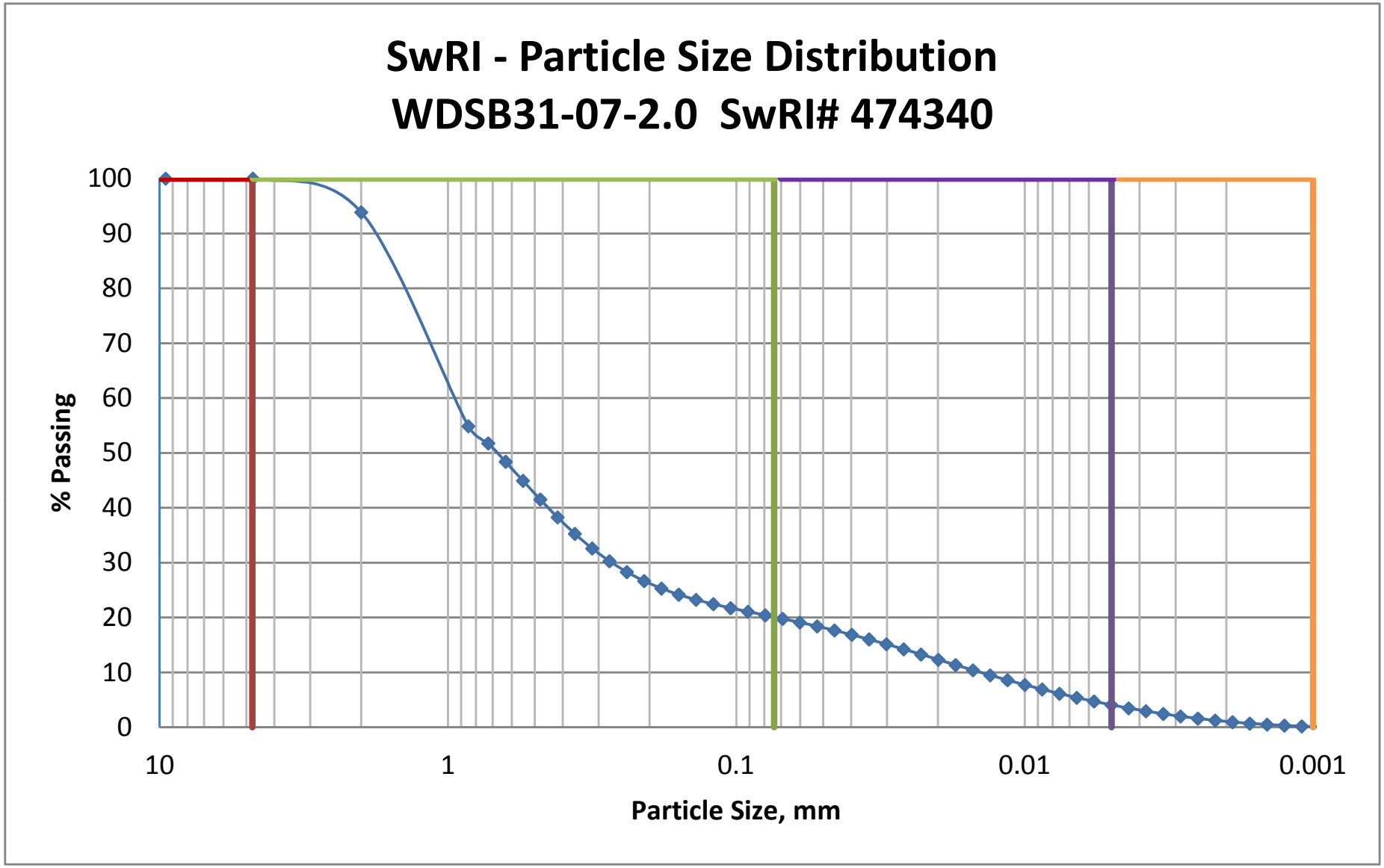
Particle Size Results


SwRI - Particle Size Distribution
WDSB02-07-24.5 SwRI 473757
% Passing
100
90
80
70
60
50
40
30
20
10
0
10
1
0.1
0.01
0.001
Particle Size, mm


SwRI - Particle Size Distribution
WDSB02-07-24.5 SwRI# 473757 - Duplicate
% Passing
100
90
80
70
60
50
40
30
20
10
0
10
1
0.1
0.01
0.001
Particle Size, mm

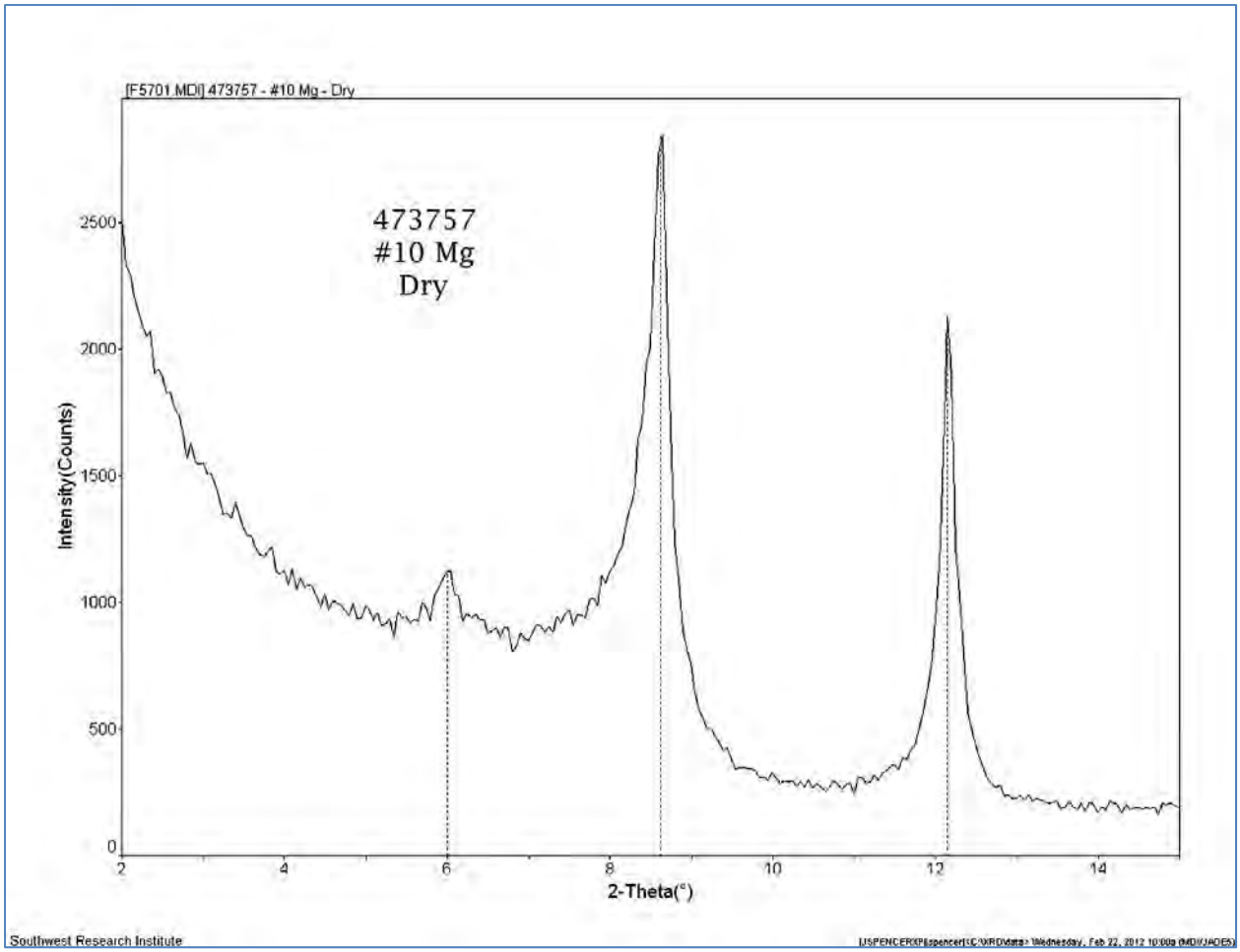

SwRI - Particle Size Distribution
WDSB29-07-4.5 SwRI# 474302
% Passing
100
90
80
70
60
50
40
30
20
10
0
10
1
0.1
0.01
0.001
Particle Size, mm


SwRI - Particle Size Distribution
WDSB21-07-19.5 SwRI# 473043
% Passing
100
90
80
70
60
50
40
30
20
10
0
10
1
0.1
0.01
0.001
Particle Size, mm


SwRI - Particle Size Distribution
WDSB31-07-2.0 SwRI# 474340
% Passing
100
90
80
70
60
50
40
30
20
10
0
10
1
0.1
0.01
0.001
Particle Size, mm

Appendix D

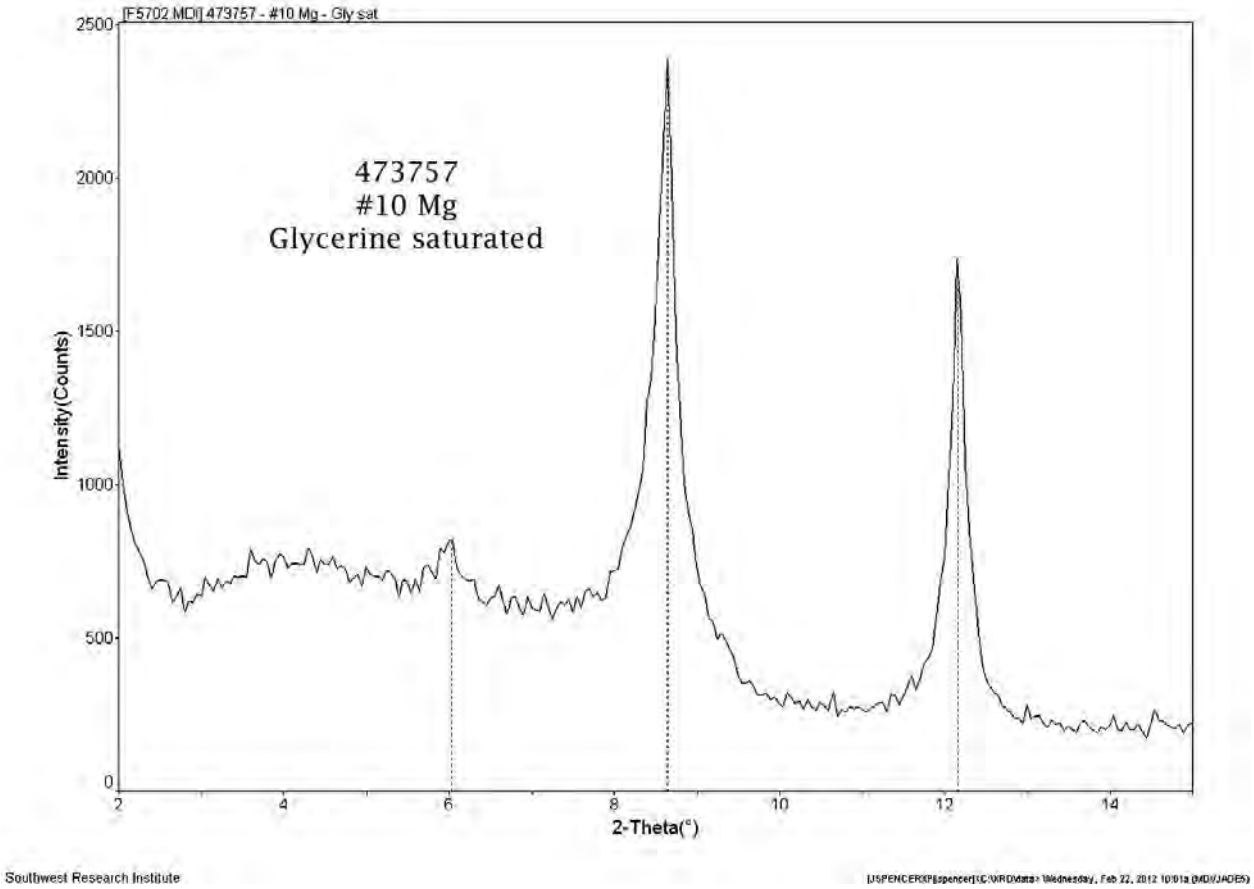
XRD Patterns for Clay Mineralogy



JADE: Peak Search Report (3 Peaks, Max P/N = 23.2)
DATE: Wednesday, Feb 22, 2012 10:00a
FILE: [F5701.MDI] 473757 - #10 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2847, 02/15/12 15:23
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing = 1.54056A(Cu/K-alpha1)

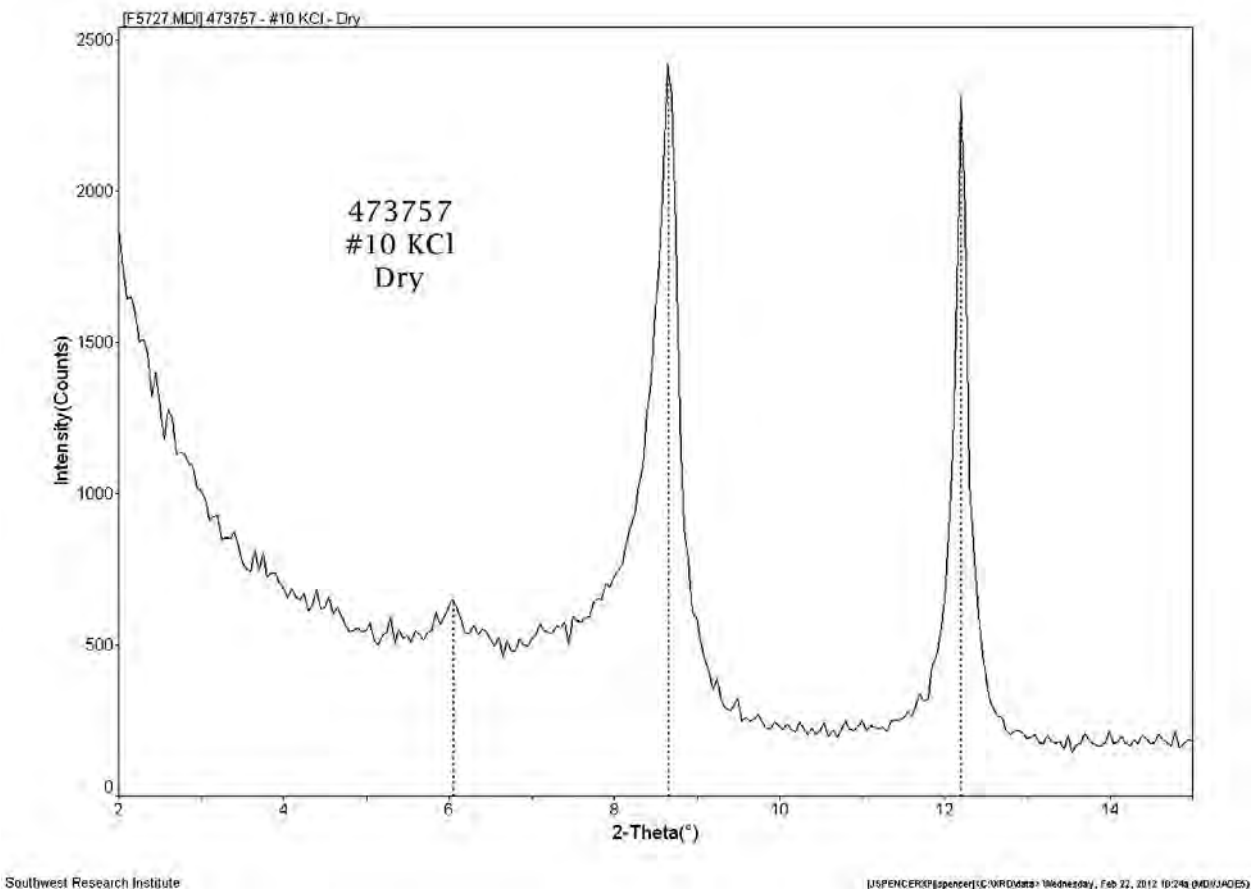
2-Theta	d(A)	BG	Height	I%	Area	I%	FWHM	XS(A)
6.004	14.7078	891	230	9.3	1853	6.1	0.322	260
8.619	10.2503	366	2481	100.0	30190	100.0	0.487	167
12.146	7.2808	254	1880	75.8	12087	40.0	0.257	337

Figure 1 WDSB02-07-24.5 (SwRI# 473757) Mg-saturated XRD



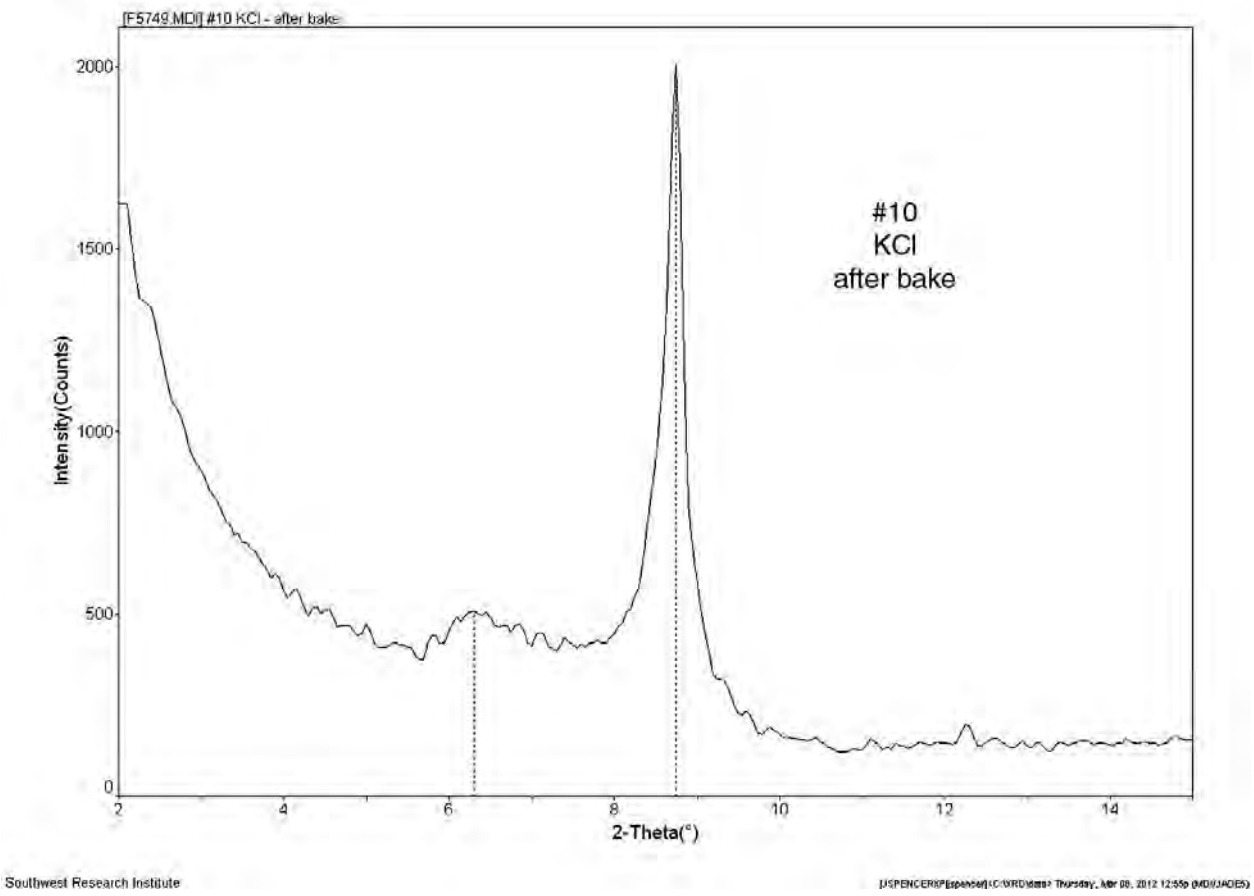

```
JADE: Peak Search Report (3 Peaks, Max P/N = 19.5)
DATE: Wednesday, Feb 22, 2012 10:01a
FILE: [F5702.MDI] 473757 - #10 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2387, 02/15/12 16:12
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.026  14.6548  647     173    9.1    985    5.9  0.228    389
  8.645  10.2202  477    1910  100.0  16730  100.0  0.350    237
 12.154   7.2762  258    1477   77.3   9363   56.0  0.254    343
```

Figure 2 WDSB-07-24.5 (SwRI# 473757) Mg saturated – glycerol solvated XRD



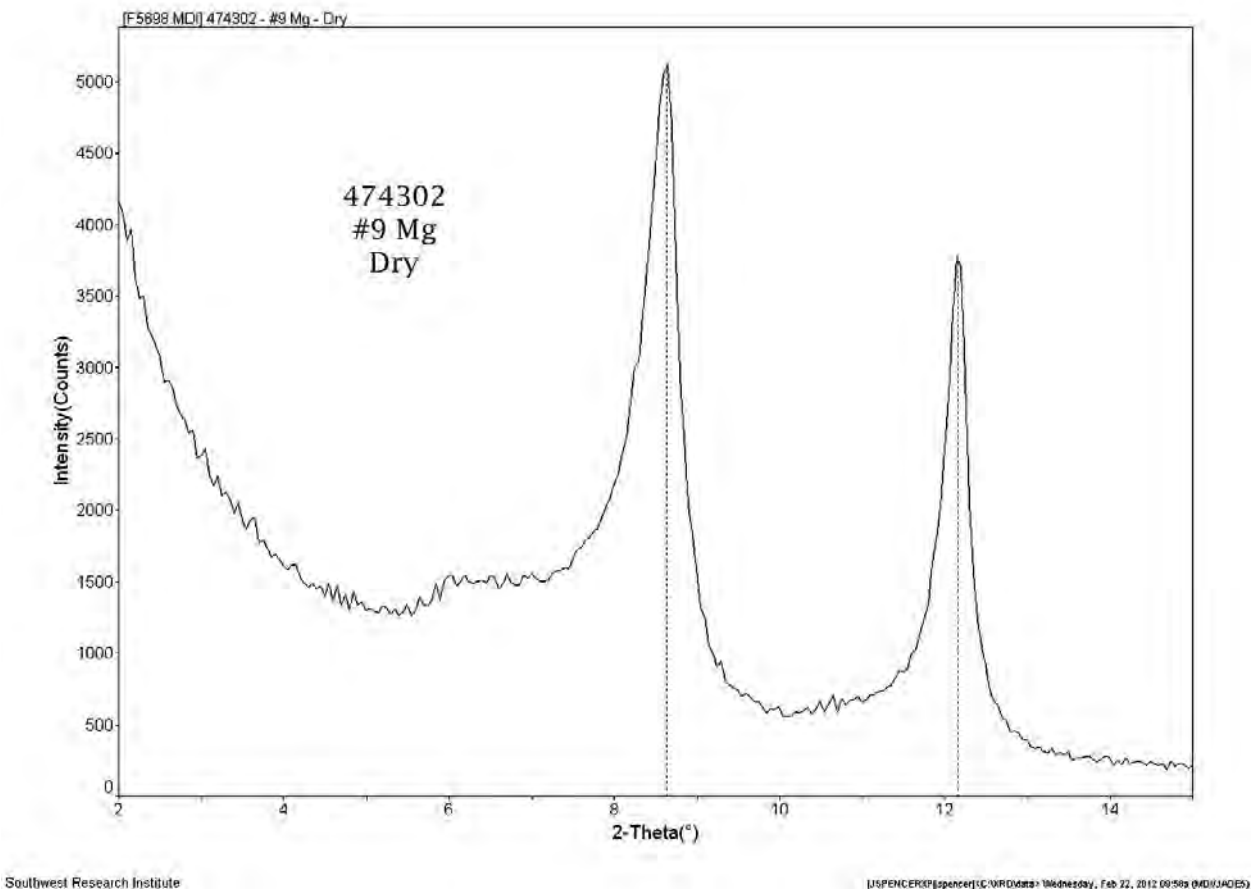

```
JADE: Peak Search Report (3 Peaks, Max P/N = 22.0)
DATE: Wednesday, Feb 22, 2012 10:25a
FILE: [F5727.MDI] 473757 - #10 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2419, 02/21/12 12:04
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.051  14.5941  510     136    6.3    910    3.8  0.268    320
  8.652  10.2112  259    2160  100.0  24265  100.0  0.449    182
 12.200   7.2485  207    2106   97.5  11369   46.9  0.216    417
```

Figure 3 WDSB02-07-24.5 (SwRI# 473757) KCl saturated XRD



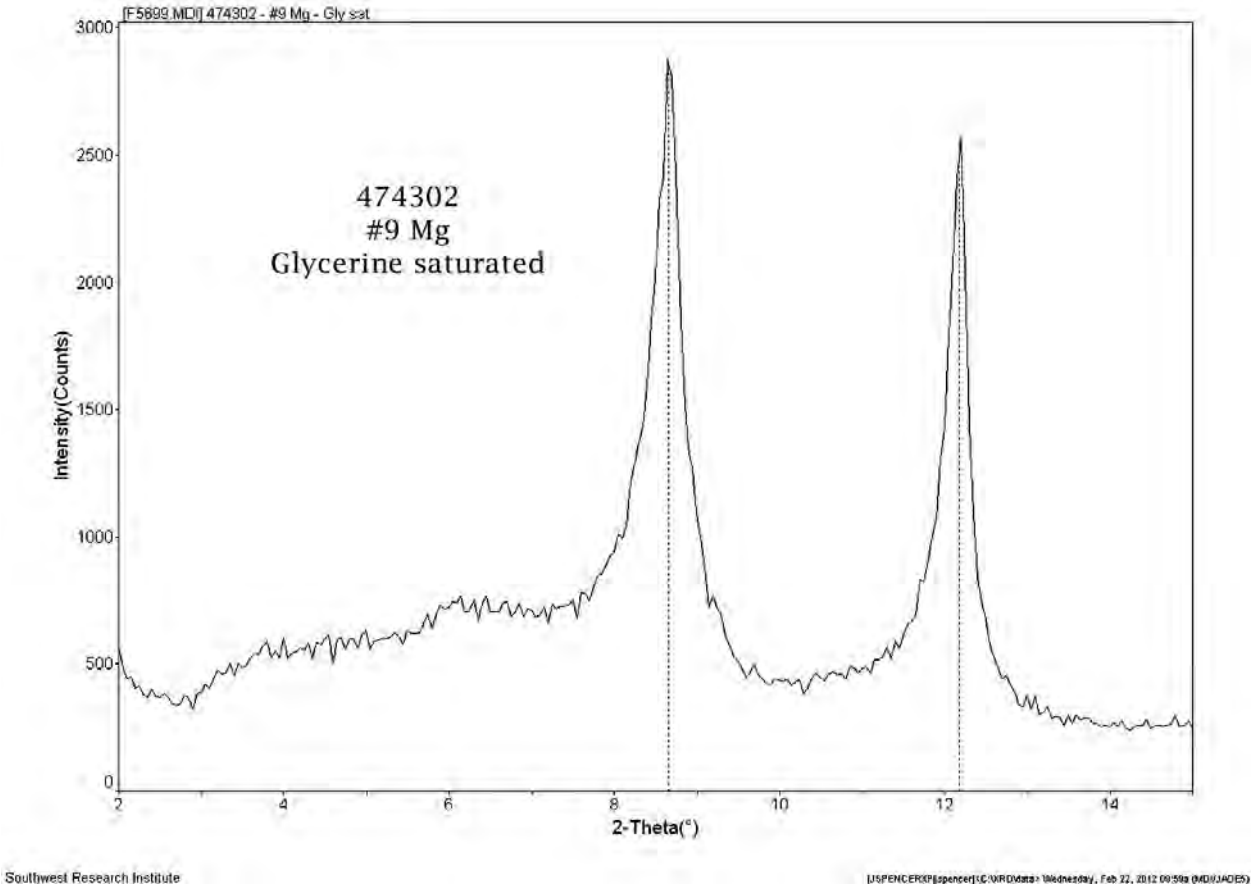

```
JADE: Peak Search Report (2 Peaks, Max P/N = 20.3)
DATE: Thursday, Mar 08, 2012 12:55p
FILE: [F5749.MDI] #10 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2007, 03/07/12 12:37
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.299  14.0197  405      99    5.4   1426    7.8  0.576    140
  8.739  10.1105  184    1823  100.0  18209  100.0  0.400    206
```

Figure 4 WDSB02-07-24.5 (SwRI# 473757) KCl-saturated and heated XRD



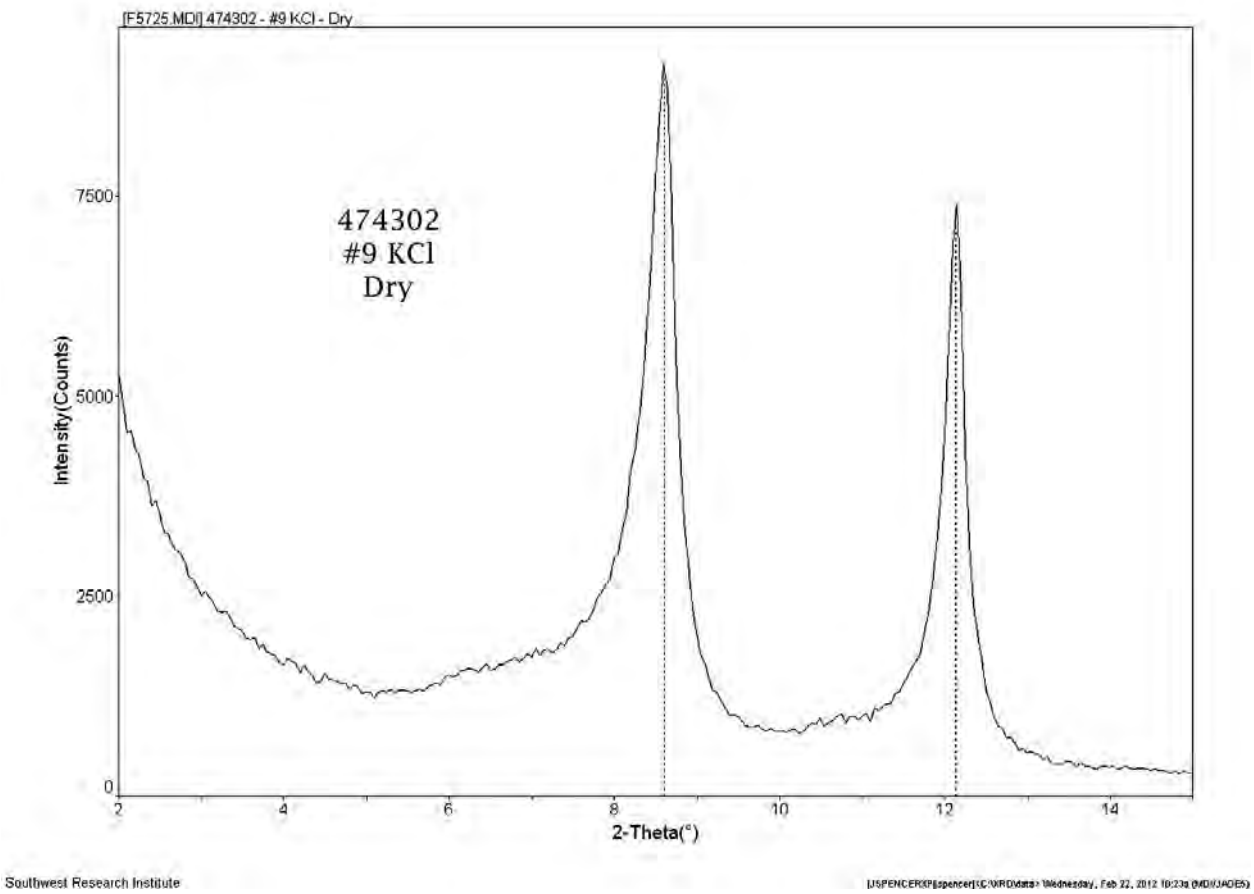

```
JADE: Peak Search Report (2 Peaks, Max P/N = 31.2)
DATE: Wednesday, Feb 22, 2012 09:58a
FILE: [F5698.MDI] 474302 - #9 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5124, 02/15/12 12:19
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.630  10.2374  654    4470  100.0  67157  100.0  0.601    134
 12.152   7.2774  312    3463   77.5  37345   55.6  0.431    190
```

Figure 5 WDSB29-07-4.5 (SwRI# 474302) Mg-saturated XRD



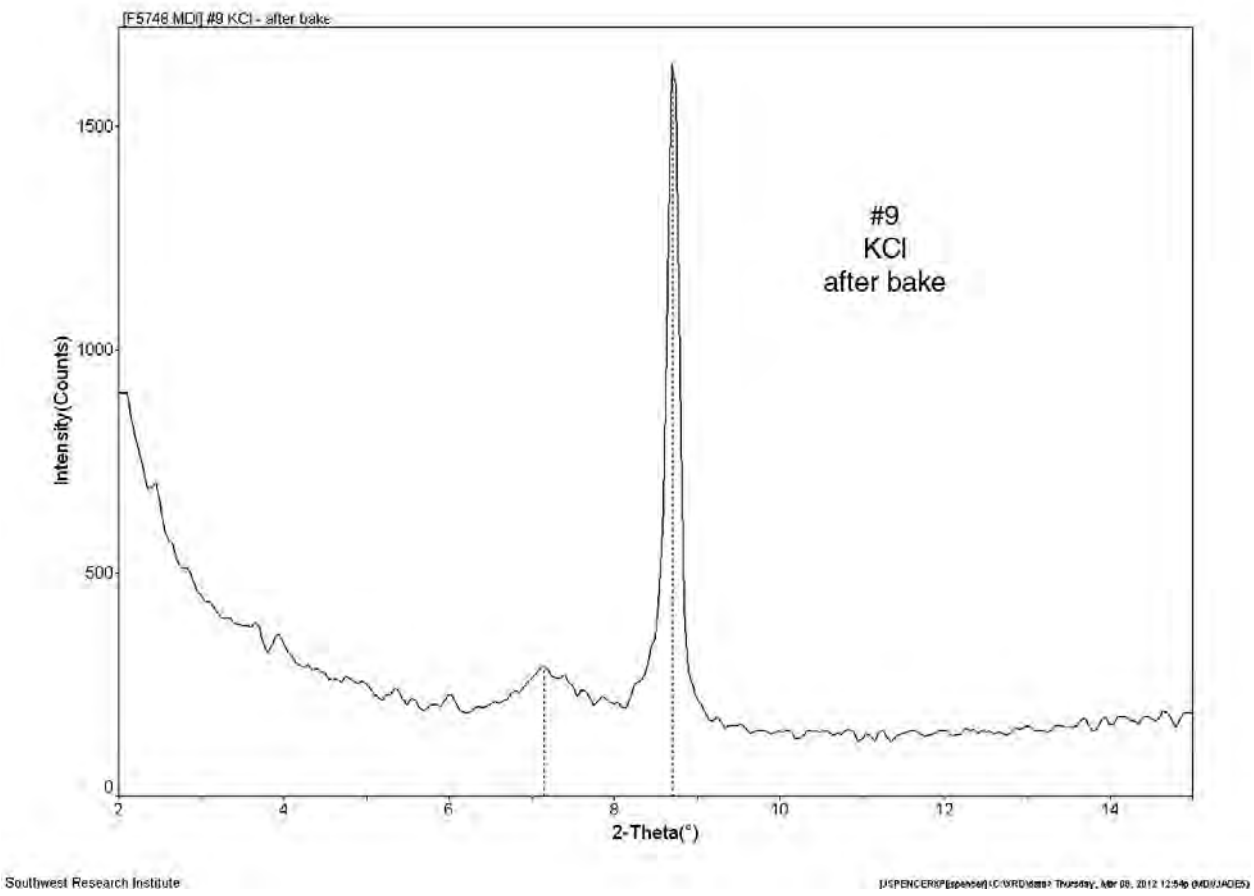

```
JADE: Peak Search Report (2 Peaks, Max P/N = 21.3)
DATE: Wednesday, Feb 22, 2012 09:59a
FILE: [F5699.MDI] 474302 - #9 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2876, 02/15/12 13:23
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.652  10.2118  629    2247  100.0  23178  100.0  0.413    199
 12.168   7.2679  409    2159   96.1  17663   76.2  0.327    256
```

Figure 6 WDSB29-07-4.5 (SwRI# 474302) Mg-saturated and glycerol solvated XRD



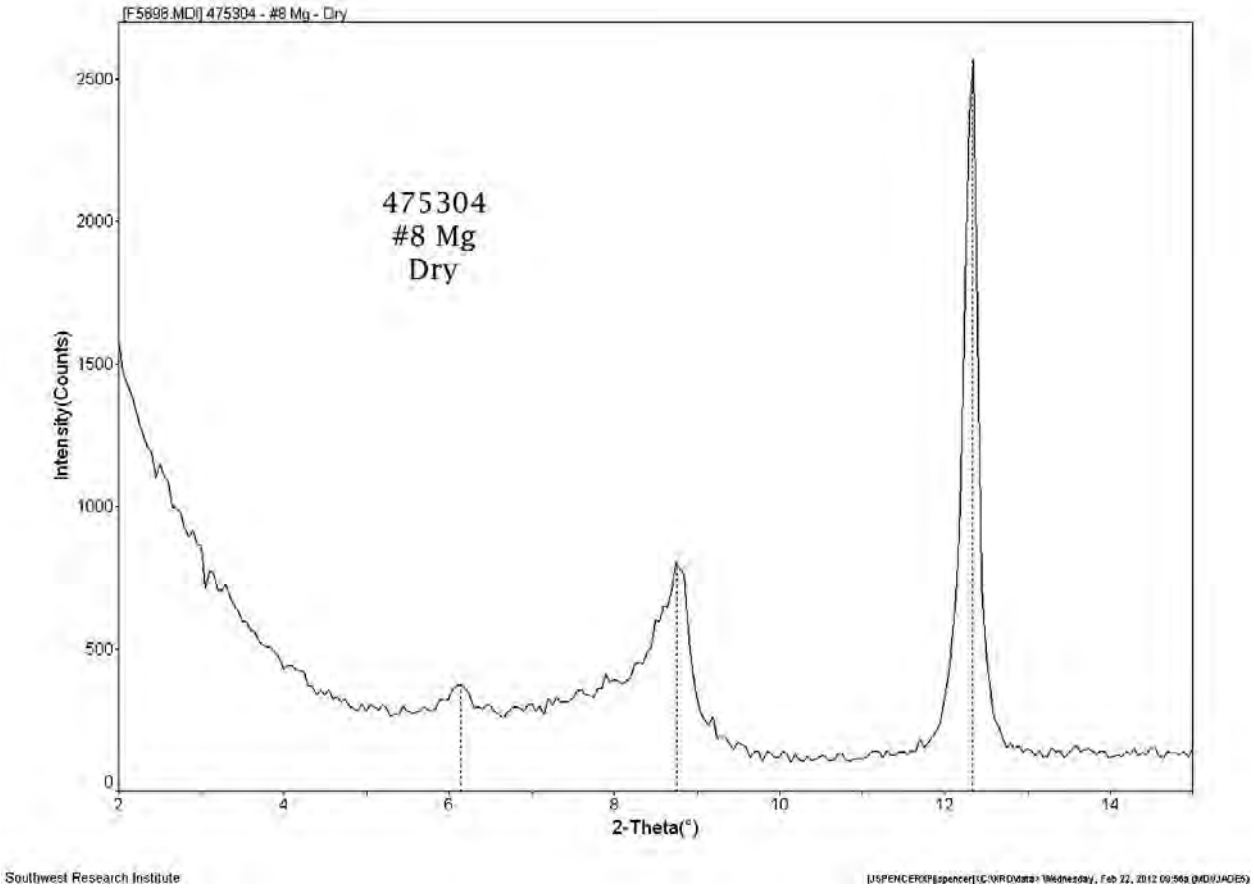

```
JADE: Peak Search Report (2 Peaks, Max P/N = 43.3)
DATE: Wednesday, Feb 22, 2012 10:23a
FILE: [F5725.MDI] 474302 - #9 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=9151, 02/21/12 10:49
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%    Area     I%   FWHM  XS(A)
  8.609  10.2632  876    8275  100.0  104589  100.0  0.506    161
 12.135   7.2873  461    6937   83.8   65929   63.0  0.380    218
```

Figure 7 WDSB29-07-4.5 (SwRI# 474302) KCl-saturated XRD



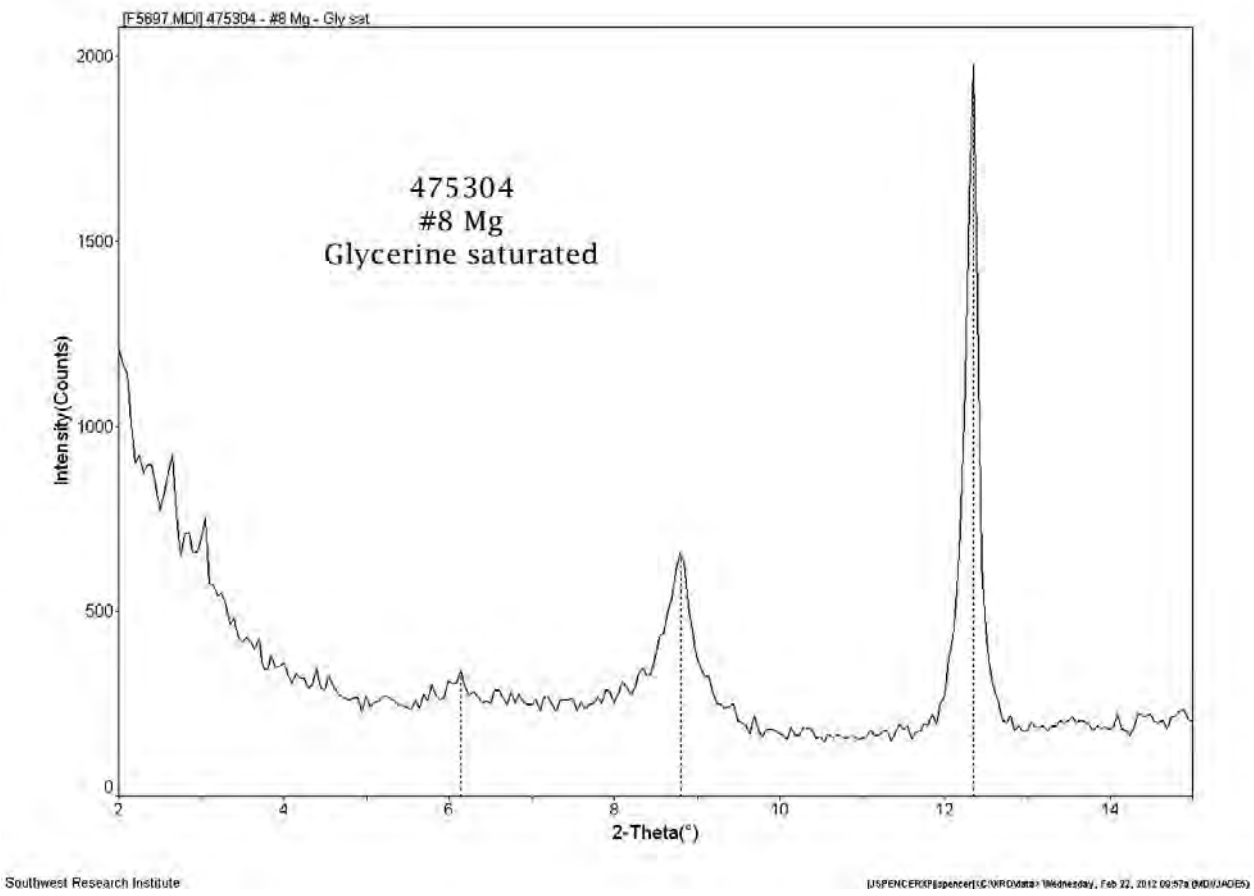

```
JADE: Peak Search Report (2 Peaks, Max P/N = 17.9)
DATE: Thursday, Mar 08, 2012 12:54p
FILE: [F5748.MDI] #9 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=1639, 03/07/12 11:50
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%  Area     I%   FWHM  XS(A)
  7.147  12.3581  203      84    5.8   944   14.9  0.450    182
  8.711  10.1430  186    1453  100.0  6336  100.0  0.174    557
```

Figure 8 WDSB29-07-4.5 (SwRI# 474302) KCl-saturated and heated XRD



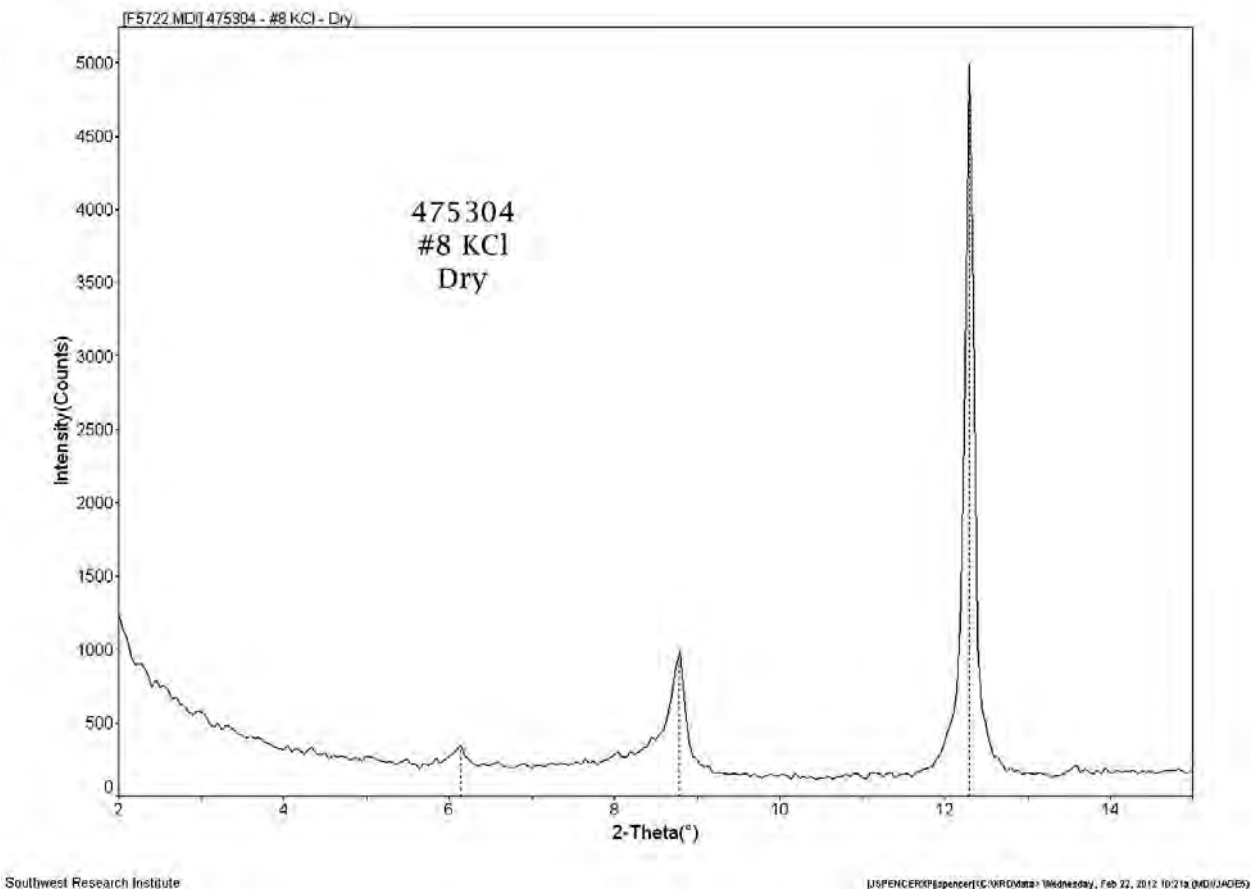

```
JADE: Peak Search Report (3 Peaks, Max P/N = 24.1)
DATE: Wednesday, Feb 22, 2012 09:56a
FILE: [F5696.MDI] 475304 - #8 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2570, 02/15/12 11:14
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.146  14.3698  276      95    3.9    543    4.4  0.229    387
  8.760  10.0855  123     677   27.7  10502   85.7  0.621    130
 12.333   7.1708  128    2442  100.0  12260  100.0  0.201    459
```

Figure 9 WDMW04B-07-BE10 (SwRI# 475304) Mg-saturated XRD



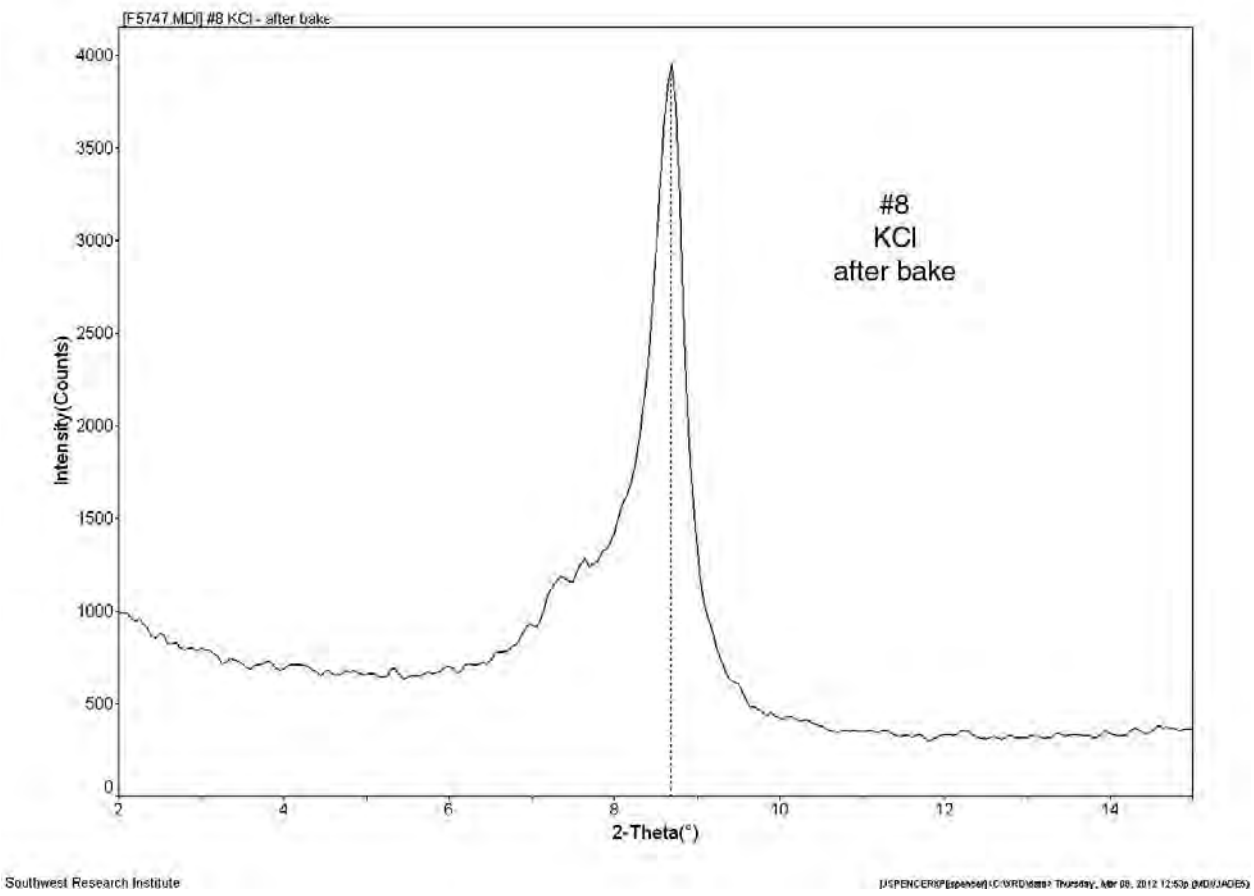

```
JADE: Peak Search Report (3 Peaks, Max P/N = 20.3)
DATE: Wednesday, Feb 22, 2012 09:57a
FILE: [F5697.MDI] 475304 - #8 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=1979, 02/15/12 11:46
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%  Area     I%   FWHM  XS(A)
  6.139  14.3841  246      90    5.0   629    7.7  0.280    305
  8.800  10.0401  214     439   24.3  4540   55.8  0.414    198
 12.341   7.1660  176    1803  100.0  8131  100.0  0.180    532
```

Figure 10 WDMW04B-07-BE10 (SwRI# 475304) Mg-saturated and glycerol solvated XRD



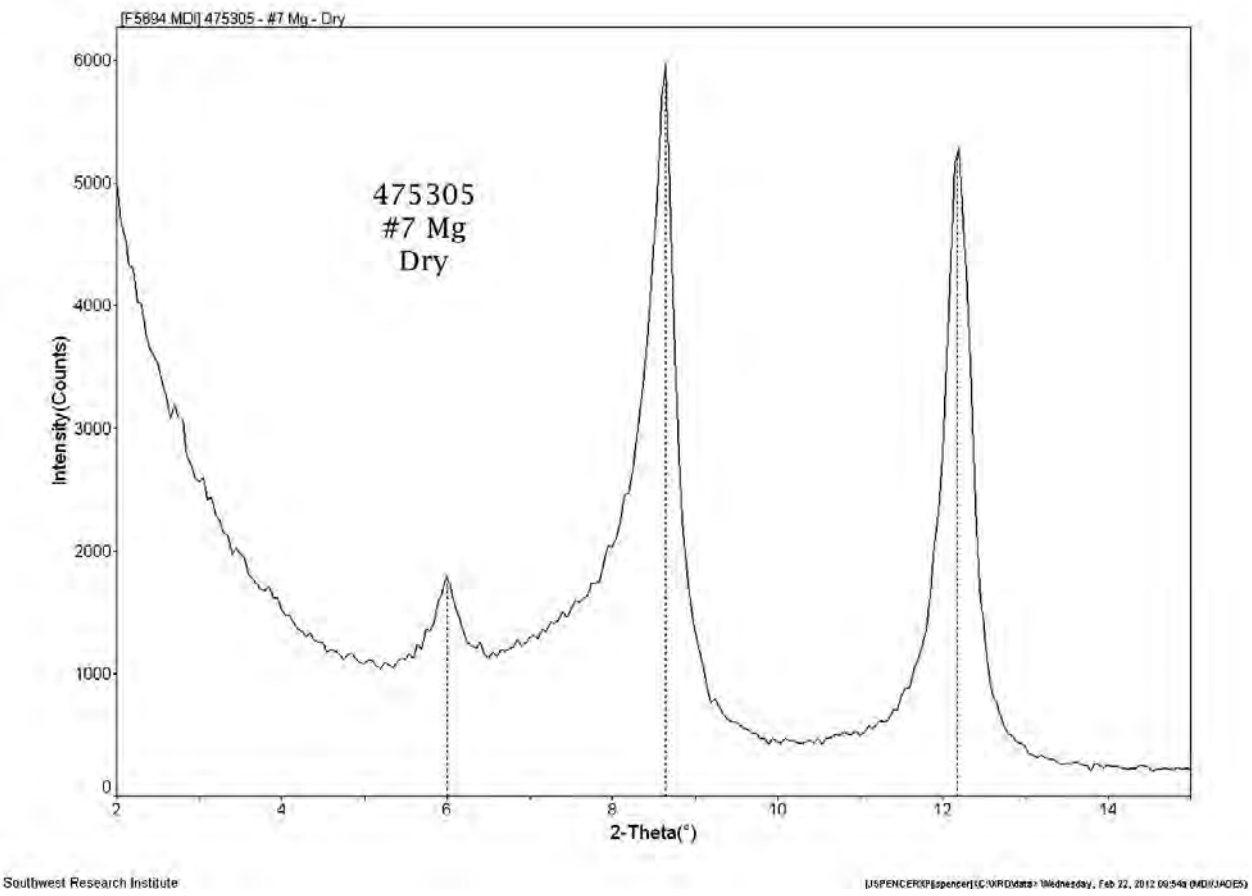

```
JADE: Peak Search Report (3 Peaks, Max P/N = 34.4)
DATE: Wednesday, Feb 22, 2012 10:21a
FILE: [F5722.MDI] 475304 - #8 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4991, 02/20/12 16:55
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.138  14.3874  203     139    2.9    512    3.1  0.147    735
  8.786  10.0562  178     802   16.5   4802   29.4  0.240    366
 12.299   7.1903  134    4857  100.0  16356  100.0  0.135    885
```

Figure 11 WDMW04B-07-BE10 (SwRI# 475304) KCl-saturated XRD



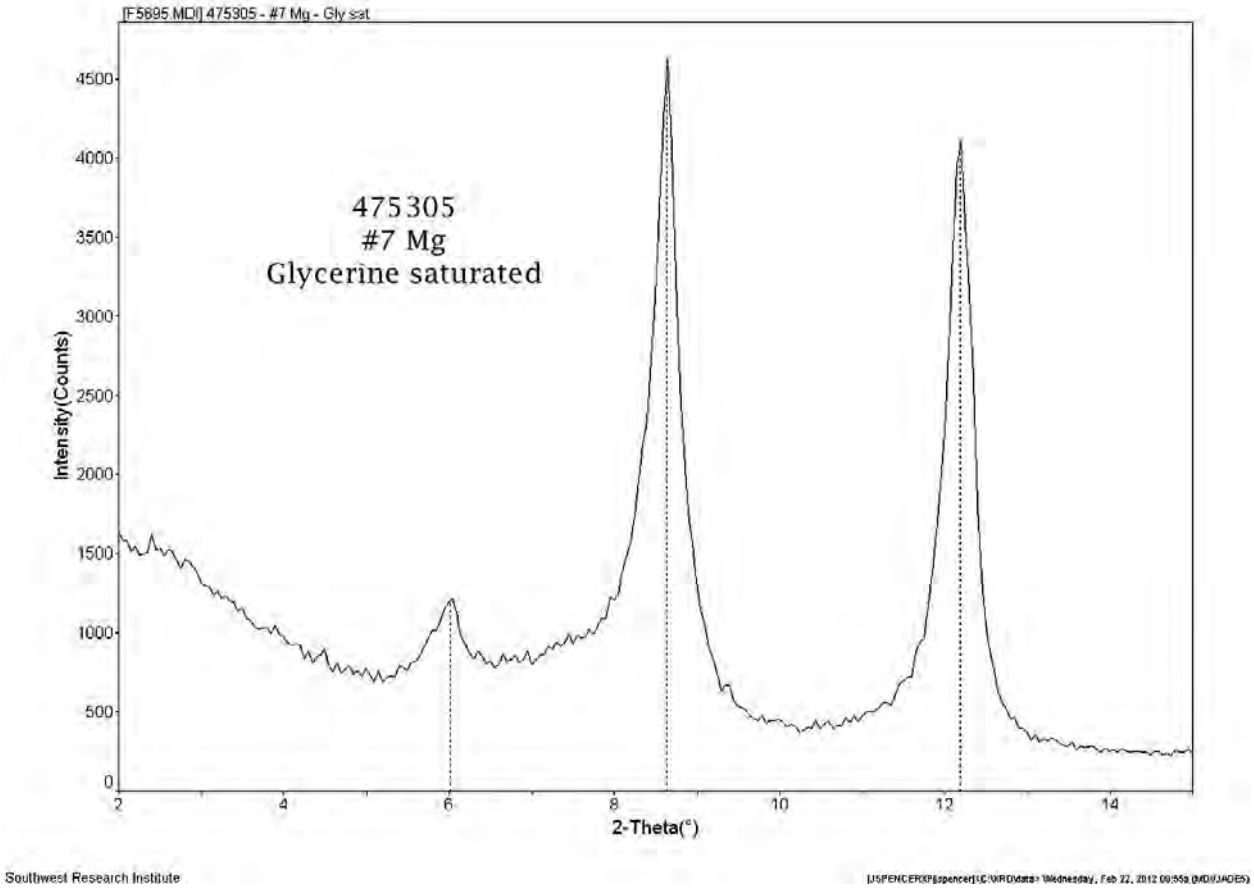

```
JADE: Peak Search Report (1 Peaks, Max P/N = 27.8)
DATE: Thursday, Mar 08, 2012 12:53p
FILE: [F5747.MDI] #8 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=3953, 03/07/12 11:00
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.684  10.1736  463    3490  100.0  49115  100.0  0.563    144
```

Figure 12 WDMW04B-07-BE10 (SwRI# 475304) KCl-saturated and heated XRD



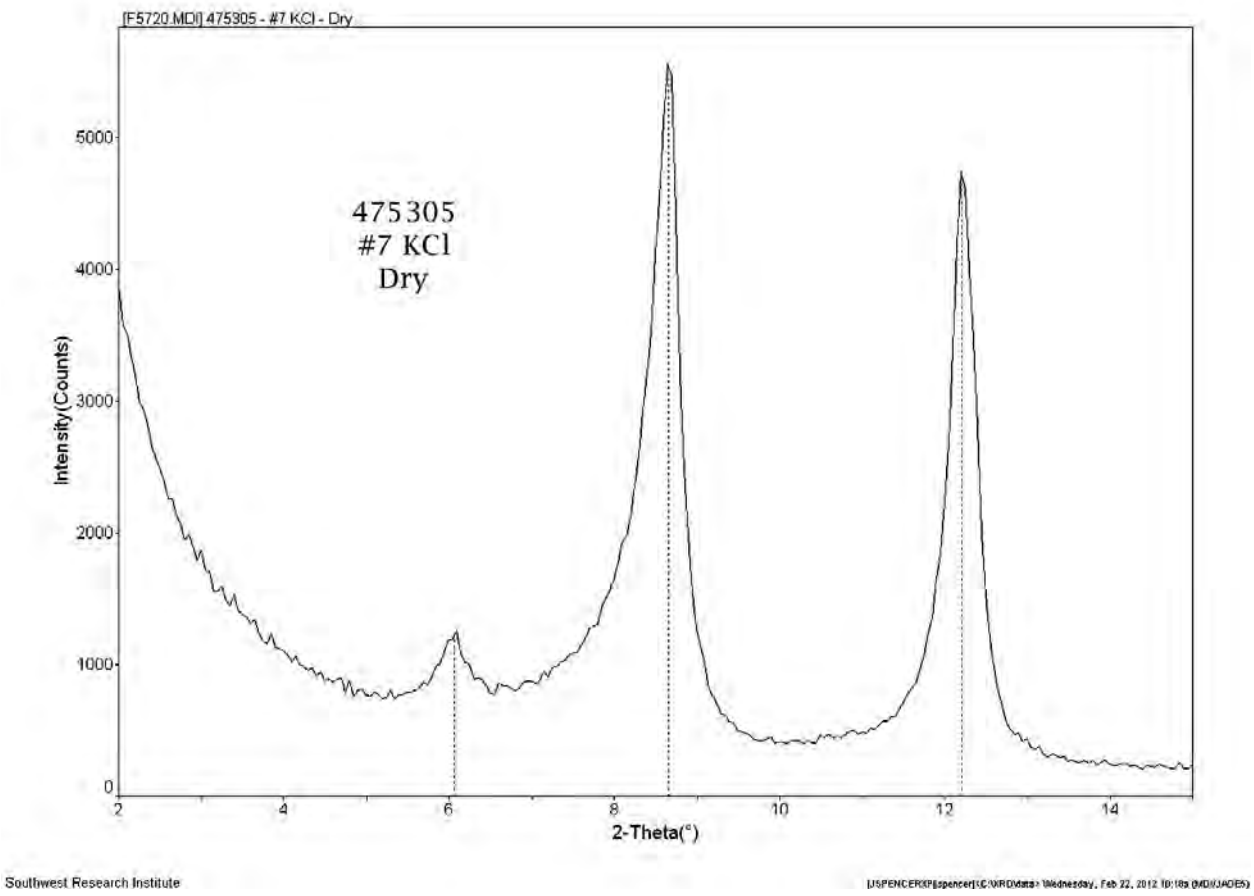

```
JADE: Peak Search Report (3 Peaks, Max P/N = 35.3)
DATE: Wednesday, Feb 22, 2012 09:54a
FILE: [F5694.MDI] 475305 - #7 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5969, 02/15/12 10:01
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.004  14.7078  1130     654   12.0   4335    6.3  0.265    324
  8.644  10.2214   508    5461  100.0  69330  100.0  0.508    160
 12.168   7.2679   423    4856   88.9  45622   65.8  0.376    221
```

Figure 13 WDMW04B-07-CU10 (SwRI# 475305) Mg-saturated XRD



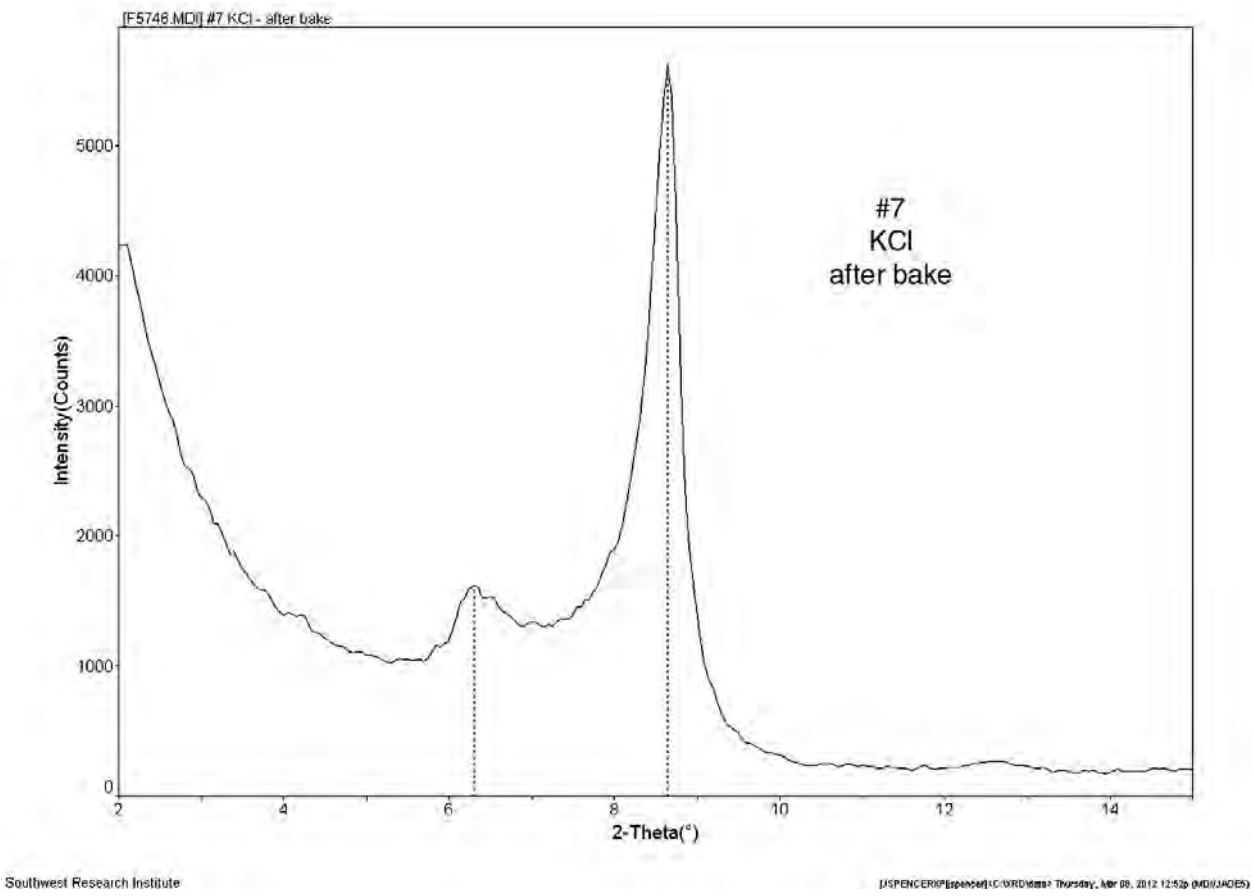

```
JADE: Peak Search Report (3 Peaks, Max P/N = 30.6)
DATE: Wednesday, Feb 22, 2012 09:55a
FILE: [F5695.MDI] 475305 - #7 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4624, 02/15/12 10:37
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.015  14.6813  774     432   10.4   3545    7.4  0.328    254
  8.630  10.2374  465    4159  100.0  48126  100.0  0.463    176
 12.179   7.2614  414    3697   88.9  34089   70.8  0.369    225
```

Figure 14 WDMW04B-07-CU10 (SwRI# 475305) Mg-saturated and glycerol solvated XRD



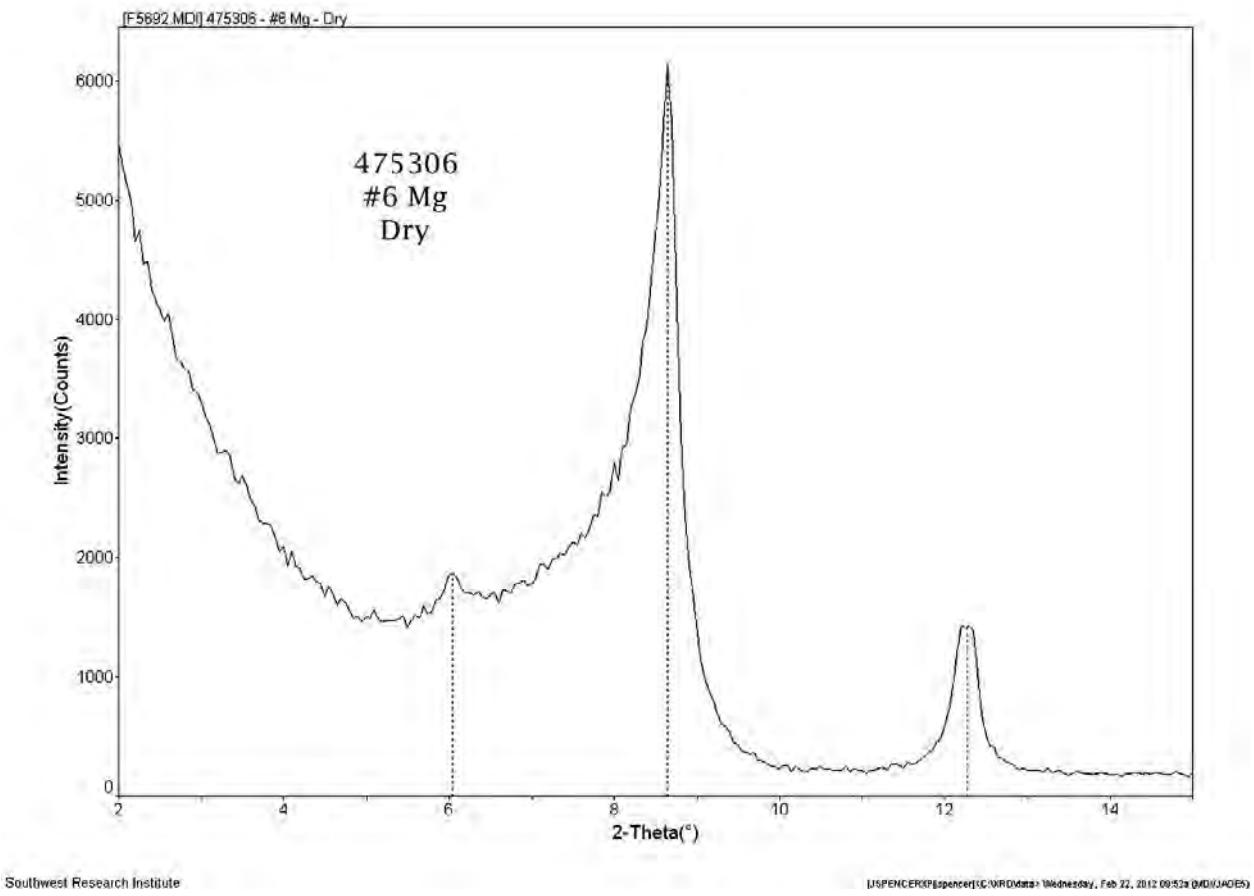

```
JADE: Peak Search Report (3 Peaks, Max P/N = 34.4)
DATE: Wednesday, Feb 22, 2012 10:19a
FILE: [F5720.MDI] 475305 - #7 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5555, 02/20/12 14:58
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.069  14.5501  796     450    8.8   3043    4.7  0.270    317
  8.663  10.1990  434    5121  100.0  64607  100.0  0.505    161
 12.204   7.2461  412    4330   84.6  41123   63.7  0.380    218
```

Figure 15 WDMW04B-07-CU10 (SwRI# 475305) KCl-saturated XRD



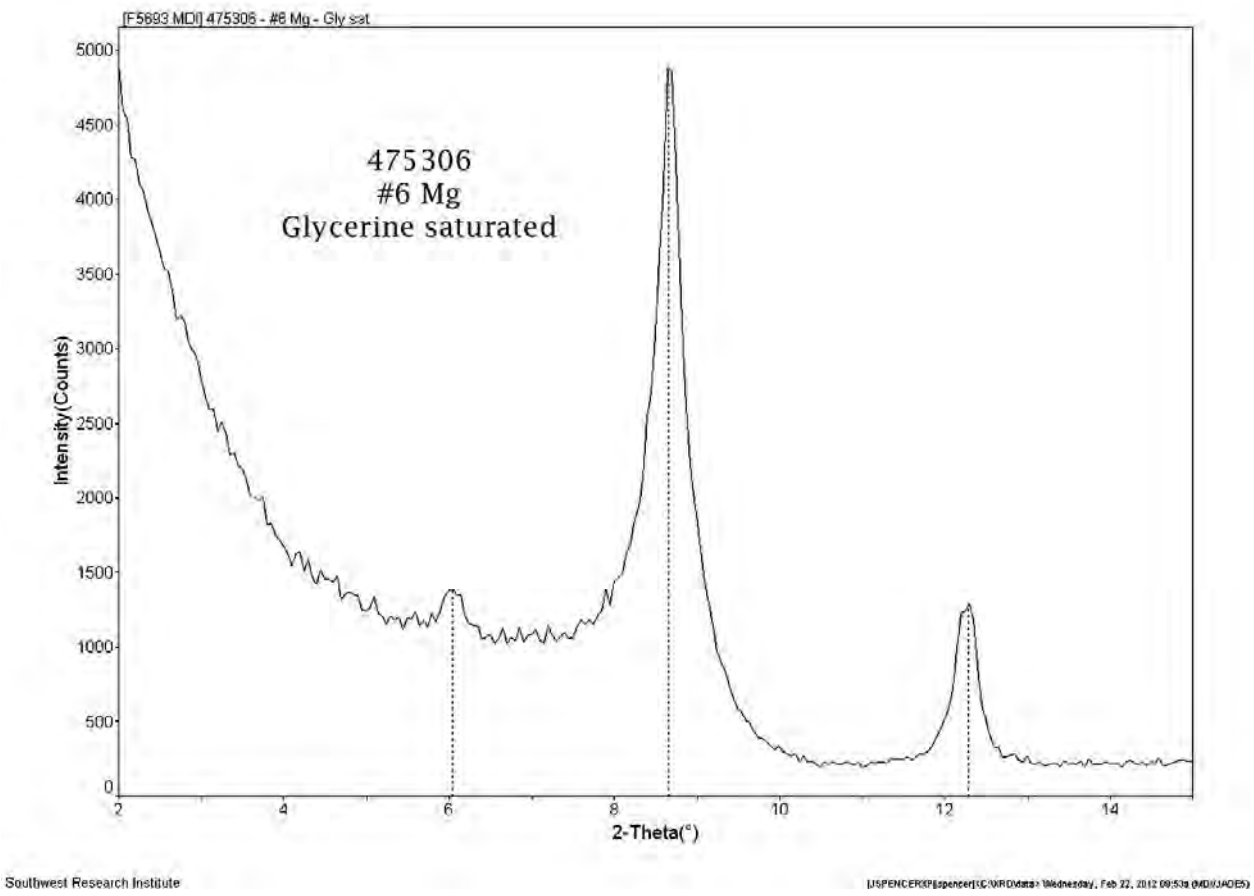

```
JADE: Peak Search Report (2 Peaks, Max P/N = 35.0)
DATE: Thursday, Mar 08, 2012 12:52p
FILE: [F5746.MDI] #7 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5625, 03/07/12 08:29
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.298  14.0218  1184     421    8.0   4139    5.6  0.393    209
  8.641  10.2246   373    5252  100.0  73545  100.0  0.560    145
```

Figure 16 WDMW04B-07-CU10 (SwRI# 475305) KCl-saturated and heated XRD



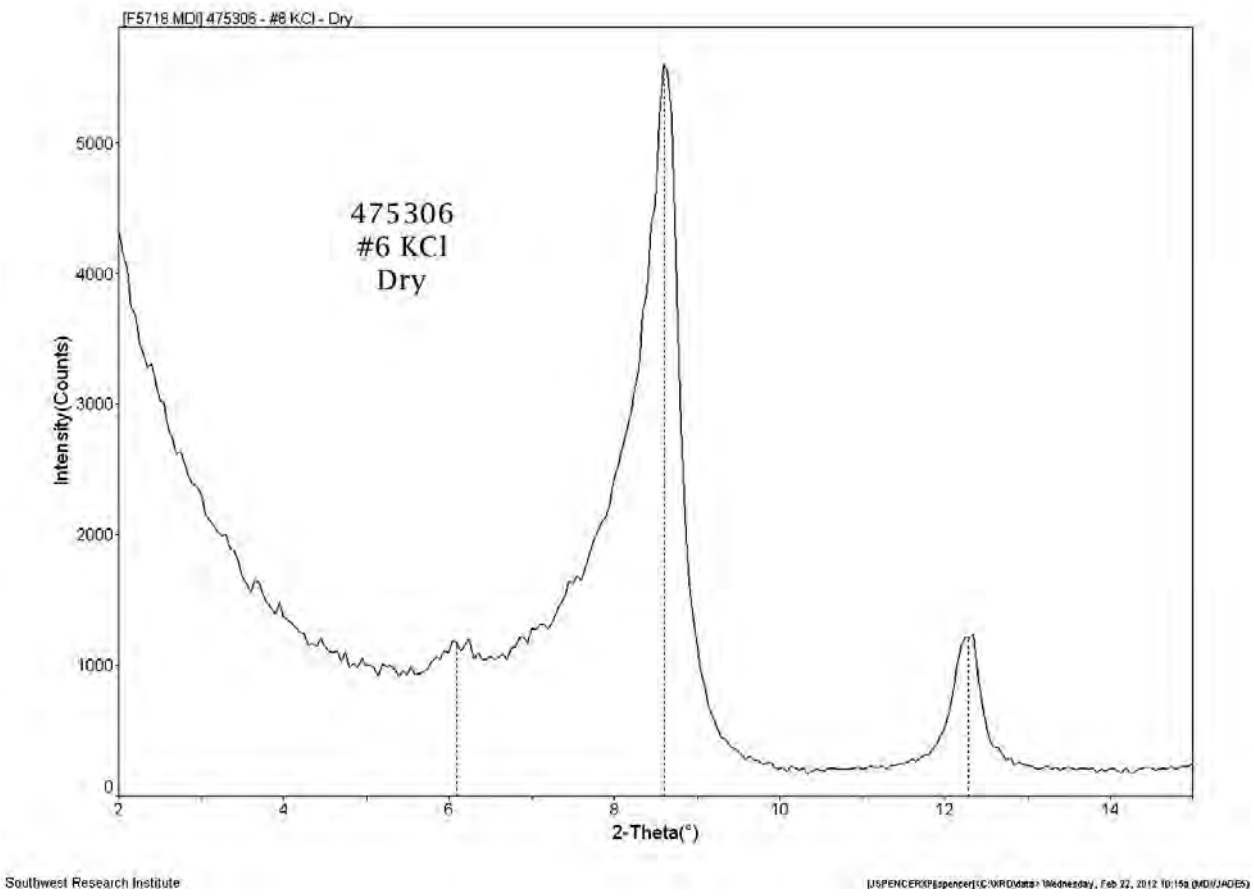

```
JADE: Peak Search Report (3 Peaks, Max P/N = 37.0)
DATE: Wednesday, Feb 22, 2012 09:52a
FILE: [F5692.MDI] 475306 - #6 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=6138, 02/14/12 17:16
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.037  14.6285  1578     282    4.9   1573    1.8  0.223    399
  8.641  10.2246   341    5797  100.0  86645  100.0  0.598    135
 12.265   7.2102   211    1204   20.8  10737   12.4  0.357    233
```

Figure 17 WDMW04B-07-SU10 (SwRI# 475306) Mg-saturated XRD



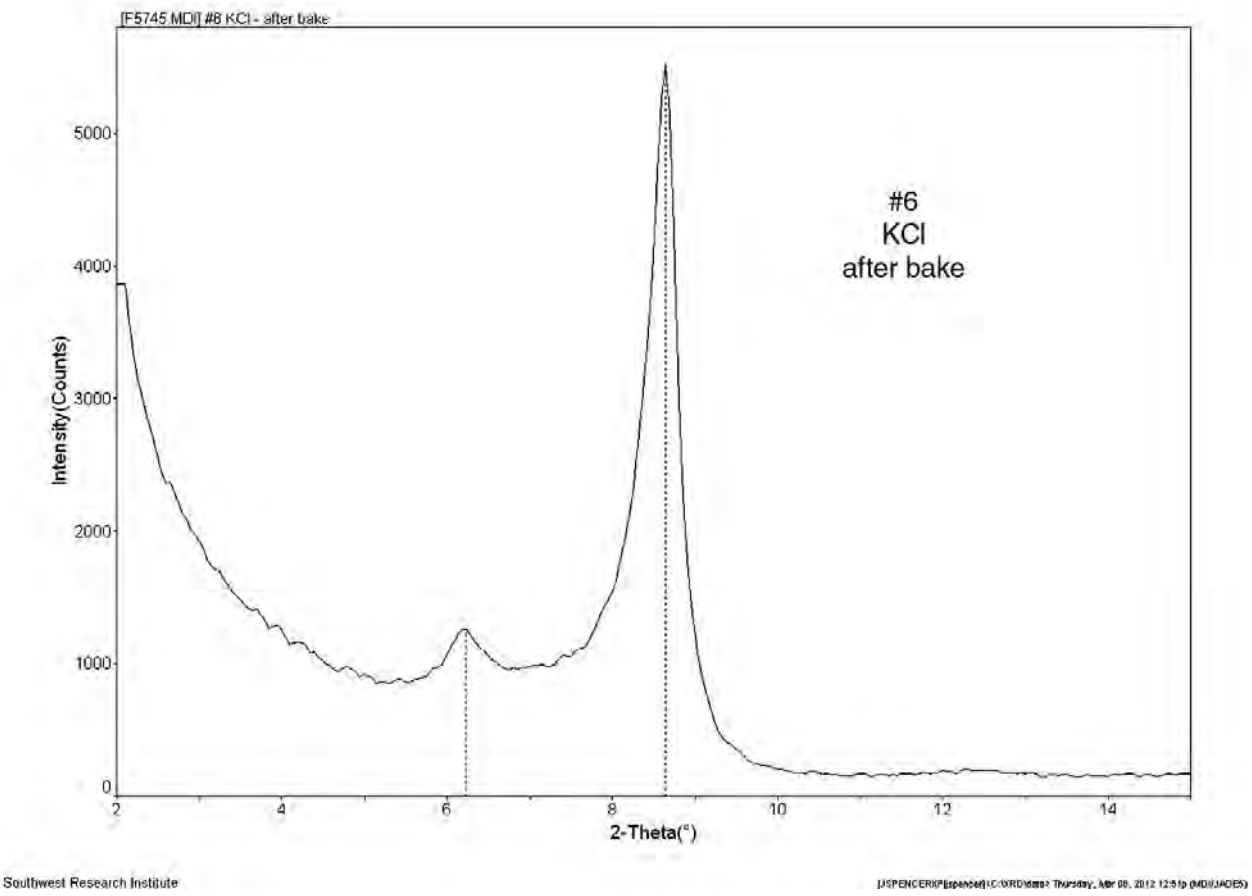

```
JADE: Peak Search Report (3 Peaks, Max P/N = 31.8)
DATE: Wednesday, Feb 22, 2012 09:53a
FILE: [F5693.MDI] 475306 - #6 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4907, 02/15/12 09:09
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.037  14.6285  1111     277    6.2   1641    2.9  0.237    370
  8.663  10.1990   437    4450  100.0  57153  100.0  0.514    158
 12.276   7.2039   216    1065   23.9   8731   15.3  0.328    256
```

Figure 18 WDMW04B-07-SU10 (SwRI# 475306) Mg-saturated and glycerol solvated XRD



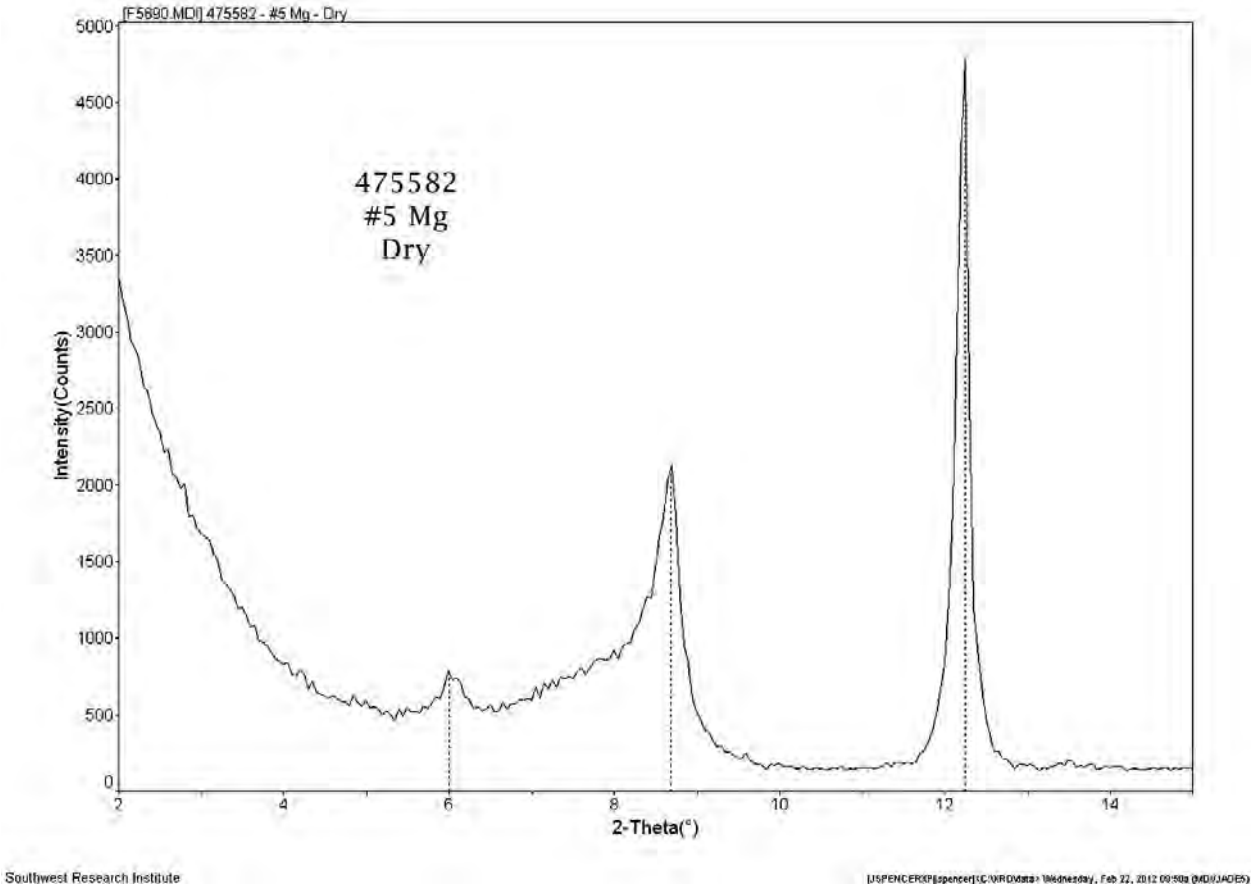

```
JADE: Peak Search Report (3 Peaks, Max P/N = 35.4)
DATE: Wednesday, Feb 22, 2012 10:16a
FILE: [F5718.MDI] 475306 - #6 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5606, 02/20/12 13:28
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.091  14.4983  1029     155    2.9    293    0.4  0.076  >1000
  8.609  10.2632   298    5308  100.0  81006  100.0  0.610    132
 12.276   7.2039   208    1017   19.2   9403   11.6  0.370    224
```

Figure 19 WDMW04B-07-SU10 (SwRI# 475306) KCl-saturated XRD



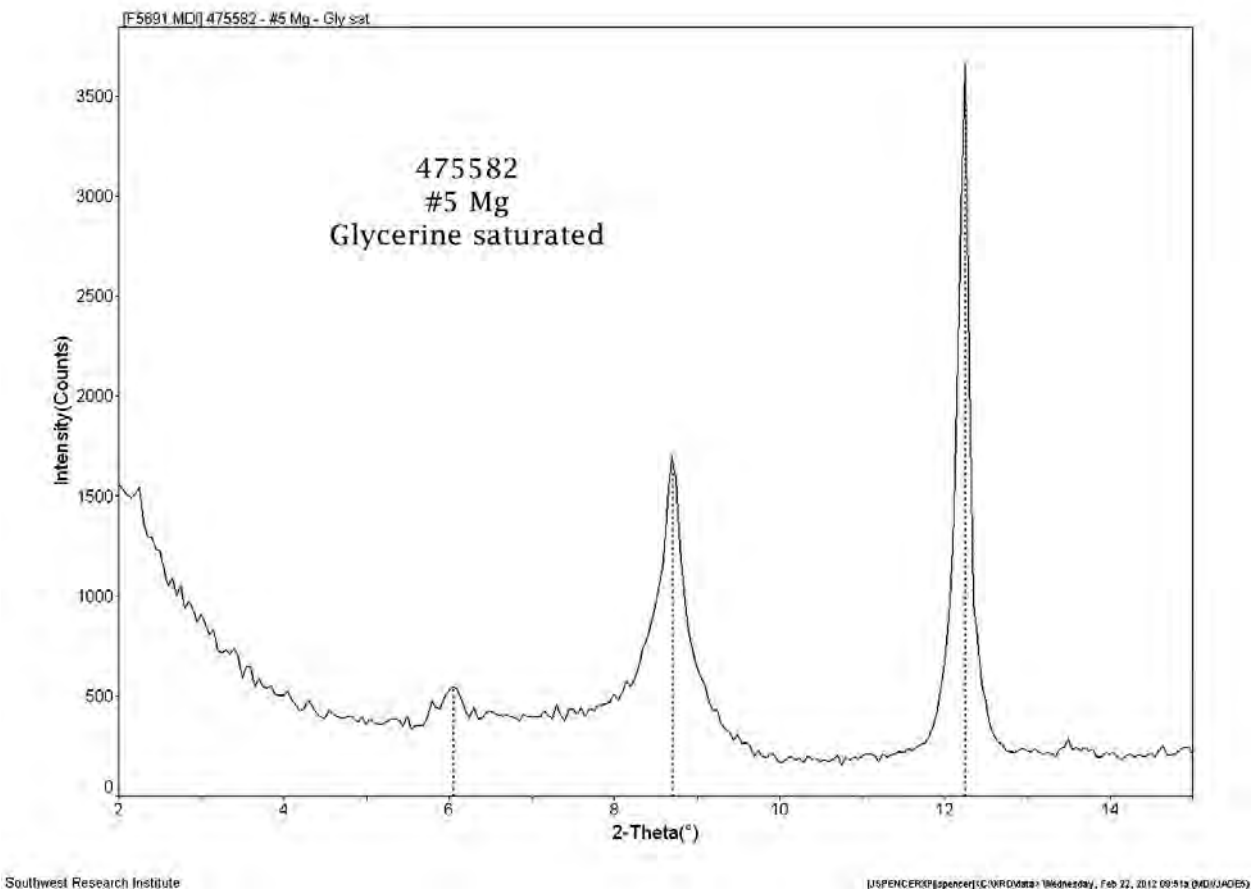

```
JADE: Peak Search Report (2 Peaks, Max P/N = 35.4)
DATE: Thursday, Mar 08, 2012 12:51p
FILE: [F5745.MDI] #6 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5522, 03/07/12 08:25
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.221  14.1952  920     326    6.2   2727    4.0  0.335    249
  8.641  10.2246  255    5267  100.0  68618  100.0  0.521    156
```

Figure 20 WDMW04B-07-SU10 (SwRI# 475306) KCl-saturated and heated XRD



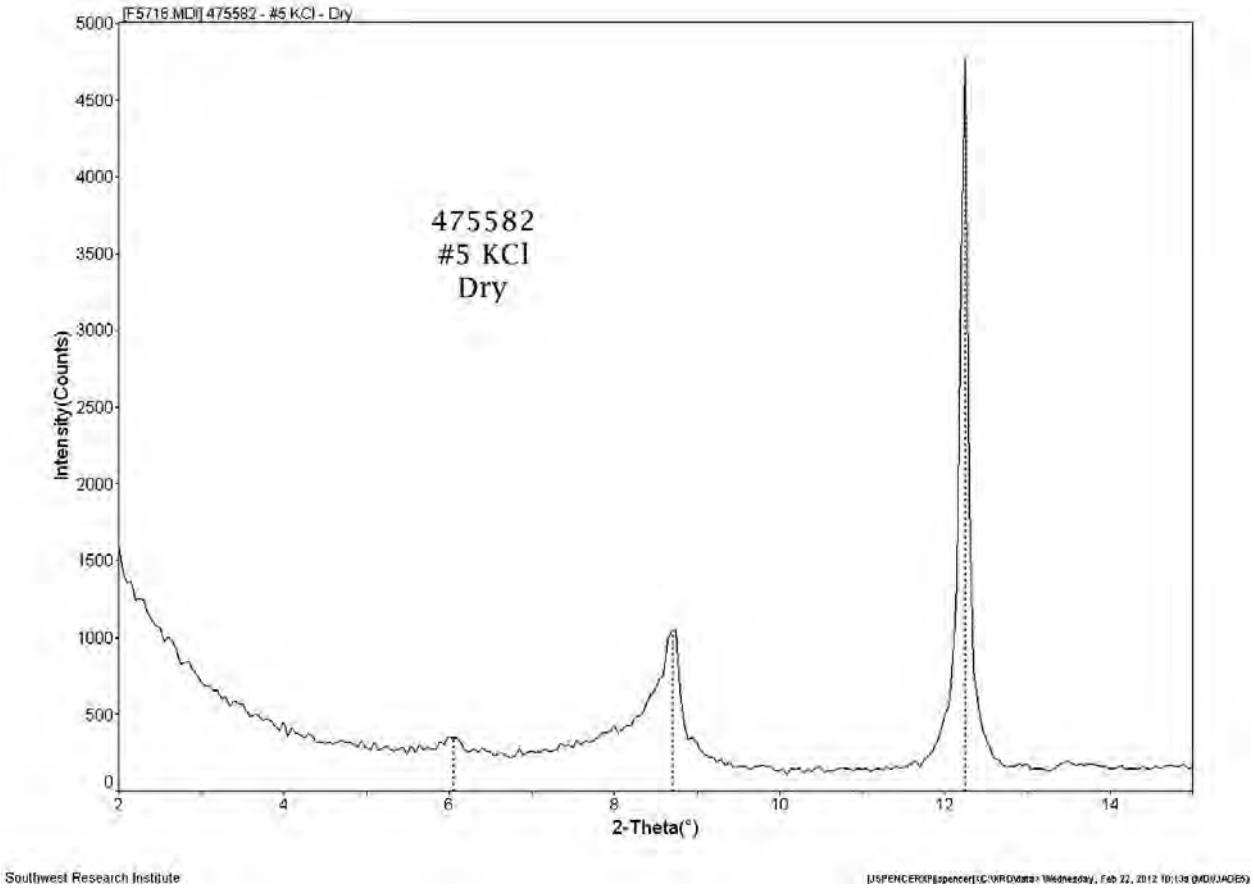

```
JADE: Peak Search Report (3 Peaks, Max P/N = 33.5)
DATE: Wednesday, Feb 22, 2012 09:51a
FILE: [F5690.MDI] 475582 - #5 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4783, 02/14/12 15:52
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.004  14.7078  516     260    5.6   1468    5.3  0.226    393
  8.684  10.1736  173    1953   42.1  27830  100.0  0.570    142
 12.244   7.2229  149    4634  100.0  22238   79.9  0.192    488
```

Figure 21 WDMW03B-07-BE10 (SwRI# 475582) Mg-saturated XRD



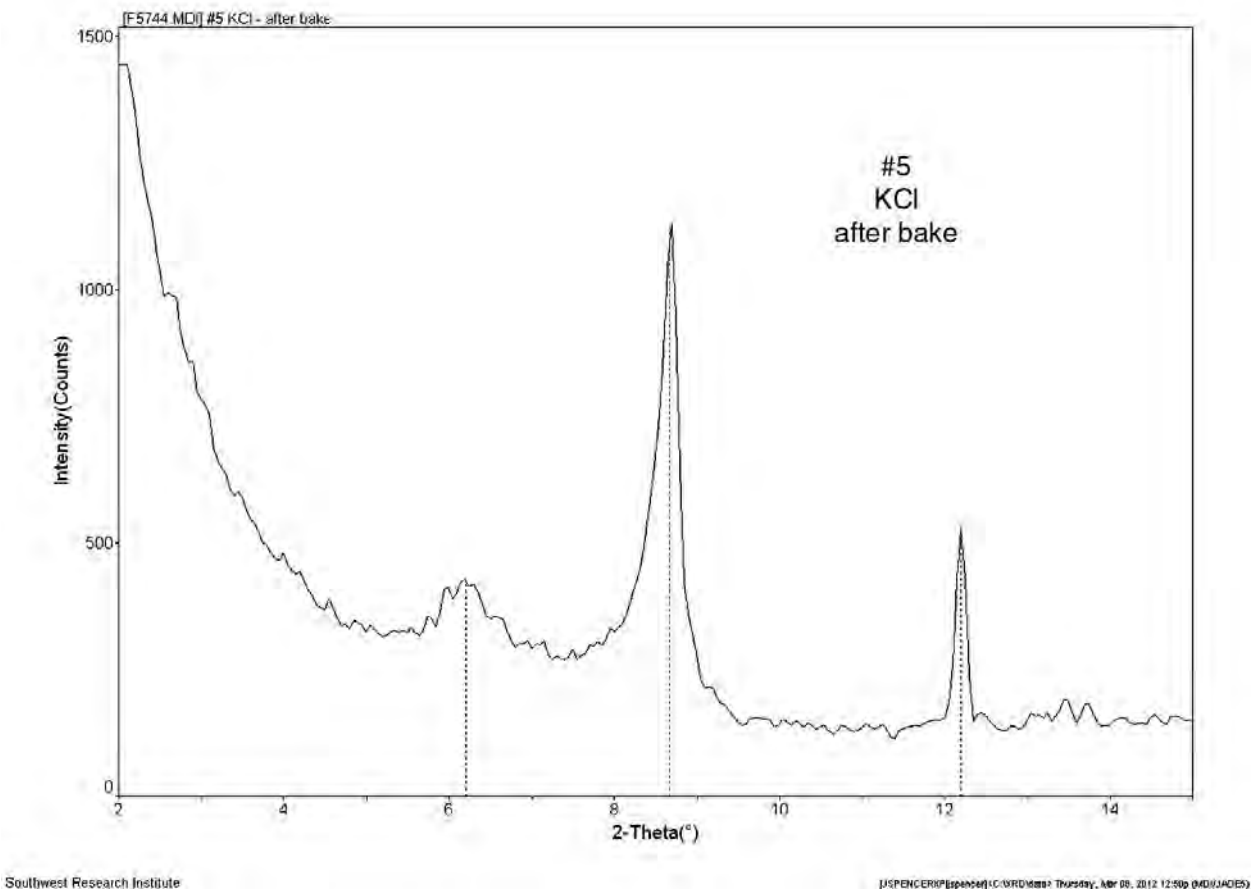

```
JADE: Peak Search Report (3 Peaks, Max P/N = 28.6)
DATE: Wednesday, Feb 22, 2012 09:51a
FILE: [F5691.MDI] 475582 - #5 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=3659, 02/14/12 16:28
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.051  14.5946  368     172    5.0   1195    7.8  0.278    307
  8.703  10.1523  319    1376   39.8  13122   85.4  0.381    216
 12.244   7.2229  202    3457  100.0  15366  100.0  0.178    543
```

Figure 22 WDMW03B-07-BE10 (SwRI# 475582) Mg-saturated and glycerol solvated XRD



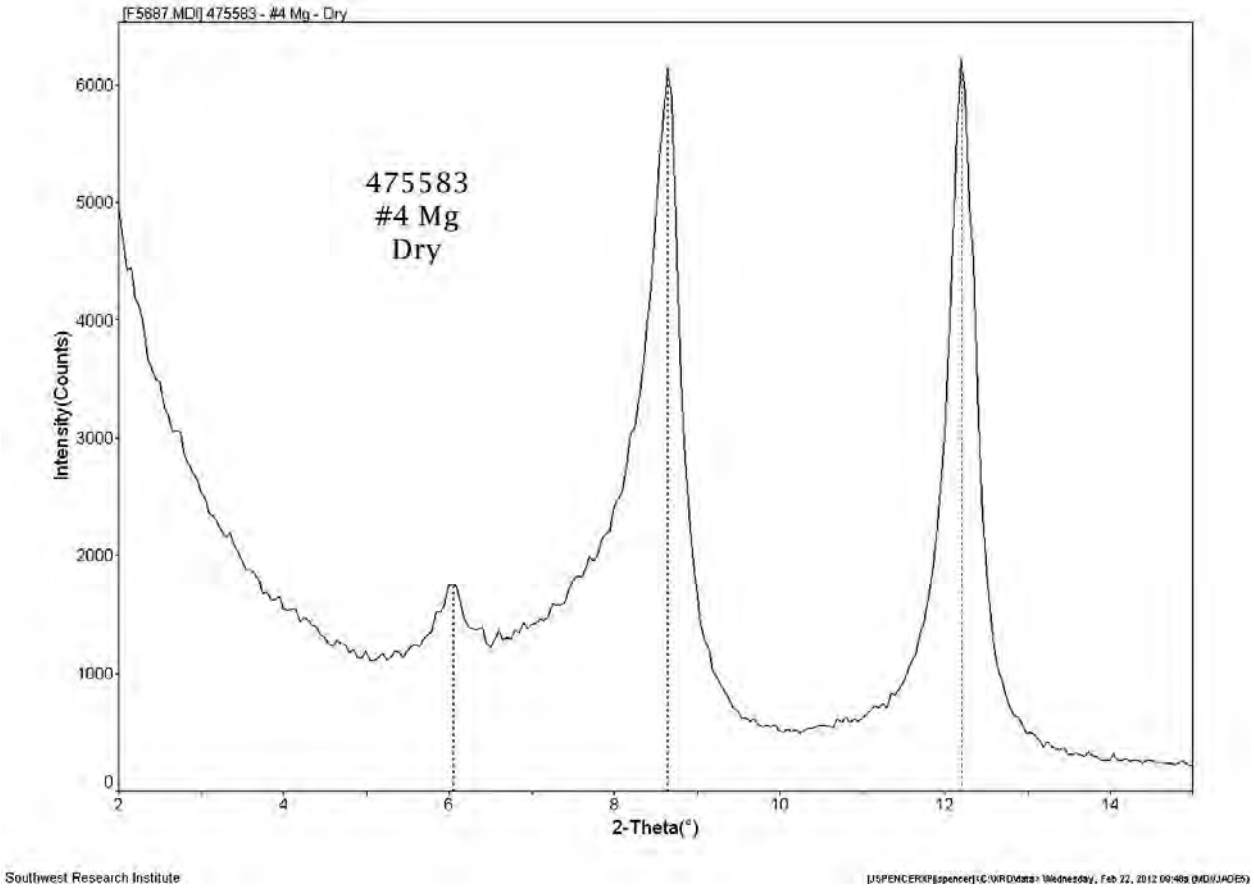

```
JADE: Peak Search Report (3 Peaks, Max P/N = 33.5)
DATE: Wednesday, Feb 22, 2012 10:14a
FILE: [F5716.MDI] 475582 - #5 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4767, 02/20/12 11:36
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.048  14.6023  250      95    2.1    536    3.6  0.226    393
  8.706  10.1483  148     899   19.4  10368   68.8  0.461    177
 12.244   7.2229  136    4631  100.0  15072  100.0  0.130    959
```

Figure 23 WDMW03B-07-BE10 (SwRI# 475582) K-saturated XRD



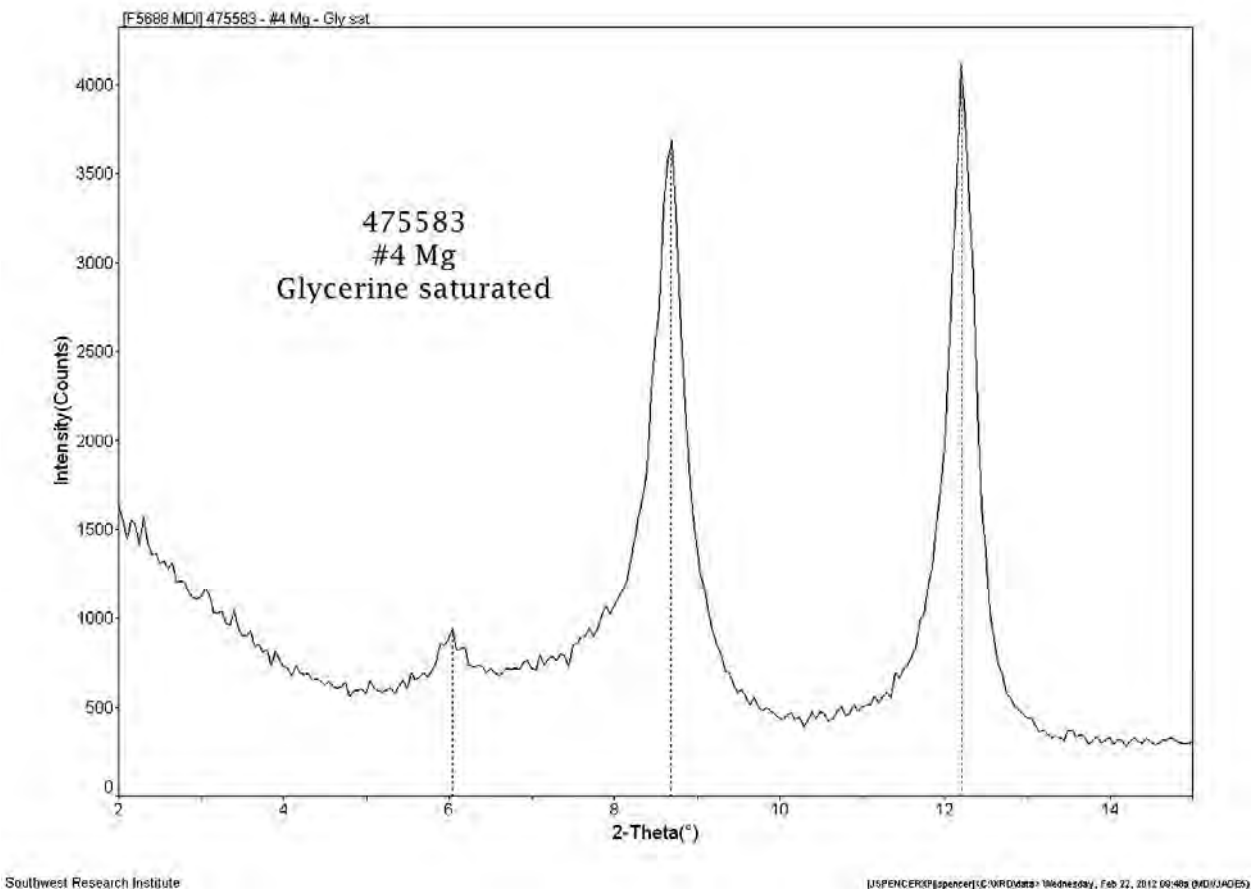

```
JADE: Peak Search Report (3 Peaks, Max P/N = 13.7)
DATE: Thursday, Mar 08, 2012 12:50p
FILE: [F5744.MDI] #5 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=1445, 03/06/12 17:31
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%  Area     I%   FWHM  XS(A)
  6.204  14.2356  301     126   13.7  1661   22.8  0.527    154
  8.674  10.1863  210     920  100.0  7270  100.0  0.316    266
 12.189   7.2550  131     396   43.0  1498   20.6  0.151    704
```

Figure 24 WDMW03B-07-BE10 (SwRI# 475582) K-saturated and heated XRD



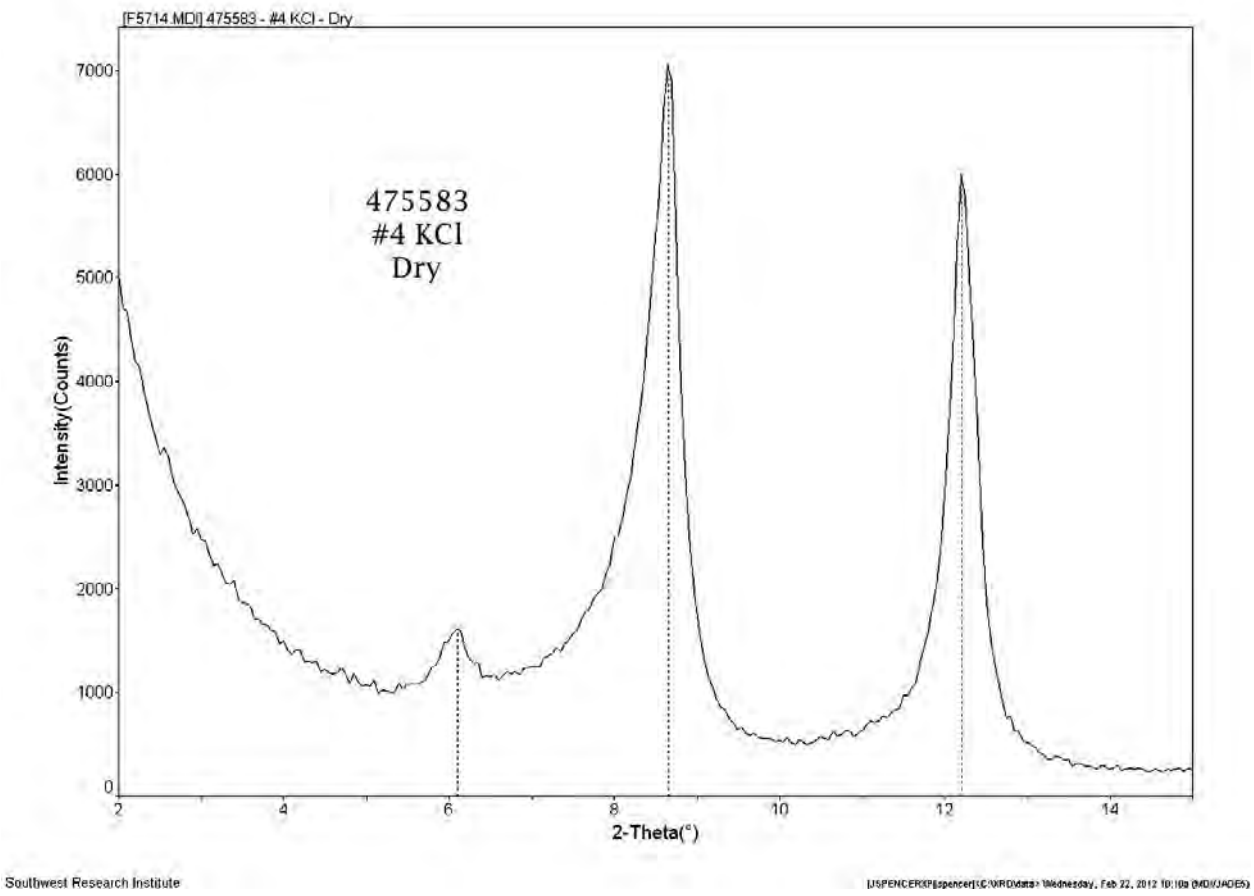

```
JADE: Peak Search Report (3 Peaks, Max P/N = 35.7)
DATE: Wednesday, Feb 22, 2012 09:48a
FILE: [F5687.MDI] 475583 - #4 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=6219, 02/14/12 12:40
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.049  14.5982  1249     496    8.8   3285    4.1  0.265    324
  8.648  10.2162   595    5545   98.6  79713  100.0  0.575    141
 12.202   7.2475   593    5626  100.0  52216   65.5  0.371    223
```

Figure 25 WDMW03B-07-CU10 (SwRI# 475583) Mg-saturated XRD



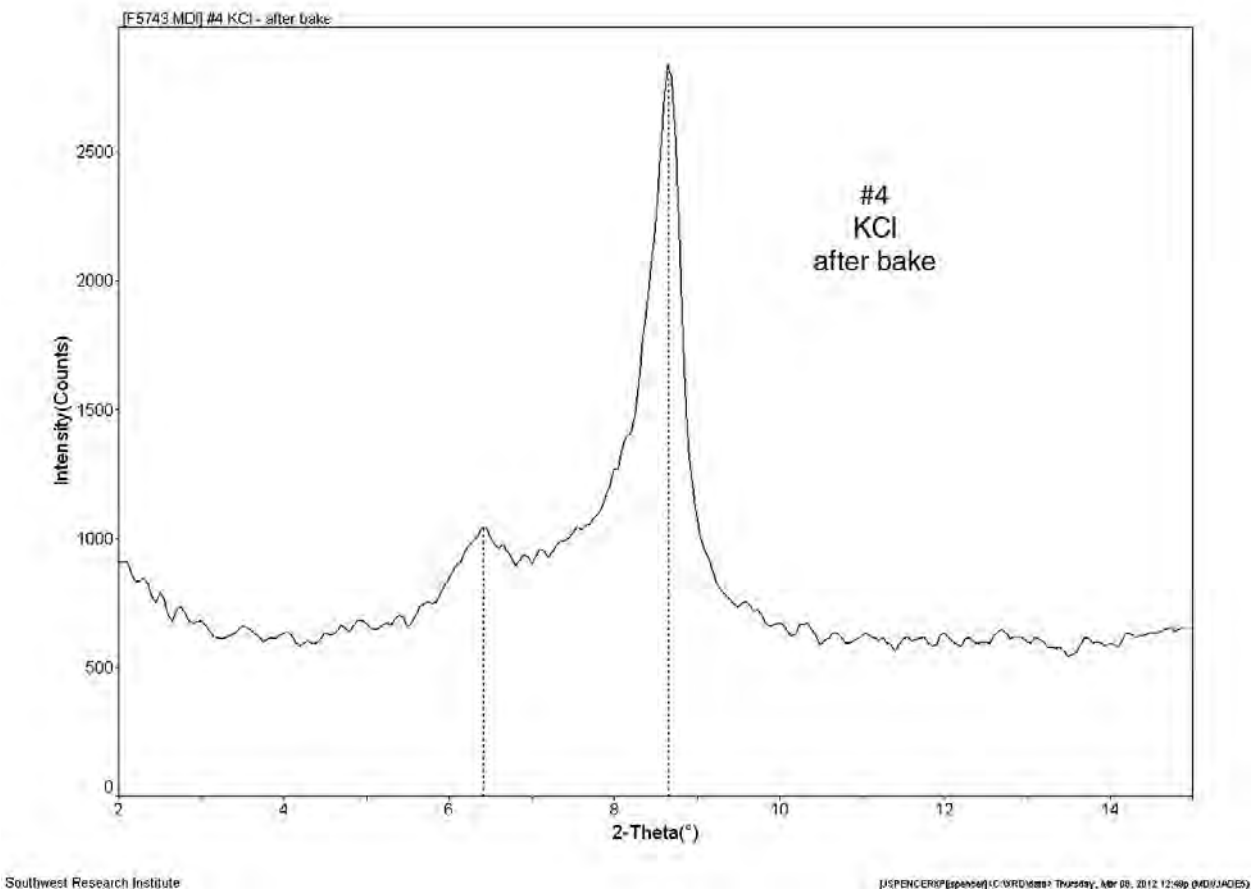

```
JADE: Peak Search Report (3 Peaks, Max P/N = 28.6)
DATE: Wednesday, Feb 22, 2012 09:49a
FILE: [F5688.MDI] 475583 - #4 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4116, 02/14/12 13:21
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.043  14.6125  660     274    7.5   1720    5.0  0.251    345
  8.684  10.1736  699    2990   81.4  31669   92.6  0.424    194
 12.203   7.2468  443    3673  100.0  34209  100.0  0.373    223
```

Figure 26 WDMW03B-07-CU10 (SwRI# 475583) Mg-saturated and glycerol solvated XRD



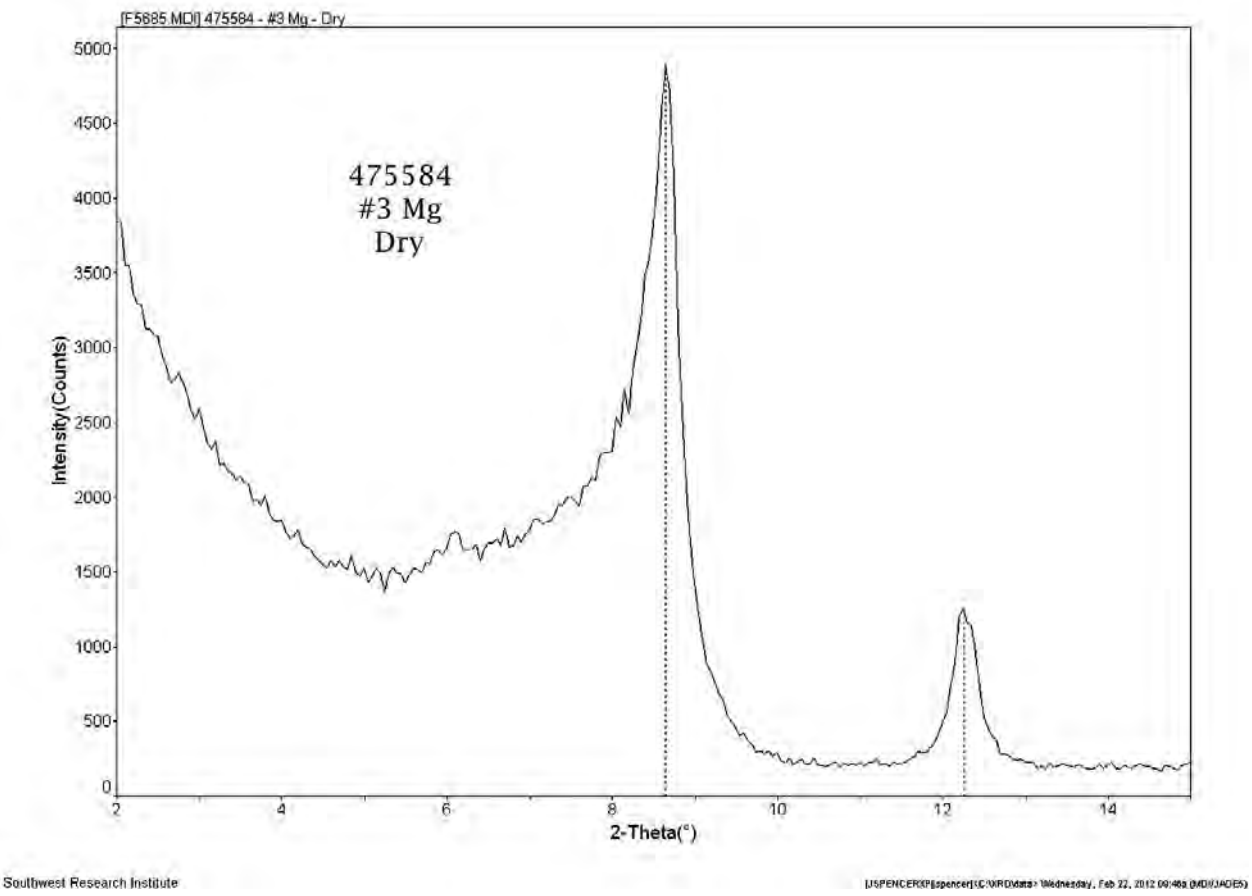

```
JADE: Peak Search Report (3 Peaks, Max P/N = 38.5)
DATE: Wednesday, Feb 22, 2012 10:10a
FILE: [F5714.MDI] 475583 - #4 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=7061, 02/17/12 11:14
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.097  14.4836  1109     486    7.5   3375    3.9  0.278    307
  8.652  10.2118   590    6471  100.0  87201  100.0  0.539    150
 12.204   7.2461   540    5451   84.2  52525   60.2  0.385    215
```

Figure 27 WDMW03B-07-CU10 (SwRI# 475583) K-saturated XRD



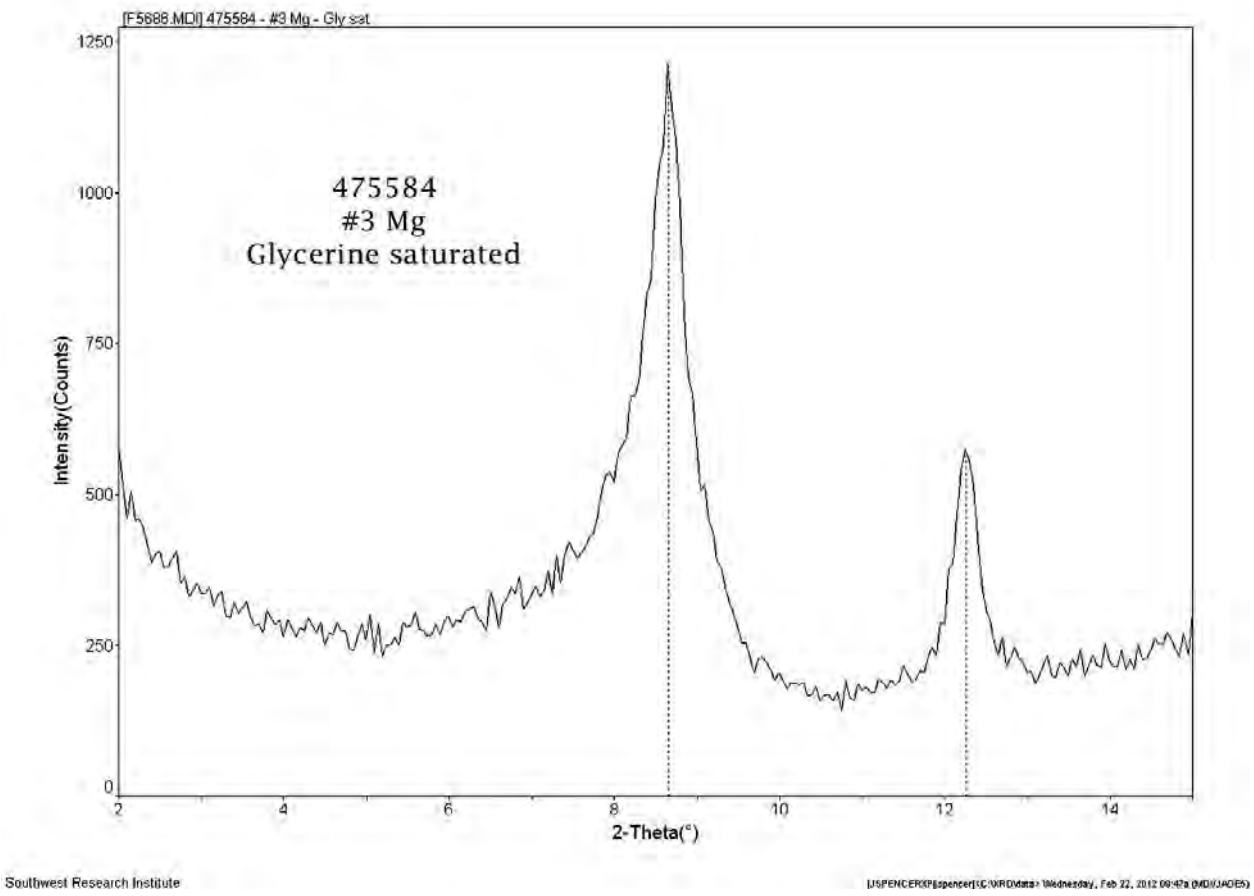

```
JADE: Peak Search Report (2 Peaks, Max P/N = 18.4)
DATE: Thursday, Mar 08, 2012 12:49p
FILE: [F5743.MDI] #4 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2841, 03/07/12 10:28
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.417  13.7635  854     185    9.4   1655    8.0  0.358    232
  8.652  10.2114  878    1963  100.0  20711  100.0  0.422    194
```

Figure 28 WDMW03B-07-CU10 (SwRI# 475583) K-saturated and heated XRD



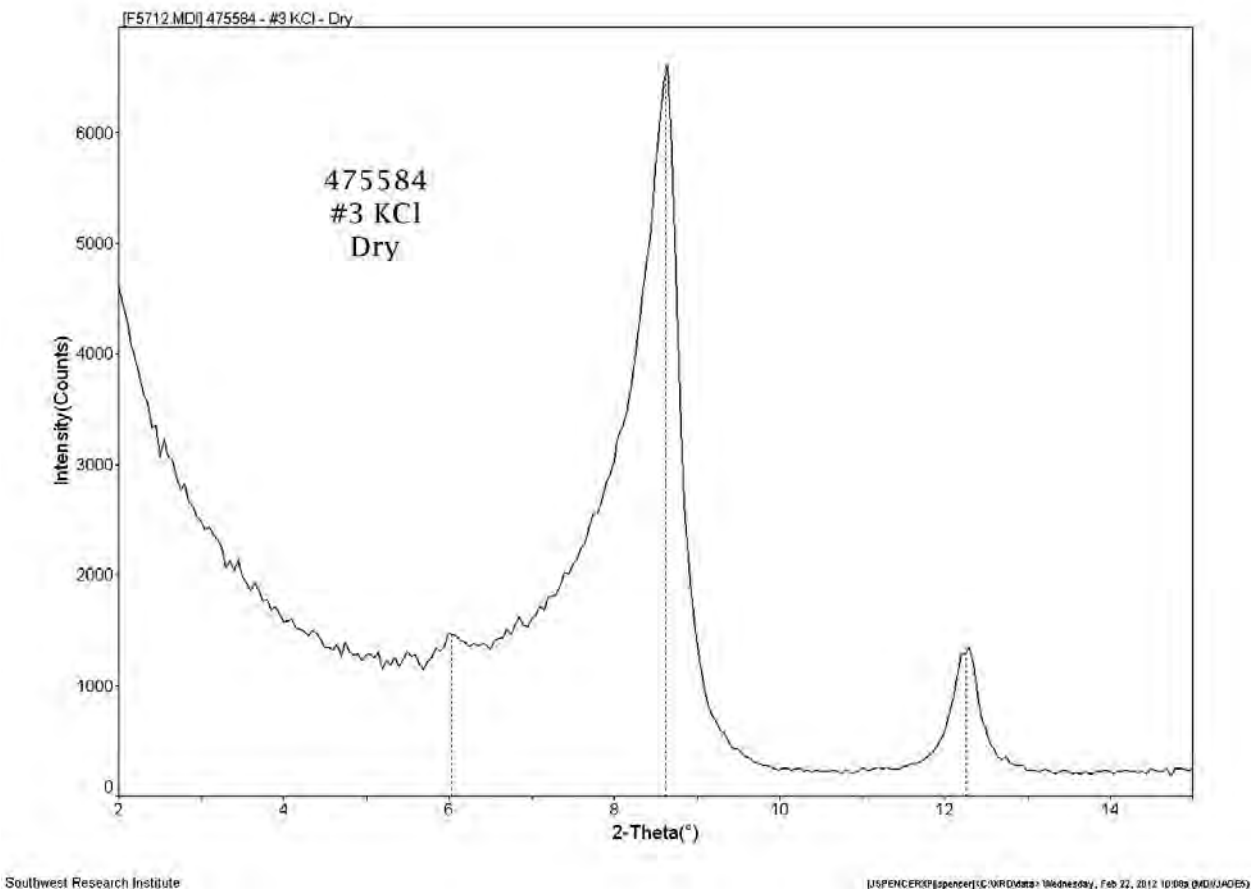

```
JADE: Peak Search Report (2 Peaks, Max P/N = 32.6)
DATE: Wednesday, Feb 22, 2012 09:46a
FILE: [F5685.MDI] 475584 - #3 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4895, 02/14/12 11:15
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.641  10.2246  337    4558  100.0  77445  100.0  0.680    119
 12.255   7.2163  201    1051   23.1   9114   11.8  0.347    241
```

Figure 29 WDMW03B-07-SU10 (SwRI# 475584) Mg-saturated XRD



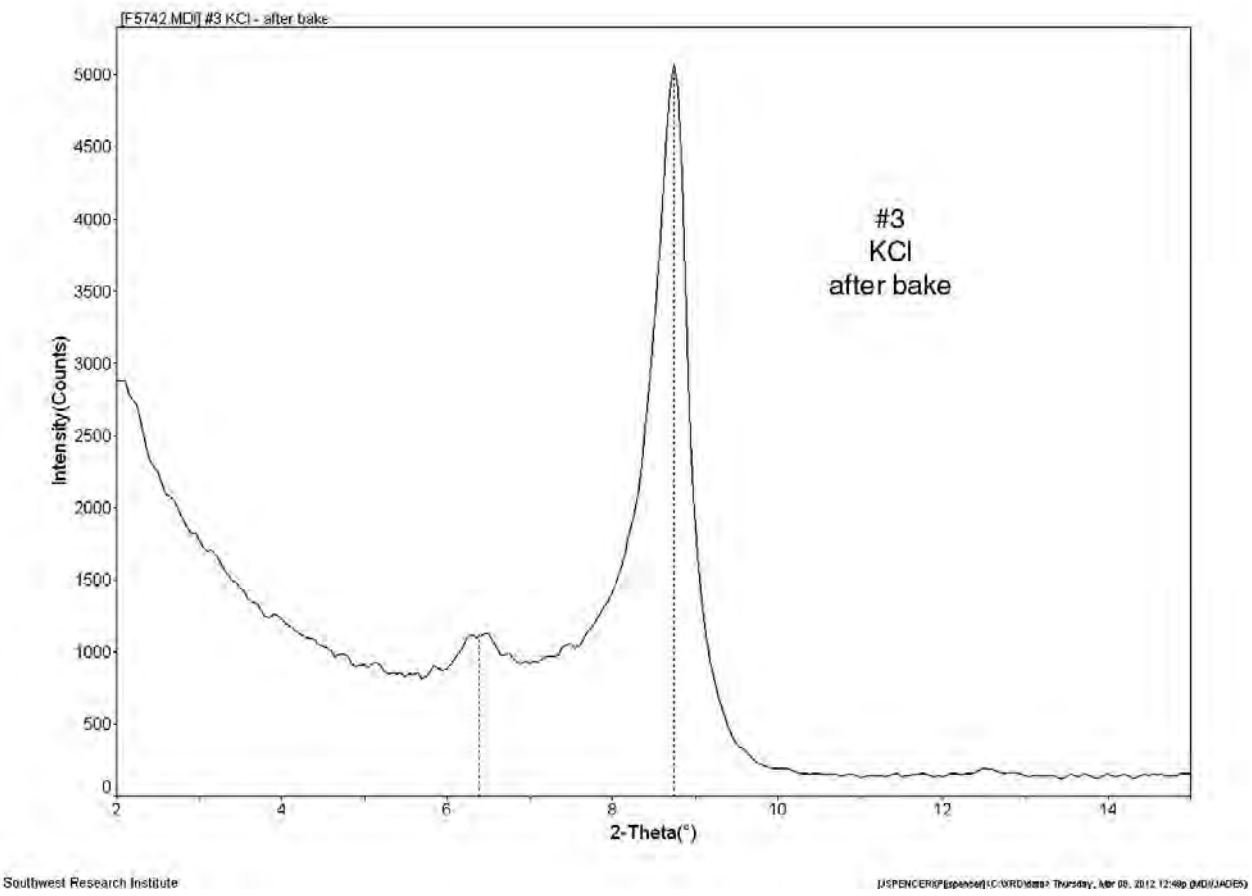

```
JADE: Peak Search Report (2 Peaks, Max P/N = 12.8)
DATE: Wednesday, Feb 22, 2012 09:47a
FILE: [F5686.MDI] 475584 - #3 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=1213, 02/14/12 12:02
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.652  10.2112  321     892  100.0  11754  100.0  0.527    154
 12.253   7.2173  196     377   42.3   3227   27.5  0.342    244
```

Figure 30 WDMW03B-07-SU10 (SwRI# 475584) Mg-saturated and glycerol solvated XRD



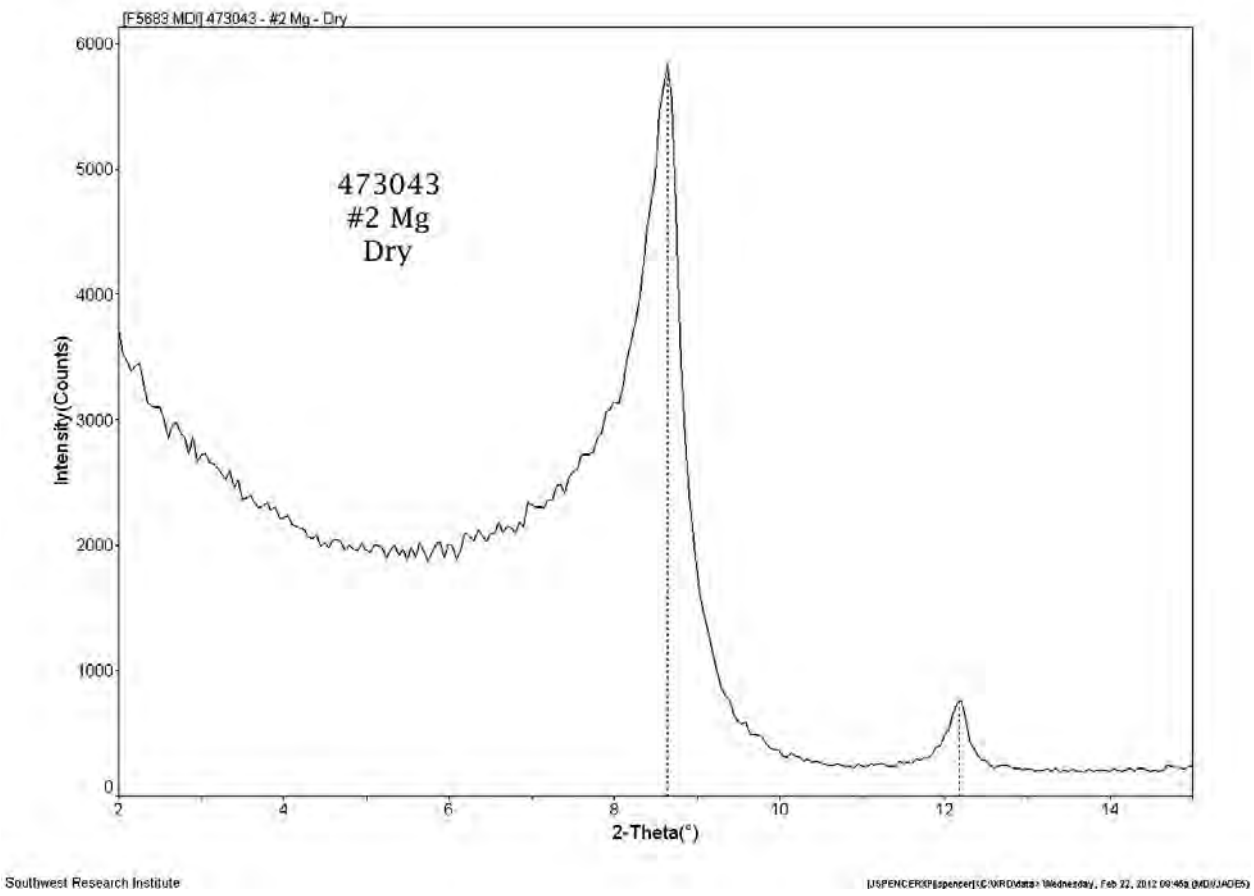

```
JADE: Peak Search Report (3 Peaks, Max P/N = 38.8)
DATE: Wednesday, Feb 22, 2012 10:08a
FILE: [F5712.MDI] 475584 - #3 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=6621, 02/17/12 10:10
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%    Area     I%   FWHM  XS(A)
  6.025  14.6574  1286     175    2.8     623    0.6  0.142    785
  8.619  10.2503   307    6314  100.0  101626  100.0  0.644    125
 12.255   7.2166   223    1117   17.7    9992    9.8  0.358    233
```

Figure 31 WDMW03B-07-SU10 (SwRI# 475584) K-saturated XRD



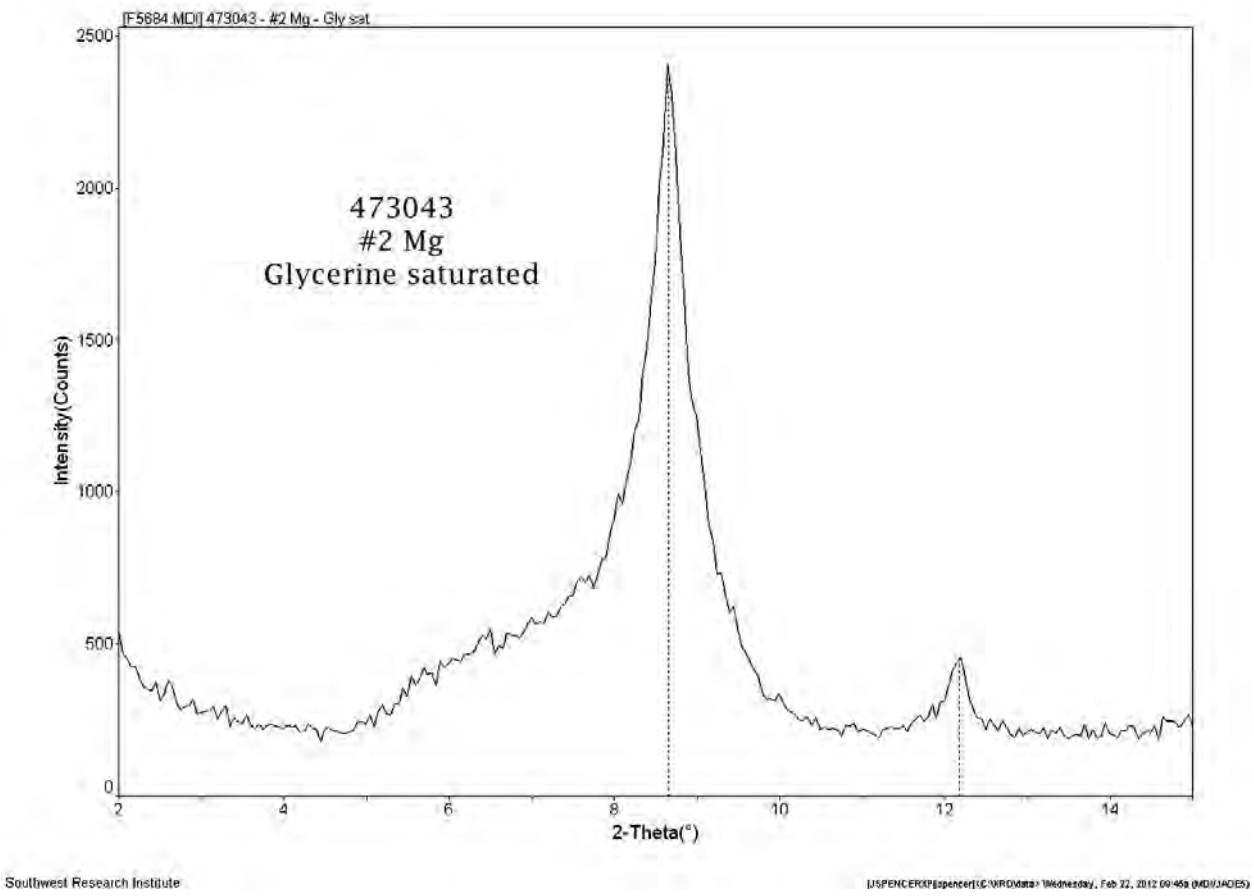

```
JADE: Peak Search Report (2 Peaks, Max P/N = 34.1)
DATE: Thursday, Mar 08, 2012 12:49p
FILE: [F5742.MDI] #3 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5075, 03/06/12 15:57
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.384  13.8336  898     221    4.6   2087    3.0  0.378    218
  8.739  10.1105  220    4855  100.0  69295  100.0  0.571    142
```

Figure 32 WDMW03B-07-SU10 (SwRI# 475584) K-saturated and heated XRD



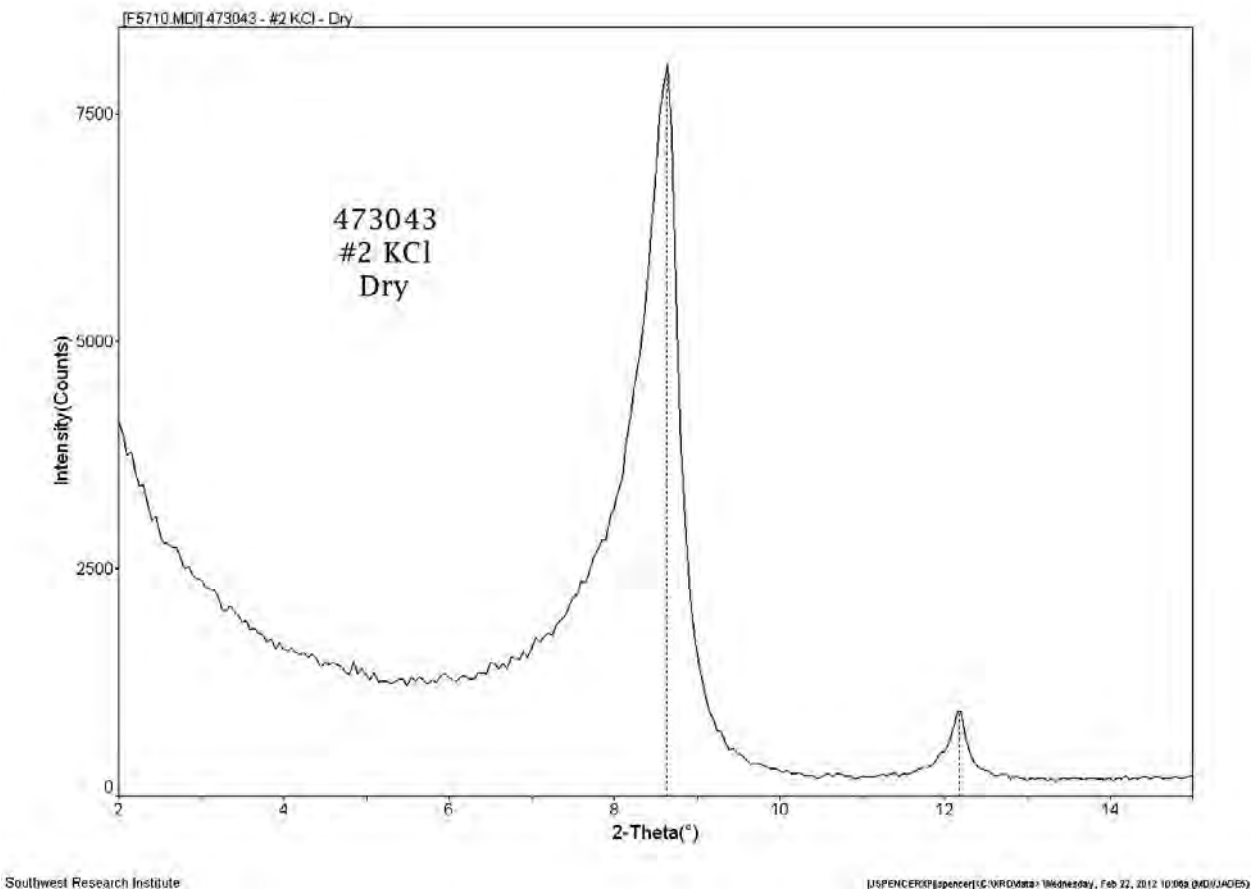

```
JADE: Peak Search Report (2 Peaks, Max P/N = 35.0)
DATE: Wednesday, Feb 22, 2012 09:45a
FILE: [F5683.MDI] 473043 - #2 Mg - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=5836, 02/14/12 09:21
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.647  10.2179  491    5345  100.0  96683  100.0  0.724    111
 12.168   7.2679  218     537   10.0   3849    4.0  0.287    297
```

Figure 33 WDSB21-07-19.5 (SwRI# 473043) Mg-saturated XRD



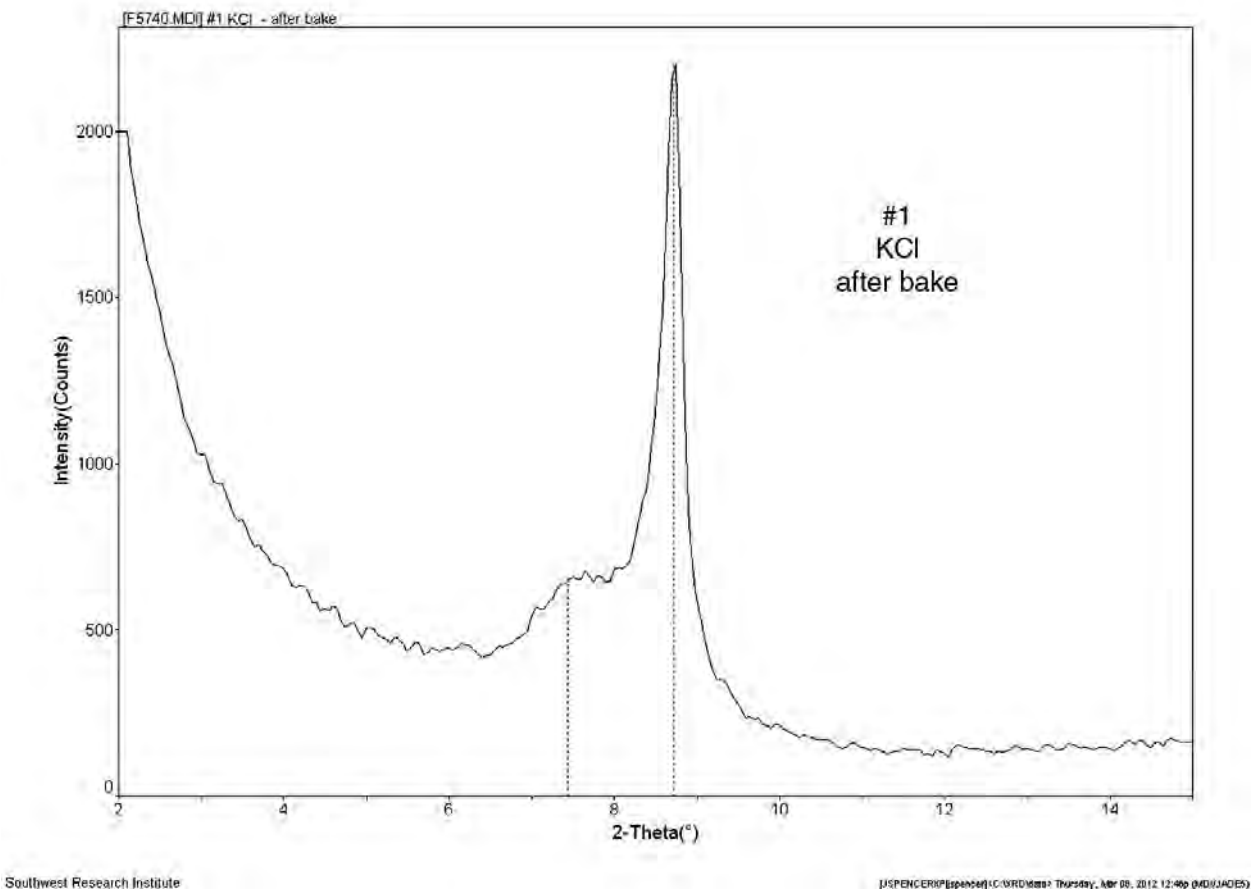

```
JADE: Peak Search Report (2 Peaks, Max P/N = 18.6)
DATE: Wednesday, Feb 22, 2012 09:46a
FILE: [F5684.MDI] 473043 - #2 Mg - Gly sat.
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2406, 02/14/12 10:18
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.653  10.2109  579    1827  100.0  22802  100.0  0.499    163
 12.168   7.2679  207     246   13.5   1956    8.6  0.318    265
```

Figure 34 WDSB21-07-19.5 (SwRI# 473043) Mg-saturated and glycerol solvated XRD



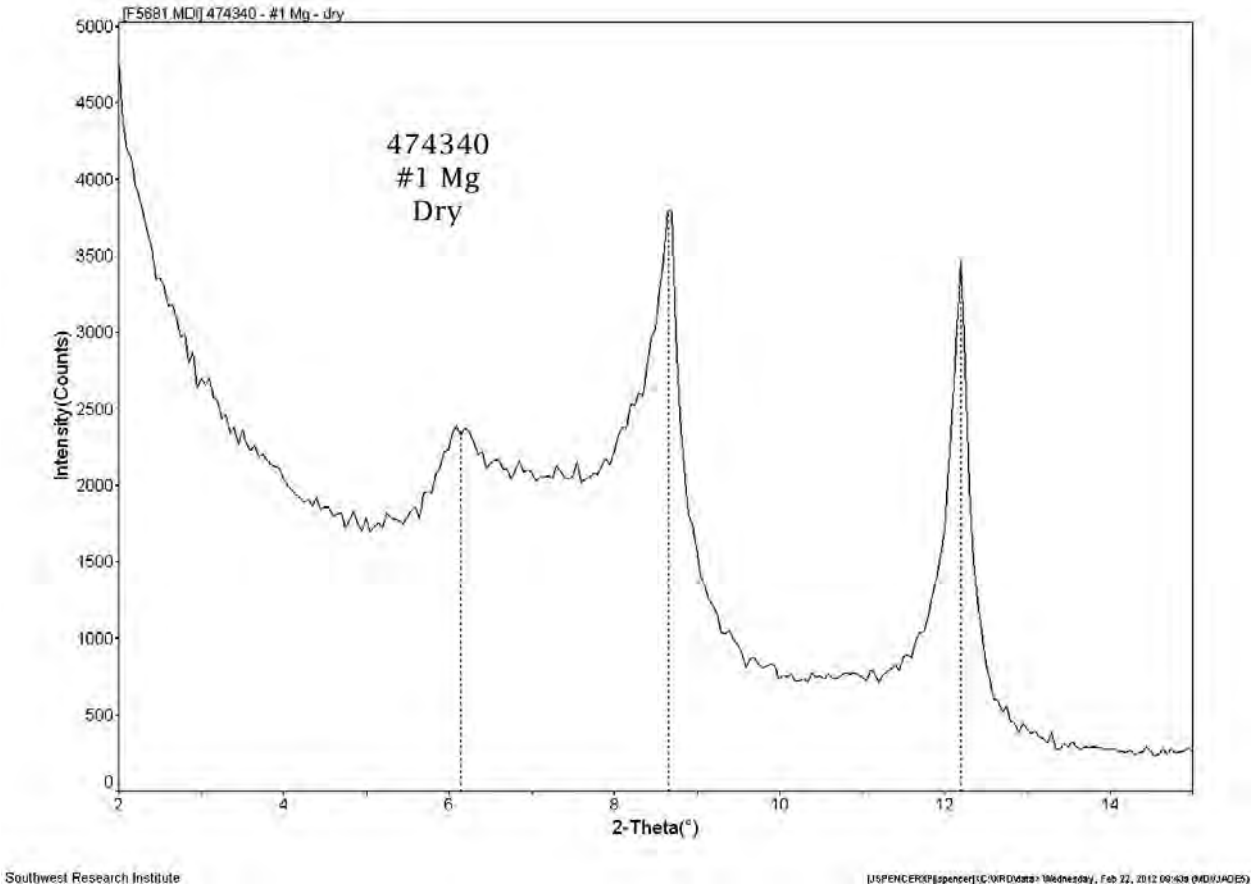

```
JADE: Peak Search Report (2 Peaks, Max P/N = 42.8)
DATE: Wednesday, Feb 22, 2012 10:07a
FILE: [F5710.MDI] 473043 - #2 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=8050, 02/17/12 08:58
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%    Area     I%   FWHM  XS(A)
  8.630  10.2374  375    7675  100.0  112777  100.0  0.588    138
 12.168   7.2679  192     730    9.5    5070    4.5  0.278    308
```

Figure 35 WDSB21-07-19.5 (SwRI# 473043) K-saturated XRD



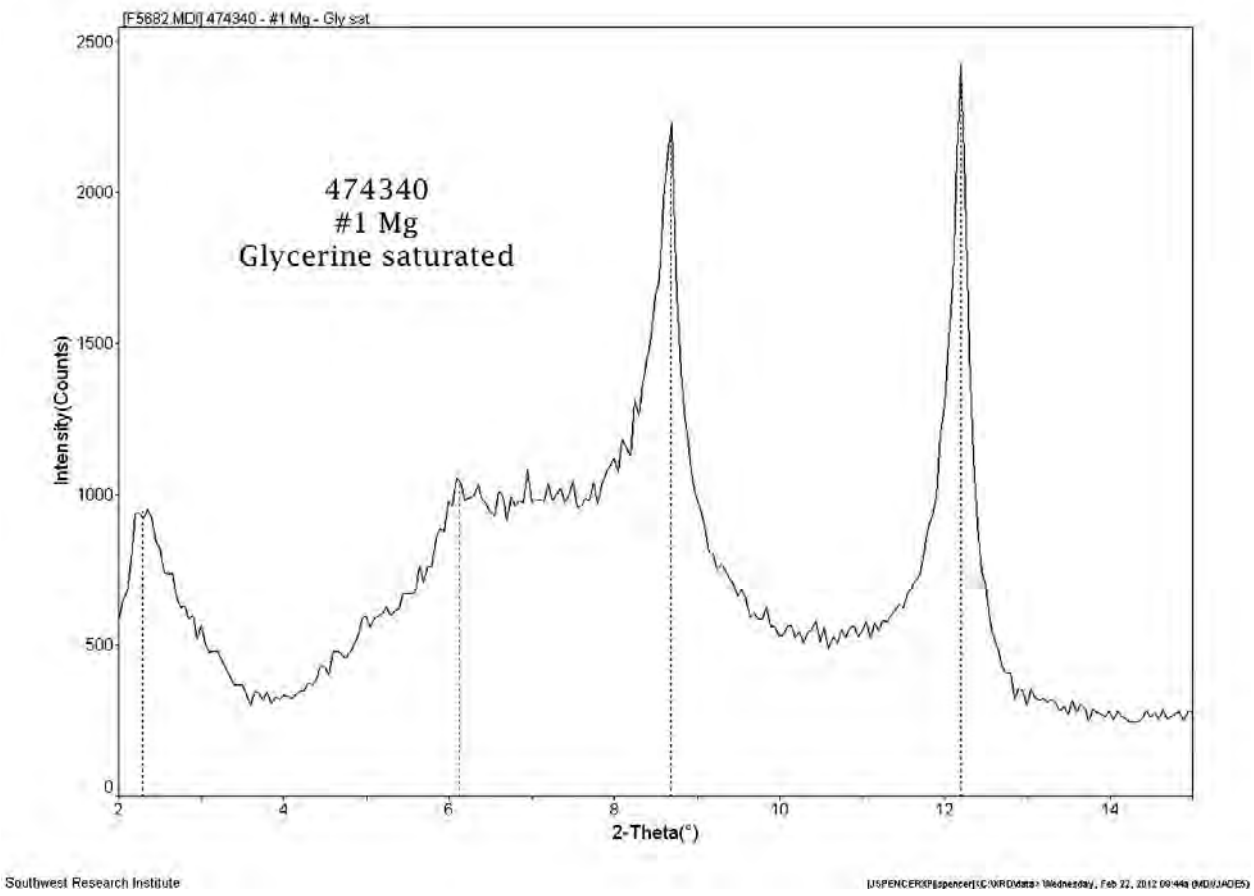

```
JADE: Peak Search Report (1 Peaks, Max P/N = 22.8)
DATE: Thursday, Mar 08, 2012 12:48p
FILE: [F5741.MDI] #2 KCl - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=3051, 03/06/12 15:14
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  8.760  10.0855  537    2514  100.0  33833  100.0  0.538    151
```

Figure 36 WDSB21-07-19.5 (SwRI# 473043) K-saturated and heated XRD



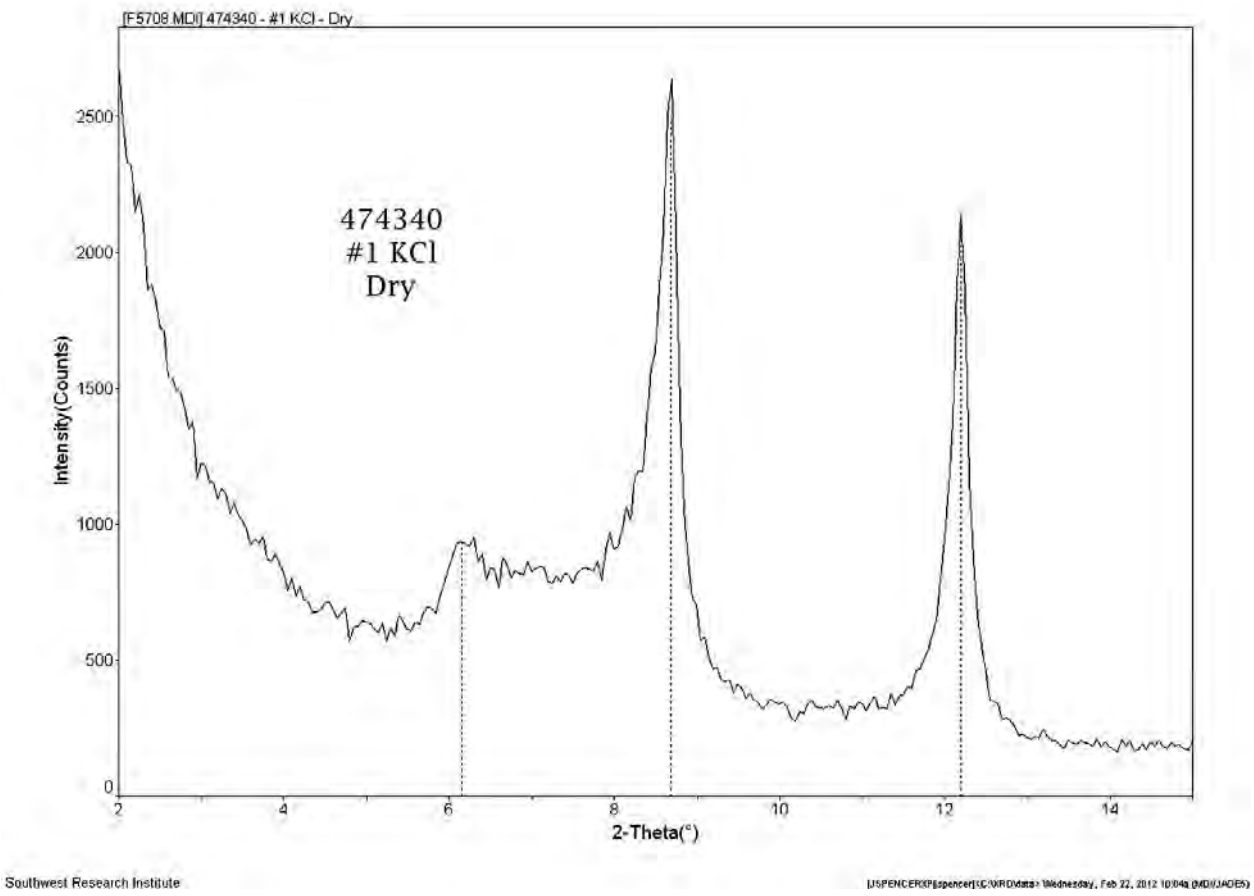

```
JADE: Peak Search Report (3 Peaks, Max P/N = 26.7)
DATE: Wednesday, Feb 22, 2012 09:41a
FILE: [F5681.MDI] 474340 - #1 Mg - dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=4786, 02/13/12 15:59
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)    BG  Height     I%   Area     I%   FWHM  XS(A)
  6.145  14.3705  1902     482   15.3   5568   11.4  0.462    176
  8.663  10.1990   883    2908   92.4  48785  100.0  0.671    120
 12.194   7.2521   325    3146  100.0  30934   63.4  0.393    210
```

Figure 37 WDSB31-07-2.0 (SWRI# 474340) Mg-saturated XRD



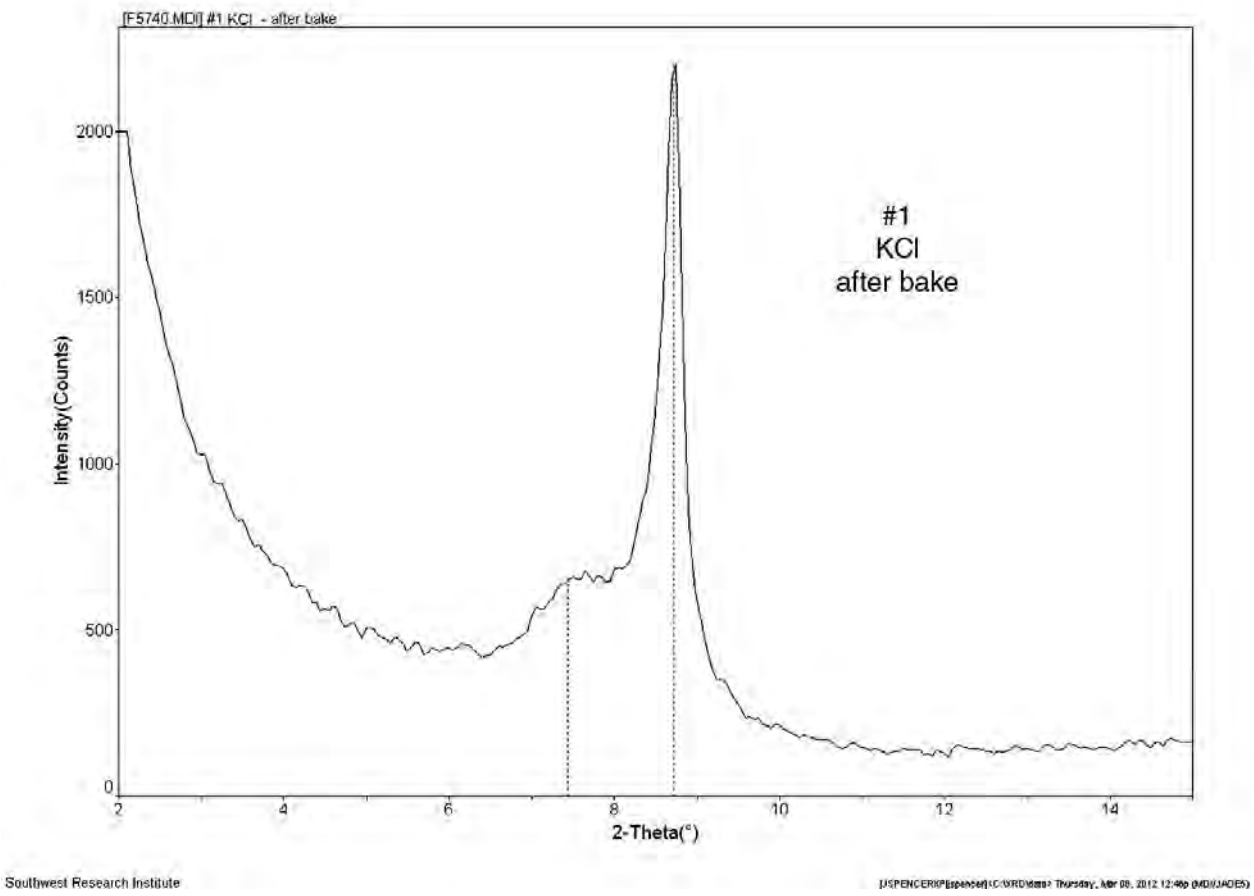

```
JADE: Peak Search Report (4 Peaks, Max P/N = 20.2)
DATE: Wednesday, Feb 22, 2012 09:44a
FILE: [F5682.MDI] 474340 - #1 Mg - Gly sat
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2425, 02/13/12 16:58
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  2.293  38.4971  597     351   17.6   3645   23.8  0.415    197
  6.124  14.4213  823     226   11.3   1570   10.2  0.278    307
  8.684  10.1736  826    1404   70.5  12565   81.9  0.358    232
 12.189   7.2550  433    1992  100.0  15339  100.0  0.308    274
```

Figure 38 WDSB31-07-2.0 (SWRI# 474340) Mg-saturated and glycerol solvated XRD




```
JADE: Peak Search Report (3 Peaks, Max P/N = 21.5)
DATE: Wednesday, Feb 22, 2012 10:05a
FILE: [F5708.MDI] 474340 - #1 KCl - Dry
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2692, 02/16/12 16:07
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  6.150  14.3596  750     186    8.6   1074    4.4  0.231    382
  8.684  10.1736  351    2156  100.0  24370  100.0  0.452    181
 12.189   7.2550  277    1861   86.3  12450   51.1  0.268    322
```

Figure 39 WDSB31-07-2.0 (SWRI# 474340) K-saturated XRD



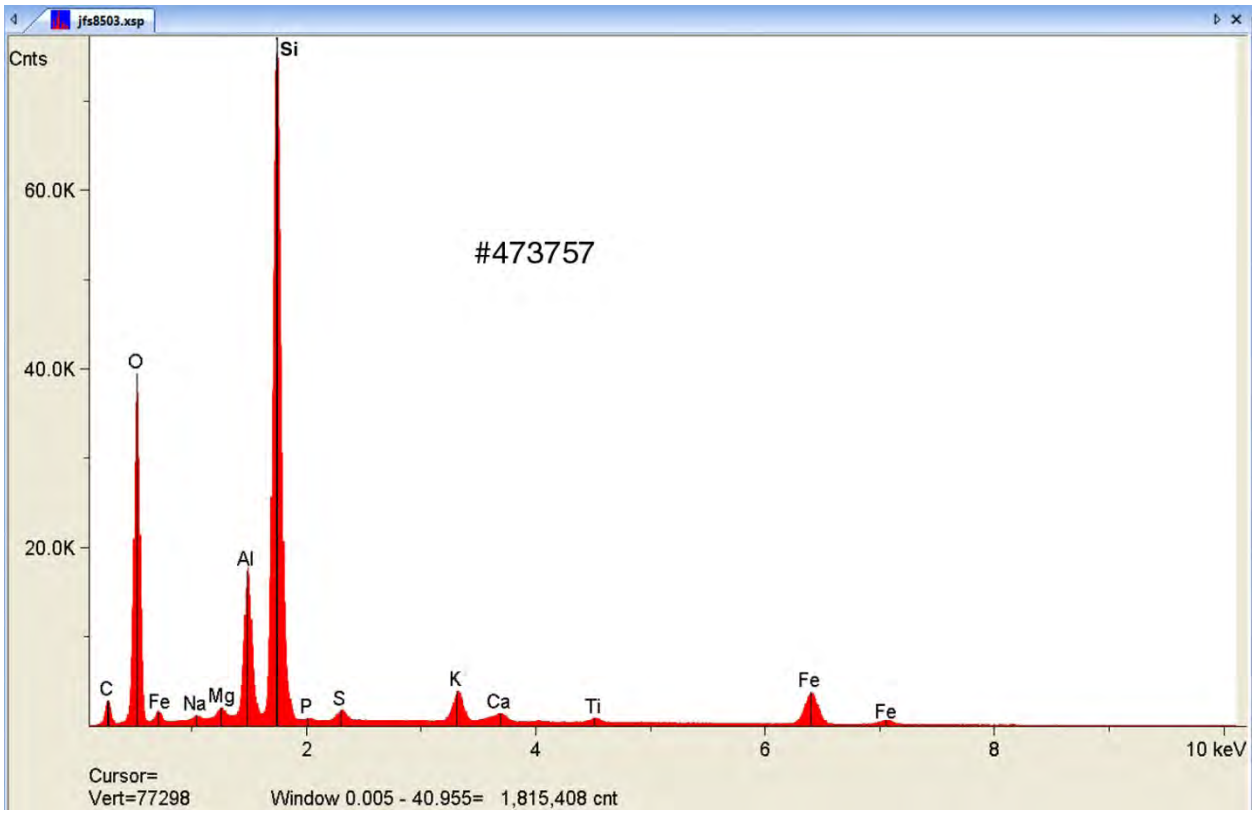

```
JADE: Peak Search Report (2 Peaks, Max P/N = 21.1)
DATE: Thursday, Mar 08, 2012 12:47p
FILE: [F5740.MDI] #1 KCL - after bake
SCAN: 2.0/15.0/0.05/6(sec), Cu, I(max)=2201, 03/06/12 14:28
PEAK: 13-pts/Parabolic Filter, Threshold=3.0, Cutoff=0.1%, BG=3/1.0, Peak-
Top=Summit
NOTE: Intensity = Counts, 2T(0)=0.0(°), Wavelength to Compute d-Spacing =
1.54056A(Cu/K-alpha1)

2-Theta     d(A)   BG  Height     I%   Area     I%   FWHM  XS(A)
  7.437  11.8777  594      63    3.2    532    2.5  0.338    247
  8.717  10.1357  217    1984  100.0  21155  100.0  0.427    192
```

Figure 40 WDSB31-07-2.0 (SWRI# 474340) K-saturated and heated XRD

Appendix E

EDS –XRF Results

Analysis Report: jfs8503



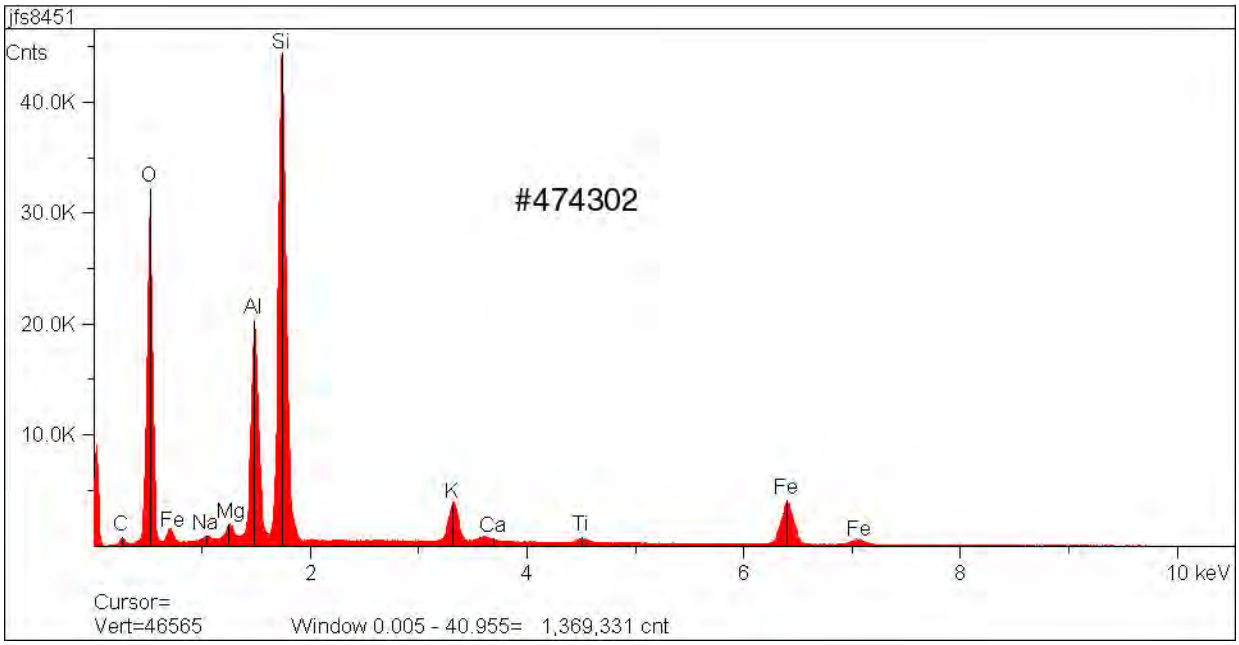
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	9.68	0.888	0.62	0.47	wt.%	
Mg	Ka	29.69	1.155	1.19	0.96	wt.%	
Al	Ka	457.57	2.675	13.93	12.43	wt.%	
Si	Ka	2,163.65	5.469	71.48	66.43	wt.%	
P	Ka	1.74	0.911	0.11	0.11	wt.%	
S	Ka	35.10	1.071	1.57	1.67	wt.%	
K	Ka	118.32	1.523	3.42	4.42	wt.%	
Ca	Ka	36.06	1.081	1.02	1.36	wt.%	
Ti	Ka	19.54	0.962	0.55	0.87	wt.%	
Fe	Ka	167.72	1.646	6.11	11.28	wt.%	
				100.00	100.00	wt.%	Total

kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 300.0

Note: Results do not include elements with Z<11 (Na).

Figure 1 WDSB02-07-24.5 (SwRI#473757) Bulk EDS-XRF

Analysis Report: jfs8451



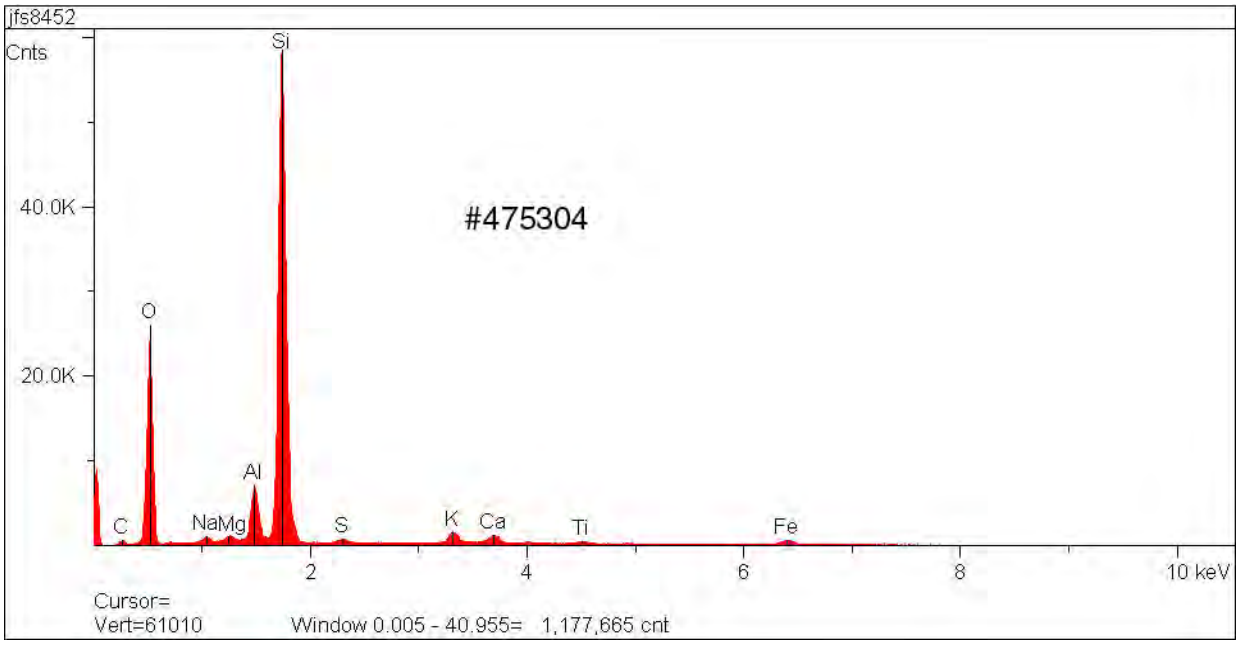
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	13.57	1.155	0.76	0.57	wt.%	
Mg	Ka	57.60	1.613	1.99	1.58	wt.%	
Al	Ka	833.51	4.273	22.11	19.49	wt.%	
Si	Ka	1,987.96	6.428	61.76	56.66	wt.%	
K	Ka	189.31	2.269	4.33	5.54	wt.%	
Ca	Ka	13.98	1.232	0.32	0.41	wt.%	
Ti	Ka	28.71	1.295	0.64	1.00	wt.%	
Fe	Ka	276.10	2.513	8.08	14.74	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 2 WDSB29-07-4.5 (SwRI#474302) Bulk EDS-XRF

Analysis Report: jfs8452



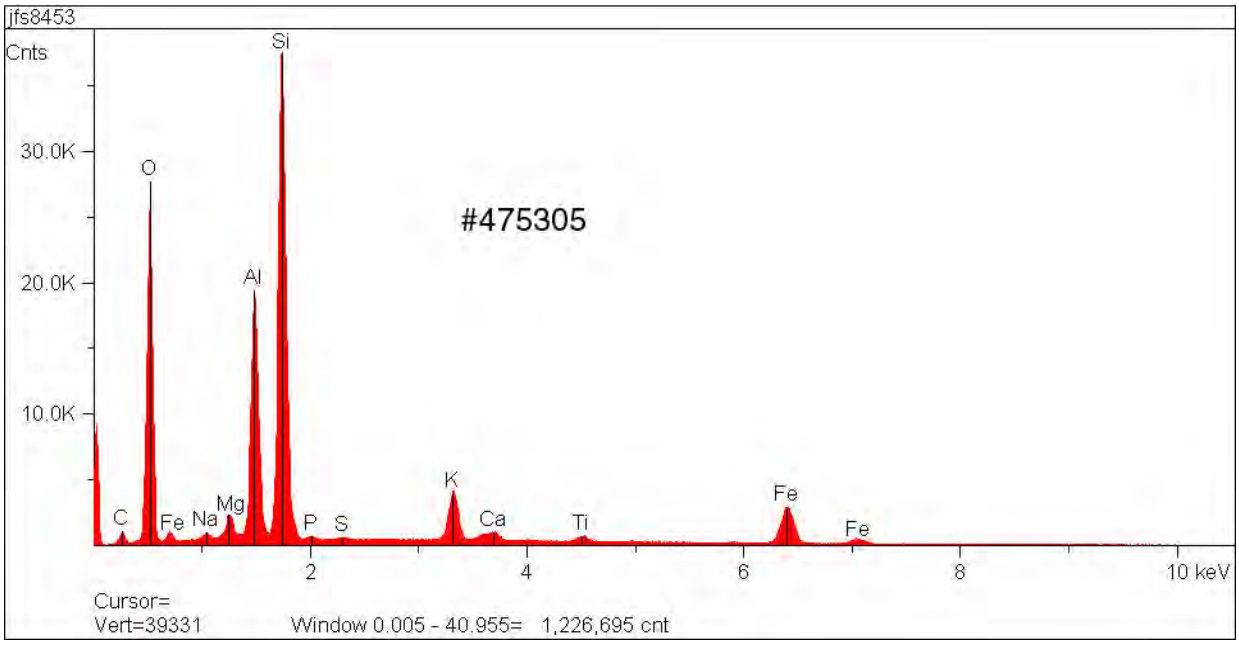
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	23.02	1.173	1.36	1.08	wt.%	
Mg	Ka	23.87	1.325	0.92	0.77	wt.%	
Al	Ka	279.60	2.647	8.29	7.72	wt.%	
Si	Ka	2,597.54	7.302	82.19	79.68	wt.%	
S	Ka	16.58	1.105	0.88	0.98	wt.%	
K	Ka	67.92	1.522	2.28	3.07	wt.%	
Ca	Ka	56.71	1.428	1.84	2.55	wt.%	
Ti	Ka	18.67	1.107	0.61	1.00	wt.%	
Fe	Ka	39.29	1.185	1.63	3.15	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 3 WDMW04B-07-BE10 (SwRI# 475304) Bulk EDS-XRF

Analysis Report: jfs8453



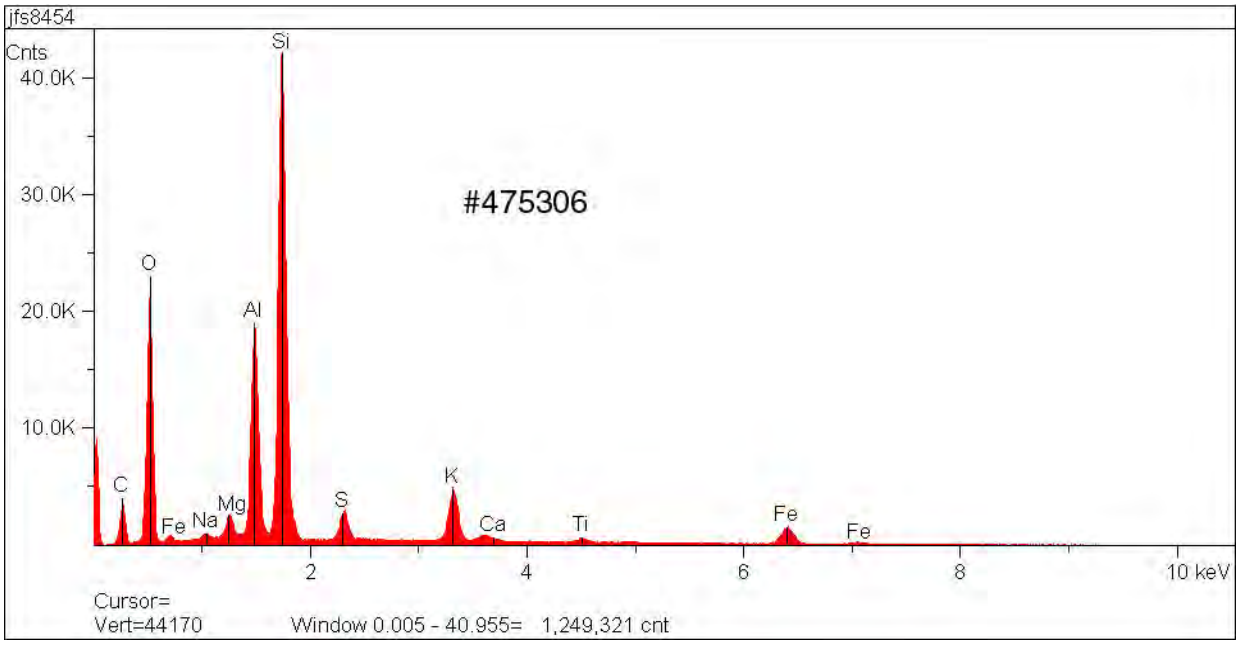
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	15.83	1.145	0.95	0.72	wt.%	
Mg	Ka	72.81	1.676	2.73	2.18	wt.%	
Al	Ka	804.21	4.193	23.59	20.96	wt.%	
Si	Ka	1,665.84	5.898	58.67	54.27	wt.%	
P	Ka	6.50	1.152	0.34	0.35	wt.%	
S	Ka	6.04	1.103	0.24	0.25	wt.%	
K	Ka	200.47	2.273	5.11	6.59	wt.%	
Ca	Ka	40.61	1.372	1.04	1.37	wt.%	
Ti	Ka	27.12	1.253	0.68	1.08	wt.%	
Fe	Ka	202.66	2.187	6.66	12.24	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 4 WDMW04B-07-CU10 (SwRI# 475305) Bulk EDS-XRF

Analysis Report: jfs8454



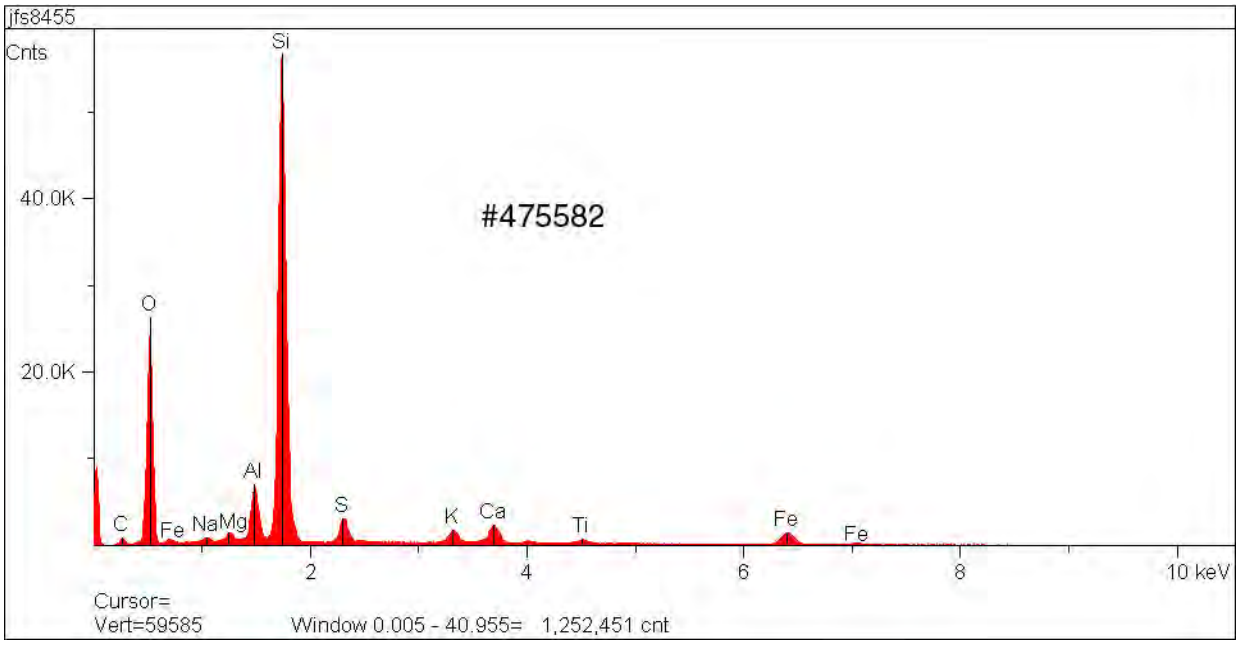
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	17.34	1.203	0.90	0.70	wt.%	
Mg	Ka	79.62	1.759	2.66	2.18	wt.%	
Al	Ka	778.02	4.145	20.80	18.92	wt.%	
Si	Ka	1,874.72	6.248	60.59	57.37	wt.%	
S	Ka	118.38	1.879	4.60	4.98	wt.%	
K	Ka	230.73	2.407	6.02	7.93	wt.%	
Ca	Ka	17.78	1.189	0.47	0.63	wt.%	
Ti	Ka	22.66	1.198	0.58	0.94	wt.%	
Fe	Ka	102.27	1.638	3.37	6.35	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 5 WDMW04B-07-SU10 (SwRI# 475306) Bulk EDS-XRF

Analysis Report: jfs8455



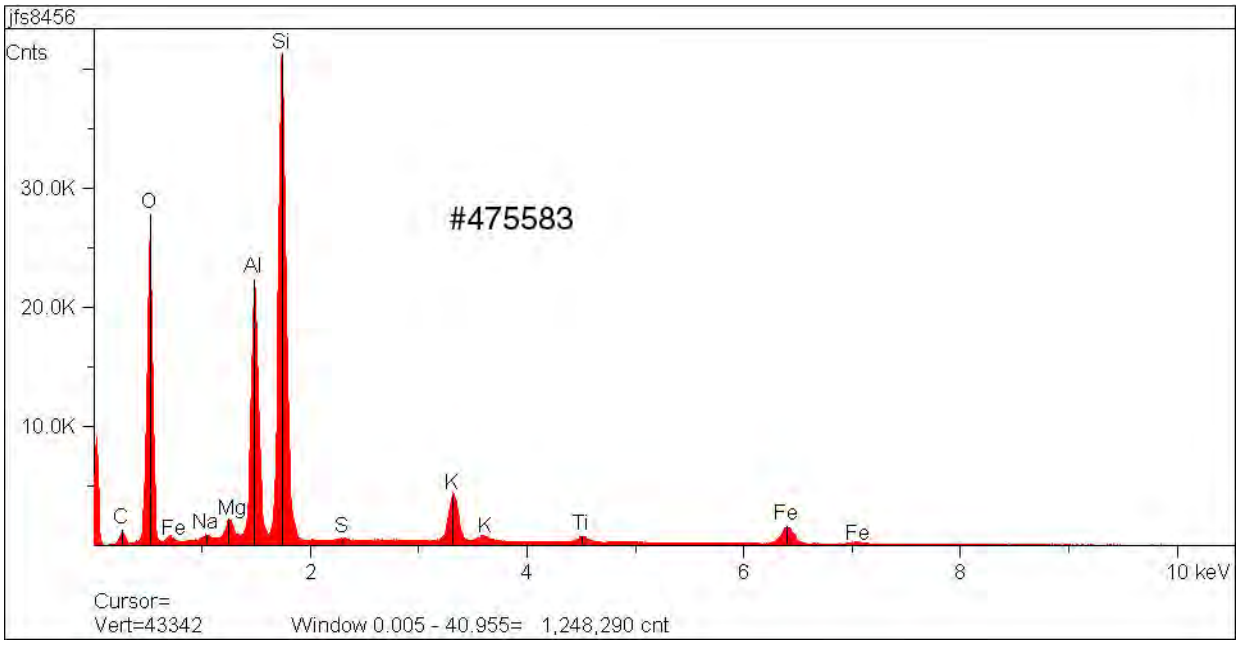
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	16.91	1.150	1.02	0.78	wt.%	
Mg	Ka	36.17	1.438	1.38	1.12	wt.%	
Al	Ka	270.90	2.625	7.83	7.06	wt.%	
Si	Ka	2,526.05	7.207	73.89	69.30	wt.%	
S	Ka	134.79	1.922	5.92	6.33	wt.%	
K	Ka	73.79	1.593	2.16	2.83	wt.%	
Ca	Ka	116.66	1.825	3.32	4.44	wt.%	
Ti	Ka	27.99	1.218	0.80	1.28	wt.%	
Fe	Ka	100.01	1.638	3.68	6.85	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 6 WDMW03B-07-BE10 (SwRI# 475582) Bulk EDS-XRF

Analysis Report: jfs8456



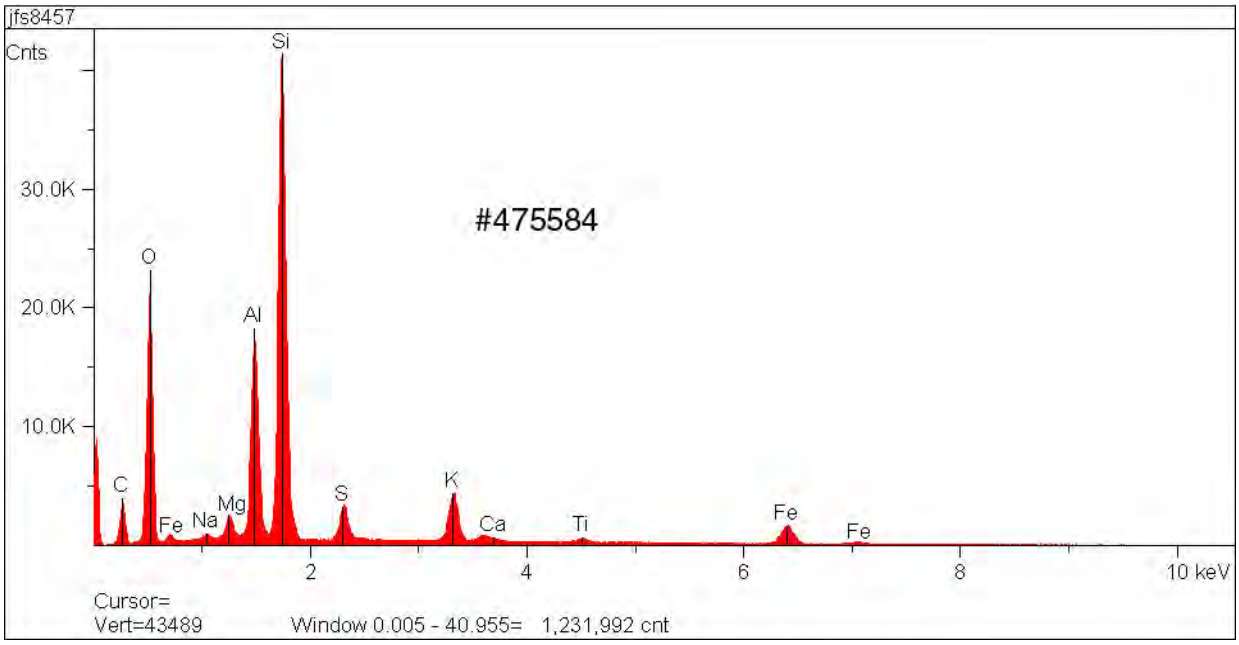
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	14.60	1.137	0.75	0.59	wt.%	
Mg	Ka	67.93	1.655	2.25	1.86	wt.%	
Al	Ka	914.10	4.446	24.28	22.26	wt.%	
Si	Ka	1,832.25	6.169	62.61	59.75	wt.%	
S	Ka	7.82	1.082	0.32	0.35	wt.%	
K	Ka	212.05	2.323	5.56	7.38	wt.%	
Ti	Ka	31.52	1.268	0.81	1.32	wt.%	
Fe	Ka	102.82	1.661	3.42	6.49	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 7 WDMW03B-07-CU10 (SwRI# 475583) Bulk EDS-XRF

Analysis Report: jfs8457



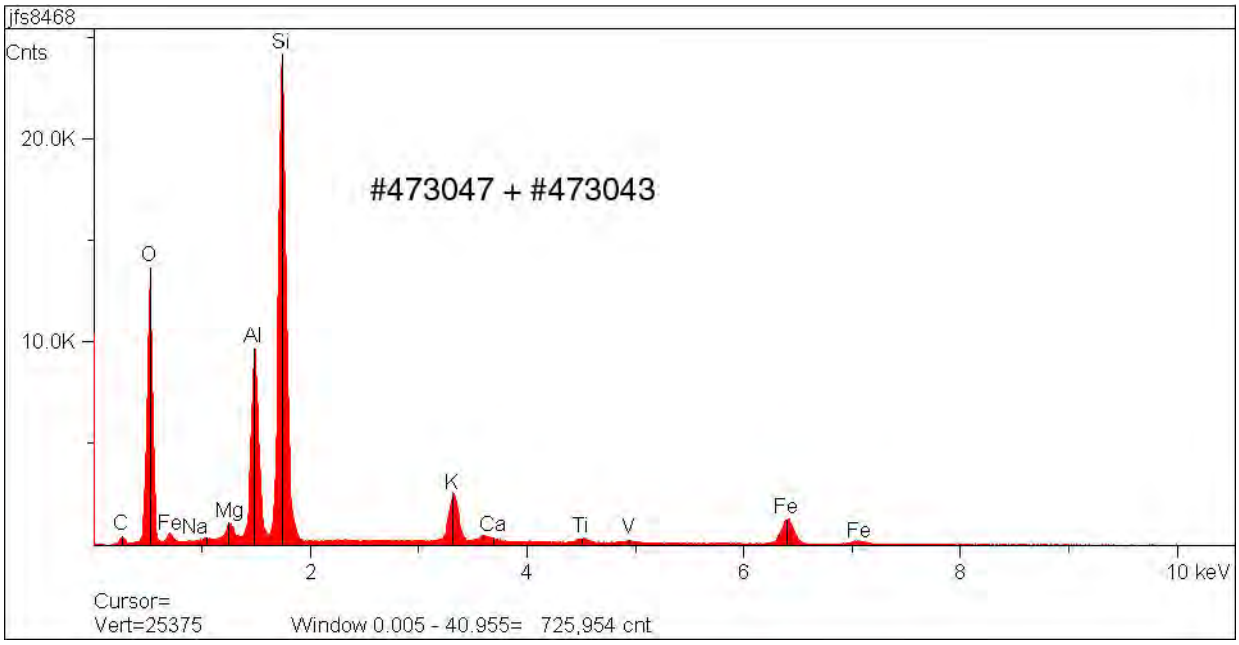
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	16.24	1.178	0.88	0.68	wt.%	
Mg	Ka	76.73	1.732	2.65	2.16	wt.%	
Al	Ka	734.69	4.036	20.20	18.32	wt.%	
Si	Ka	1,837.90	6.191	60.27	56.87	wt.%	
S	Ka	140.72	1.987	5.54	5.97	wt.%	
K	Ka	214.51	2.337	5.72	7.51	wt.%	
Ca	Ka	17.66	1.182	0.47	0.63	wt.%	
Ti	Ka	21.15	1.180	0.55	0.89	wt.%	
Fe	Ka	110.57	1.696	3.71	6.97	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 200.0

Note: Results do not include elements with Z<11 (Na).

Figure 8 WDMW03B-07-SU10 (SwRI# 475584) Bulk EDS-XRF

Analysis Report: jfs8468



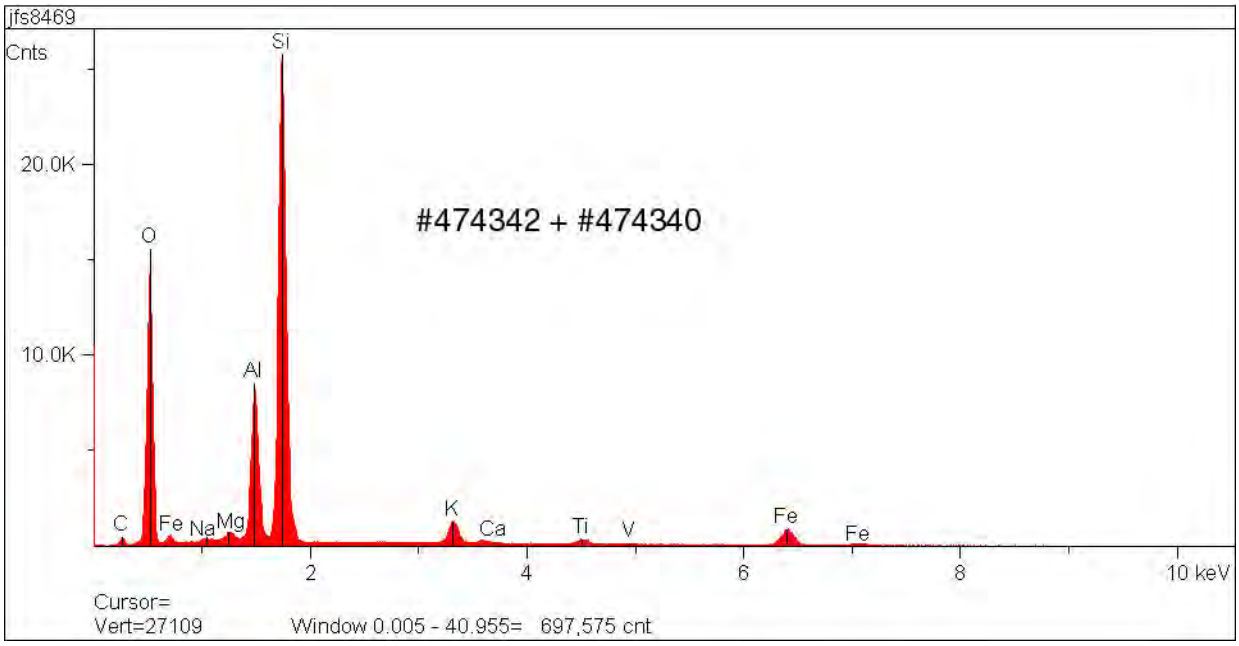
Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	2.68	0.514	0.42	0.32	wt.%	
Mg	Ka	22.59	0.779	2.22	1.79	wt.%	
Al	Ka	267.14	1.976	20.55	18.43	wt.%	
Si	Ka	707.39	3.123	64.47	60.17	wt.%	
K	Ka	80.43	1.172	5.73	7.44	wt.%	
Ca	Ka	6.00	0.596	0.43	0.57	wt.%	
Ti	Ka	8.54	0.596	0.60	0.95	wt.%	
V	Ka	3.63	0.513	0.26	0.44	wt.%	
Fe	Ka	58.34	0.973	5.32	9.87	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 300.0

Note: Results do not include elements with Z<11 (Na).

Figure 9 WDSB21-07-19.5 (SwRI# 473043) Bulk EDS-XRF

Analysis Report: jfs8469



Elt.	Line	Intensity (c/s)	Error 2-sig	Atomic %	Conc	Units	
Na	Ka	4.72	0.547	0.75	0.59	wt.%	
Mg	Ka	12.97	0.702	1.32	1.09	wt.%	
Al	Ka	228.37	1.838	18.15	16.63	wt.%	
Si	Ka	755.32	3.224	71.50	68.17	wt.%	
K	Ka	40.69	0.890	3.29	4.36	wt.%	
Ca	Ka	1.85	0.499	0.15	0.20	wt.%	
Ti	Ka	10.25	0.582	0.80	1.30	wt.%	
V	Ka	0.52	0.433	0.04	0.07	wt.%	
Fe	Ka	39.57	0.819	4.00	7.59	wt.%	
				100.00	100.00	wt.%	Total

File SP0
kV 20.0
Takeoff Angle 23.0°
Elapsed Livetime 300.0

Note: Results do not include elements with Z<11 (Na).

Figure 10 WDSB31-07-2.0 (SwRI# 474340) Bulk EDS-XRF

Appendix F

XRD Results for Bulk Sample

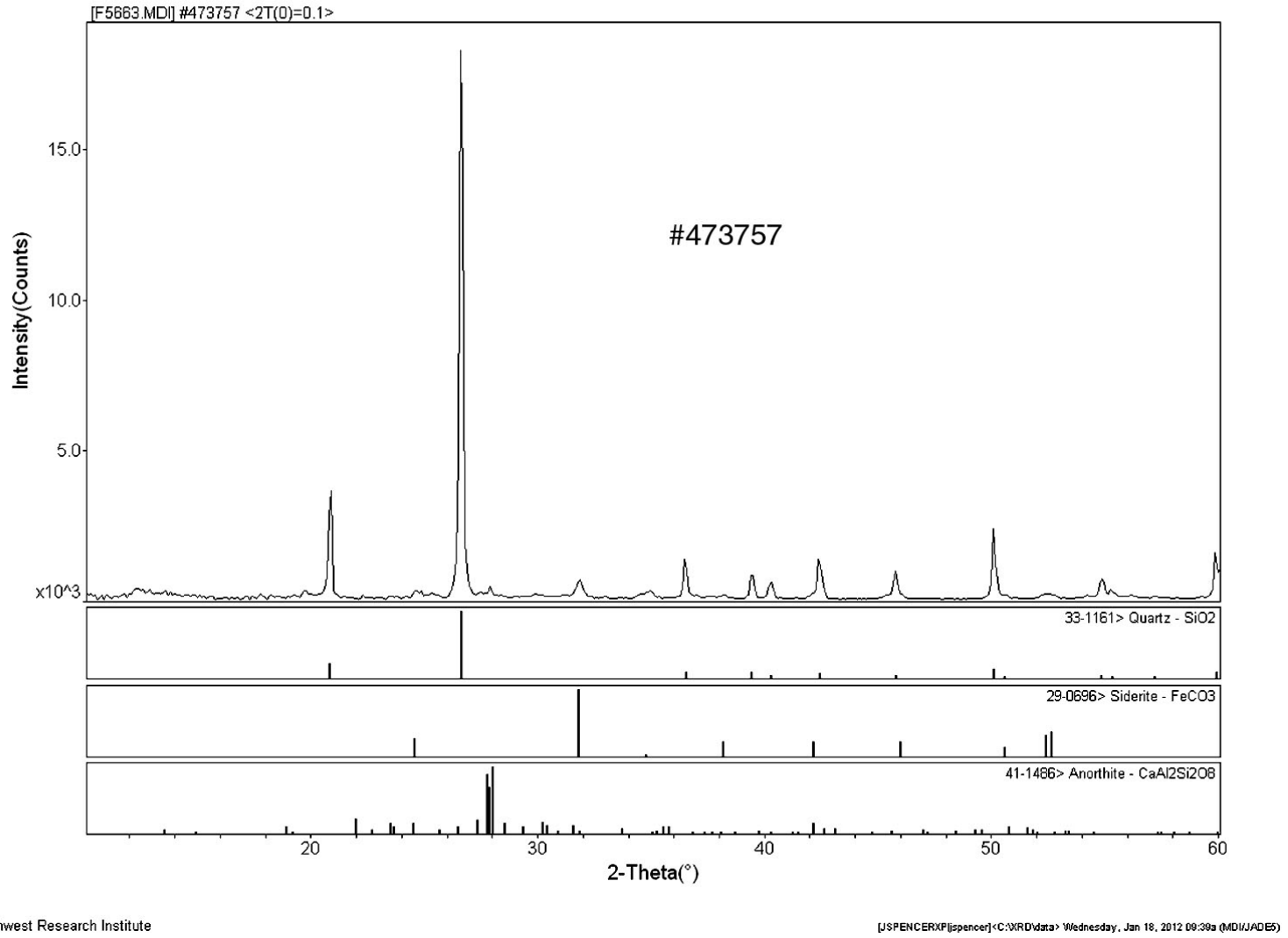


Figure 1 WDSB02-07-24.5 (SwRI#473757) Bulk XRD

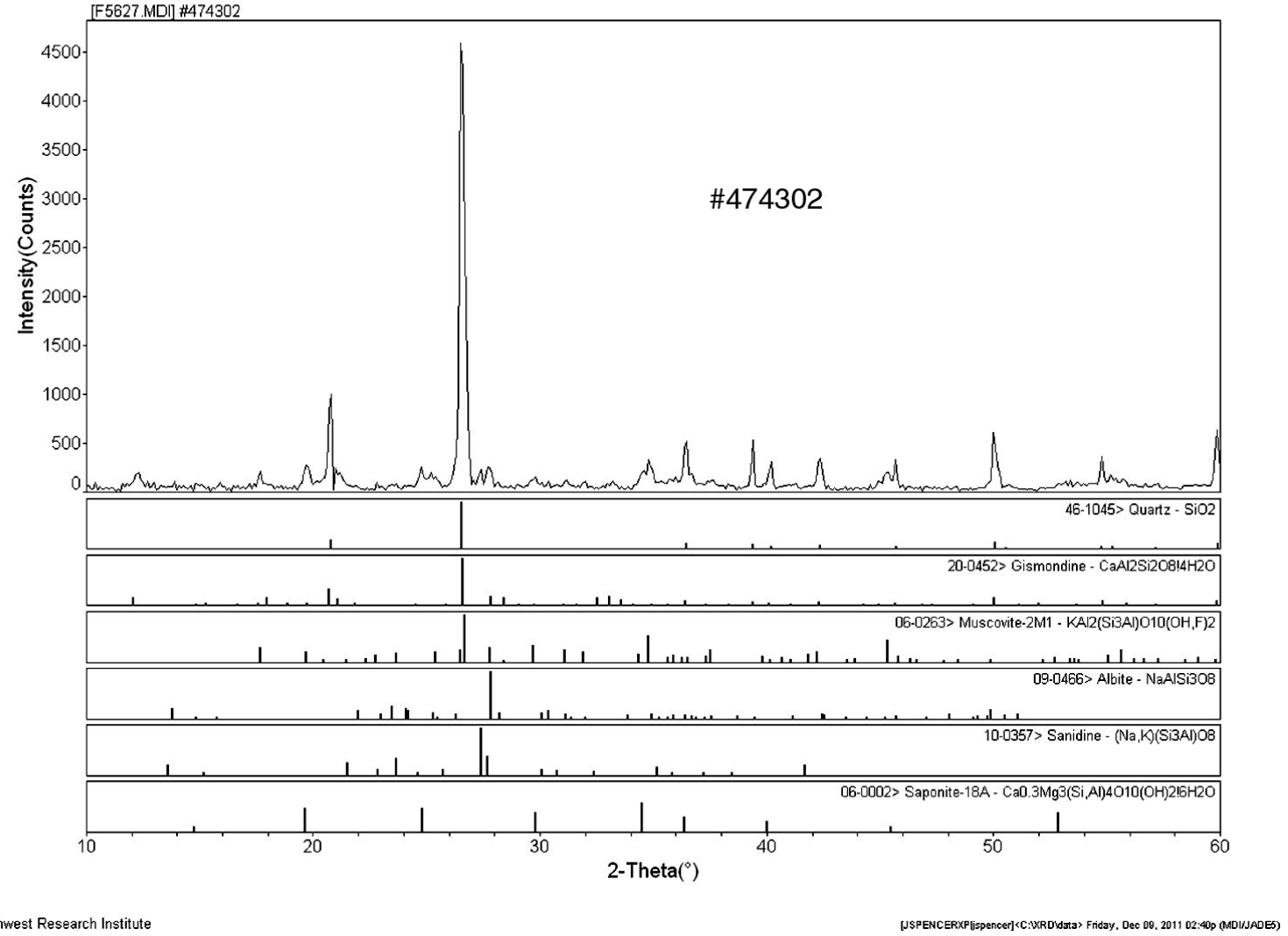


Figure 2 WDSB29-07-4.5 (SwRI#474302) Bulk XRD

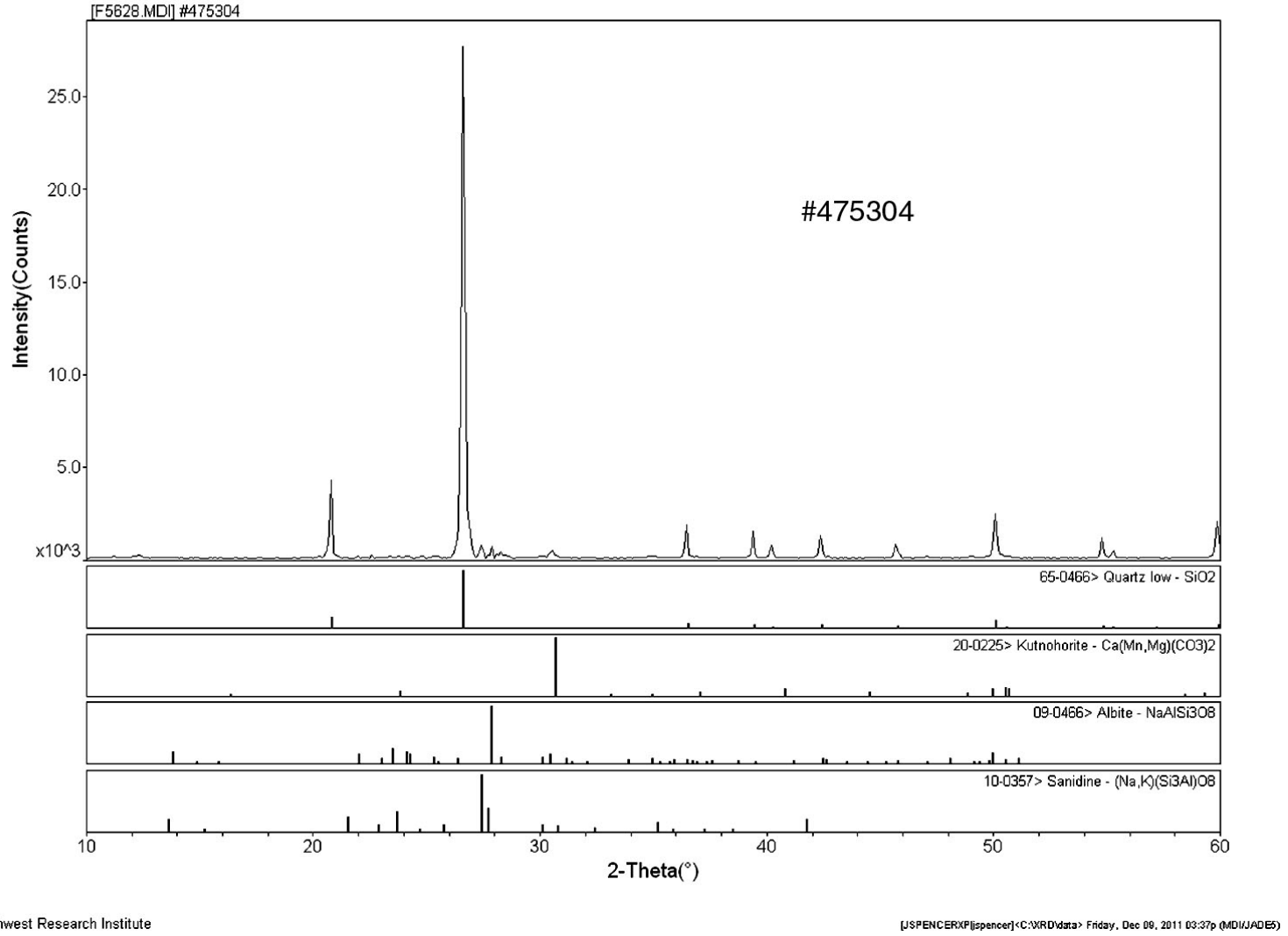


Figure 3 WDMW04B-07-BE10 (SwRI# 475304) Bulk XRD

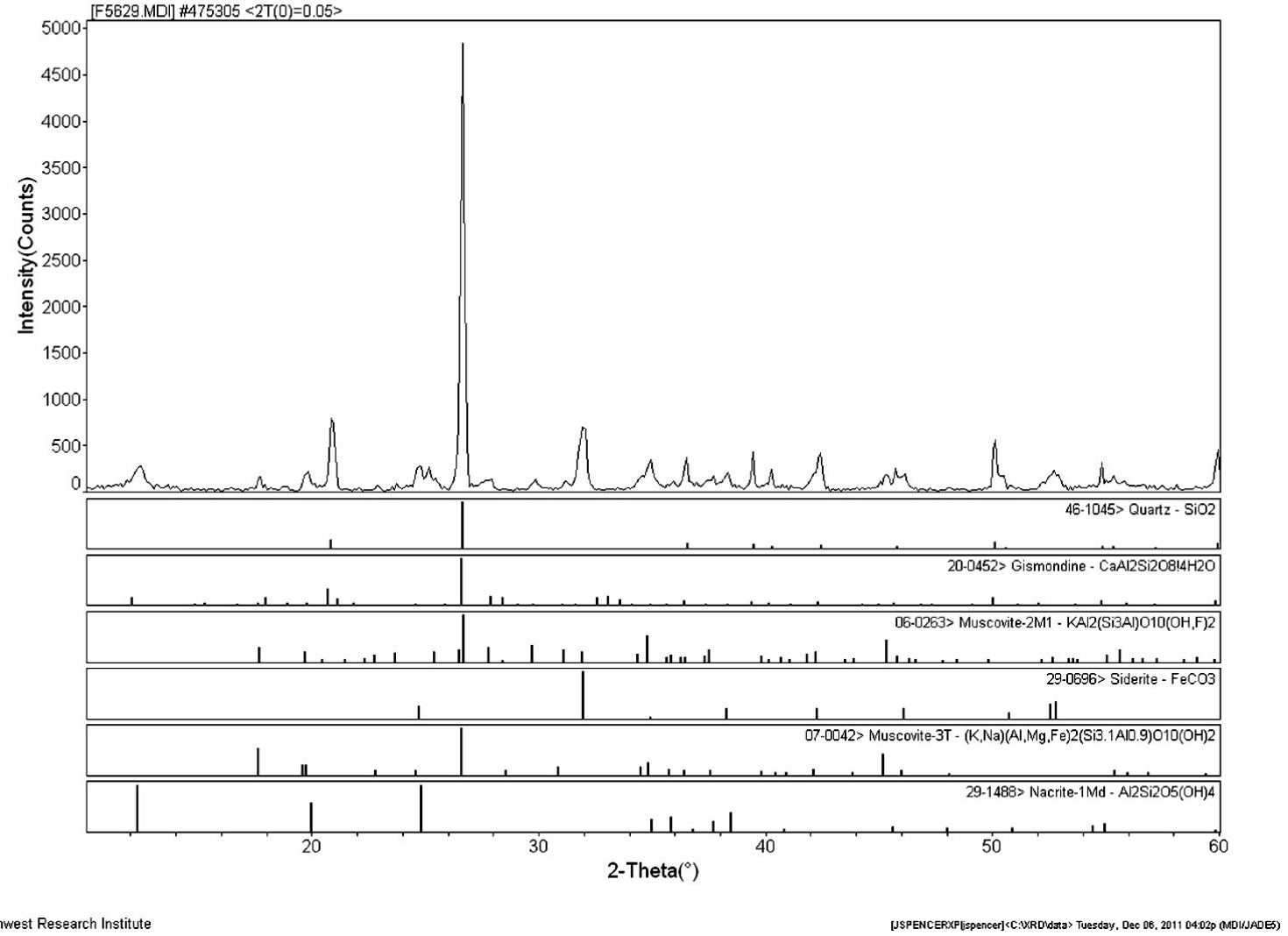


Figure 4 WDMW04B-07-CU10 (SwRI# 475305) Bulk XRD

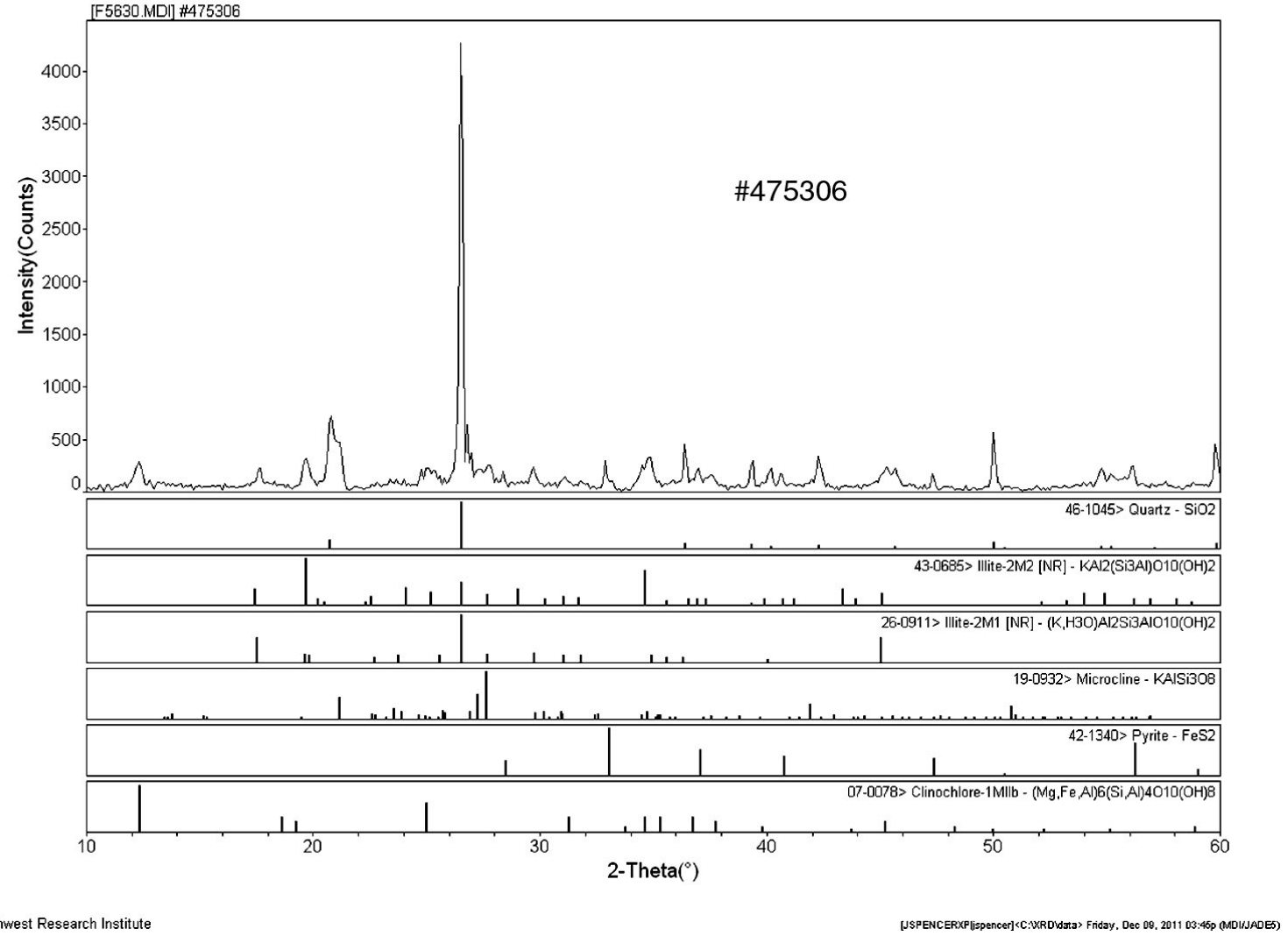


Figure 5 WDMW04B-07-SU10 (SwRI# 475306) Bulk XRD

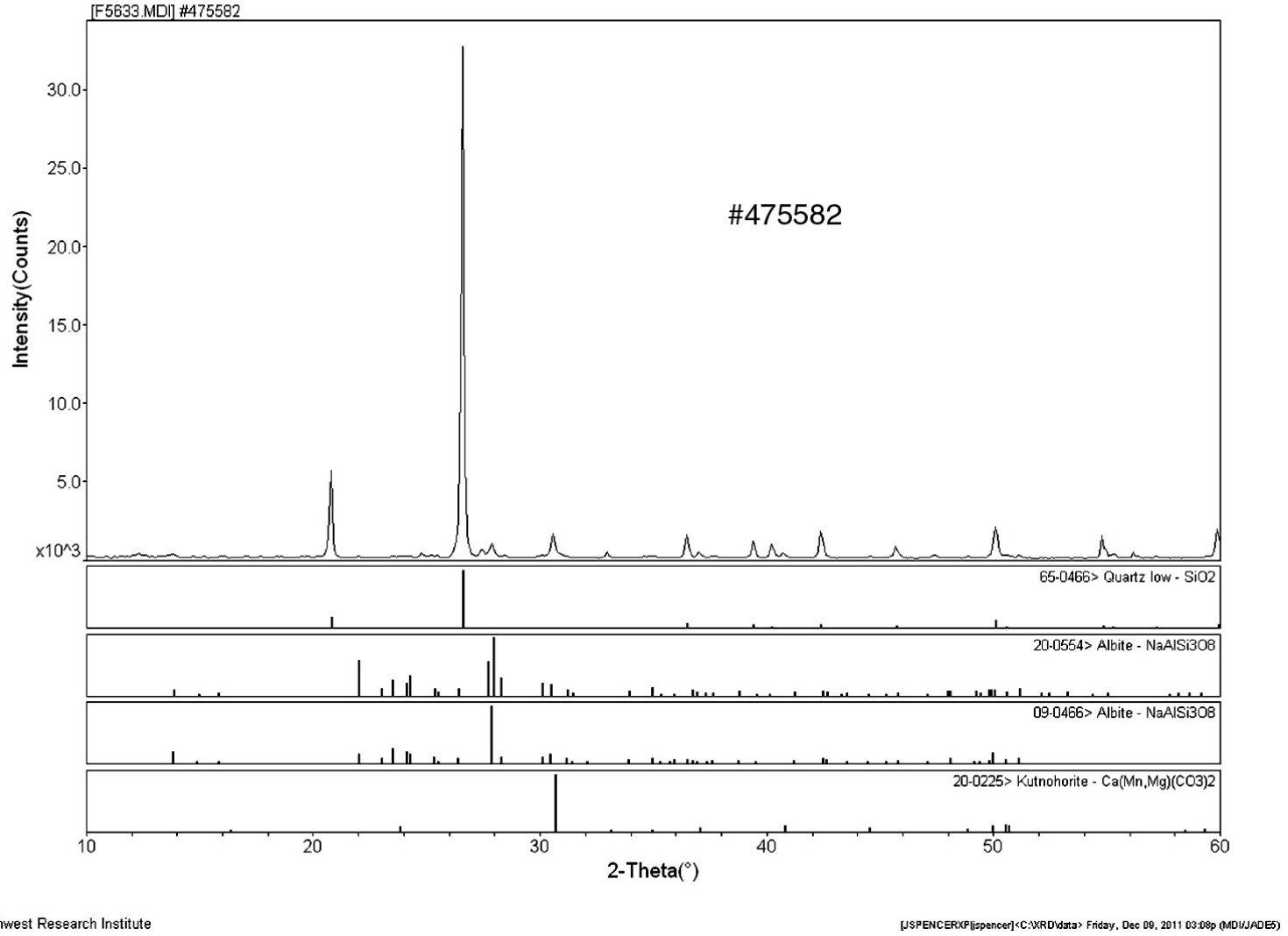


Figure 6 WDMW03B-07-BE10 (SwRI# 475582) Bulk XRD

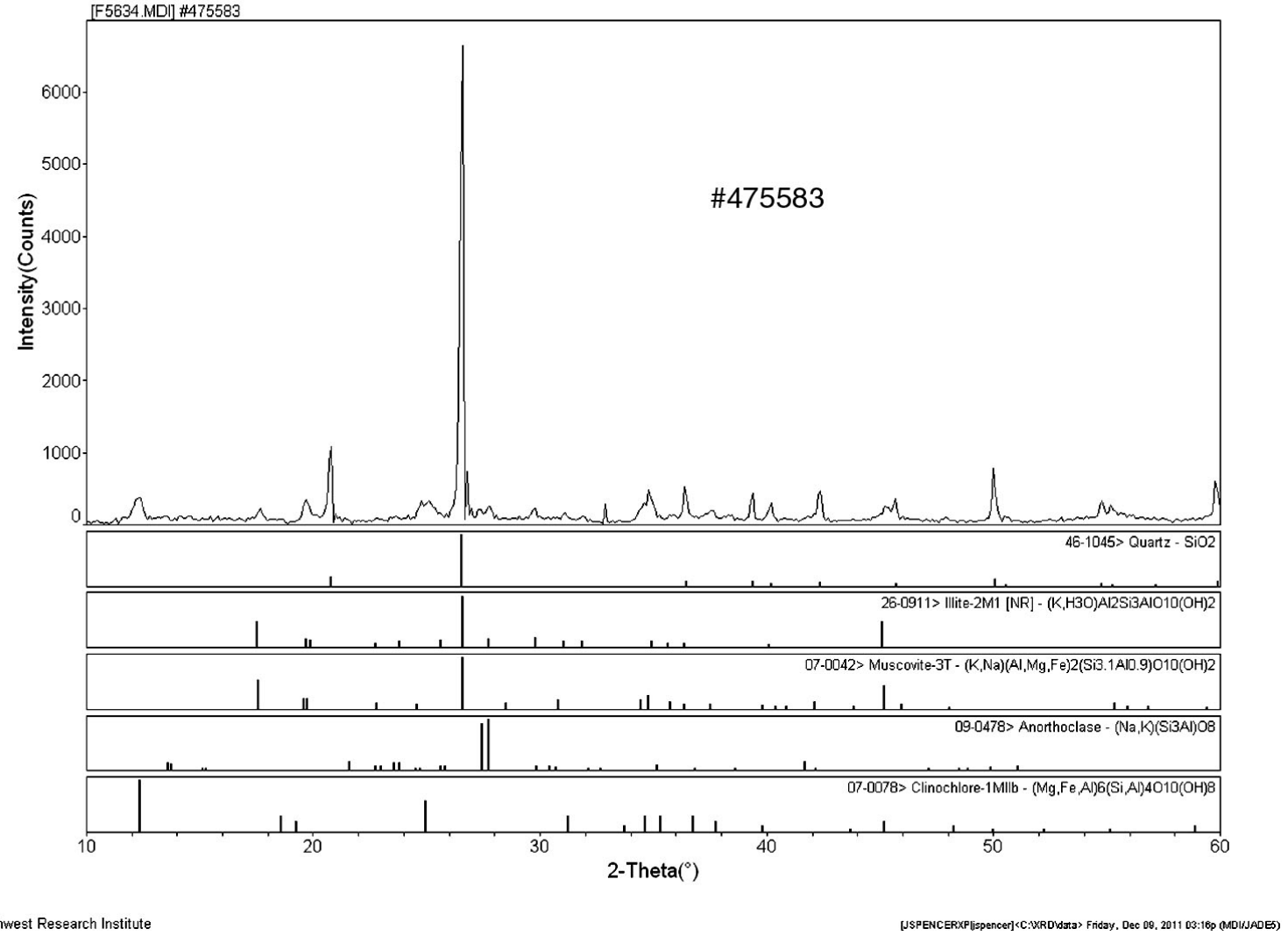


Figure 7 WDMW03B-07-CU10 (SwRI# 475583) Bulk XRD

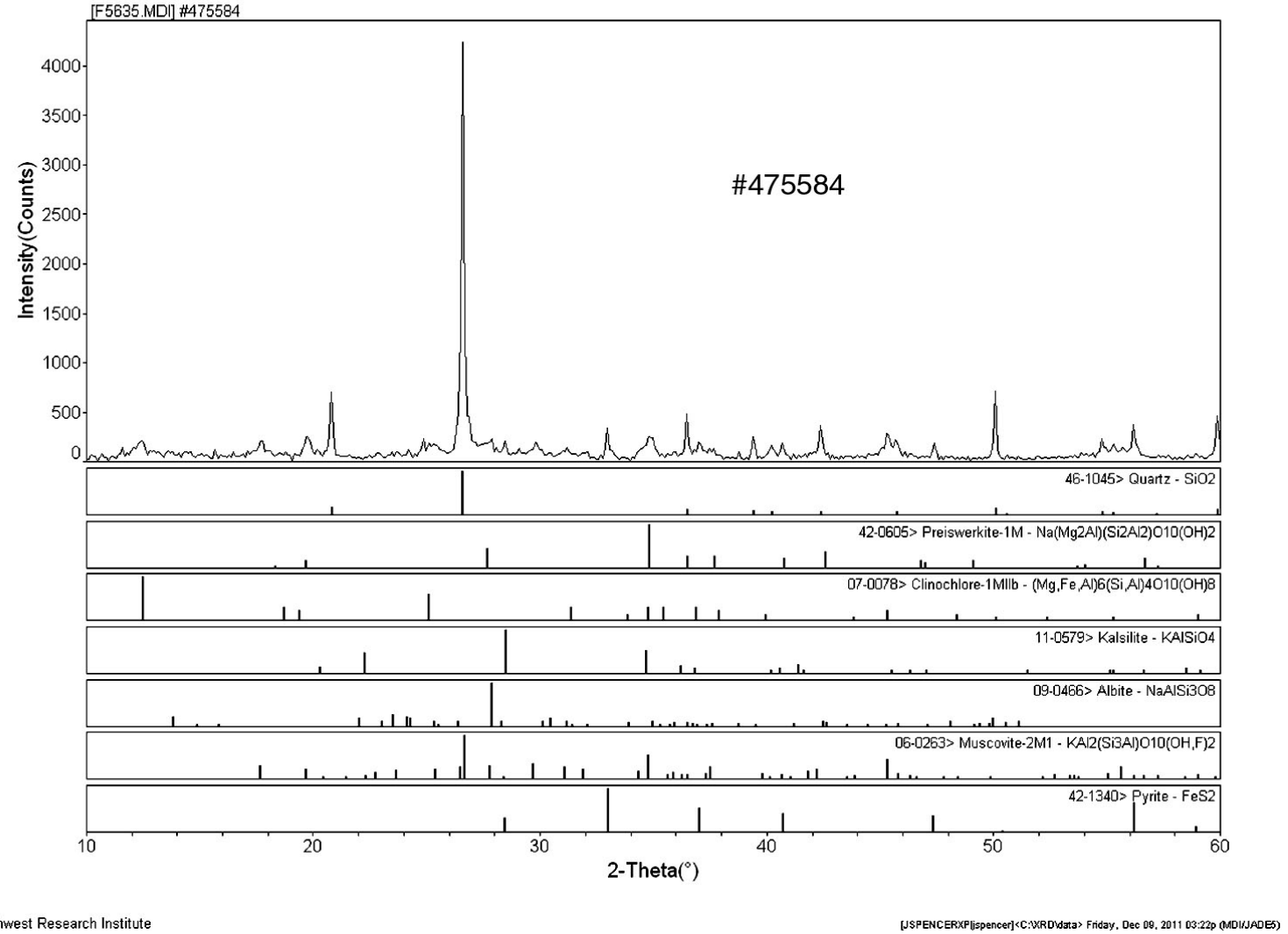


Figure 8 WDMW03B-07-SU10 (SwRI# 475584) Bulk XRD

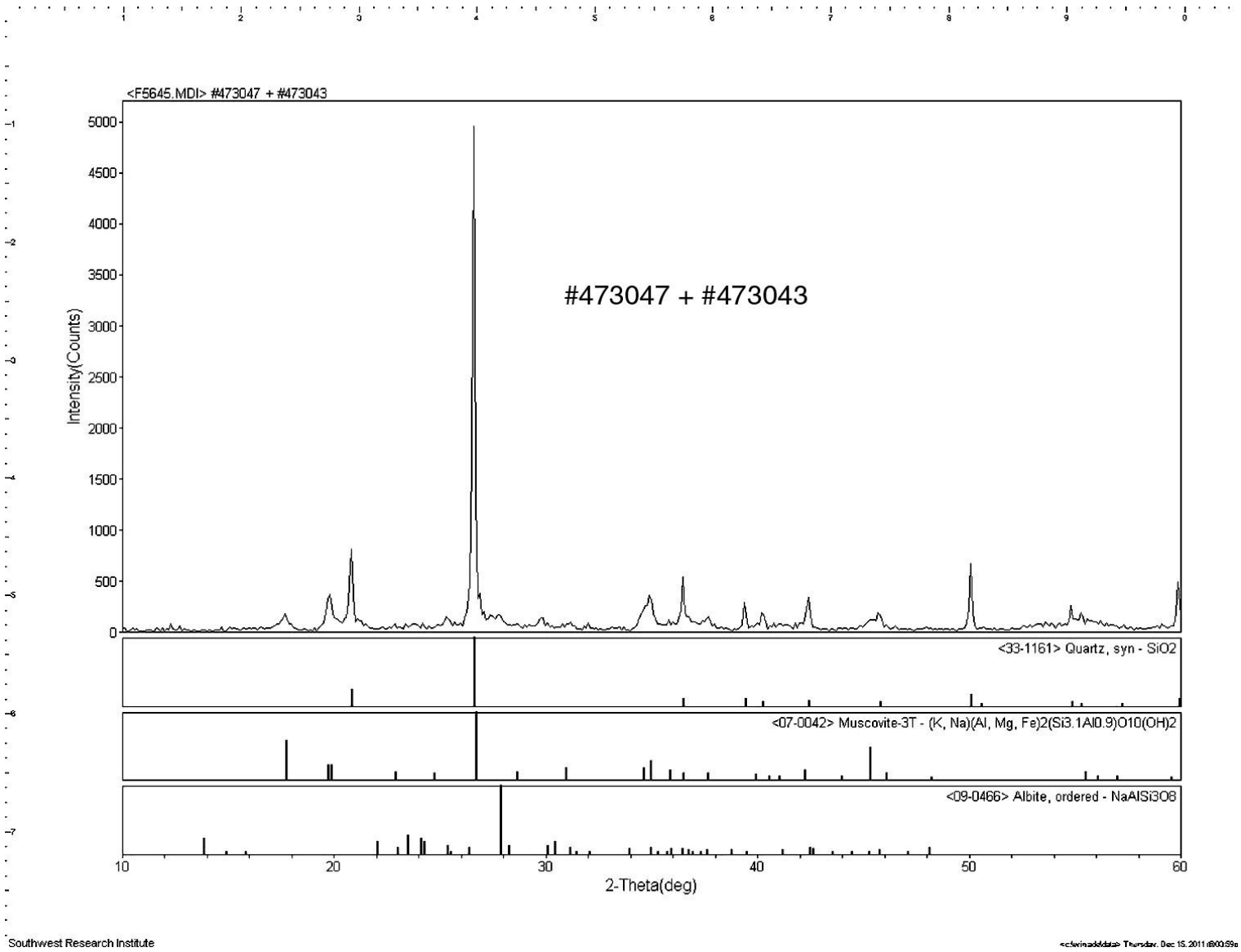


Figure 9 WDSB21-07-19.5 (SwRI# 473043) Bulk XRD

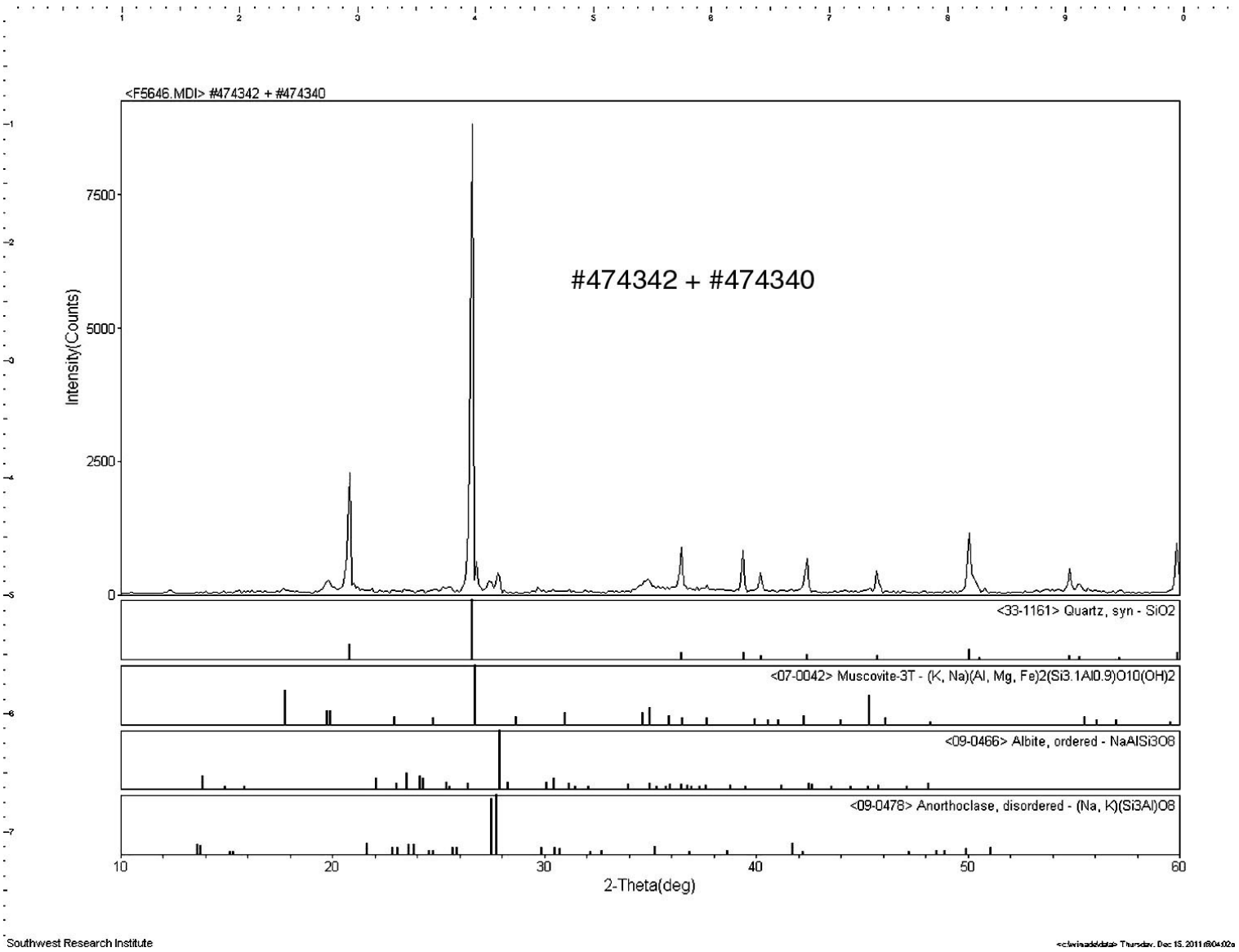


Figure 10 WDSB31-07-2.0 (SwRI# 474340) Bulk XRD

Appendix G

XRD Results for Silt Fraction (5-74 micron)

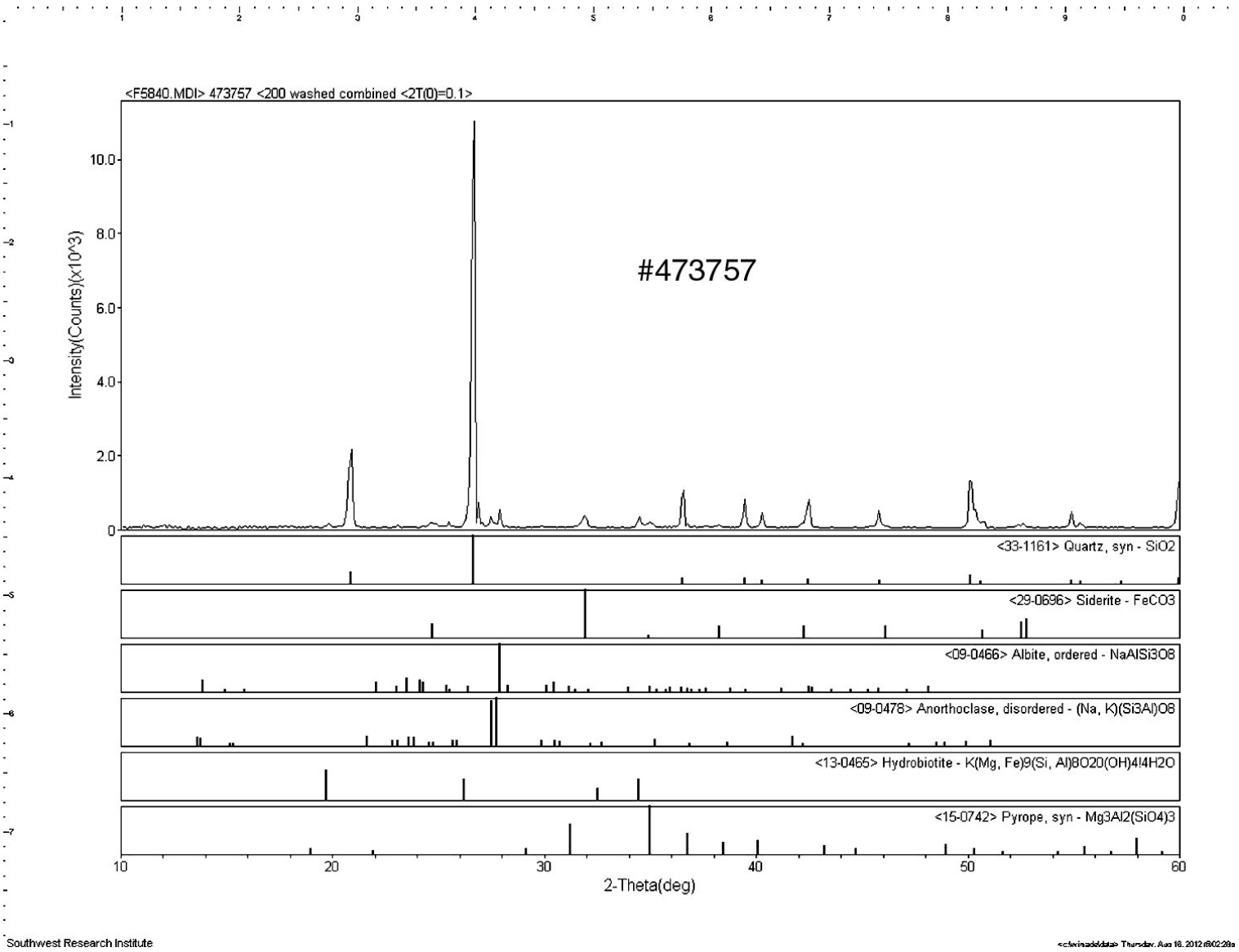


Figure 1 WDSB02-07-24.5 (SwRI#473757) Silt Fraction XRD

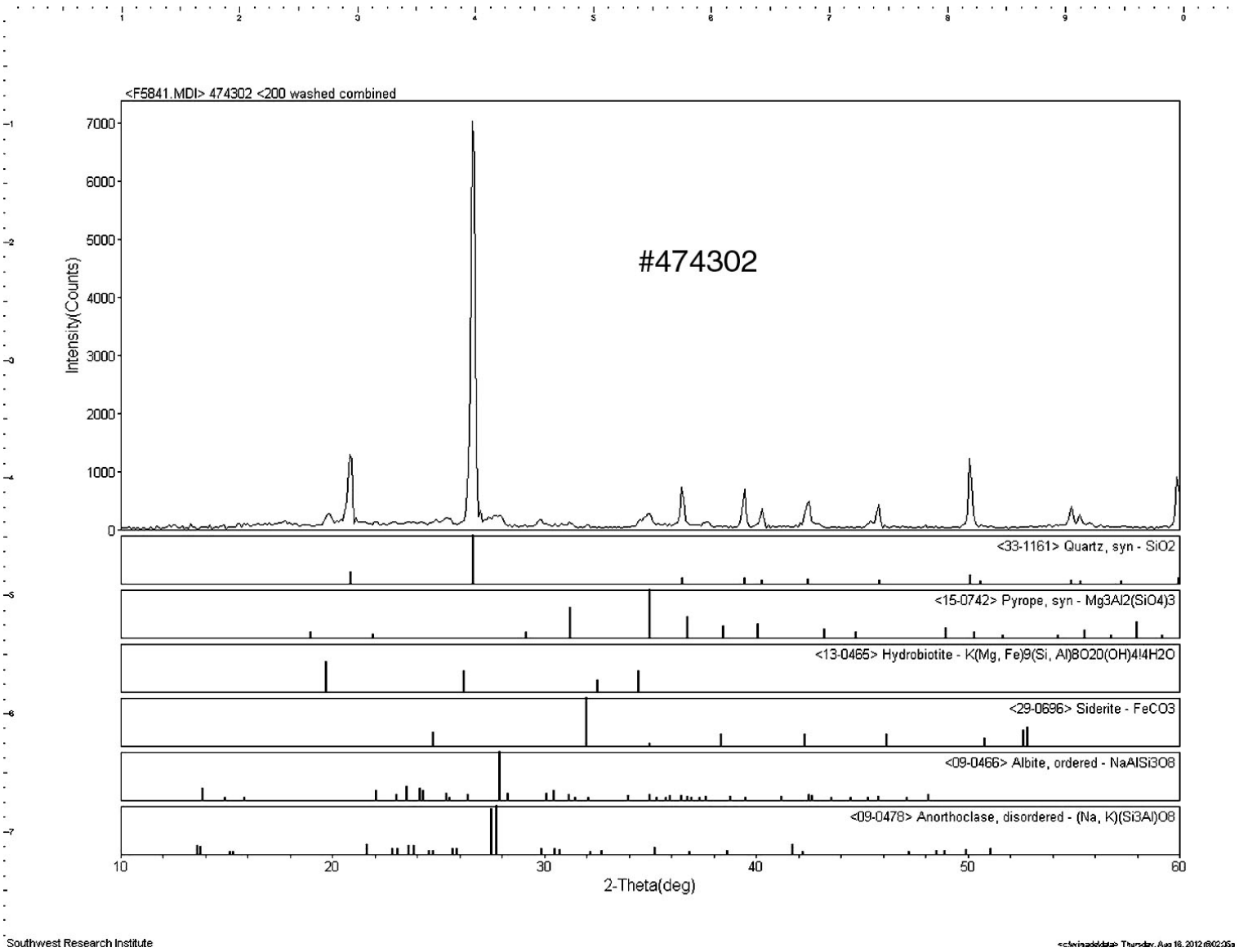


Figure 2 WDSB29-07-4.5 (SwRI#474302) Silt Fraction XRD

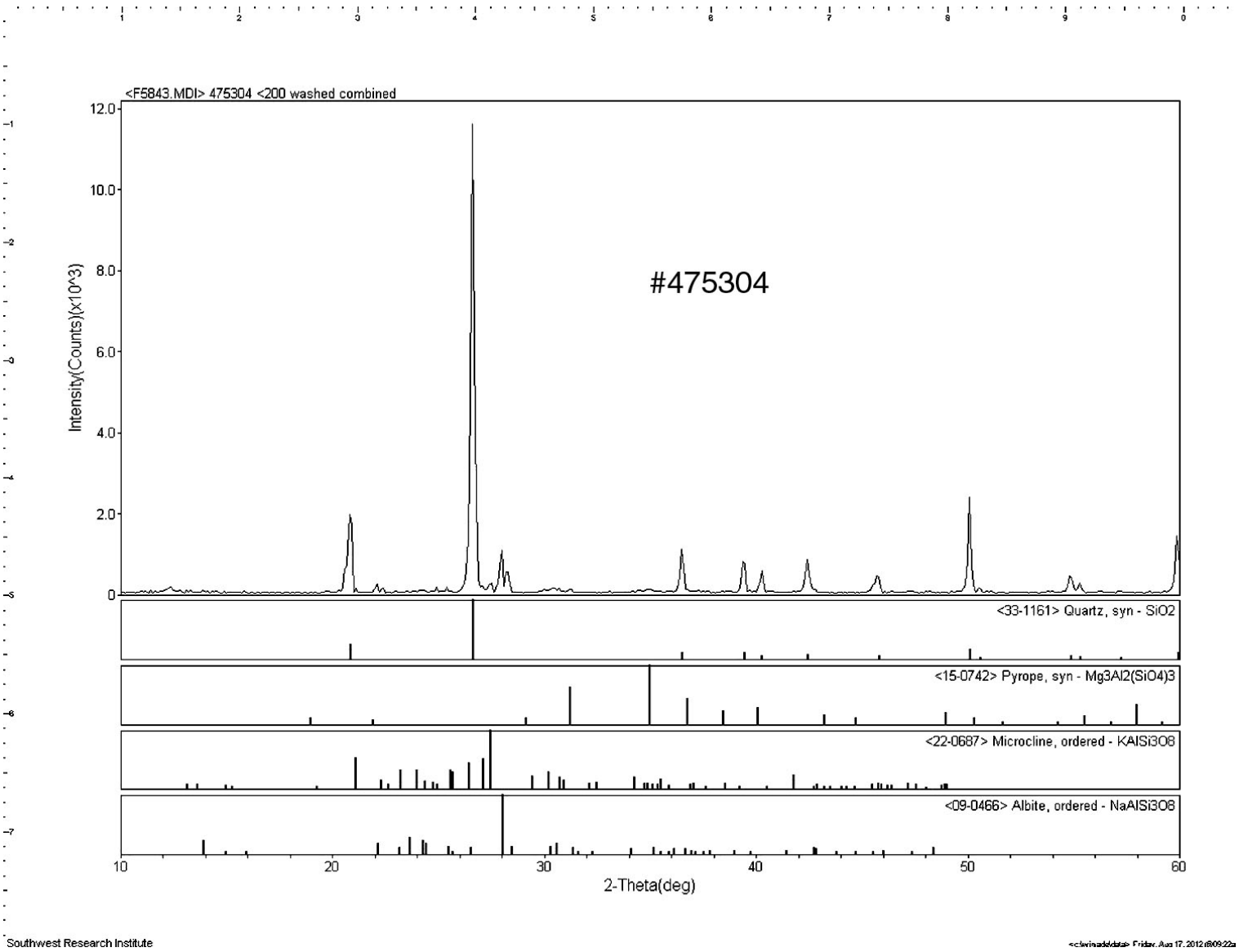


Figure 3 WDMW04B-07-BE10 (SwRI# 475304) Silt Fraction XRD

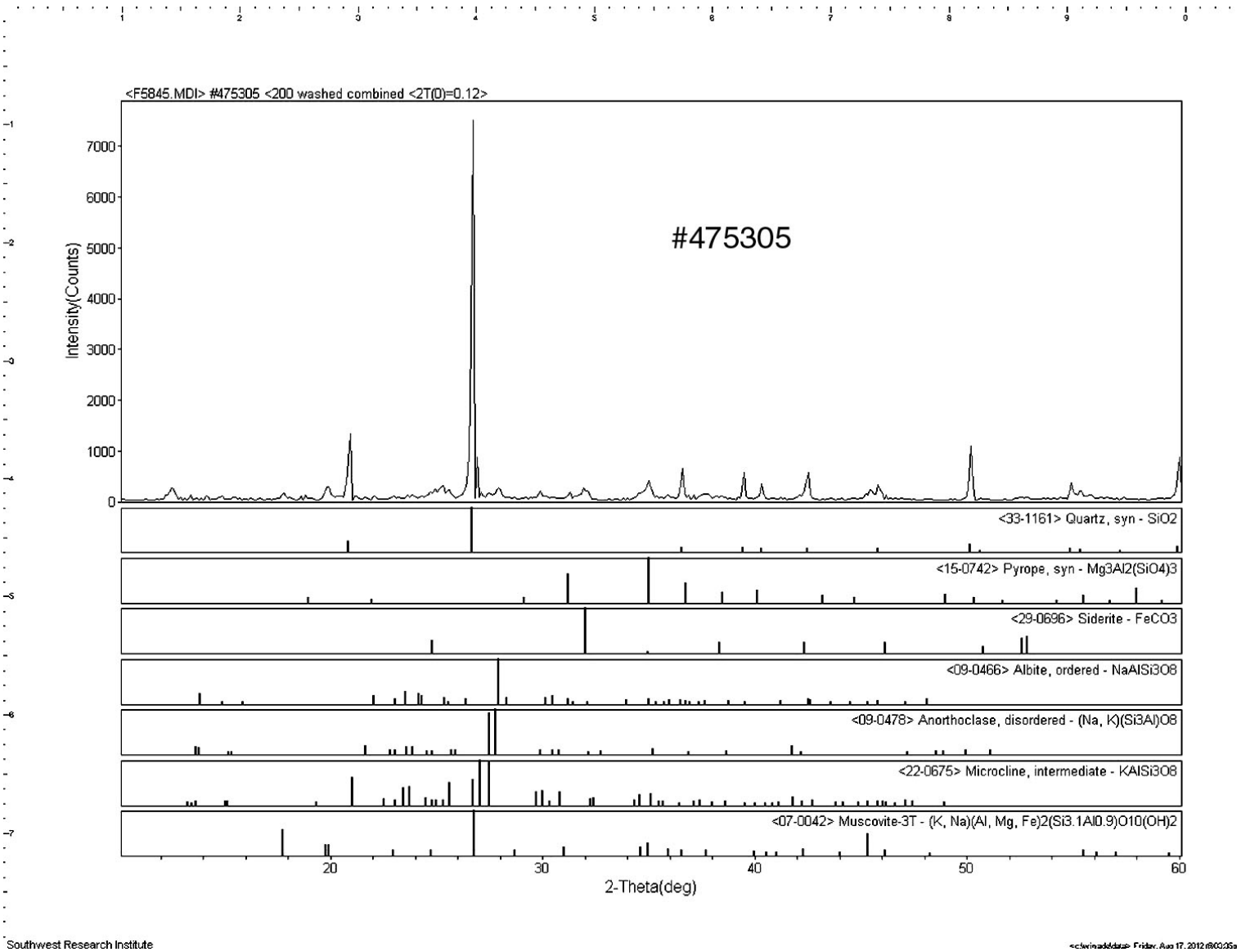


Figure 4 WDMW04B-07-CU10 (SwRI# 475305) Silt Fraction XRD

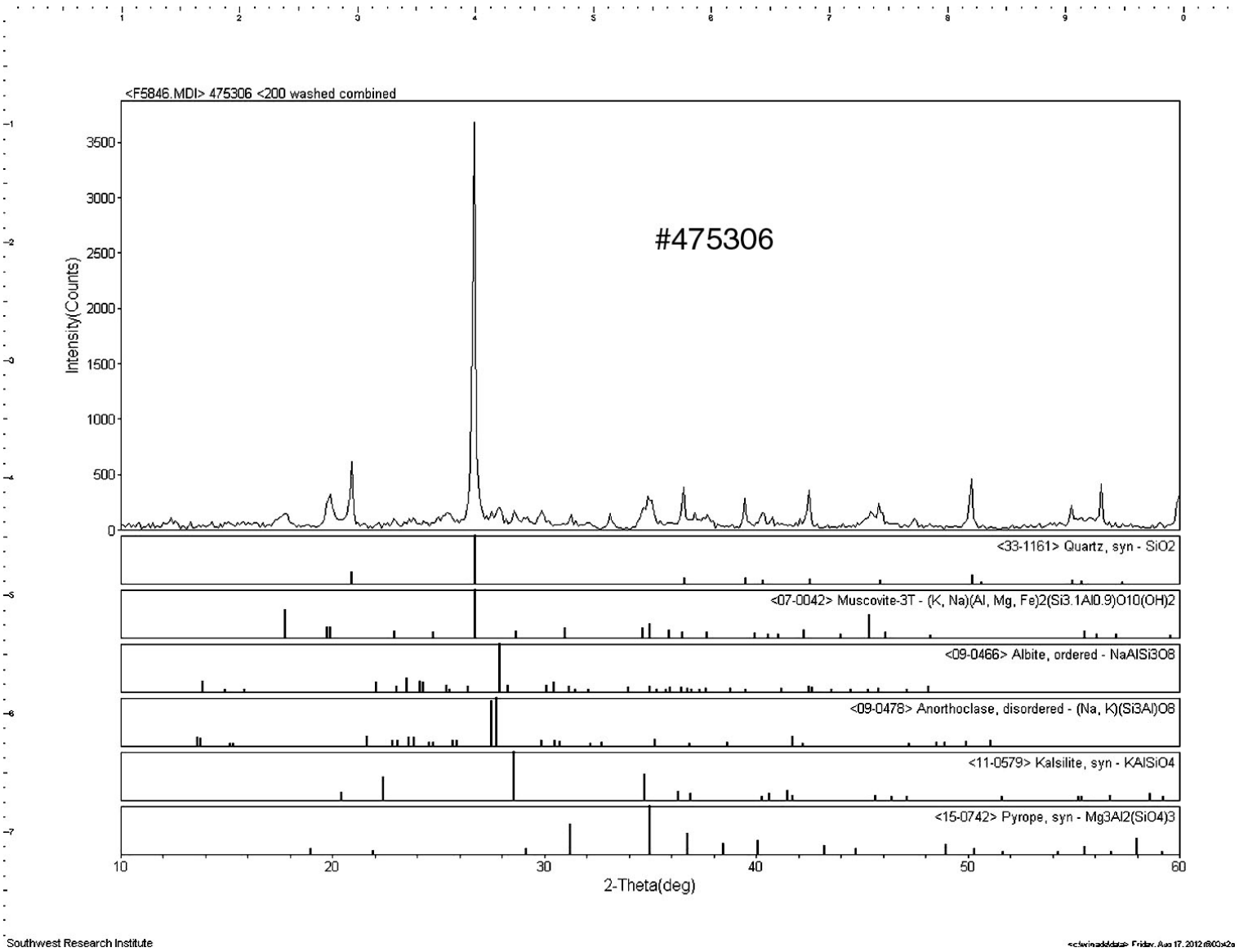


Figure 5 WDMW04B-07-SU10 (SwRI# 475306) Silt Fraction XRD

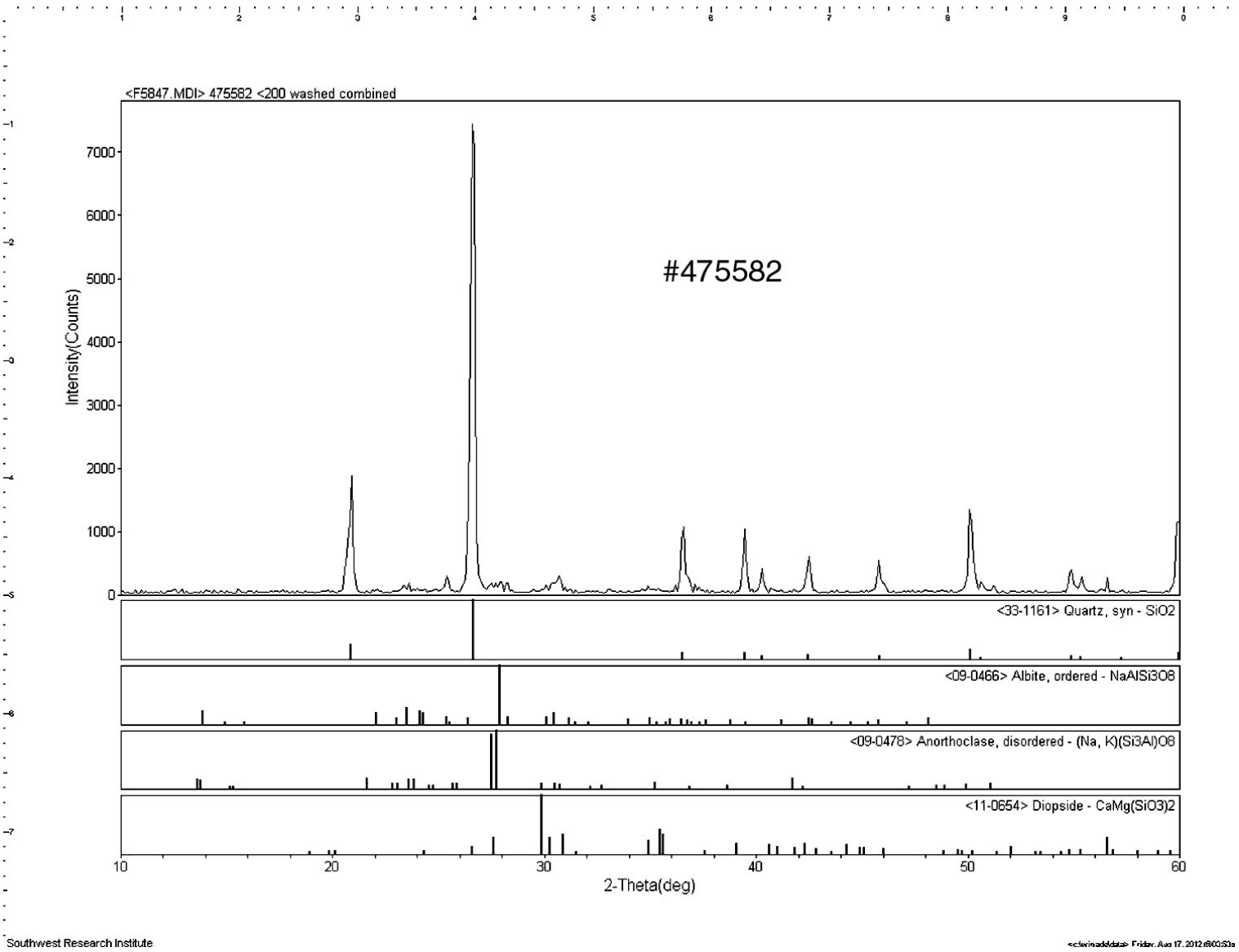


Figure 6 WDMW03B-07-BE10 (SwRI# 475582) Silt Fraction XRD

Figure 7 WDMW03B-07-CU10 (SwRI# 475583) Silt Fraction XRD

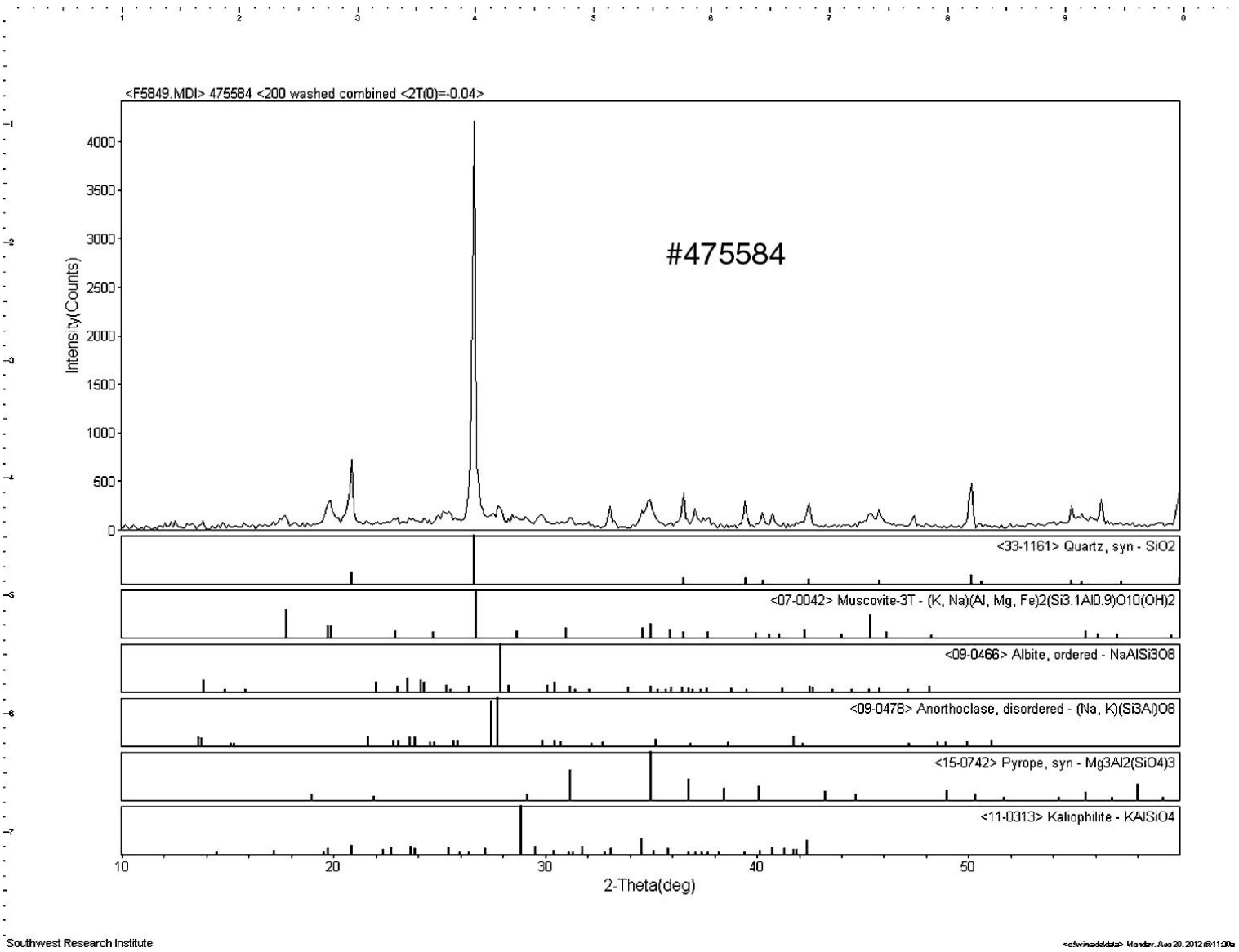


Figure 8 WDMW03B-07-SU10 (SwRI# 475584) Silt Fraction XRD

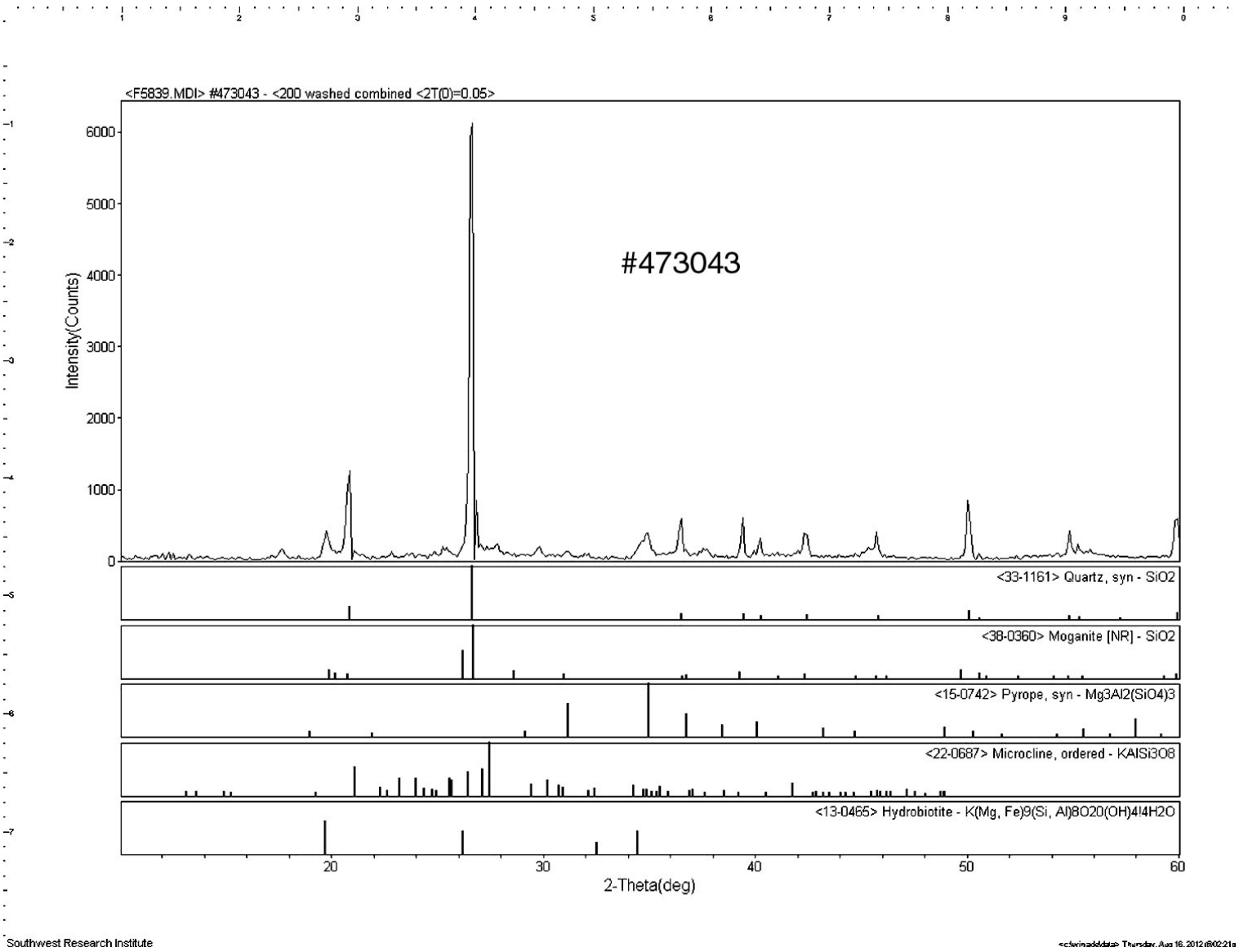


Figure 9 WDSB21-07-19.5 (SwRI# 473043) Silt Fraction XRD

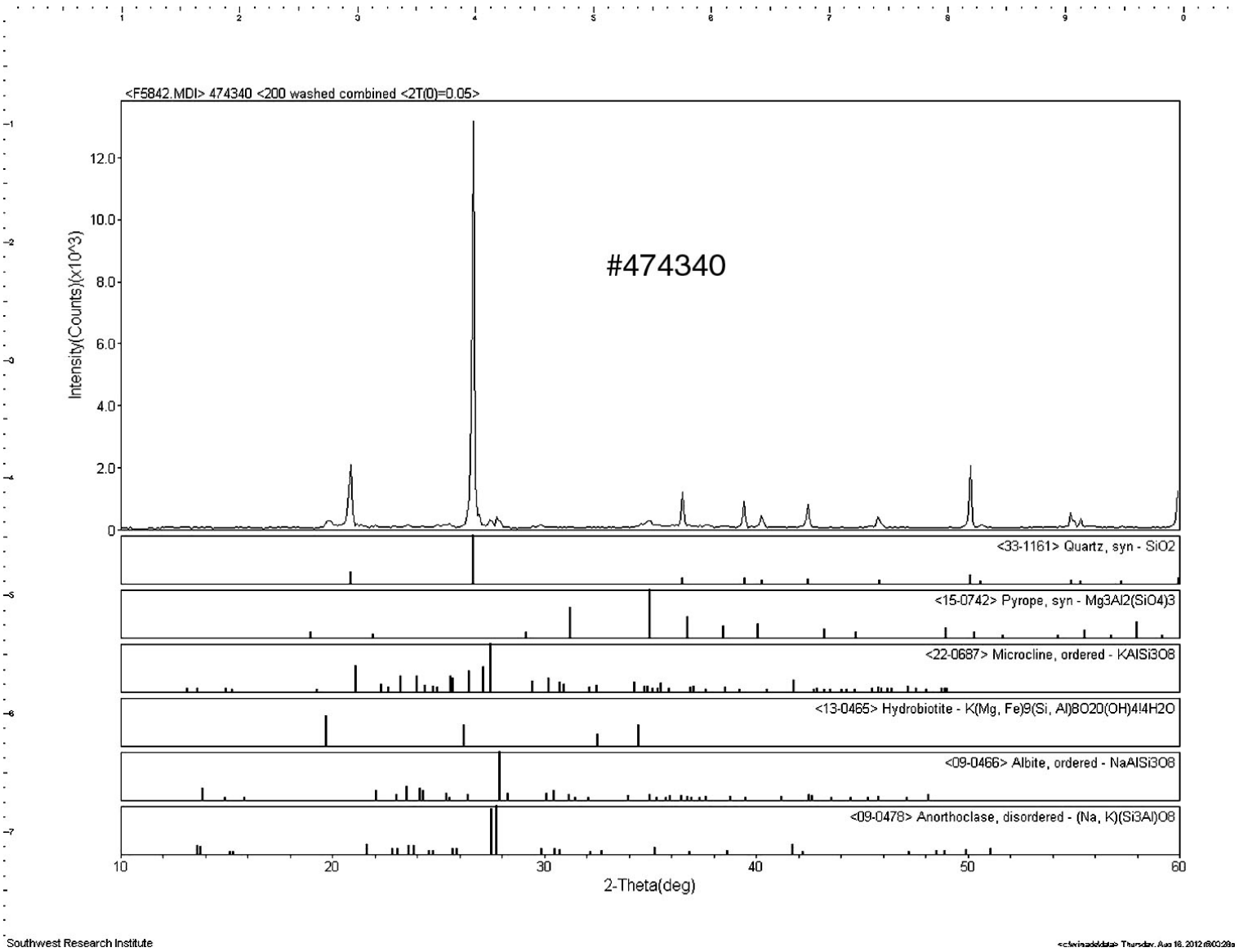


Figure 10 WDSB31-07-2.0 (SwRI# 474340) Silt Fraction XRD

Appendix H

Petrology Photomicrographs

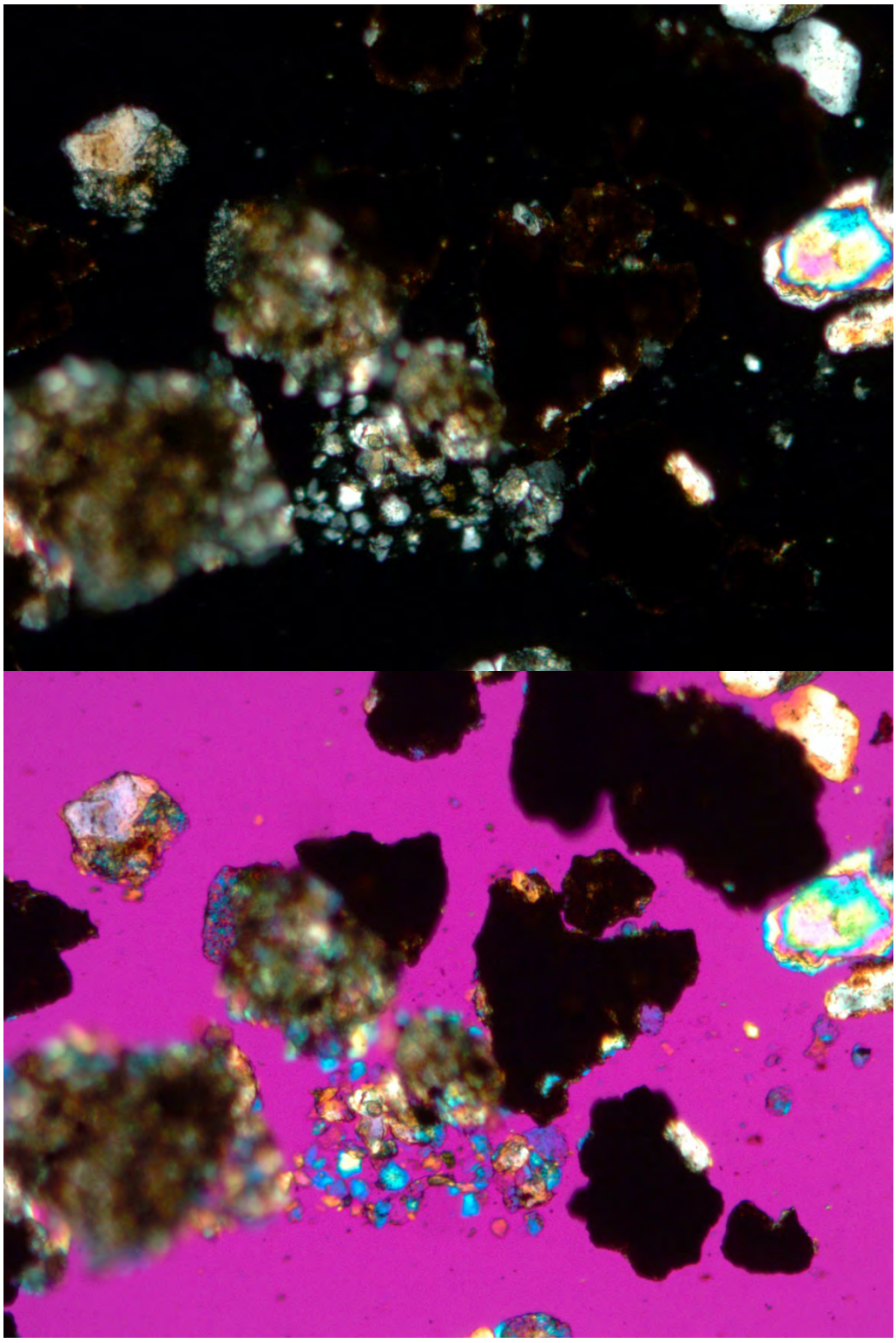


Figure 1 WDSB02-07-24.5 (SwRI#473757) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

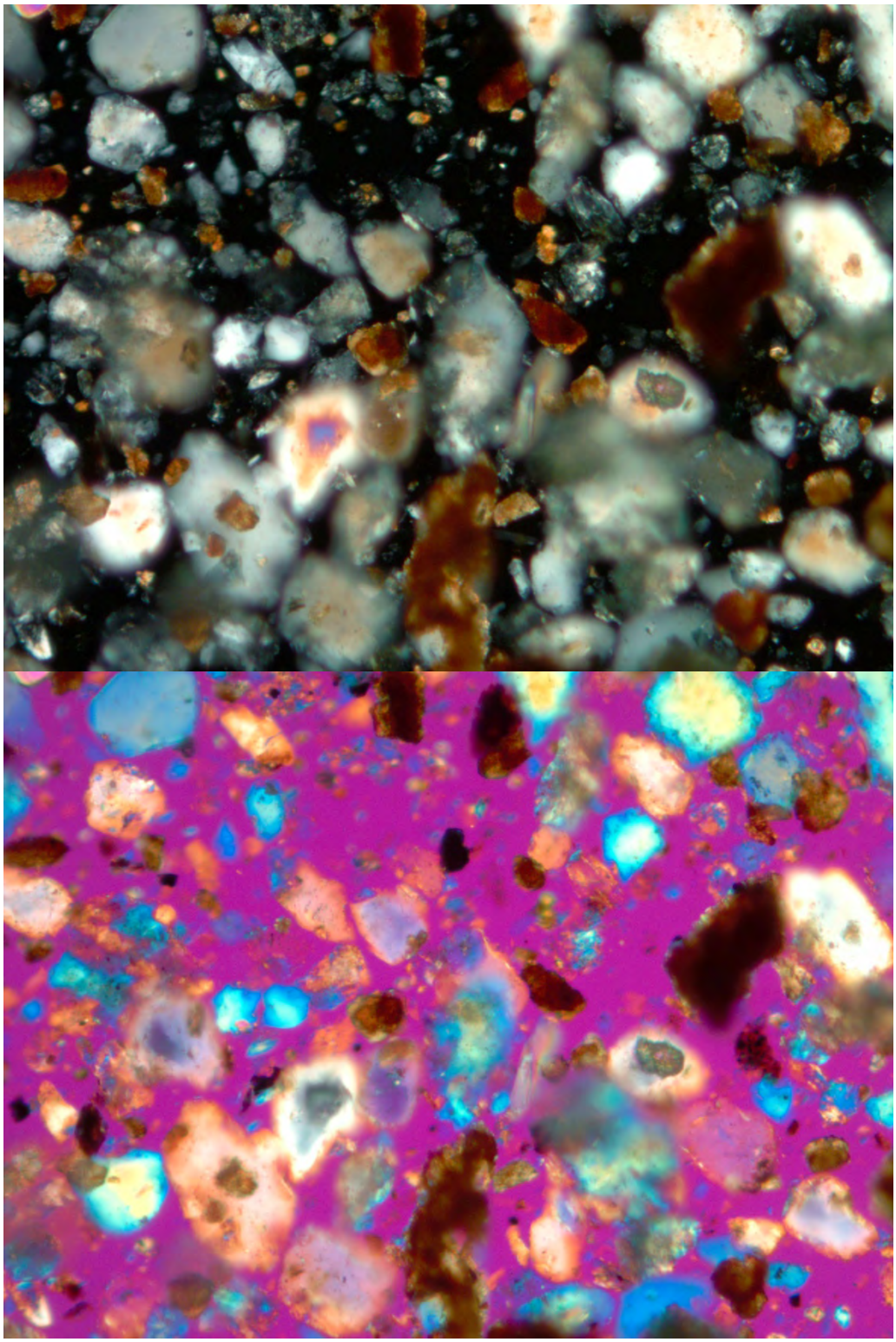


Figure 2 WDSB02-07-24.5 (SwRI#473757) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

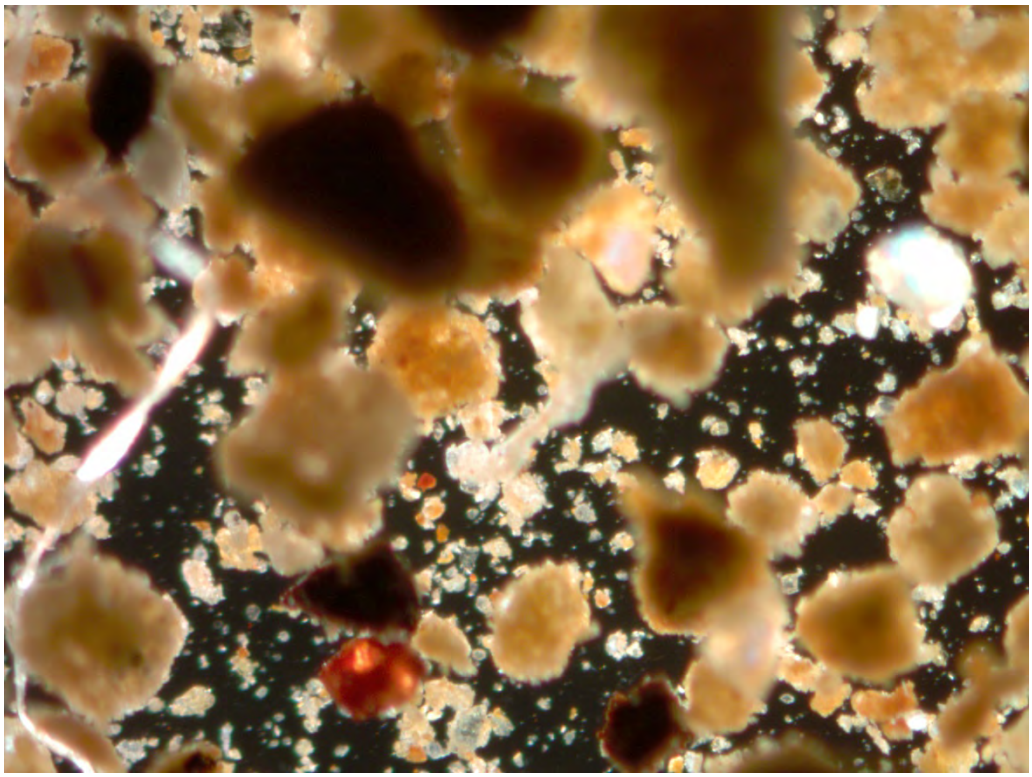


Figure 3 WDSB29-07-4.5 (SwRI#474302) Sand fraction (no Canada Balsam) at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

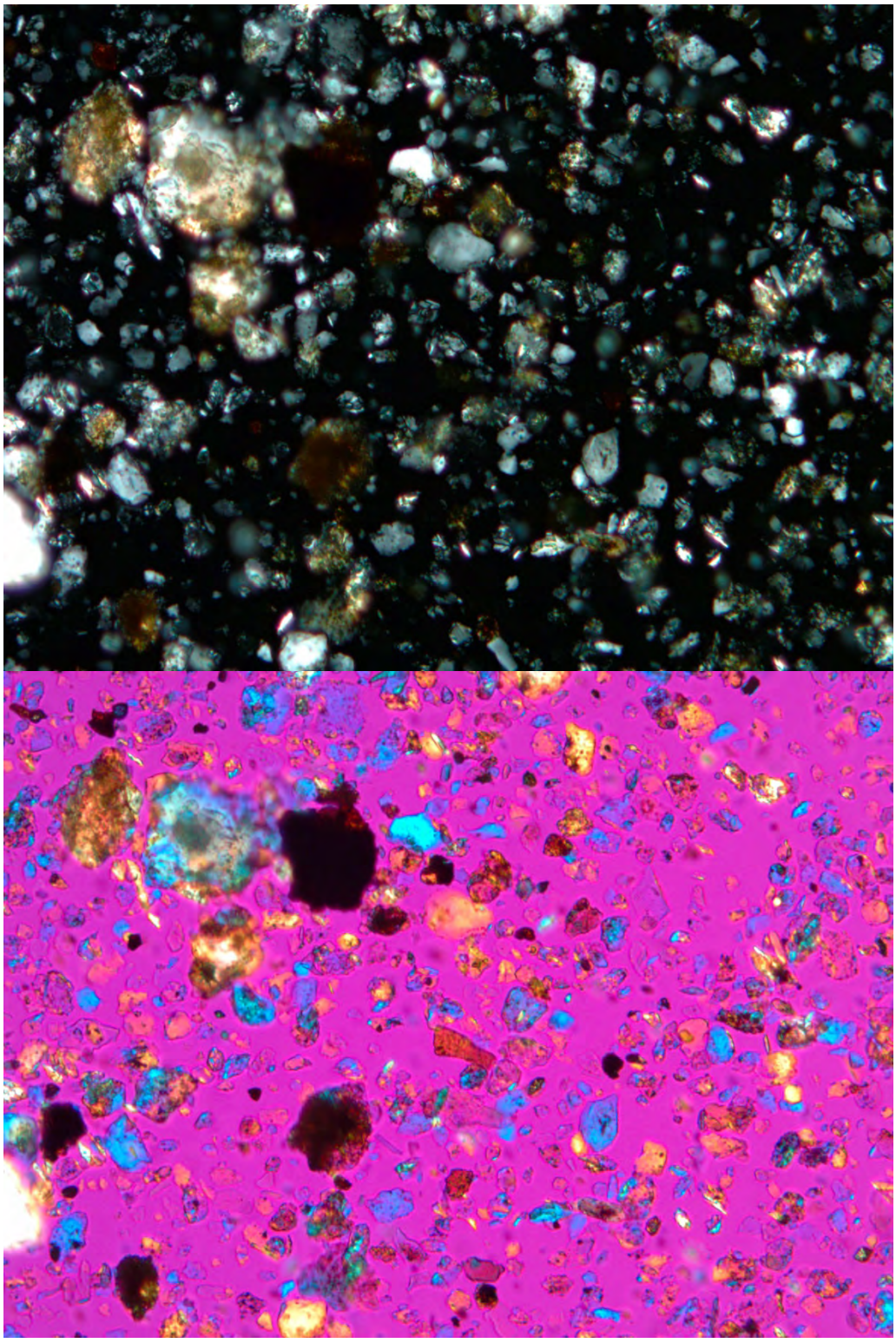


Figure 4 WDSB29-07-4.5 (SwRI#474302) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

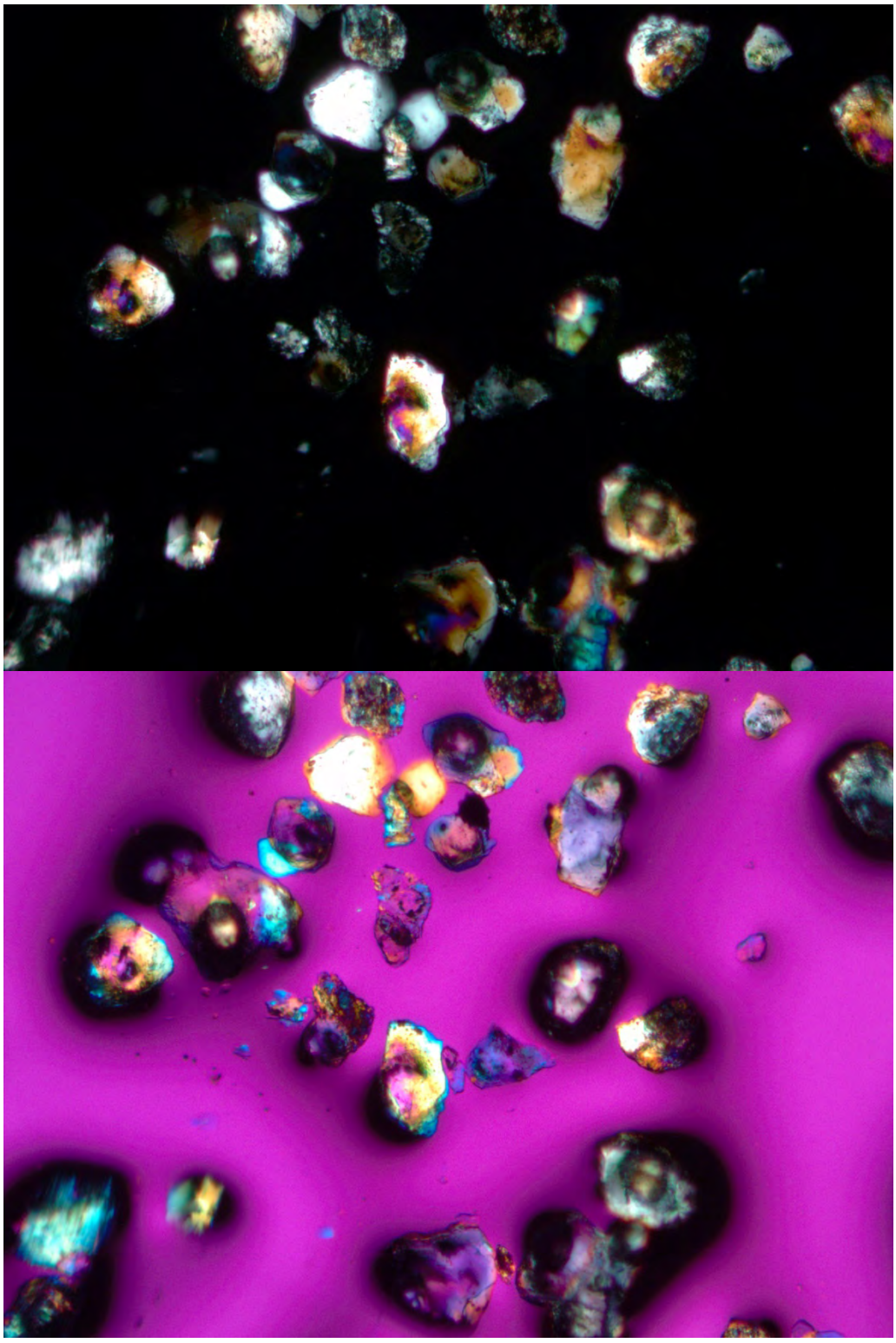


Figure 5 WDMW04B-07-BE10 (SwRI# 475304) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

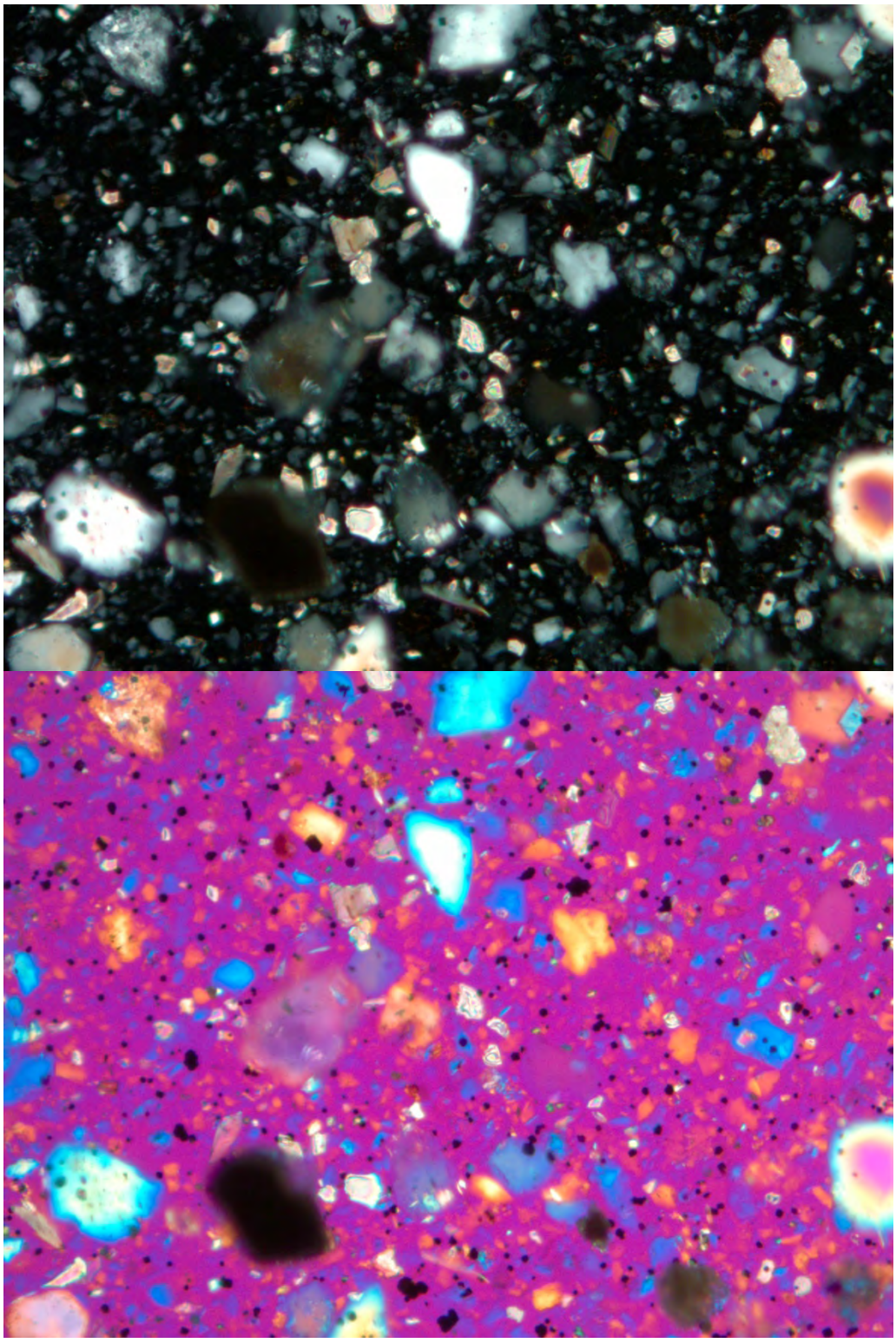


Figure 6 WDMW04B-07-BE10 (SwRI# 475304) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

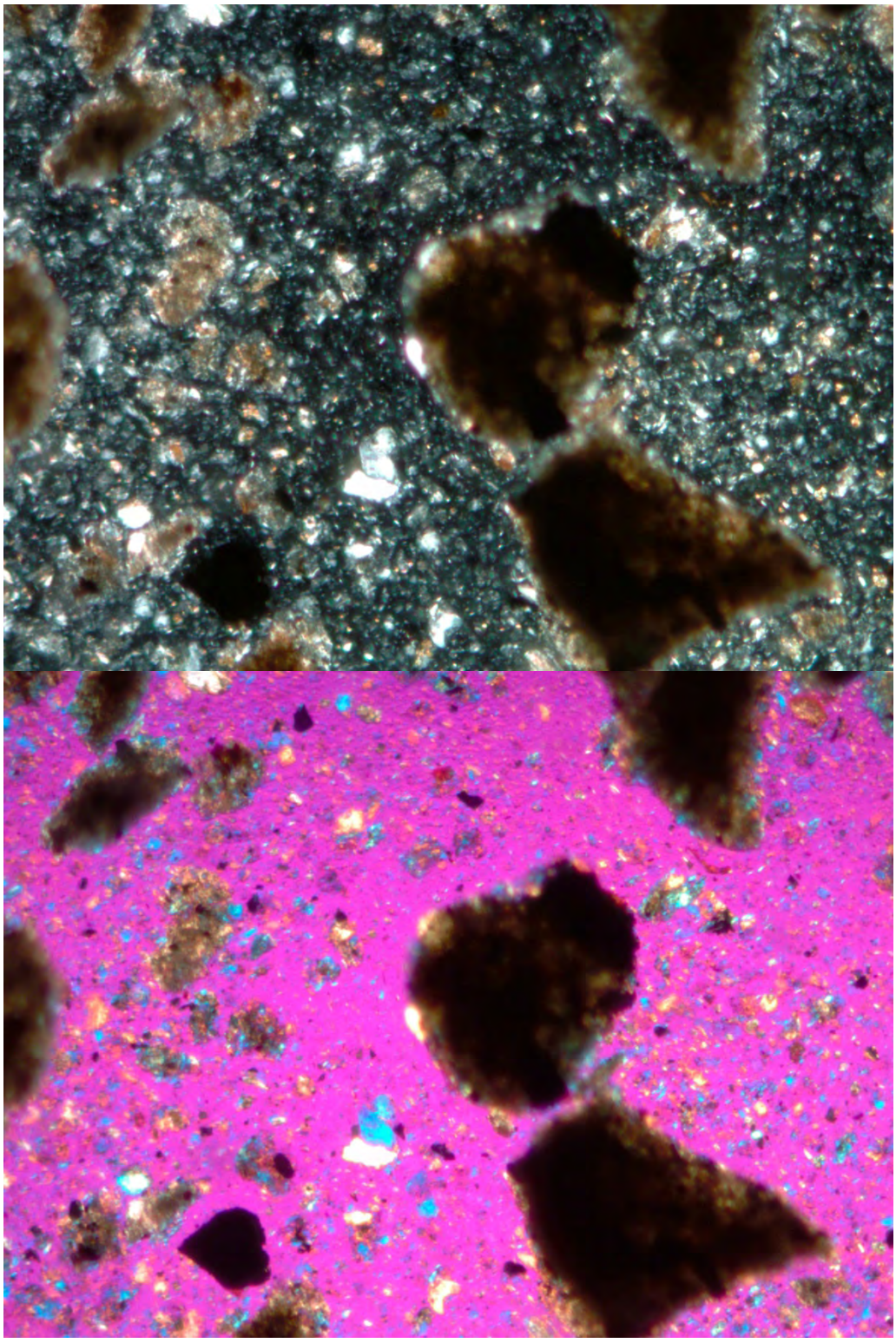


Figure 7 WDMW04B-07-CU10 (SwRI# 475305) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom

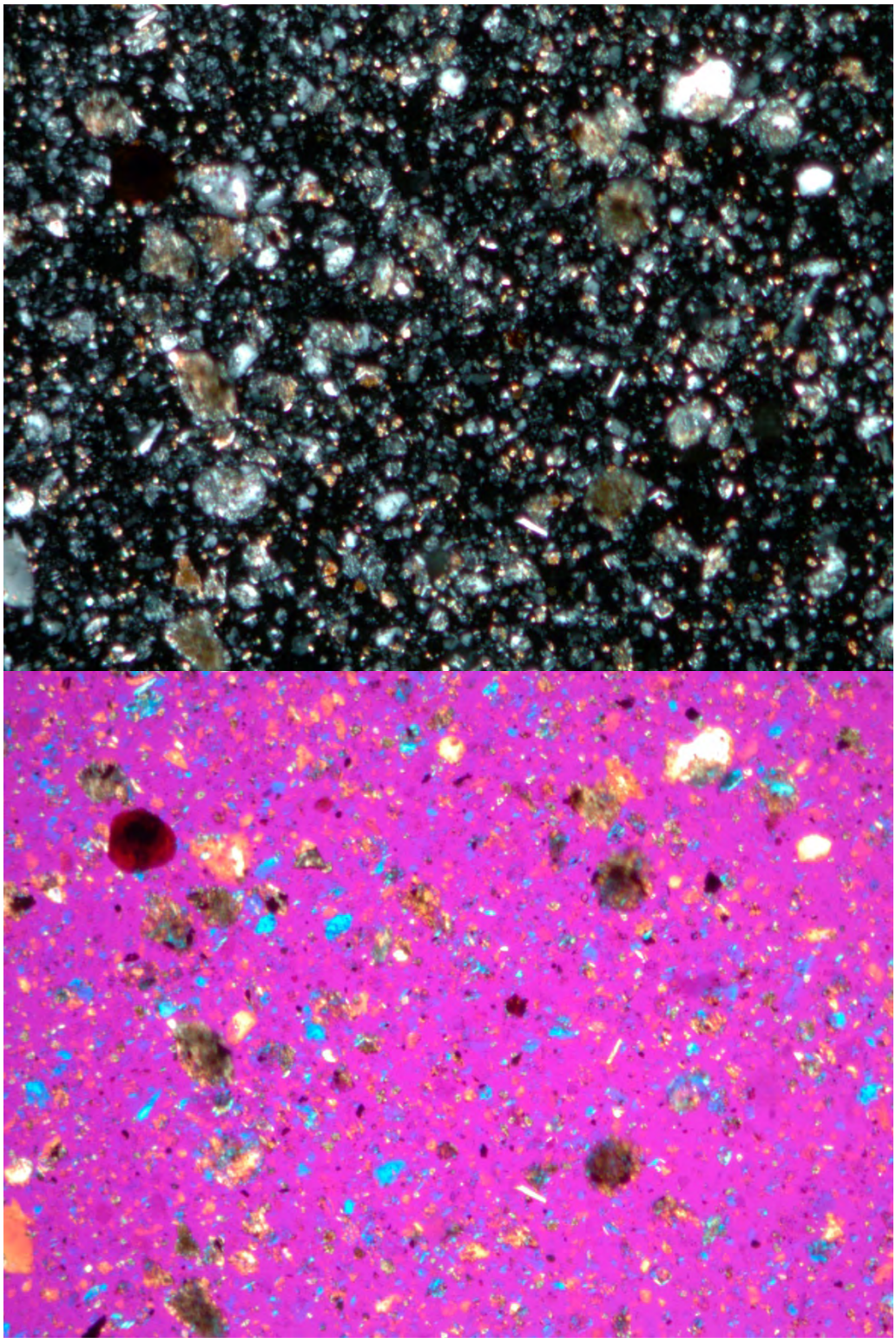


Figure 8 WDMW04B-07-CU10 (SwRI# 475305) Silt fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

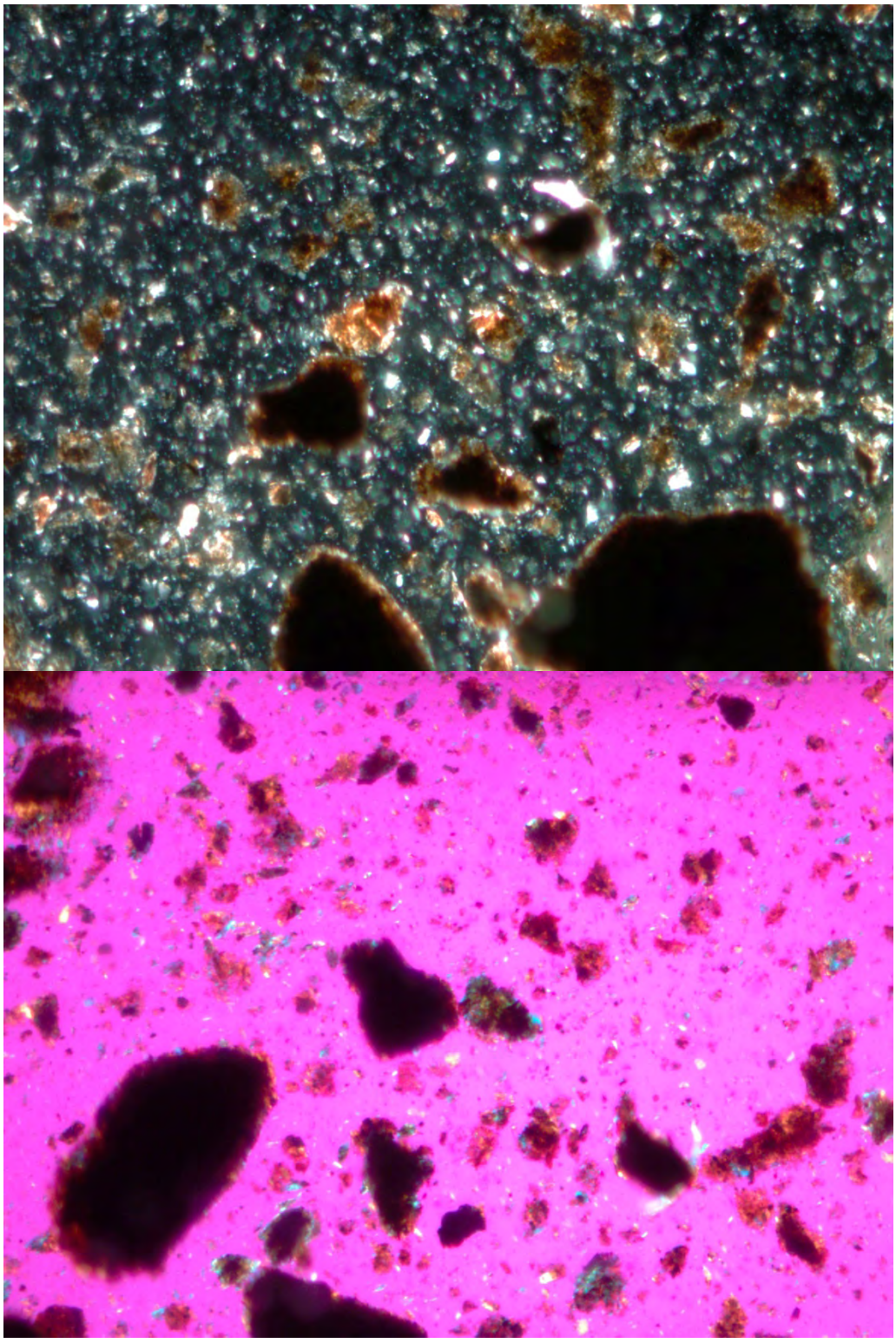


Figure 9 WDMW04B-07-SU10 (SwRI# 475306) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom

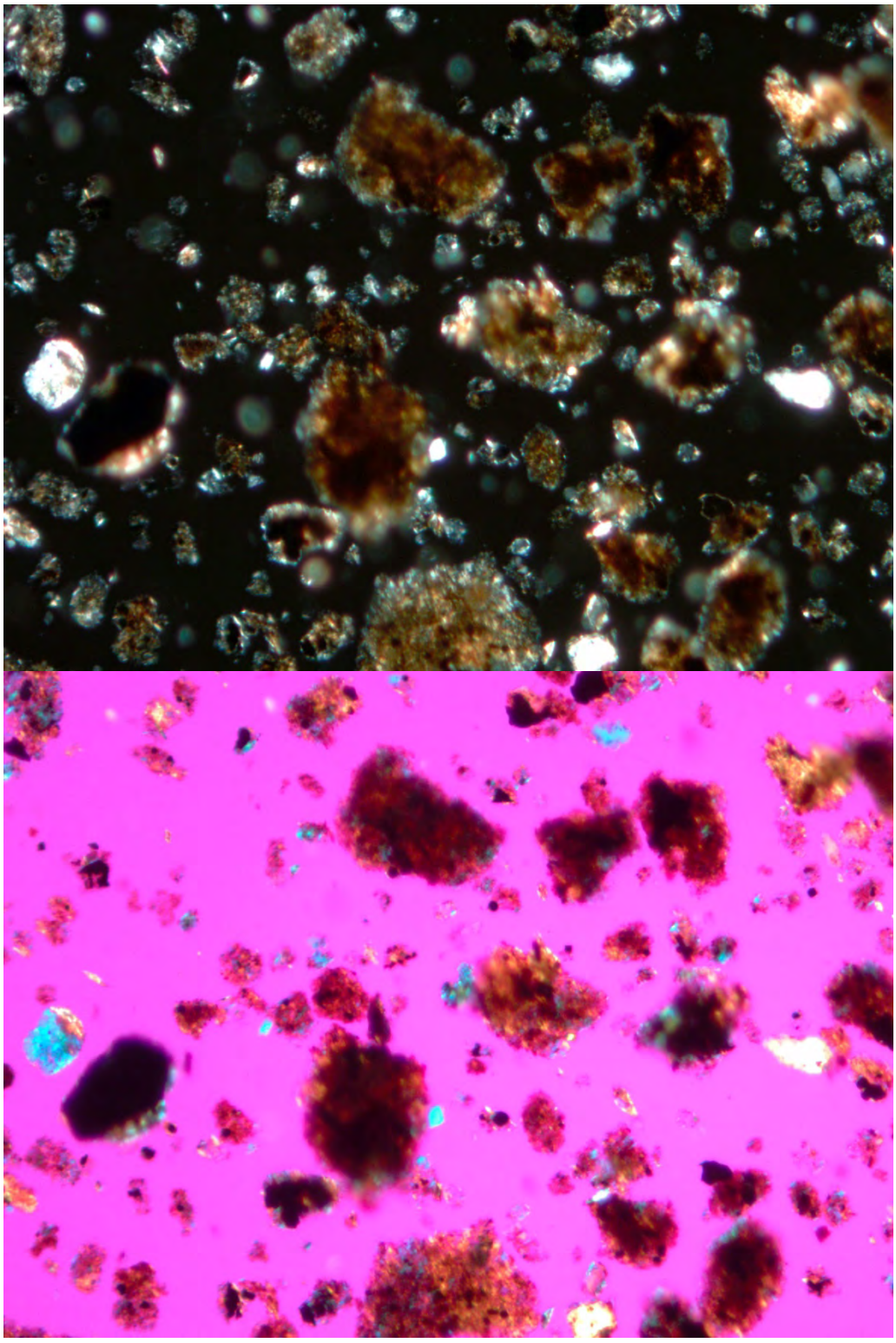


Figure 10 WDMW04B-07-SU10 (SwRI# 475306) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

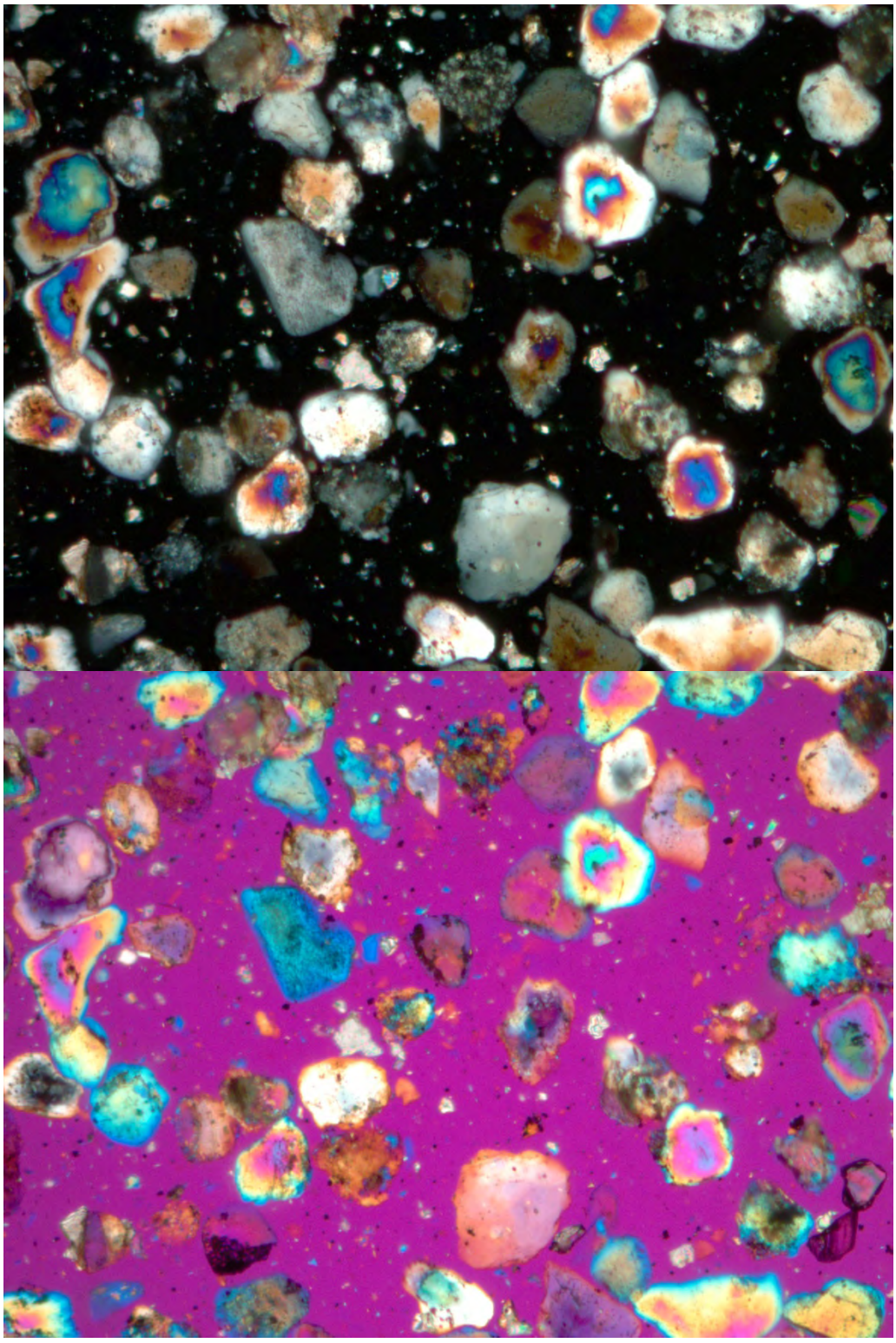


Figure 11 WDMW03B-07-BE10 (SwRI# 475582) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

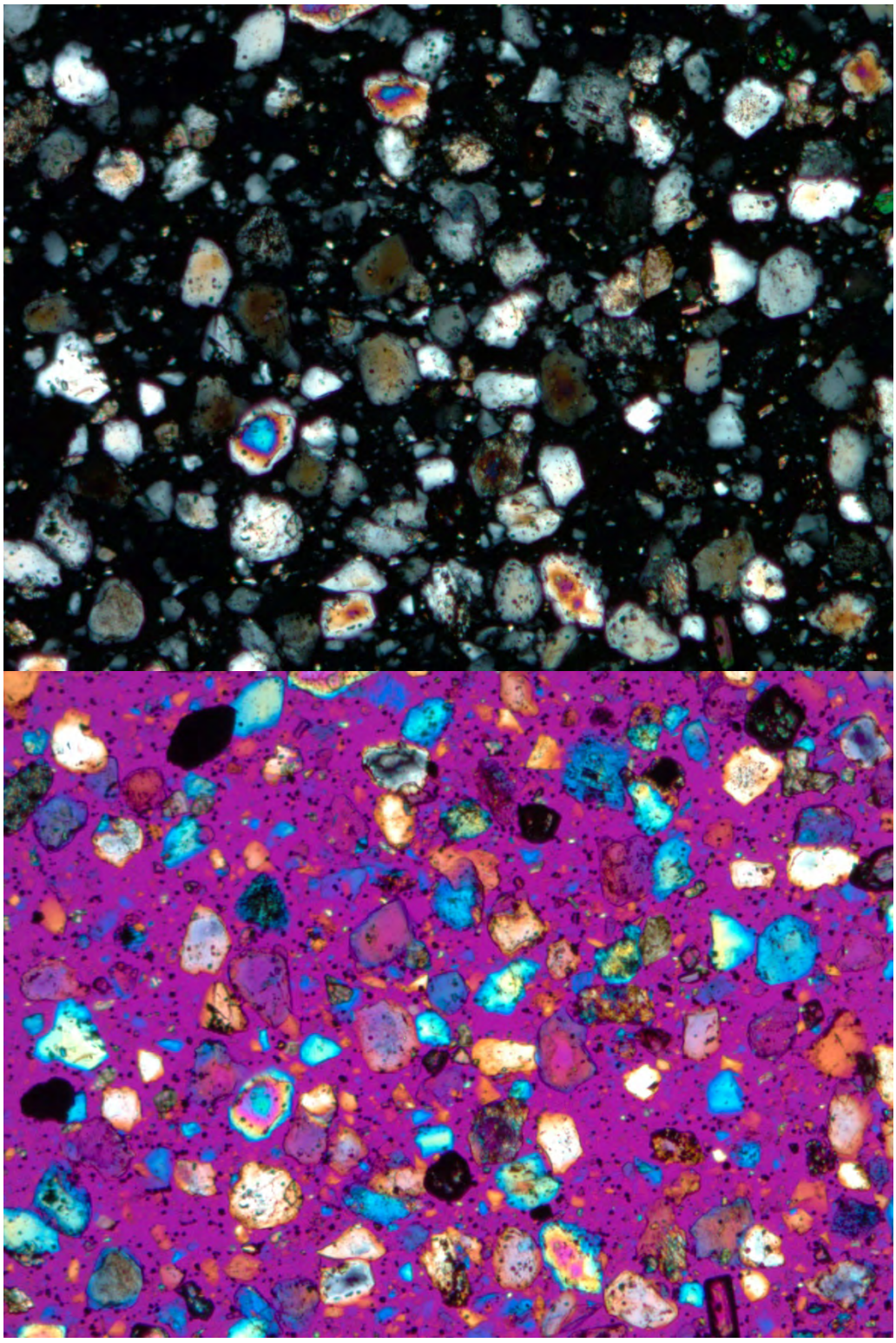


Figure 12 WDMW03B-07-BE10 (SwRI# 475582) Silt fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

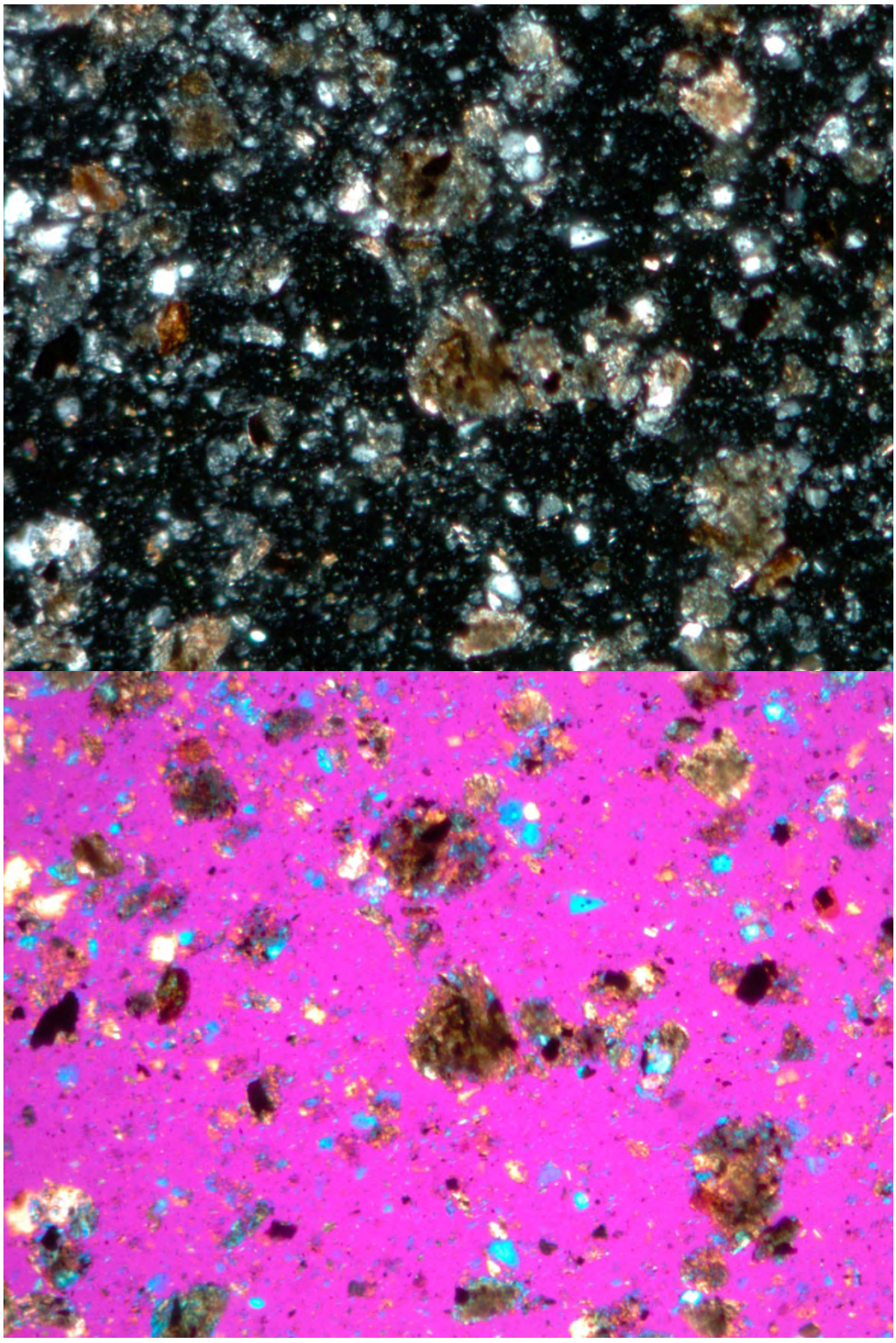


Figure 13 WDMW03B-07-CU10 (SwRI# 475583) Sand fraction in Canada Balsam at 50x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

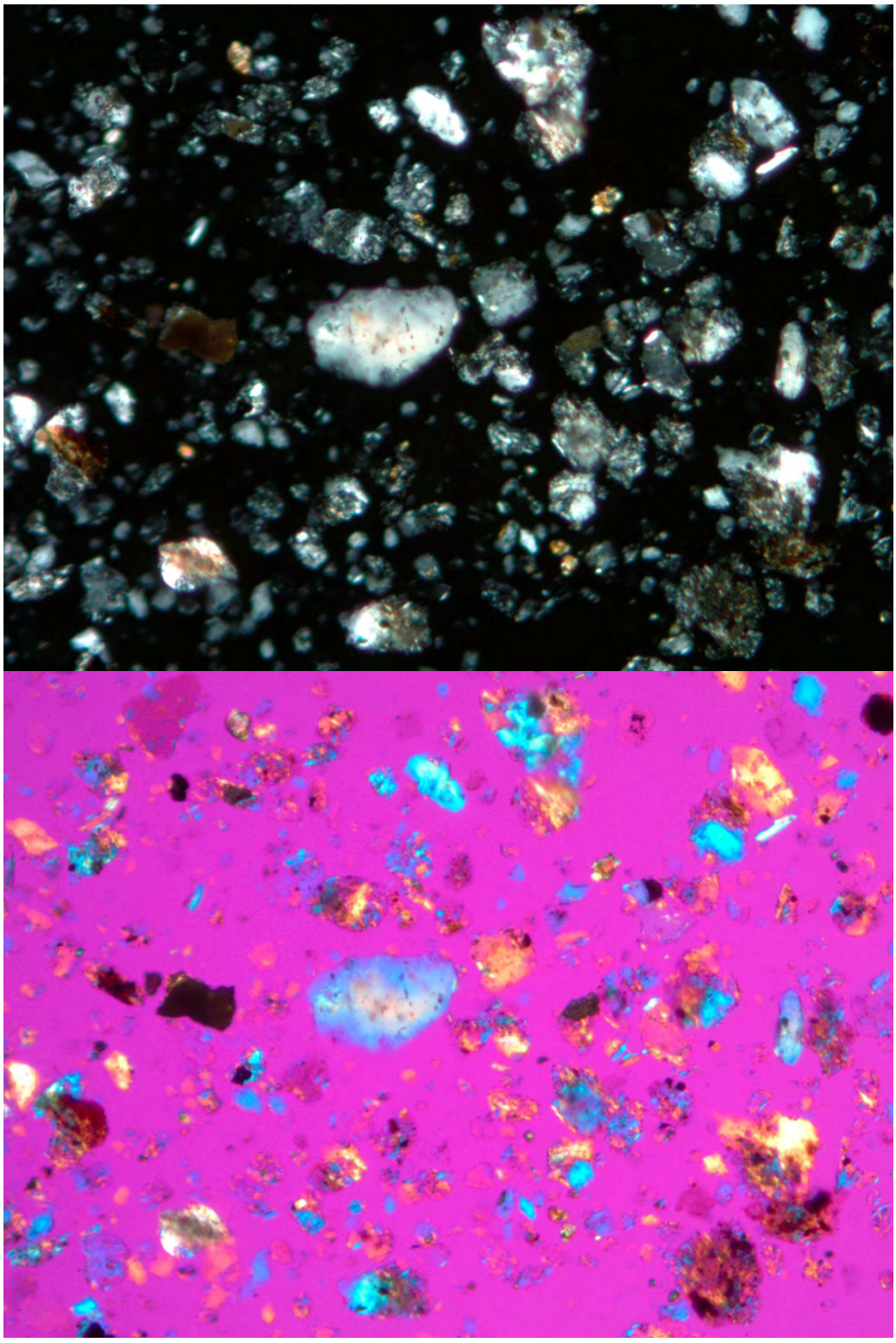


Figure 14 WDMW03B-07-CU10 (SwRI# 475583) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

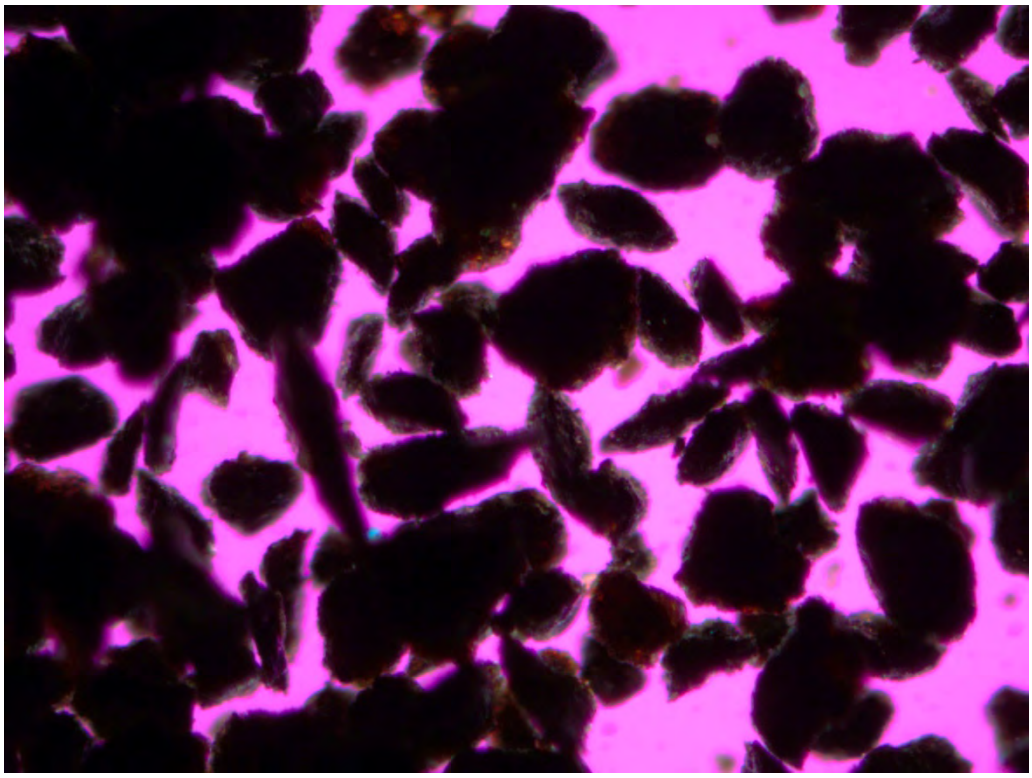


Figure 15 WDMW03B-07-SU10 (SwRI# 475584) Sand fraction in Canada Balsam at 200x magnification under crossed polars and with gypsum plate inserted

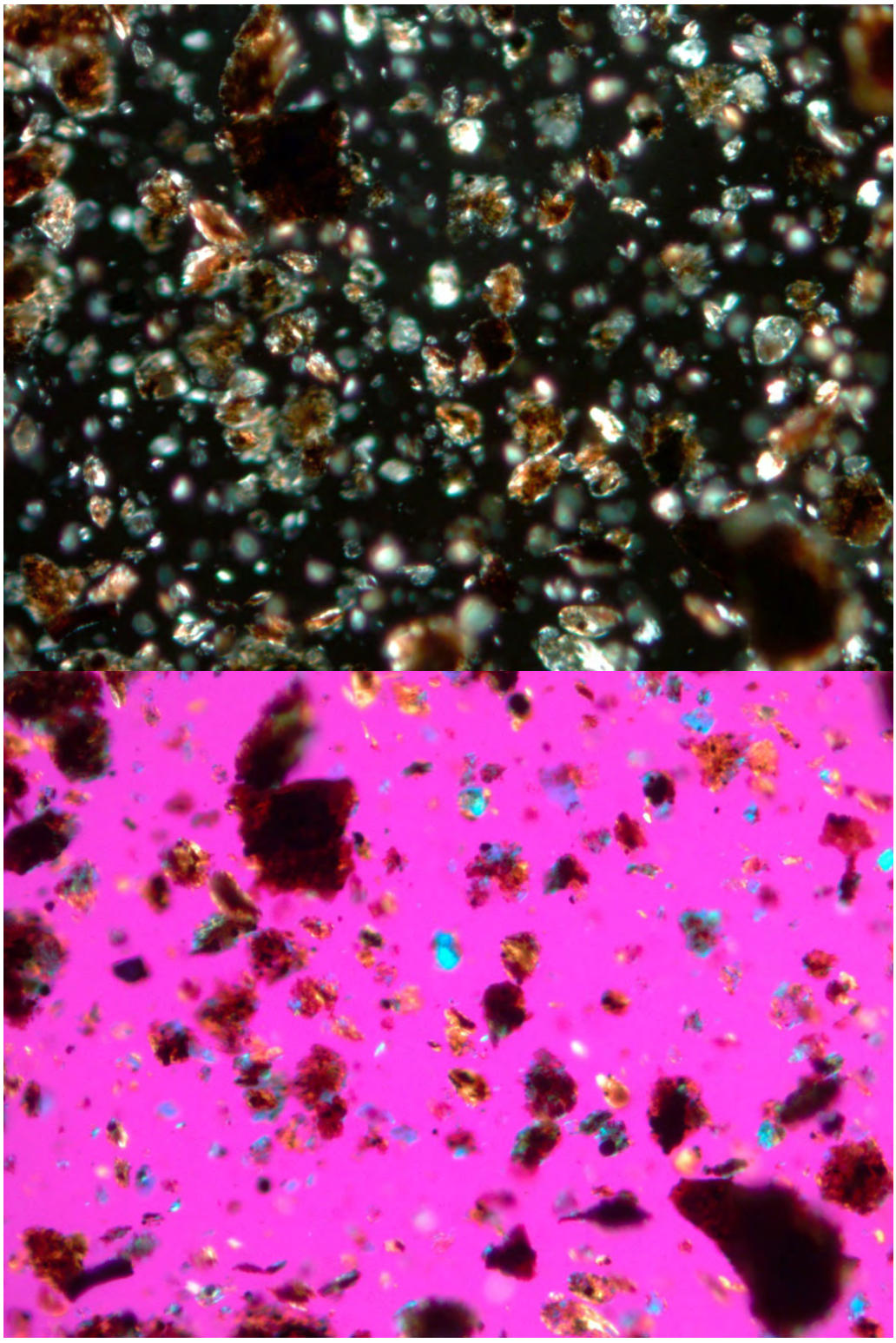


Figure 16 WDMW03B-07-SU10 (SwRI# 475584) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

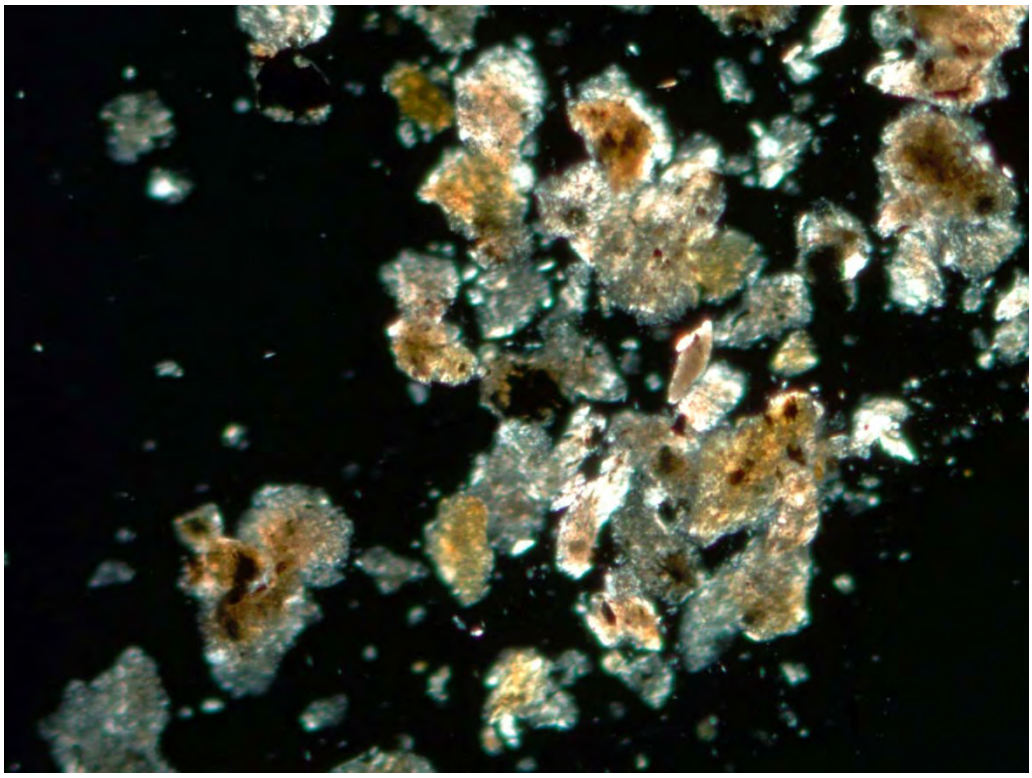


Figure 17 WDSB21-07-19.5 (SwRI# 473043) Sand fraction in Canada Balsam at 50x magnification under crossed polars

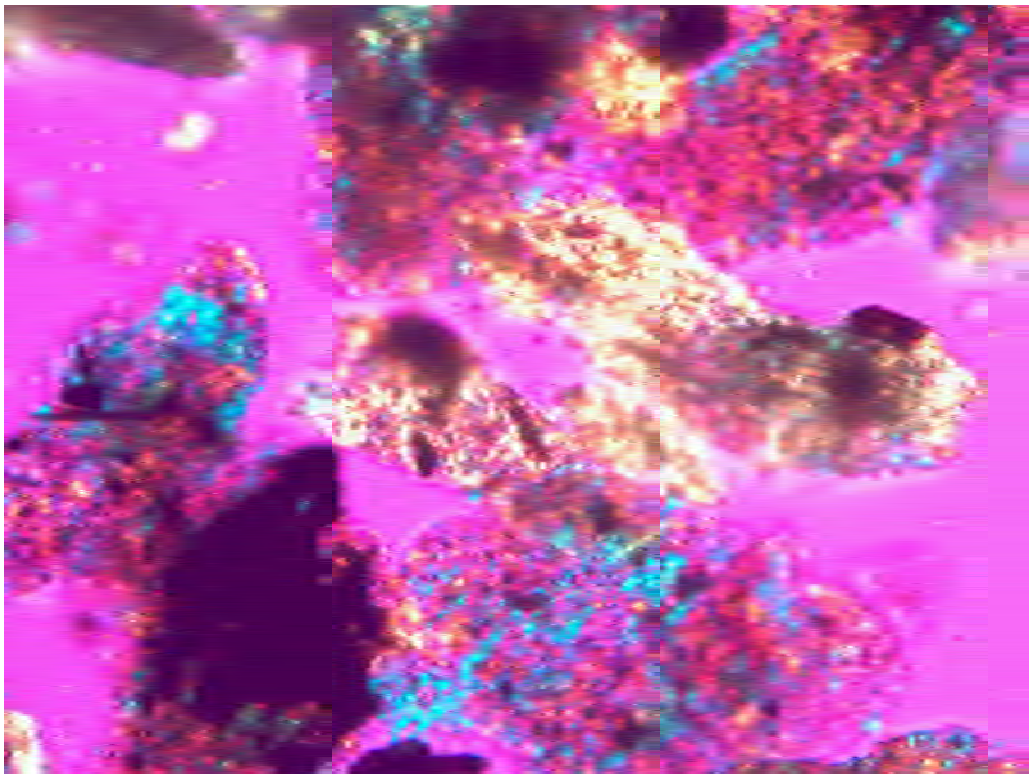


Figure 18 WDSB21-07-19.5 (SwRI# 473043) Sand fraction in Canada Balsam at 200x magnification under crossed polars with gypsum plate inserted

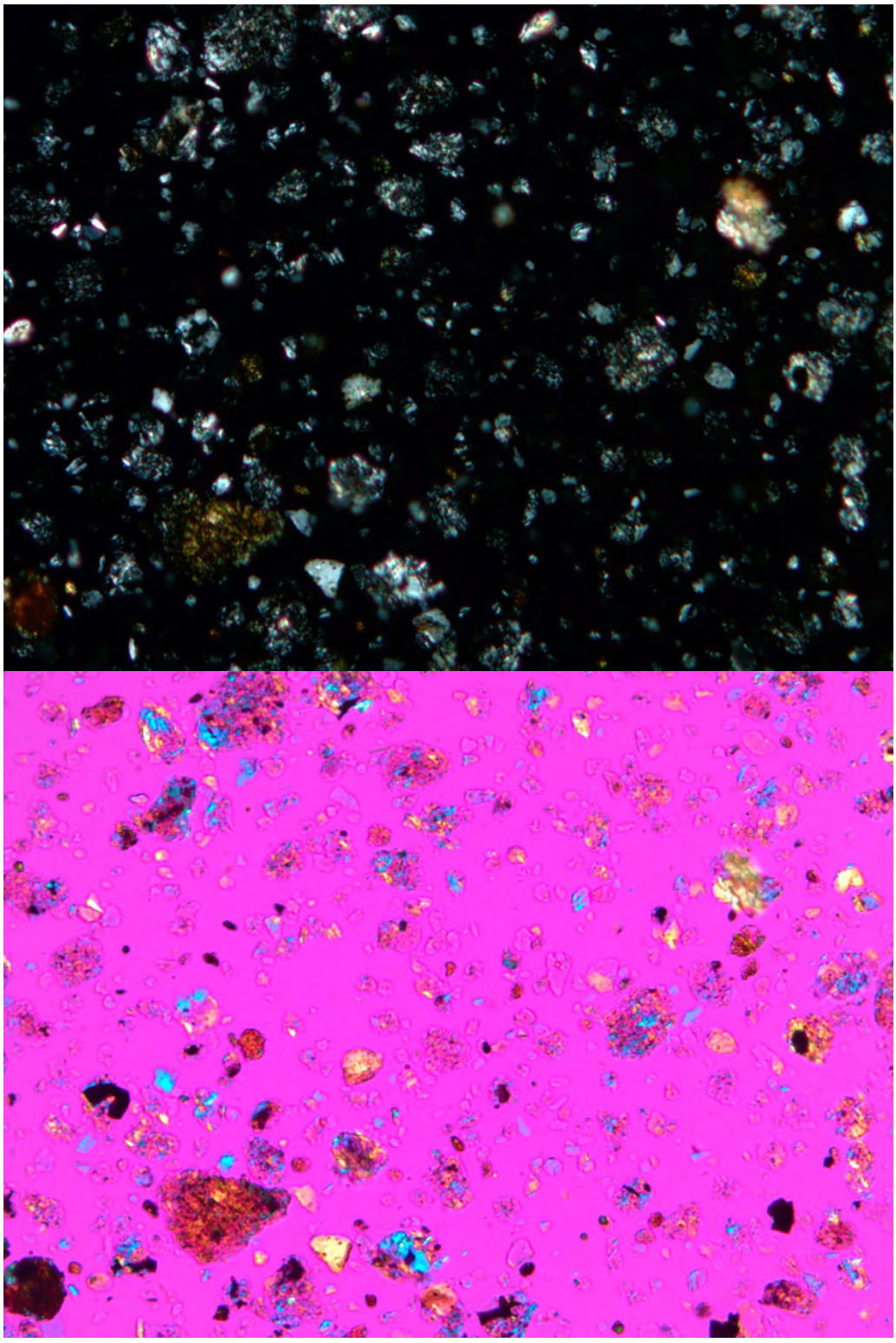


Figure 19 WDSB21-07-19.5 (SwRI# 473043) Silt fraction particles in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

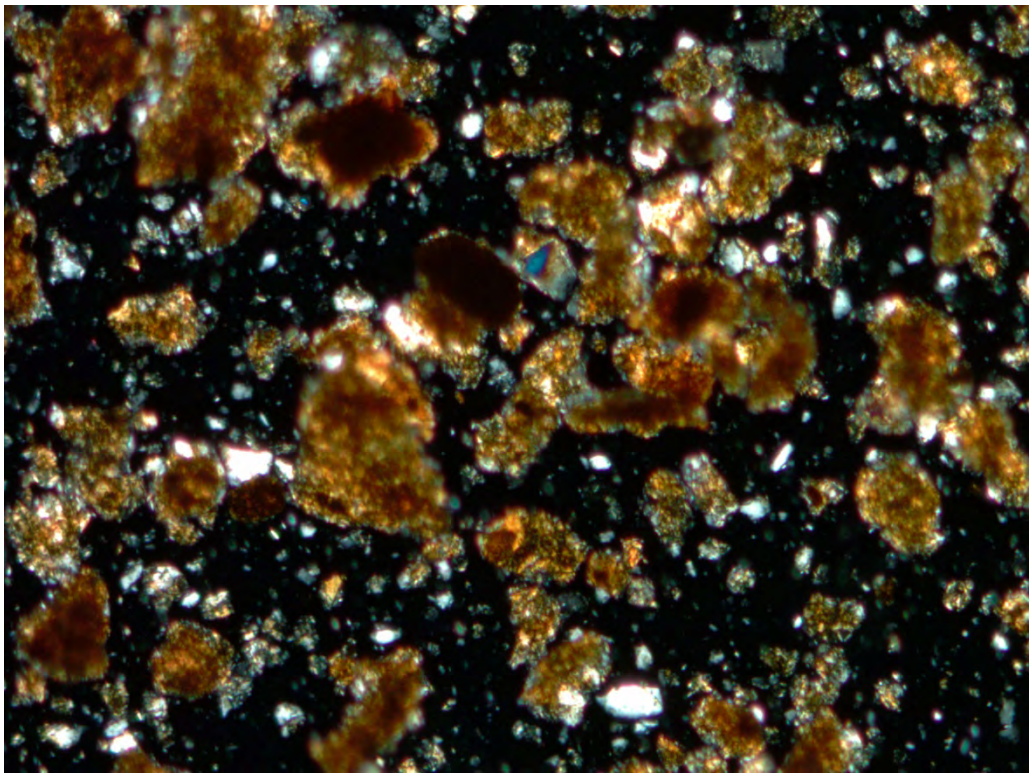


Figure 20 WDSB31-07-2.0 (SwRI# 474340) Sand fraction in Canada Balsam at 50x magnification under crossed polars

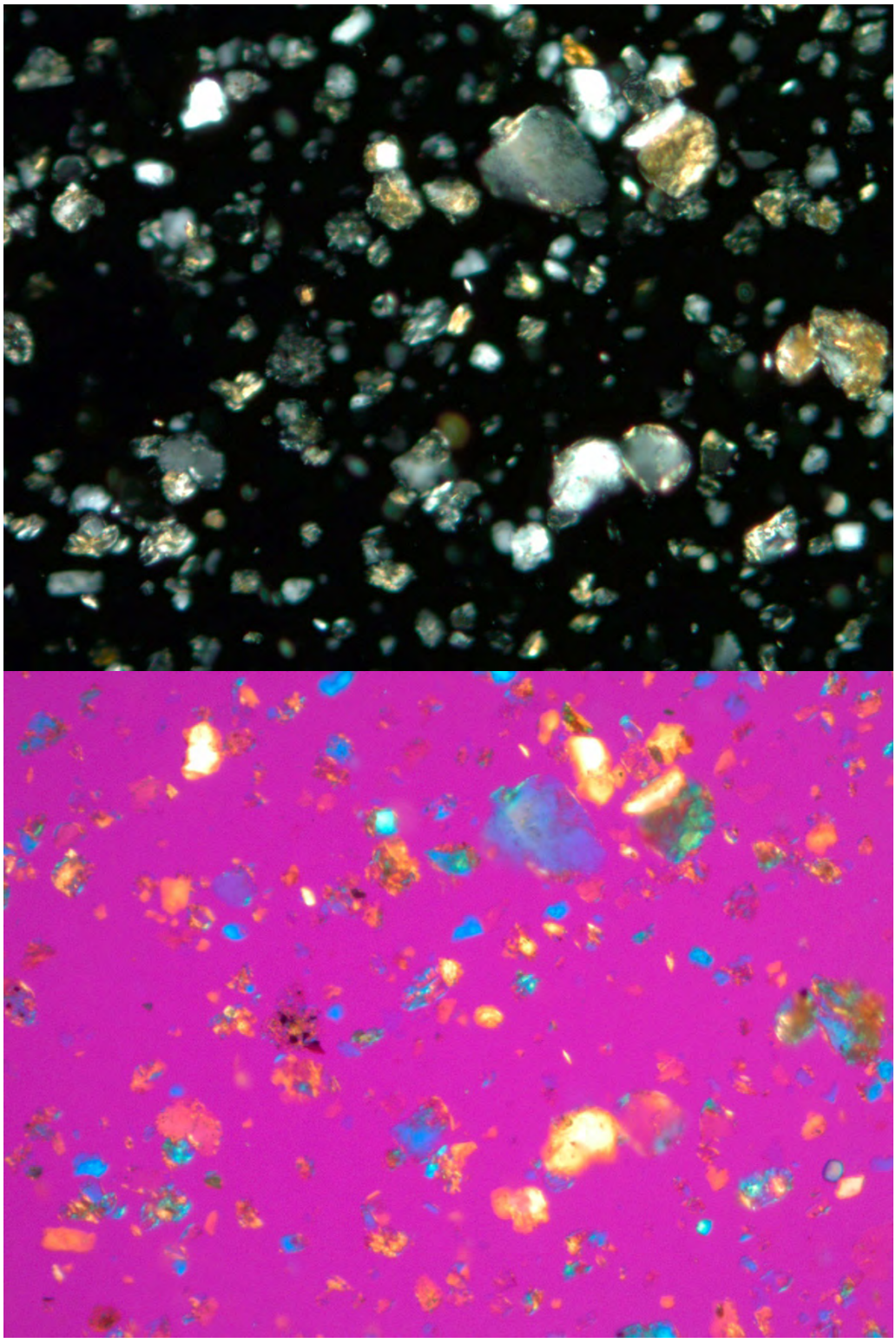


Figure 21 WDSB31-07-2.0 (SwRI# 474340) Silt fraction in Canada Balsam at 100x magnification under crossed polars (top) and with gypsum plate inserted (bottom)

OSDC AQUIFER PERFORMANCE TEST TECHNICAL MEMO

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Section 1
Overview and Test Objectives

Fluor-B&W Portsmouth LLC (FBP) conducted aquifer testing at the proposed On Site Disposal Cell (OSDC) Area D adjacent to the Portsmouth Gaseous Diffusion Plant, located in Piketon, Ohio for the US Department of Energy (DOE). The testing consisted of single well yield tests and long-term, constant rate aquifer performance tests (CRTs).

The objectives of the testing were to:

- Determine the interconnectedness between the Berea Formation and any saturated portions of the stratigraphically higher Cuyahoga Formation.
- Estimate the hydraulic transmissivity and storativity (volume of water released from storage per unit decline in hydraulic head in the aquifer, per unit area of the aquifer) of the two-foot sandstone layer within the Cuyahoga Formation and any other saturated zones identified within the Cuyahoga Formation.

The information collected from the tests will be used to evaluate and characterize the proposed OSDC Study Area D hydrogeology and to help refine the site-wide numerical groundwater model.

The aquifer performance testing was conducted between the dates of June 7, 2012 and October 1, 2012.The testing consisted of five components:

- Background water level monitoring.
- Hydraulic communication testing to estimate the interconnectedness of the Cuyahoga and Berea Formations.
- Yield testing performed on open borehole Cuyahoga piezometers to estimate hydraulic characteristics of the Cuyahoga Formation.
- Yield testing performed on isolated zones within Cuyahoga piezometers to estimate hydraulic characteristics of the Cuyahoga Formation.
- Long term CRTs performed on isolated zones within Cuyahoga piezometers to estimate hydraulic characteristics of the Cuyahoga Formation.

Figure 1-1 shows the proposed OSDC Area D and the monitoring wells and piezometers used during the aquifer performance tests (APTs).

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Section 2
Test Methods

The APTs were composed of three components: background monitoring, yield testing, and long-term CRTs. The stratigraphic units of interest during performance of the APTs are introduced below.

2.1 Stratigraphic Units

In the vicinity of the OSDC, the Cuyahoga, Sunbury, and Bedford Formations are predominantly shales, while the Berea Formation is predominantly sandstone. This stratigraphy is described below, from oldest to youngest.

2.1.1 Bedford Shale

The Bedford Formation, commonly referred to as the Bedford Shale, is continuous beneath PORTS. It averages 100 feet in thickness, and consists of shale with thin interbeds and laminations of hard, gray, fine-grained sandstone and siltstone.

2.1.2 Berea Sandstone

The Berea Formation, commonly referred to as the Berea Sandstone overlies the Bedford Shale. In the proposed OSDC area, the Berea Sandstone is approximately 30 feet thick. The upper 10 to 15 feet of the Berea Formation is composed of a light-gray, hard, thickly bedded, fine-grained sandstone; the lower 5 to 20 feet of the formation has numerous interlayered shale and sandstone laminations, very similar to the underlying Bedford Formation.

2.1.3 Sunbury Shale

The Sunbury Shale is a competent black shale that averages about 15 to 20 feet in thickness beneath the proposed OSDC area.

2.1.4 Cuyahoga Shale

The Cuyahoga Formation, commonly referred to as the Cuyahoga Shale, is the uppermost bedrock formation in the proposed OSDC area. It is a moderately-hard, thinly-laminated shale with numerous sandstone laminations. It forms hills surrounding the facility but is not found beneath the industrial portion of PORTS.

A continuous two-foot sandstone layer occurs within the Cuyahoga Formation. Within the proposed OSDC Area D footprint, the two-foot sandstone layer dips gently to the southeast, at approximately five feet per thousand feet. In the southeastern portion, the sandstone layer is saturated and shows artesian condition. In the northwest portion of the proposed OSDC, the two-foot sandstone layer is higher and is not saturated.

2.2 Background Monitoring

Continuous water level measurements were collected with electronic data recorders at Berea monitoring wells and Cuyahoga piezometers. The Berea Formation monitoring wells were constructed within a borehole using an inner PVC casing, slotted screen, filter pack, and grout seal. Cuyahoga piezometers were constructed as open bedrock boreholes. The construction logs of the monitoring wells and piezometers are presented in Appendix A.

2.2.1 Rationale

Background monitoring was conducted to identify impacts on water levels from natural causes such as barometric pressure, precipitation, and anthropogenic causes such as groundwater withdrawal. Background water levels were collected at four Cuyahoga piezometers and four Berea wells for a period of six weeks. Several

of the Cuyahoga piezometers responded weakly, if at all, to barometric fluctuation. As the Cuyahoga is a confined aquifer, piezometers installed in the Cuyahoga would be expected to respond efficiently to barometric pressure. Piezometers WD-PZ11C, WD-PZ13C, WD-PZ15C, WD-PZ16C, and WD-PZ17C did not respond to barometric fluctuations, raising doubts concerning the degree to which they are hydraulically connected to the Cuyahoga Formation. It is suspected that pronounced skin effects, related to well construction and development, may have compromised data from the non-responding wells. These concerns are explored further in Section 4.

WD-PZ09C and WD-PZ12C responded consistently to barometric fluctuations. WD-PZ09C was chosen as the Cuyahoga Formation background monitoring piezometer and WD-MW05B was chosen to monitor the Berea Formation. The location of the wells is shown in Figure 1-1.

2.2.2 Methods

Electronic water level transducers/recorders were placed in each well. After the water level stabilized, an initial water level measurement was collected with a water level indicator. This reference level was loaded into the transducer/recorder and documented in the field logbook and the data collection was initiated. Periodically, transducer measurements were verified using manual water measurements. Background monitoring hydrographs for the Cuyahoga piezometer and Berea well are included in Figures 2-1 and 2-2.

2.3 Hydraulic Communication Between Cuyahoga and Berea Formations

The degree of hydraulic interconnectedness between the Berea and Cuyahoga Formations was investigated by pumping the Berea Formation and monitoring the response, or absence of response, in the Cuyahoga Formation. Between June 26 and July 3, 2012 communication tests were conducted in each of the following four Berea wells, while water levels were monitored in each Berea well's paired Cuyahoga piezometer:

- Pumped WD-MW03B and Monitored WD-PZ12C.
- Pumped WD-MW04B and Monitored WD-PZ13C.
- Pumped WD-MW05B and Monitored WD-PZ14C.
- Pumped WD-MW06B and Monitored WD-PZ11C.

2.3.1 Hydraulic Communication Testing Approach

Each test was started by pumping the Berea well at 0.1 gallons per minute (gpm). If the Berea well yield was sufficient (i.e., > 0.1 gpm), the test progressed by selecting additional pumping rates of increasing magnitude. If the Berea well yield was insufficient (i.e., <0.1 gpm), the Berea well was pumped dry and recharge was recorded.

2.3.2 Hydraulic Communication Testing Implementation

The testing was performed according to the following steps:

- A pressure transducer was deployed in the pumping well and the paired observation well. Initial water levels were collected using a hand meter and the transducers were referenced to this reading.
- A bladder pump was installed in the Berea well.
- Transducer data collection was initiated.
- Pumping was initiated at 0.1 gpm.
- Throughout the test, data were collected at both wells to determine the presence or absence of hydraulic communication between the two formations.

- If the Berea well sustained a 0.1 gpm discharge rate with stable drawdown over one hour, a higher pumping rate was initiated. Increasing pumping rates were implemented, until the well yield was exceeded.
- If a steady-state flow rate of 0.1 gpm could not be maintained during the test, the well was pumped dry, and the recovery of the well was recorded on the transducer. No Berea well produced 0.1 gpm.
- Recovery data were recorded as feet of recovery per time. The values were converted into volume per time to characterize the yield of the well.
- Water level data and calculations associated with the testing are presented in Figures 2-3 to 2-6.

2.4 Cuyahoga Formation Hydraulic Properties

Testing was performed between July 12, 2012 and Oct 1, 2012 to collect data that were used to estimate the hydraulic properties of the Cuyahoga Formation. The testing consisted of yield tests and long term CRTs. Where present, water levels were monitored in nearby Cuyahoga bedrock borings to provide additional data for the hydraulic property evaluation.

2.4.1 Yield Testing of Open Boreholes

Yield tests were initiated at the following six piezometers by placing a pump approximately two feet above the borehole bottom and pumping the entire borehole (i.e., no packers were used):

- Pumped WD-PZ11C and monitored WD-MW06B.
- Pumped WD-PZ13C and monitored WD-MW04B.
- Pumped WD-PZ14C and monitored WD-MW05B.
- Pumped WD-PZ15C and monitored SB67.
- Pumped WD-PZ16C and monitored SB57.
- Pumped WD-PZ17C and monitored SB53, SB54.

2.4.1.1 Approach to Yield Testing of Open Boreholes

Each test started with an initial pumping rate of 0.1 gpm and was intended to progress by selecting three additional pumping rates of increasing magnitude. Pumping rates progressed only if the Cuyahoga piezometer could sustain a 0.1 gpm discharge rate with stable drawdown over one hour. The flow rate at each subsequent pumping rate was selected based on the drawdown measured during the previous pumping step. The goal was to determine if the piezometer should receive subsequent testing of isolated zones. The nearby Berea well was monitored during testing of WD-PZ11C, WD-PZ13C, and WD-PZ14C to detect any evidence of hydraulic communication between the Cuyahoga and Berea Formations. In the case of WD-PZ15C, WD-PZ16C, and WD-PZ17C, the nearby Cuyahoga borings SB67, SB57, and SB53/SB54 were monitored in the expectation of detecting a hydraulic response that would provide an additional method for estimating a value for hydraulic conductivity for the Cuyahoga Formation.

2.4.1.2 Implementation of Yield Testing of Open Boreholes

The testing was performed according to the following steps:

- A pressure transducer was deployed in the pumping well and the paired observation point. Initial water levels were collected using a hand meter and the transducers were referenced to this reading.
- A bladder pump (WD-PZ11C, WD-PZ13C, and WD-PZ14C) or rotary impeller pump (WD-PZ15C, WD-PZ16C, and WD-PZ17C) was installed in the piezometer.
- Transducer data collection was initiated.

- Pumping was initiated at a rate of 0.1 gpm (WD-PZ11C, WD-PZ13C, and WD-PZ14C), as it was uncertain if the piezometers could sustain a 0.1 gpm discharge rate with stable drawdown over one hour.
- Pumping was initiated at a rate of 2 gpm (WD-PZ15C, WD-PZ16C, and WD-PZ17C), as groundwater sampling previously conducted at these piezometers had revealed well yields < 0.1 gpm.
- At WD-PZ09C and WD-PZ12C the open borehole could sustain a 0.1 gpm discharge rate with stable drawdown over one hour. At these piezometers, isolated zones within the borehole were subsequently tested, and as explained in Section 2.4.2.
- Piezometers WD-PZ15C, WD-PZ16C, and WD-PZ17C are co-located with a Cuyahoga bedrock boring located approximately 10 feet from the piezometer. At these three locations, water levels were recorded in both the pumped piezometer and the paired bedrock boring.
- Piezometers WD-PZ11C, WD-PZ13C, and WD-PZ14C are co-located with a Berea well located approximately 10 feet from the piezometer. At these three locations, water levels were recorded in both the pumped piezometer and the Berea well.
- Water level data and calculations associated with the yield testing in open boreholes are included in Figures 2-7 to 2-12.

The following quality control measures were taken.

- Manual water levels were collected from the isolated zone during each test to verify the electronic data.
- Flow rate was measured at the beginning of each pumping rate, periodically for the first 15 minutes, and at the end of each pumping rate to ensure a constant flow rate.
- For each pumping step, the discharge rate was confirmed using flow meter readings, totalizer readings divided by elapsed time, and timed filling of a graduated cylinder.

2.4.2 Yield Testing of Isolated Borehole Zones

Testing of isolated zones within the borehole was initiated at open boreholes that could sustain a 0.1 gpm discharge rate with stable drawdown over one hour. Isolated zones were selected prior to commencement of aquifer testing based on observations during drilling, water level response during groundwater sampling, as well as examination of geophysical logs. The selected pumping zones were:

- WD-PZ09C: 679-671 feet* (two-foot sandstone layer)
- WD-PZ09C: 671-636 feet (possible saturated zone below two-foot sandstone layer)
- WD-PZ12C: 749-709 feet (saturated zone above two-foot sandstone layer)
- WD-PZ12C: 710-679 feet (possible saturated zone above two-foot sandstone layer)
- WD-PZ12C: 712-681 feet (possible saturated zone above two-foot sandstone layer)
- WD-PZ12C: 678-663 feet (two-foot sandstone layer)

*Vertical datum NGVD29

2.4.2.1 Approach behind Yield Testing of Isolated Borehole Zones

Each test started with an initial pumping rate of 0.1 gpm and was intended to progress by selecting three additional rates of increasing magnitude. Pumping rates progressed only if the isolated zone could sustain a 0.1 gpm discharge rate with stable drawdown over one hour. Each subsequent pumping rate was selected based on the drawdown measured during the previous pumping step. The goal was to have the third pumping rate match the maximum pumping rate sustainable during a long term CRT, and to exceed the zone's yield during the fourth

pumping rate. If a steady-state flow rate of 0.1 gpm could not be maintained, the zone was pumped dry and the recovery of the well was recorded using the transducers. These data were recorded as feet of recovery per time. The values were converted into volume per time to characterize the yield of the well.

2.4.2.2 Implementation of Yield Testing of Isolated Boreholes Zones

The testing was performed according to the following steps:

- The pneumatic packer assembly was configured so that the target zone could be isolated.
- The pneumatic packer assembly was lowered to the selected depth.
- In the case of a double packer assembly, one packer was placed just below the bottom of the target zone and the other packer above the target zone.
- In the case of a single packer assembly, one packer was placed either just below or just above the target zone.
- Transducers below, within, and above the isolated zone were referenced to the static water level.
- The hydraulic packers were inflated.
- Transducer data collection was initiated.
- Pumping was initiated.
- Drawdown recorded in zones above or below the target interval was interpreted to be a potential poor seal, and the packers were deflated and vertically adjusted to establish a better seal. The lithologic and geophysical logs were consulted to help minimize the magnitude of the vertical adjustment.
- If the zone could sustain a 0.1 gpm pumping rate with stable drawdown, over one hour, progressively higher pumping rates were initiated, followed by a long term CRT, as explained in Section 2.4.3.
- If a steady-state flow rate of 0.1 gpm could not be maintained, the zone was pumped dry, and the recovery of the well was recorded using the transducers. These data were recorded as feet of recovery per time. The values were converted into gpm to characterize the yield of the zone.

Water level data hydrographs and pumping rates are presented in Figures 2-13 to 2-18.

2.4.3 Constant Rate Yield Testing of Isolated Borehole Zones

A long term CRT was planned for each isolated zone that could sustain a 0.1 gpm discharge rate with stable drawdown. The goal was to collect data allowing an estimate of the hydraulic transmissivity and storativity within the Cuyahoga Formation. The selected pumping zones were:

- WD-PZ09C: 679-671 feet (containing the two-foot sandstone layer).
- WD-PZ12C: 678-663 feet (containing the two-foot sandstone layer).

2.4.3.1 Constant Rate Testing Approach

The isolated zones were pumped at a constant rate, which was selected based on the results of the step test. The objective was to stress the aquifer as much as possible, while maintaining a water level above the pump intake. Each test was terminated after 48 hours.

2.4.3.2 Constant Rate Testing Implementation

The testing was performed according to the following steps:

- The pneumatic packer assembly was configured so that the target zone could be isolated.
- The pneumatic packer assembly was lowered to the selected depth.

- One packer was placed just below the bottom of the target zone and the other packer above the target zone.
- Transducers below, within, and above the isolated zone were referenced to the static water level.
- The hydraulic packers were inflated.
- Transducer data collection was initiated.
- Pumping was initiated.
- Drawdown recorded in zones above or below the target interval was interpreted to be a potential poor seal, and the packers were deflated and vertically adjusted to establish a better seal. The lithologic and geophysical logs were consulted to help minimize the magnitude of the vertical adjustment.
- WD-PZ09C: 679-671 feet
  - Discharge rate: 0.6 gpm
  - Pumping begins: 19:07 on 9/12/12
  - Pumping ends: 19:07 on 9/14/12
  - Monitor:
    - WD-PZ11C
    - WD-PZ12C
    - WD-PZ13C
    - WD-PZ14C
    - WD-MW03B
    - WD-MW04B
    - WD-MW05B
    - WD-MW06B
- WD-PZ12C: 678-663 feet
  - Discharge rate: 1.2 gpm
  - Pumping begins: 16:30 on 9/21/12
  - Pumping ends: 17:01 on 9/23/12
  - Monitor:
    - WD-PZ09C
    - WD-PZ11C
    - WD-PZ13C
    - WD-PZ14C
    - WD-MW03B
    - WD-MW04B
    - WD-MW05B
    - WD-MW06B

Section 3
Data Analysis and Results

The testing data were evaluated to identify any interconnectedness of the Cuyahoga and Berea Formations and to estimate the hydraulic properties within the two-foot sandstone layer and identified saturation zones within the Cuyahoga Formation. Evaluating background data supported the interconnectedness and hydraulic property evaluation.

3.1 Evaluation of Background Data

Background water levels were evaluated for Cuyahoga piezometer WD-PZ09C and Berea well WD-MW03B. The goal was to identify the cause of water level fluctuations (e.g. aquifer drainage, barometric response, aquifer pumping, earth tides, and precipitation influences) and to quantify any identified effects so that the effects can be removed from the CRT data, prior to hydraulic analysis.

3.1.1 Draining Influence

No long term declining or increasing trends in water level were noted in the hydrographs. This observation suggests drainage or recharge effects did not have a significant impact on CRT data.

3.1.2 Pumping Effects and Earth Tides

In the OSDC area, all wells are of the monitoring type, no pumping is performed, and no effects from pumping were expected. Water levels in aquifers may exhibit fluctuations due to changes in gravity caused by changes in the position of the sun and moon relative to the earth. These fluctuations are called earth tides. Earth tides are typically not observed in unconfined aquifers but can be detected in confined aquifers. Background monitoring hydrographs for WD-PZ09C and WD-MW05B show cyclic impacts in water levels on the order of 0.03 to 0.04 feet. These impacts can be attributed to earth tides. However, the magnitude of these effects was considered negligible during the data analysis.

3.1.3 Barometric Effects

When examining the background data, fluctuations in barometric pressure are identifiable as the major effect on the background water levels. The magnitude of the water level response to changes in barometric pressure is defined as the formation's barometric efficiency:

- If an aquifer is unaffected by changes in barometric pressure, then all of the change in water level measured at the borehole is due to atmospheric pressure fluctuations acting on the exposed borehole, not to changes in the aquifer water level. In this extreme case, barometric efficiency would be 100%.
- If an aquifer responds instantaneously to changes in barometric pressure, then all of the change in water level measured at the borehole is due to water level changes in the aquifer acting on the exposed borehole. None of the change in the borehole water level is due to change in barometric pressure acting on the exposed borehole. In this extreme case, the barometric efficiency would be 0%.

Barometric pressure data were collected using an onsite barometric transducer. These data were used to estimate the barometric pressure influence on the groundwater levels.

Cuyahoga piezometer WD-PZ09C and Berea well WD-MW03B exhibited water level fluctuations that correlated with changes in barometric pressure. Because the barometric effects were large relative to the induced drawdown, water elevation data were corrected for barometric effects. Curve-matching was employed using a

range of barometric efficiencies to minimize the effects of barometric variation. Barometric efficiency is defined using the following equation.

Barometric efficiency = (average change in water level / average change in barometric pressure) x 100%

Overall, a barometric efficiency value of 90% provided the best fit. This value is high, which is consistent with an aquifer that is confined to a high degree. Figures 3-2 to 3-9 and 3-11 to 3-18 show hydrographs for locations monitored during the two CRTs including raw water levels, barometric readings, and water levels corrected for barometric effects.

3.2 Hydraulic Communication between Cuyahoga and Berea Formations

The degree of hydraulic interconnectedness between the Berea and Cuyahoga Formations was investigated by pumping the following Berea Formation piezometers and monitoring the response, or absence of response, in the following Cuyahoga Formation monitoring wells, located at a lateral distance of approximately 10 feet:

- Pumped WD-MW03B and Monitored WD-PZ12C
- Pumped WD-MW04B and Monitored WD-PZ13C
- Pumped WD-MW05B and Monitored WD-PZ14C
- Pumped WD-MW06B and Monitored WD-PZ11C

None of the Berea wells could maintain a pumping rate of 0.1 gpm with steady state drawdown. As a result, each borehole was pumped dry and the recharge was recorded. Notable in the hydrographs is the absence of response of the water level in the Cuyahoga piezometer to pumping in the Berea well. This lack of response suggests little to no hydraulic communication between the Cuyahoga Formation and the Berea Formation.

To estimate the yield of wells, recovery was recorded using transducers. These data were recorded as feet of recovery per time. The values were converted into gpm. These values were converted into recharge rates ranging from 0.008 gpm at WD-MW05B to 0.02 gpm at WD-MW06B.

Well ID	Total Draw-down	90% Recovery		50% Recovery	
		Volume	Rate	Volume	Rate
WD-MW03B	21.99 ft	19.79 ft x 0.163 gal/ft* = 3.2 gal	3.23 gal / 306 min = 0.01 gpm	Not Applicable**	Not Applicable**
WD-MW04B	15.98 ft	14.38 ft x 0.163 gal/ft = 2.34 gal	2.3 gal / 273 min = 0.009 gpm	7.99 ft x 0.163 gal/ft = 1.3 gal	1.3 gal / 95 min = 0.01 gpm
WD-MW05B	16.58 ft	14.92 ft x 0.163 gal/ft = 2.4 gal	2.4 gal / 310 min = 0.008 gpm	8.29 ft x 0.163 gal/ft = 1.4 gal	1.4 gal / 86 min = 0.02 gpm
WD-MW06B	18.38 ft	16.54 ft x 0.163 gal/ft = 2.7 gal	2.7 gal / 140 min = 0.02 gpm	9.19 ft x 0.163 gal/ft = 1.5 gal	1.5 gal / 47 min = 0.03 gpm

*0.163 gallons per foot of depth in a 2-inch well.

**Recharge rate not estimated. 50% recovery was achieved before data logger began recording.

3.3 Hydraulic Properties of Low-Yielding Saturated Zones Identified within the Cuyahoga Formation

Only two zones (WD-PZ09C: 679-671 feet and WD-PZ12C: 678-663 feet) could maintain a pumping rate of > 0.1 gpm. The following piezometers or isolated zones within piezometers could not maintain a pumping rate of 0.1 gpm:

- WD-PZ09C (671-636 feet)
- WD-PZ11C (Entire borehole)
- WD-PZ12C (749-709 feet and 712-681 feet)
- WD-PZ13C (Entire borehole)
- WD-PZ14C (Entire borehole)
- WD-PZ15C (Entire borehole)
- WD-PZ16C (Entire borehole)
- WD-PZ17C (Entire borehole)

At each low-yielding zone, the borehole or isolated zone was pumped dry, and recharge was recorded. The time required to recover a percentage of the applied drawdown was measured and converted into gpm. These values were used to estimate the yield of the well. The yield ranged from 0.0007 gpm at WD-PZ15C to 0.05 gpm at WD-PZ13C.

Well ID	Total Draw-down	90% Recovery		50% Recovery	
		Volume	Rate	Volume	Rate
WD-PZ11C	12.17 ft	10.95 ft x 1.47 gal/ft* = 16.1 gal	16.1 gal / 649 min = 0.03 gallons per minute (gpm)	6.09 ft x 1.47 gal/ft = 8.9 gal	8.9 gal / 244 min = 0.04 gpm
WD-PZ13C	20.46 ft	Not Applicable**	Not Applicable**	10.23 ft x 1.47 gal/ft = 15.0 gal	15.0 gal / 334 min = 0.05 gpm
WD-PZ14C	19.97 ft	17.97 ft x 1.47 gal/ft = 26.4 gal	26.4 gal / 11,165 min = 0.002 gpm	9.99 ft x 1.47 gal/ft = 14.7 gal	14.7 gal / 4,502 min = 0.003 gpm
		Recovery		Volume	Rate
WD-PZ15C	28.92 ft	13%		4.0 ft x 1.47 gal/ft = 5.9 gal	5.9 gal / 8600 min = 0.0007 gpm
WD-PZ16C	11.02 ft	50%		5.5 ft x 1.47 gal/ft = 8.1 gal	8.1 gal / 8,299 min = 0.001 gpm
WD-PZ17C	18.09 ft	33%		6.0 ft x 1.47 gal/ft = 8.8 gal	8.8 gal /8600 min = 0.001 gpm

*1.47 gallons per foot of depth in 6-inch well

**Recharge rate could not be estimated. 50% recovery was achieved before data logger began recording.

Notable in the hydrographs for WD-PZ15C, WD-PZ16C, and WD-PZ17C is the absence of hydraulic response recorded at the nearby Cuyahoga bedrock boring. Also notable is that the recovery data are highly linear. The

linearity of the recovery data is uncharacteristic of a standard aquifer response. Poor hydraulic communication between the piezometer and the saturated formation may also play a role in the atypical recovery.

Poor hydraulic communication between piezometer and formation can be thought of in terms of a skin effect. The concept of a wellbore skin is used to account for the difference between measured and predicted response in a pumping well. A positive skin, resulting from reduced permeability near the wellbore, is caused by damage to the interface between the aquifer and the wellbore. To evaluate the skin effect at WD-PZ15C, WD-PZ16C, and WD-PZ17C, basic assumptions were made concerning the dimensions of the skin. These assumptions, combined with recovery data from WD-PZ15C, WD-PZ16C, and WD-PZ17C, were input into Darcy's Law to get a sense of the skin effect. Darcy's Law describes the following relationship:

Darcy's Law $Q = Kia$

Rearranging $K = Q/ia$

Q = discharge (volume /time)
K = hydraulic conductivity (length/time)
i = gradient (unitless)
a = cross sectional area ($length^2$)

The skin effect was assumed to extend outward from the borehole to a radius of 1.5 ft. Beyond this radius, the head in the formation was assumed to be unaffected by evacuating the piezometer. The cross-sectional area was assumed to be the height of the two-foot sandstone layer multiplied by the diameter of the extent of the skin effect. Q was assumed to be the measured recovery rate at each piezometer.

K = Q/ia						
Well ID	**Q (ft^3/day)**	**Drawdown (ft)**	**Skin Radius (ft)**	**i**	**a (ft^2)**	**K (ft/day)**
WD-PZ15C	0.131	28.92	1.5	19.3	6	1×10^{-3}
WD-PZ16C	0.196	11.02	1.5	7.3	6	4×10^{-3}
WD-PZ17C	0.196	18.09	1.5	12.1	6	3×10^{-3}

Using this method, estimating the hydraulic conductivity of the skin effect is dependent on the estimated radial distance to which the skin effect extends. During advancement of the borehole drilling fluids containing naturally occurring clay particles (pulverized shale) enter the aquifer. Permeable zones are most easily penetrated by the clay-containing drilling fluids, and their effects can extend out from the borehole several feet. A radial distance of 1.5 feet was chosen as a conservative estimate for the penetration depth of drilling fluids.

The conductivities estimated for the well skin are higher than the horizontal hydraulic conductivity included in the site-wide groundwater numerical model for the Cuyahoga Formation (7×10^{-5} feet/day). It is uncertain whether the hydraulic testing simply measured a skin effect, and the true hydraulic conductivity in these areas is much greater than 10^{-3} ft/day. Alternatively, the skin effect may be negligible, in which case the testing has measuring the true hydraulic conductivity. This issue is discussed in further detail in Section 4.

3.4 Hydraulic Properties Based on Testing of the Two-Foot Sandstone Layer Higher-Yielding Saturated Zones Identified in the Cuyahoga Formation

During the two Cuyahoga Formation CRTs, while pumping WD-PZ09C, a water level response was recorded at WD-PZ12C and at no other location. Similarly, while pumping WD-PZ12C, a water level response was recorded at WD-PZ09C and at no other location. The data collected at WD-PZ09C and WD-PZ12C responded to barometric pressure in an instantaneous and consistent manner, allowing the barometric effects to be easily removed. The underlying response to pumping was found to be similar to the type curve for confined response to pumping. As a consequence, during pumping of WD-PZ09C and WD-PZ12C, the data collected at observation wells WD-PZ12C and WD-PZ09C, respectively, were evaluated to estimate the hydraulic characteristics of the two-foot sandstone within the Cuyahoga Formation.

3.4.1 General Conditions of the Two-Foot Sandstone Layer in Higher-Yielding Parts of the Cuyahoga Formation

Based on the hydrolithology of the two-foot sandstone layer and the observation that water levels within the Cuyahoga piezometers rise above the two-foot sandstone layer, hydraulic conditions within the two-foot sandstone layer are likely semi-confined or confined. Therefore, hydraulic response was evaluated using solutions for semi-confined and confined aquifer conditions. It was found that curve matches were best using the confined solution. The close match between recorded data and the confined aquifer type curve, the potentiometric surface that rises above the saturated zone, and the high degree of barometric efficiency exhibited by the Cuyahoga piezometers are each consistent with confined conditions within the two-foot sandstone layer.

Transmissivity and storage coefficients were estimated using a solution for confined aquifer conditions (Theis, 1935). The Theis solution was chosen since it is commonly used for test evaluations when site conditions meet, to a reasonable extent, solution assumptions. As with all field conditions, Cuyahoga Formation conditions do not exactly match the Theis solution requirements (Kruseman, G.P. and N.A. de Ridder 1990). For example, one solution assumption is that the aquifer must be homogeneous and isotropic. The Cuyahoga Formation at Proposed OSDC Area D is a low permeability shale that includes a transmissive two-foot sandstone layer. The tested formation is heterogeneous and anisotropic.

3.4.2 Hydraulic Properties of the Two-Foot Sandstone Layer in Higher-Yielding Parts of the Cuyahoga Formation

The curves are presented as Figures 3-19 and 3-20 and show range of transmissivity from 80 ft^2/day (using data from observation well WD-PZ09C) to 100 ft^2/day (using data from observation well WD-PZ12C) and a range of storativity from 3×10^{-4} to 5×10^{-4}. Dividing the average transmissivity determined during curve matching by the aquifer thickness of two feet, the resulting hydraulic conductivity range is 40 to 50 ft/day.

3.4.3 Absence of Berea Formation Response to Pumping in Higher-Yielding Parts of the Cuyahoga Formation during the CRTs

Berea well hydrographs collected during the Cuyahoga CRTs record no reaction to pumping in the Cuyahoga Formation (Figures 3-6 to 3-9 and 3-15 to 3-18). In addition to testing designed specifically to estimate the interconnectedness, as described in Section 3.2, the absence of response in the Berea Formation during performance of CRTs within the Cuyahoga Formation is an additional indicator that the two formations have little to no hydraulic communication.

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Section 4
Conclusions and Recommendations

Two CRTs were performed during the aquifer performance testing. The CRTs were performed by pumping piezometers WD-PZ09C and WD-PZ12C, which are located within or near the south central portion of proposed OSDC Area D. Hydraulic properties estimated from the CRTs are applicable to the vicinity of the southeastern portion of proposed OSDC Area D. In the central and northwestern portions of the Proposed OSDC Area D, it was not possible to perform CRTs, due to low-yielding Cuyahoga piezometers. In the central and northwestern portions of the Proposed OSDC Area D, observations of hydraulic performance were based solely on stressing and measuring response at single piezometers (i.e., no observation well data were suitable for use). As will be discussed in the sections below, the single piezometer data are suspect, due to concerns surrounding the degree of communication between the piezometer and the two-foot sandstone layer.

Within or near the south central portion of proposed OSDC Area, testing provided strong indications that the conditions within the two-foot sandstone layer are confined:

- The hydrolithology of the two-foot sandstone layer (underlain and overlain by low conductivity shale).
- The low estimated storativity of the two-foot sandstone layer.
- Observed water level elevations rising above the two-foot sandstone layer.
- The estimated 90% barometric efficiency of the two higher-yielding Cuyahoga piezometers. High barometric efficiency is consistent with confined conditions.
- The close match between CRT response hydrographs for the two higher-yielding Cuyahoga piezometers and the confined aquifer type curve.

Using confined aquifer type curve matching, the hydraulic conductivity of the two-foot sandstone layer was estimated to be in the range is 40 to 50 ft/day with storativity from 3×10^{-4} to 5×10^{-4}. In addition, hydraulic communication testing indicated no hydraulic communication between the Cuyahoga and Berea Formations.

4.1 Lithology and Hydraulic Properties of the Two-Foot Sandstone Layer in Low-Yielding and Higher-Yielding Parts of the Cuyahoga Formation

Lithologic logs completed for borings in Proposed OSDC Area D contain descriptions of the two-foot sandstone layer that are notably similar from location to location. The recurring description is of hard, sound, fresh, grey, very fine to fine sandstone. At widely separated locations, the two-foot sandstone layer is under roughly equivalent piezometric head. Static water levels were between six and nine feet above the top of the two-foot sandstone layer at piezometers WD-PZ09C, WD-PZ11C, WD-PZ12C, WD-PZ15C, and WD-PZ17C. However, the hydraulic performance of the five mentioned piezometers varied in the extreme. WD-PZ09C and WD-PZ12C yielded 0.6 gpm and 1.2 gpm, respectively, while well yields at WD-PZ11C, WD-PZ15C, and WD-PZ17C were four orders of magnitude less. Based on similar lithology and piezometric head, similar hydraulic performance would be predicted. This conflicting and/or uncharacteristic observation, as well as others, indicates the possibility that skin effects may have dominated the hydraulic performance of the low-yielding piezometers. Skin effects are likely related to well construction and will be discussed in subsequent sections.

4.2 Piezometer Construction

At Proposed OSDC Area D, piezometers were installed using air rotary techniques to advance the borehole to a depth at least several feet deeper than the two-foot sandstone layer. The Cuyahoga Formation is both hydraulically low-yielding and friable. Described below are aspects of piezometer installation relating to the nature of the Cuyahoga Formation and ultimately to the suitability of the piezometers for aquifer performance testing:

- To enhance identification of minor saturated zones within the Cuyahoga Formation, no water was added to the airstream during advancement using air rotary.
- Because little water was produced by the formation and no water was added during drilling, little to no water was available to develop the borehole after reaching final depth. At a more productive borehole, a column of water is available to lift and drop, using air introduced to the bottom of the borehole through the tooling. The process causes vigorous flow in and out of productive zones, and is typically repeated over an extended period of time, until the purge water turbidity is reduced to acceptable levels.
- Because a column of water was not available for borehole development, it was not possible to clear shale cuttings (pulverized shale and clay to silt-sized particles) from the productive portion of the borehole (i.e., the bedding plane fractures at the lithologic contact between the two-foot sandstone and the surrounding shale).
- The friable Cuyahoga shale tends to crumble and collapse in the borehole, especially when exposed to water. Over the six to nine months between installation and aquifer testing, many piezometers became shallower, evidence of minor collapse.

4.3 Evidence of Poor Hydraulic Communication between Formation and Borehole at Tested Piezometers

Perhaps the strongest argument for poor communication between low-yielding Cuyahoga piezometers and the two-foot sandstone layer is the lack of barometric response recorded at the low-yielding Cuyahoga piezometers. The water levels measured in higher-yielding piezometers WD-PZ09C and WD-PZ12C respond with estimated 90% barometric efficiency. This means that 90% of the change in water level measured at the borehole is due to atmospheric pressure fluctuations acting on the exposed borehole and 10% of the change in water level measured at the borehole is due to water level changes in the aquifer acting on the exposed borehole. If all piezometers were in equal hydraulic communication with the two-foot sandstone layer, uniform barometric efficiency would be predicted across the proposed OSDC Area D (i.e, piezometers WD-PZ09C, WD-PZ11C, WD-PZ12C, WD-PZ15C, and WD-PZ17C would display similar barometric efficiency). Absent lithologic or piezometric head variation, a likely mechanism to profoundly change barometric efficiency is not available. More plausible is the notion of widely varying hydraulic communication between the Cuyahoga piezometers and the two-foot sandstone layer.

Another argument for poor communication between Cuyahoga piezometers and the two-foot sandstone layer is the linearity of the recovery data in the hydrographs for WD-PZ15C and WD-PZ17C. Linear recovery is uncharacteristic of a standard aquifer response. The atypical recovery, combined with an absence of barometric response, is a strong indicator of poor hydraulic communication between the piezometer and the saturated formation.

4.4 Impact of Poor Hydraulic Communication

As a result of the likely poor hydraulic communication between some Cuyahoga piezometers and the two-foot sandstone layer, it is premature to conclude with certainty that data collected from a low-yielding piezometer can be used to accurately estimate the hydraulic properties of the two-foot sandstone in the vicinity of the low-yielding piezometer. When analyzing data from a low-yielding Cuyahoga piezometer, it is unclear whether the piezometer is in good hydraulic communication with the two-foot sandstone. It is also possible that borehole instability and insufficient development play a large role in the absence or very small magnitude of hydraulic response.

To proceed conservatively with the data currently available, the following assumption is prudent: In areas where only low-yielding Cuyahoga piezometers are available, the true hydraulic conductivity in the two-foot sandstone layer lies somewhere between the values measured using type curve matching, at WD-PZ09C and WD-PZ12C, and the values estimated using Darcy's Law, at WD-PZ11C, WD-PZ12C, WD-PZ15C, and WD-PZ17C. This wide

range of hydraulic conductivity provides limited assistance in the attempt to refine the site-wide numerical groundwater model in the vicinity of Proposed OSDC Area D.

4.5 Recommended Modifications

Each Cuyahoga piezometer would benefit from stabilization and development. To stabilize the piezometer, the installation of a conventional well using a five-foot screen, filter pack, and riser is recommended. Impairment of the two-foot sandstone layer that occurred during drilling (i.e., plugging productive fractures with fine material) must be repaired to restore the formation's native hydraulic properties. Introduced water will be necessary, as a significant column of water will be required to cause forceful reversals of flow through the well screen and sandstone layer. Reversing the direction of flow breaks down cohesive fines and moves the fine material into the piezometer so that it can be removed. To force water into and out of the screen and sandstone layer, use of a surge block, air lifting, or alternative method will be necessary. To select the most appropriate development method, consultation with the drilling firm that installed the piezometers is recommended. After development, testing should be performed, following the methods used previously.

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Section 5
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Figure 2-1
WD-PZ09C Cuyahoga Formation Background Monitoring

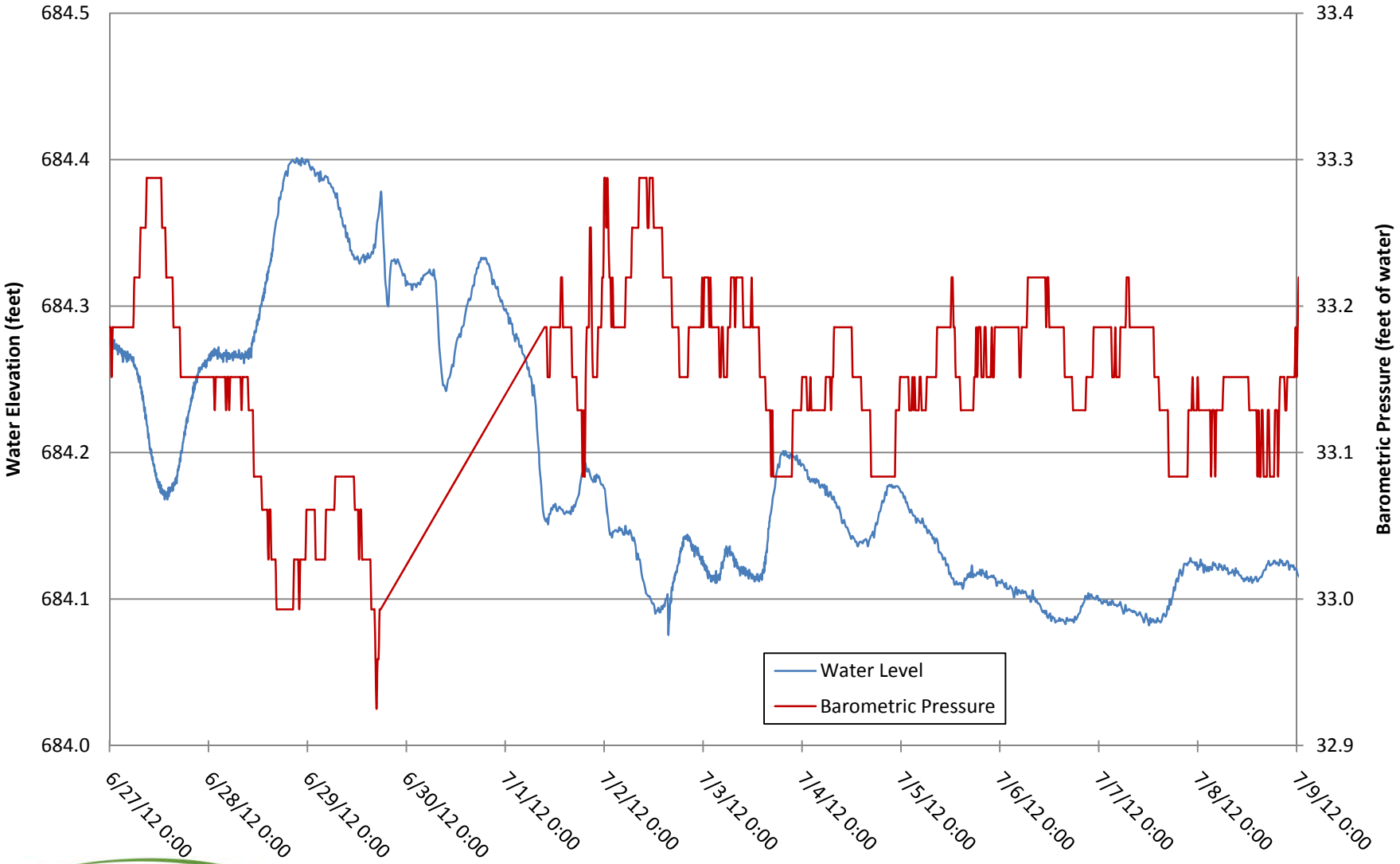


Figure 2-2
WD-MW05B Berea Formation
Background Monitoring

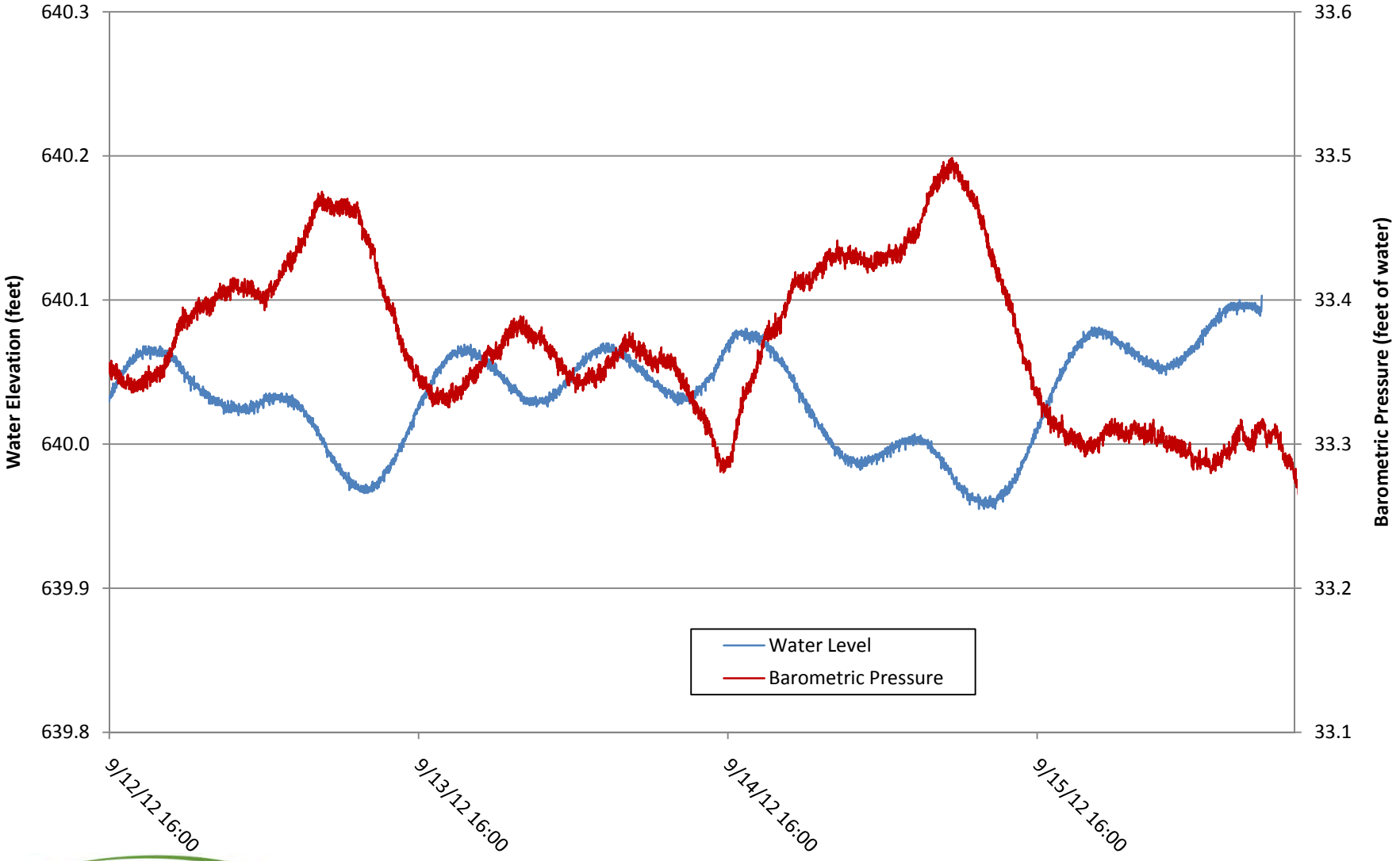


Figure 2-3 Hydraulic Communication Testing
WD-MW03B (pumped)
WD-PZ12C (monitored)

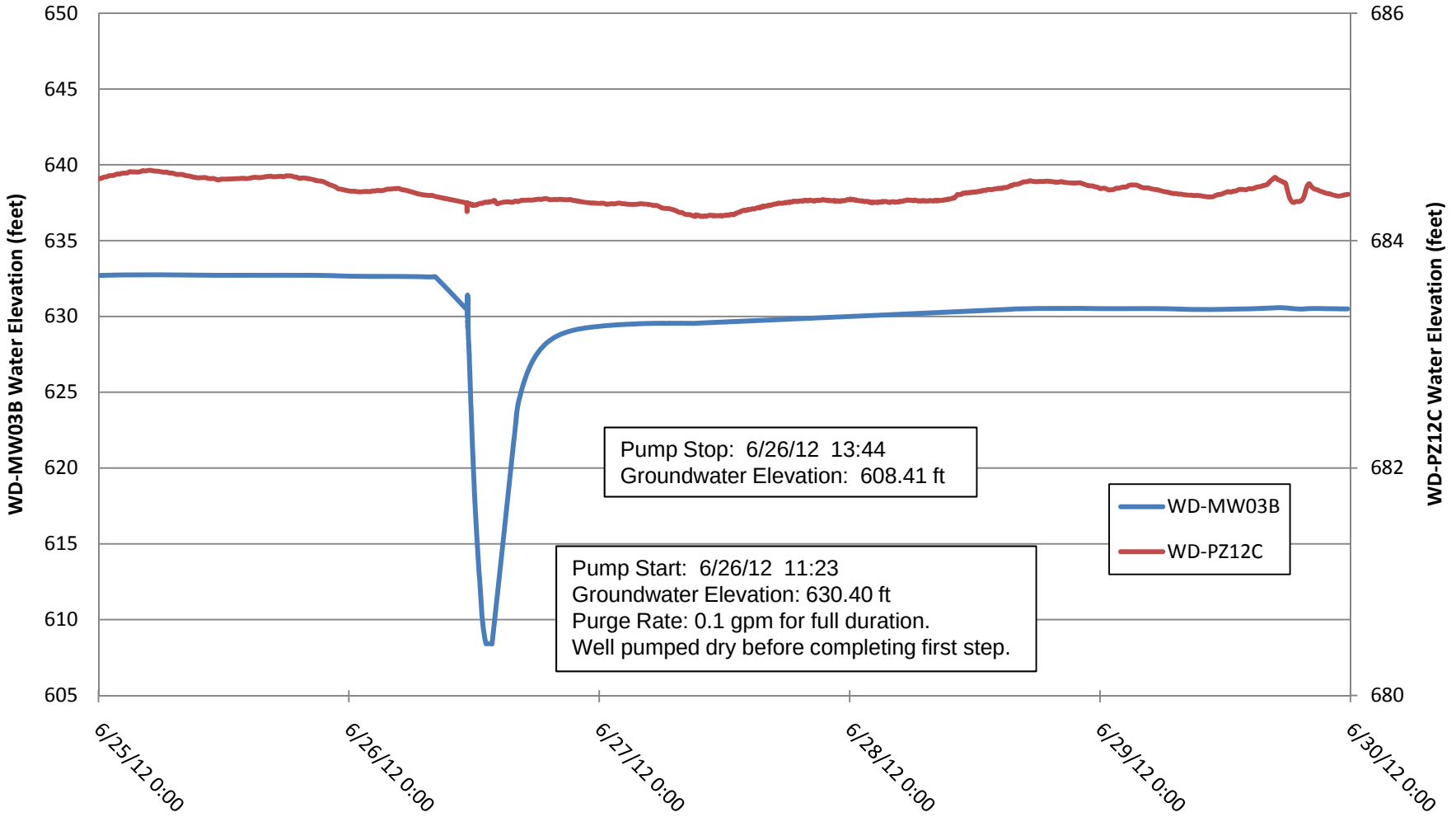


Figure 2-4 Hydraulic Communication Testing
WD-MW04B (pumped)
WD-PZ13C (monitored)

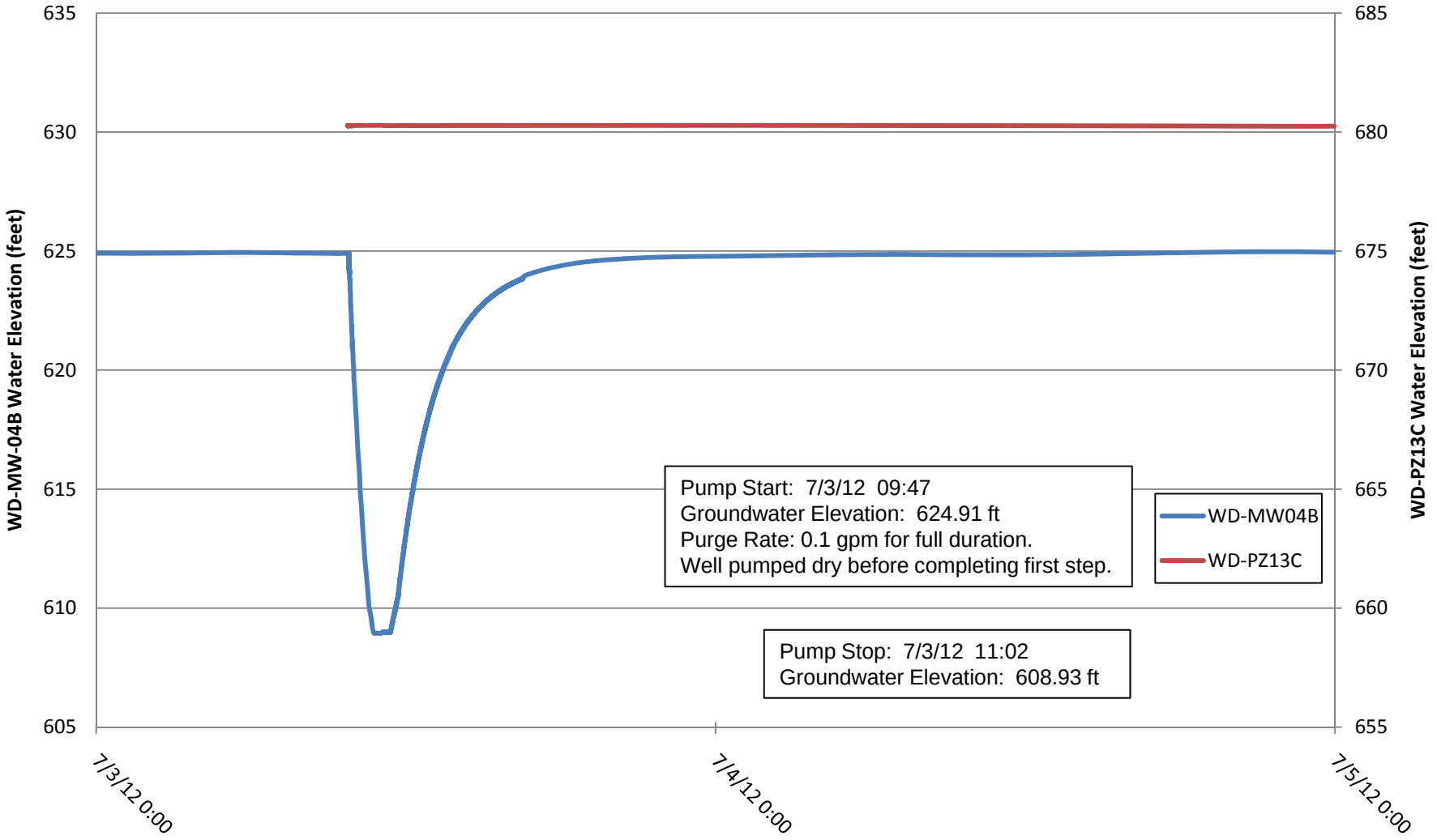


Figure 2-5 Hydraulic Communication Testing
WD-MW05B (pumped)
WD-PZ14C (monitored)

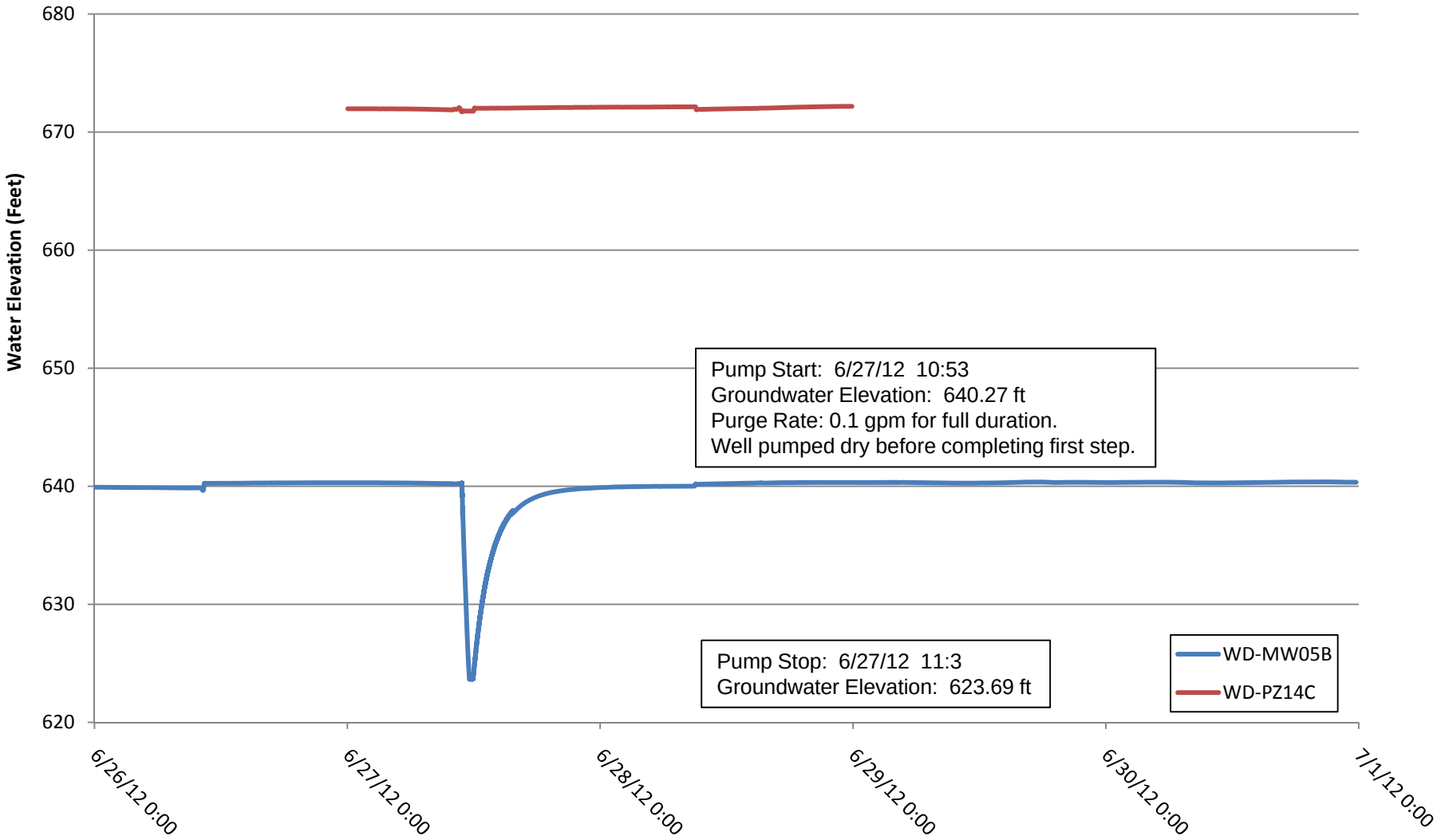


Figure 2-6 Hydraulic Communication Testing
WD-MW06B (pumped)
WD-PZ11C (monitored)

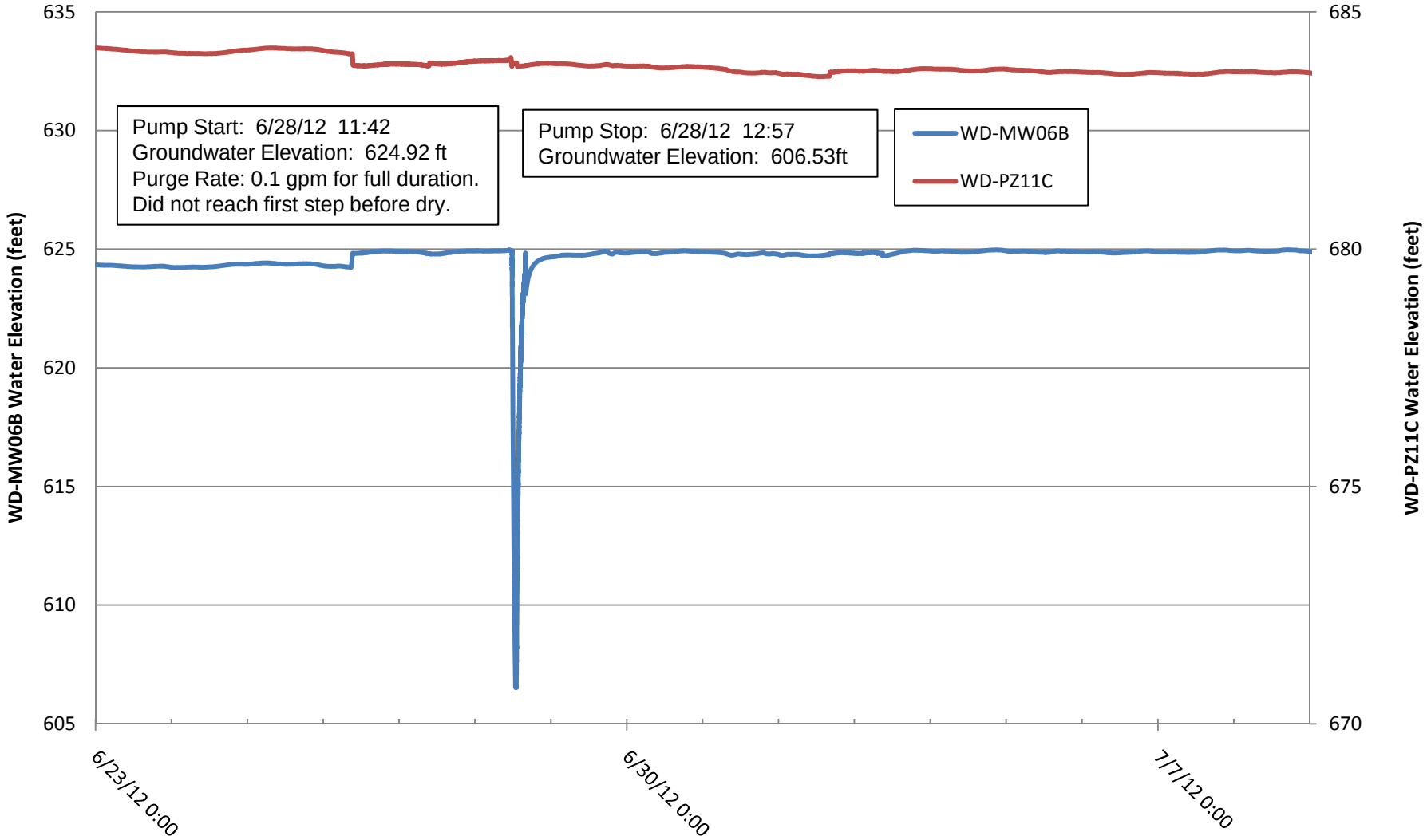


Figure 2-7 Yield Testing of Open Borehole WD-PZ11C (pumped) WD-MW06B (monitored)

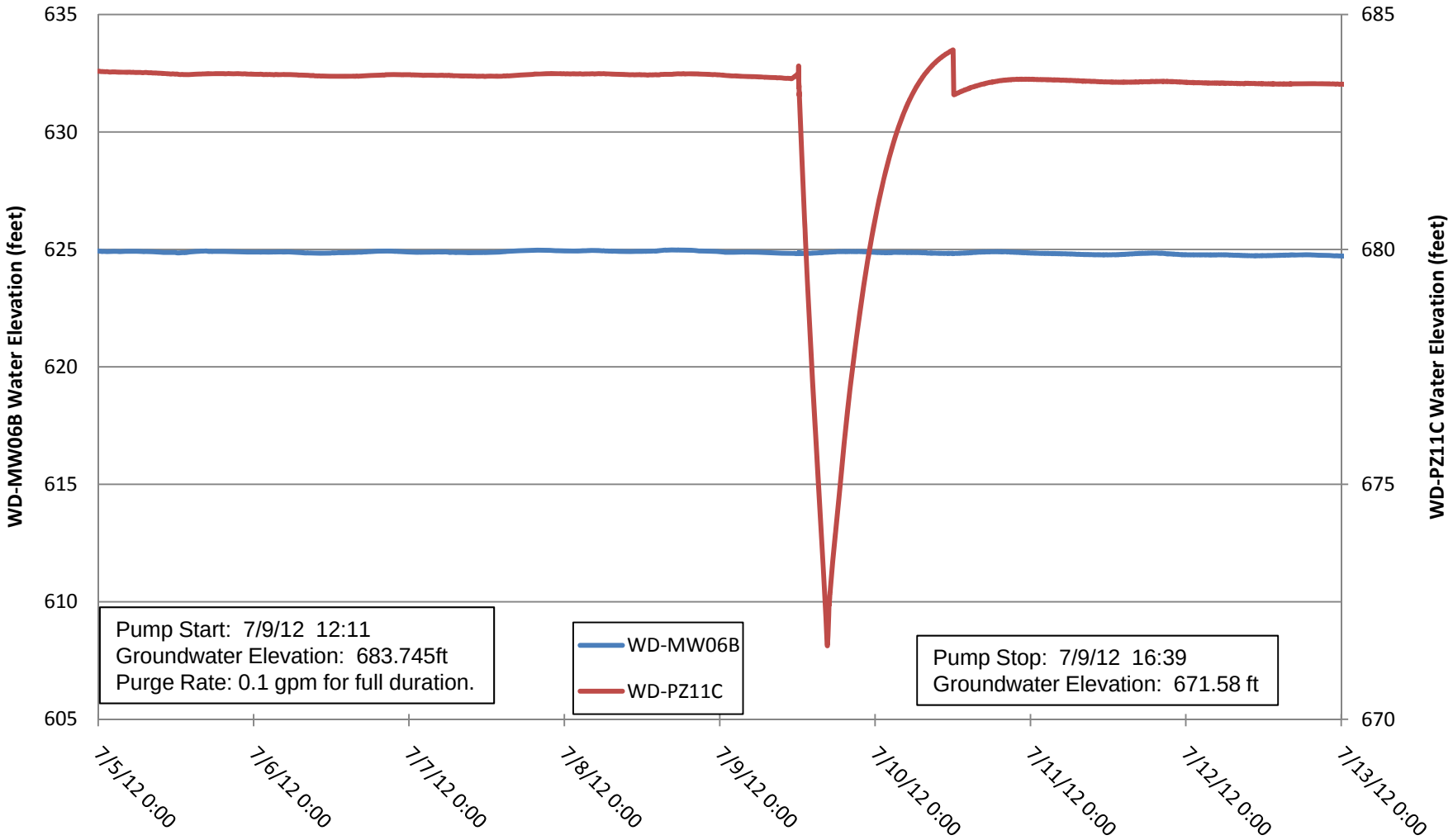


Figure 2-8 Yield Testing of Open Borehole WD-PZ13C (pumped) WD-MW04B (monitored)

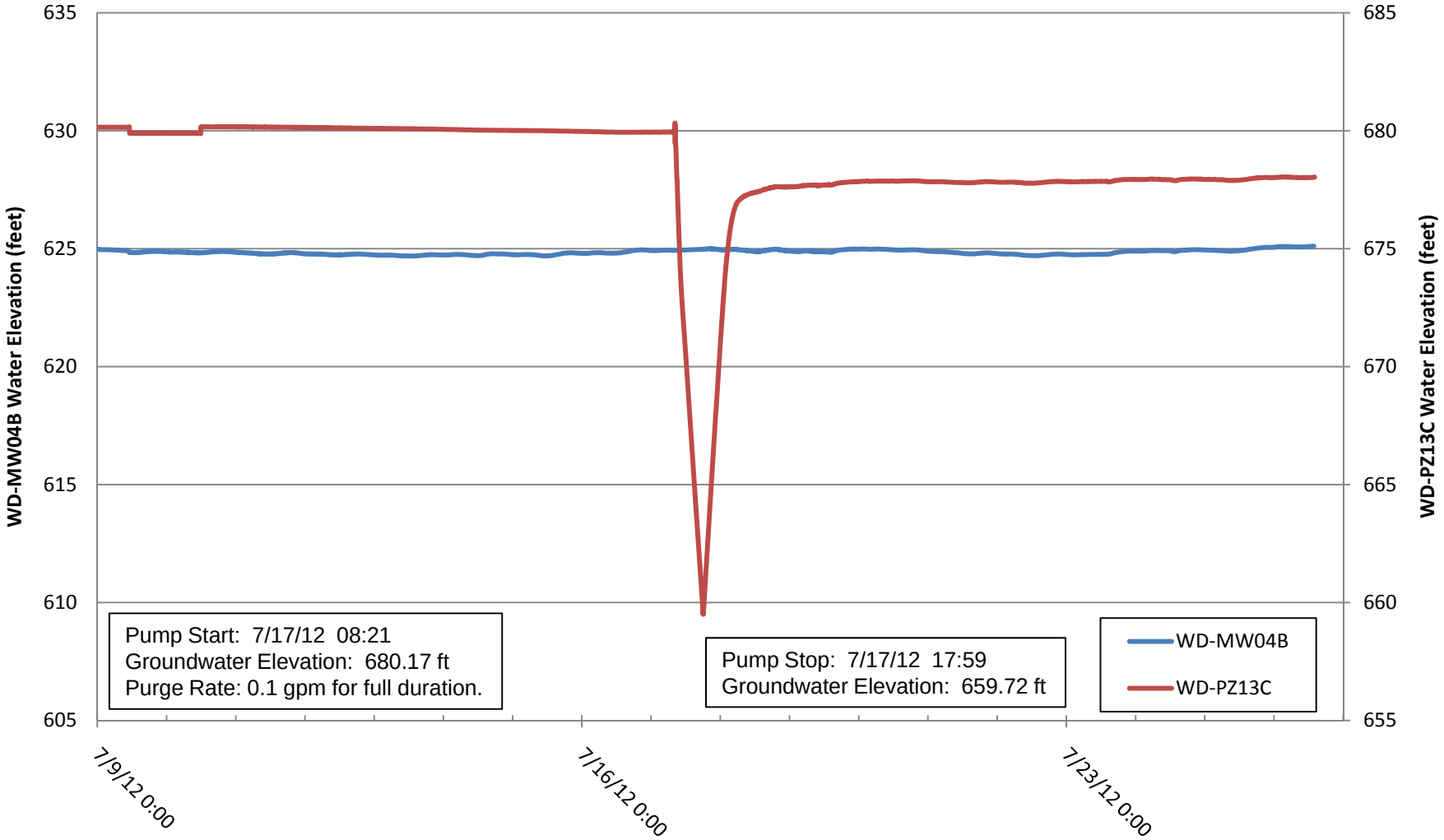


Figure 2-9 Yield Testing of Open Borehole WD-PZ14C (pumped) WD-MW05B (monitored)

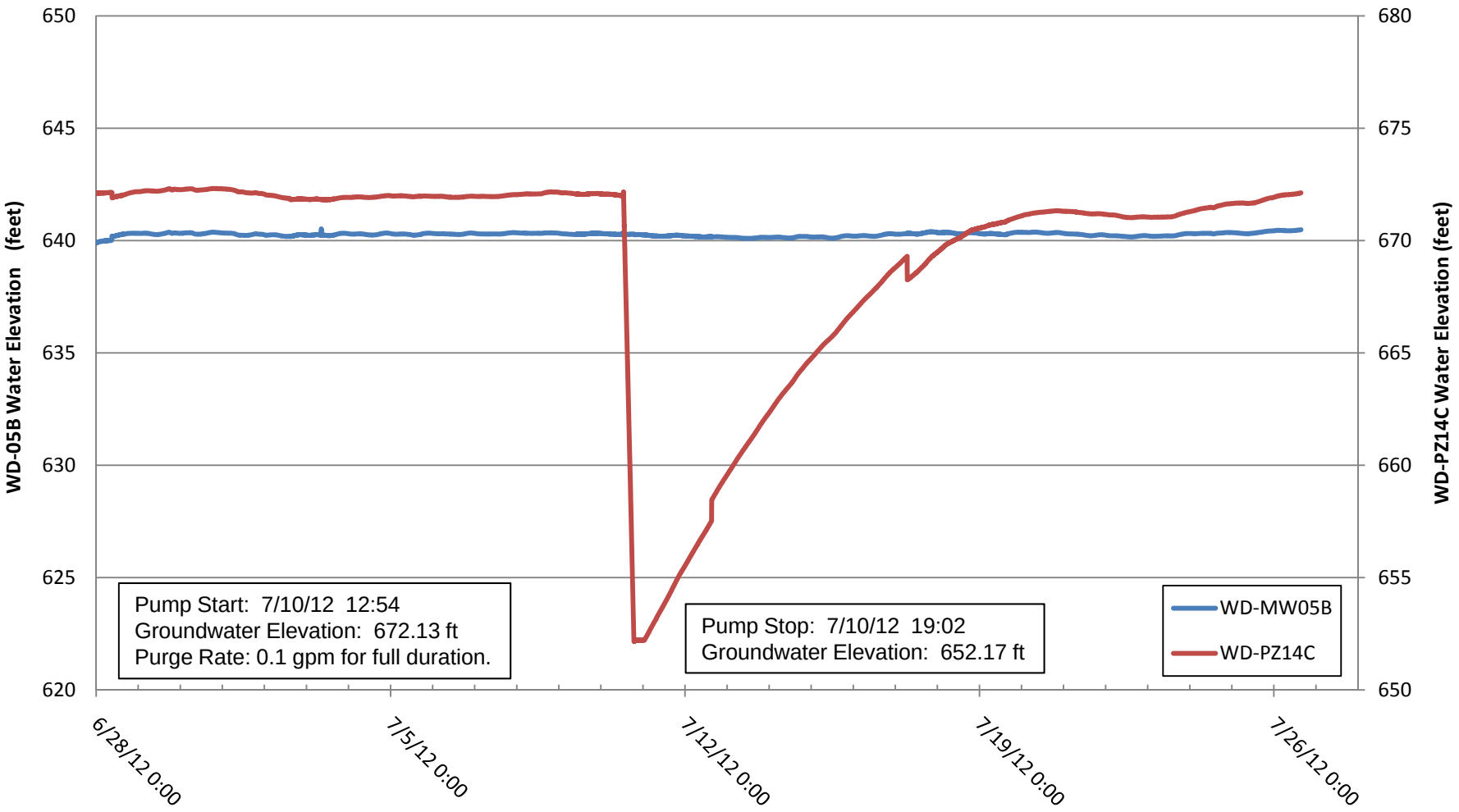


Figure 2-10 Yield Testing of Open Borehole WD-PZ15C (pumped) SB67 (monitored)

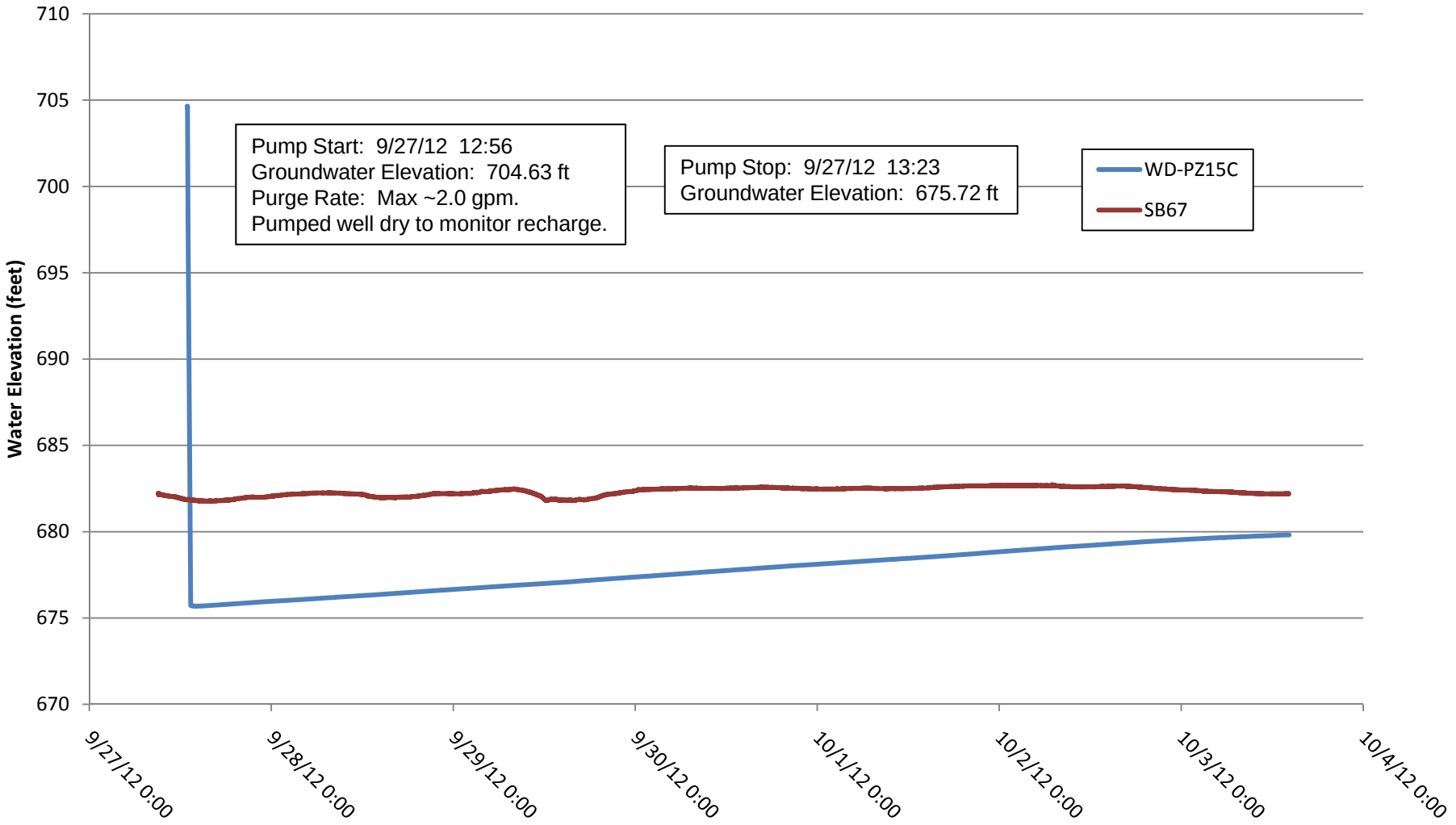


Figure 2-11 Yield Testing of Open Borehole WD-PZ16C (pumped) SB57 (monitored)

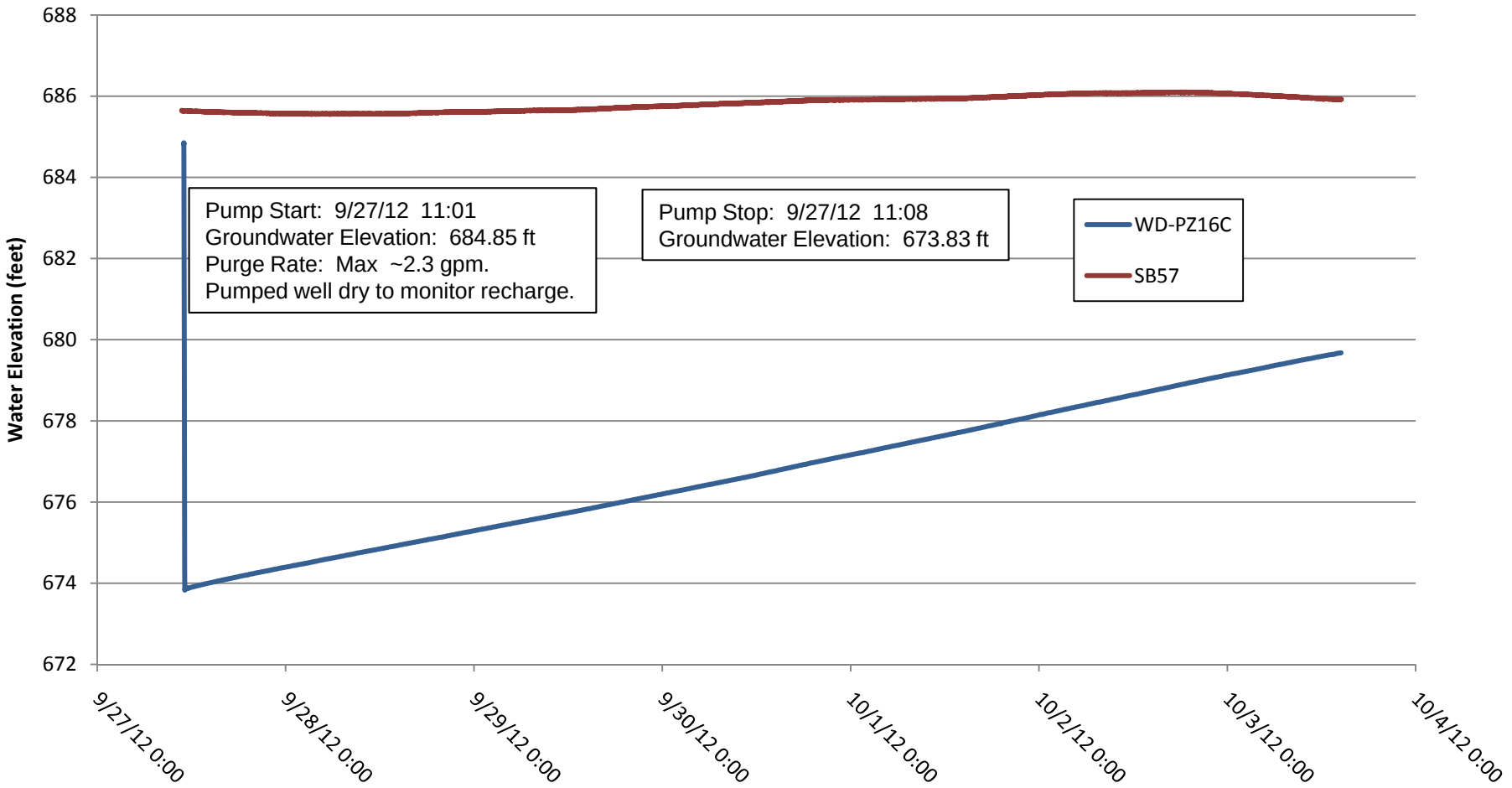


Figure 2-12 Yield Testing of Open Borehole WD-PZ17C (pumped) SB53, SB54 (monitored)

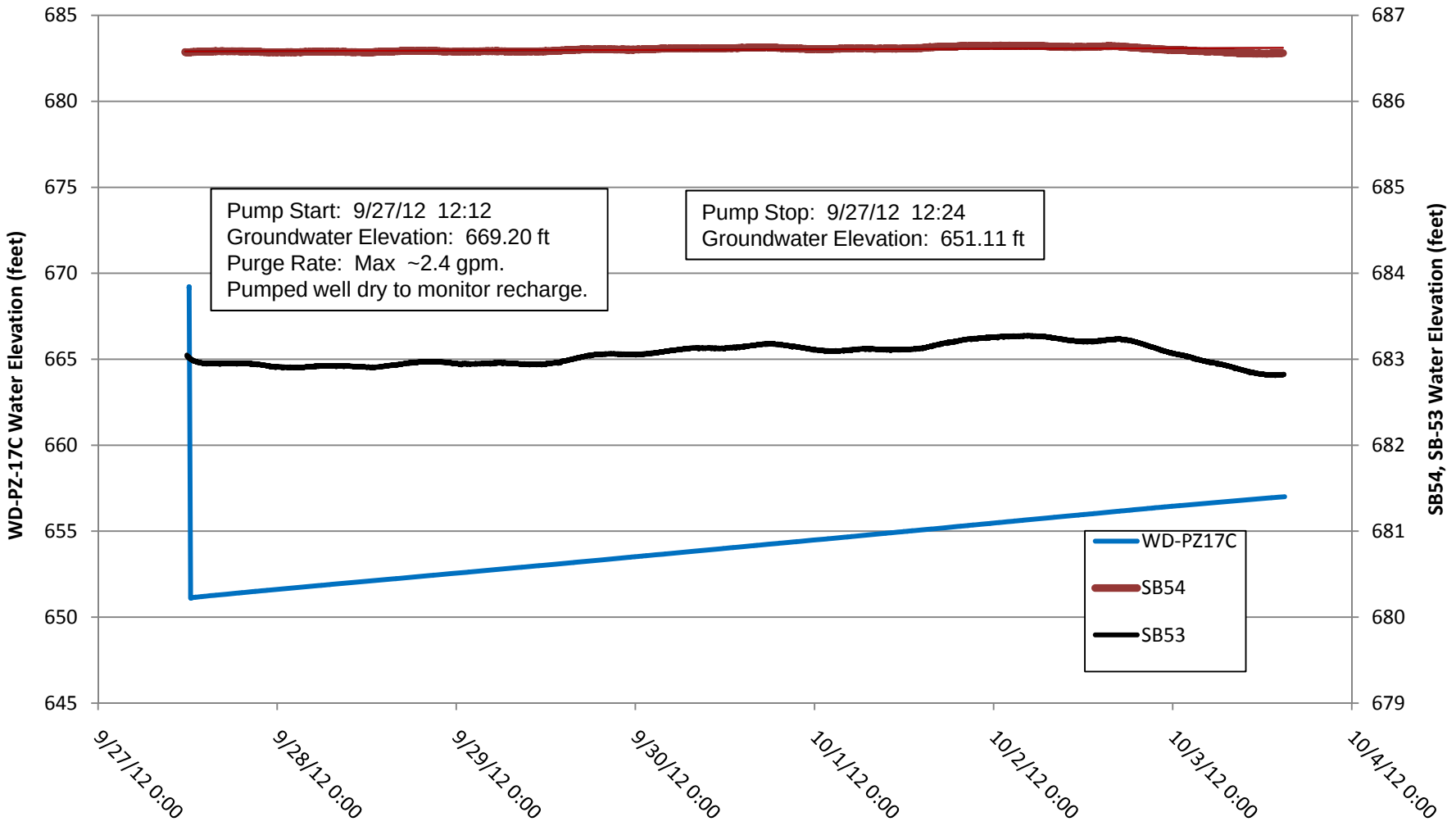


Figure 2-13 Yield Testing Isolated Zone WD-PZ09C (679-671 feet)

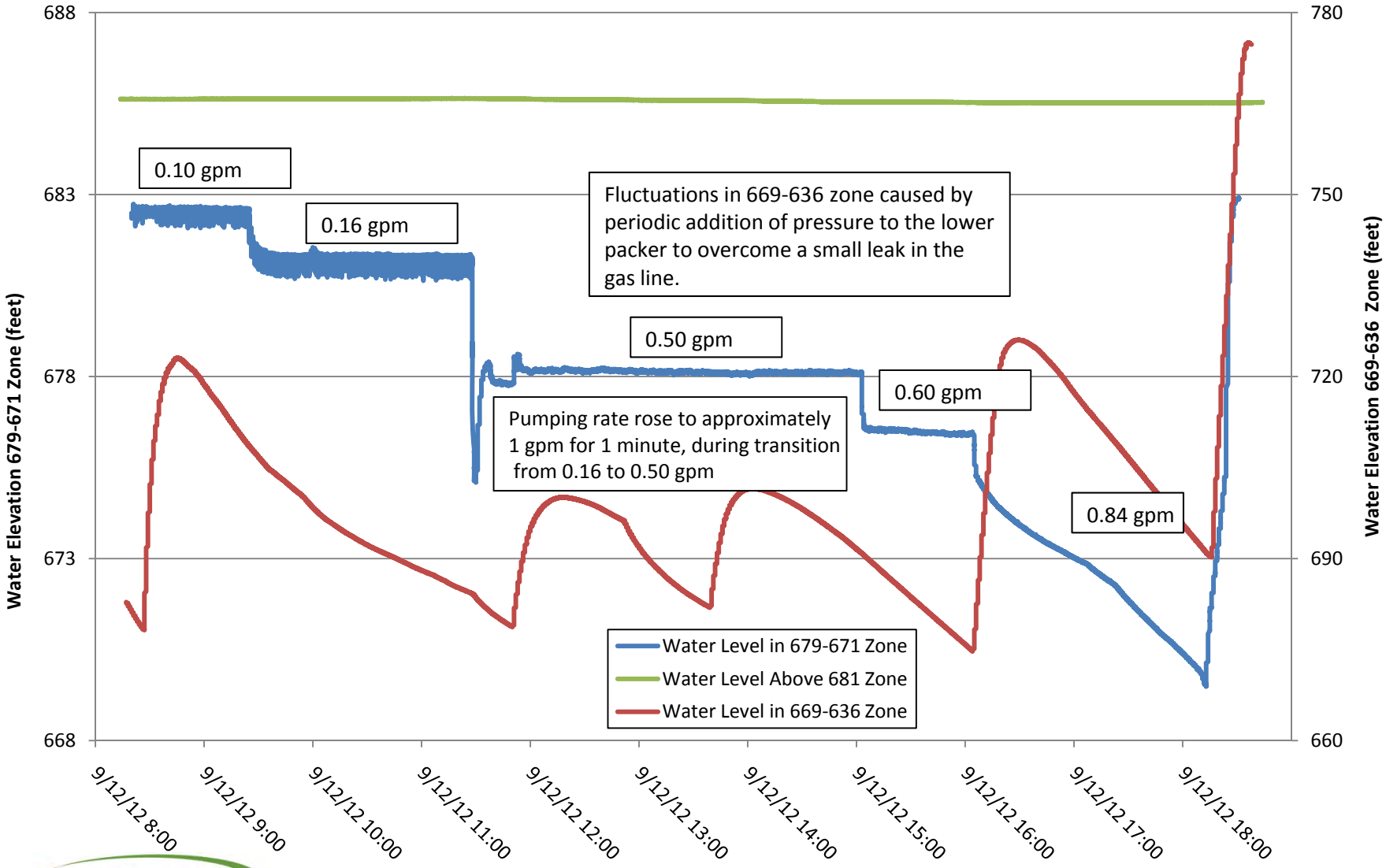


Figure 2-14 Yield Testing Isolated Zone WD-PZ09C (671-636 feet)

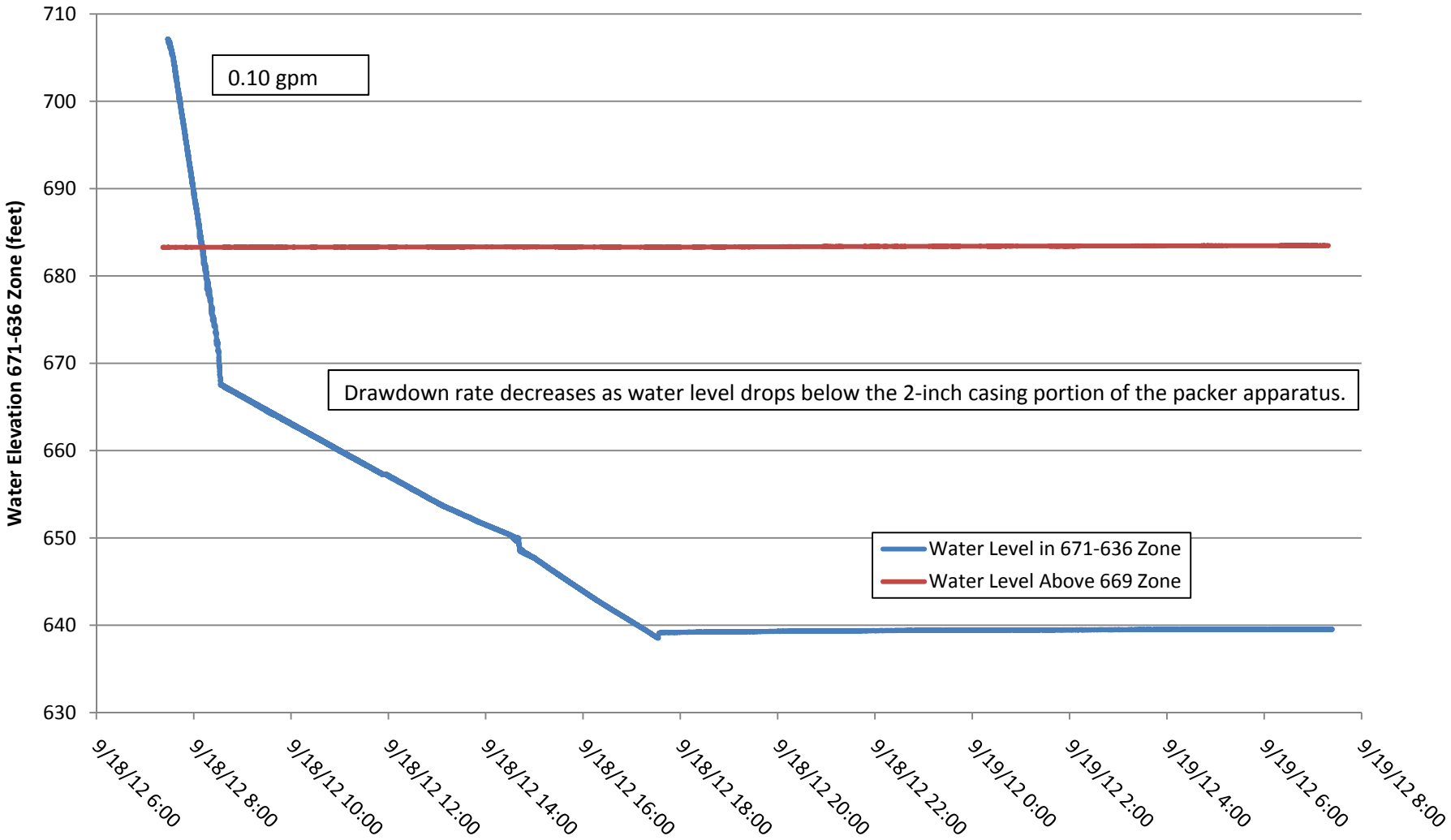


Figure 2-15 Yield Testing Isolated Zone WD-PZ12C (749-709 feet)

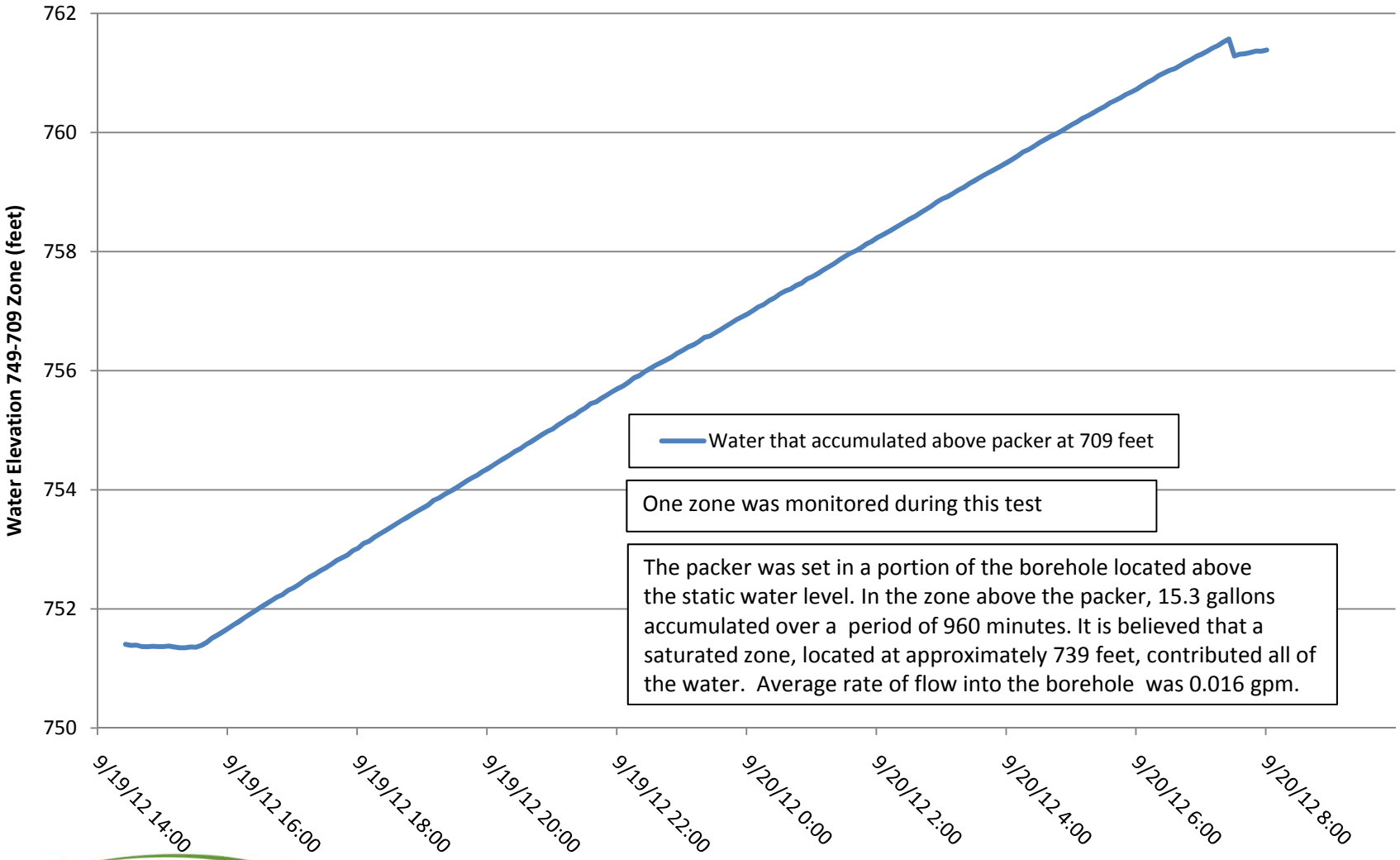


Figure 2-16 Yield Testing Isolated Zone WD-PZ12C (710-679 feet) Sandstone (675-673 feet)

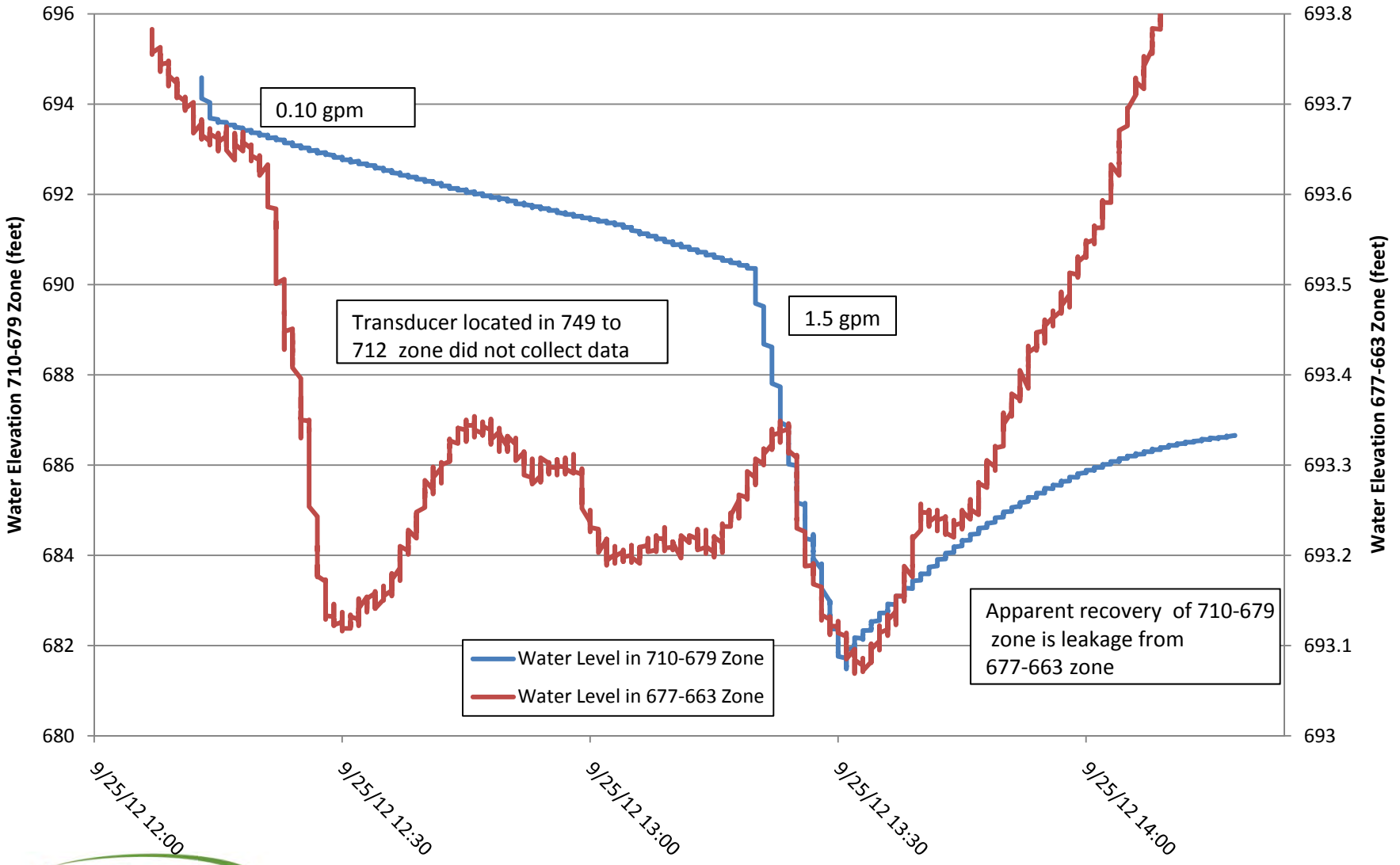


Figure 2-17 Yield Testing Isolated Zone WD-PZ12C (712-681 feet) Sandstone (675-673 feet)

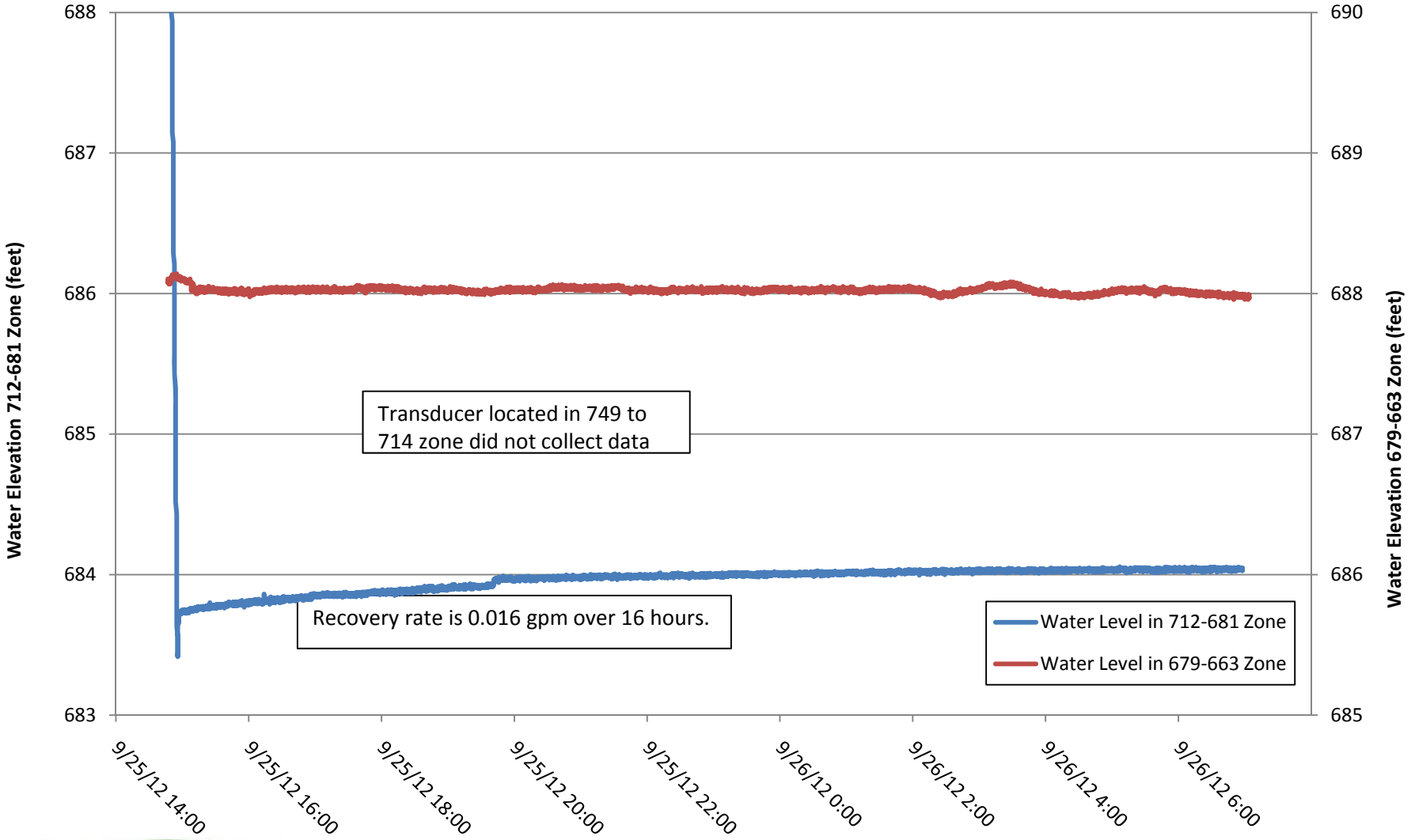


Figure 2-18 Yield Testing Isolated Zone WD-PZ12C (678-663 feet)

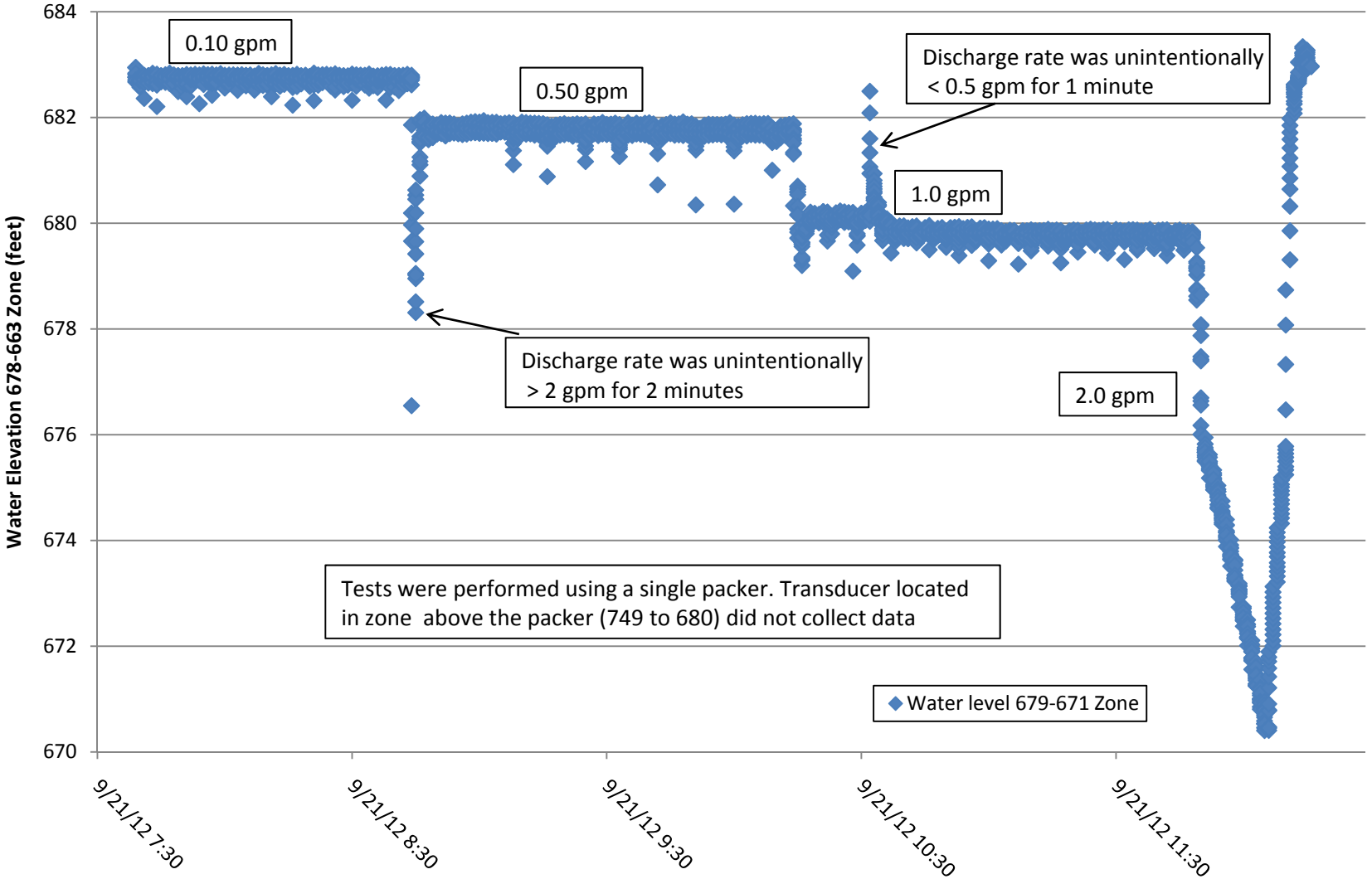


Figure 3-1 WD-PZ09C
Constant Rate Test (679-671 feet)

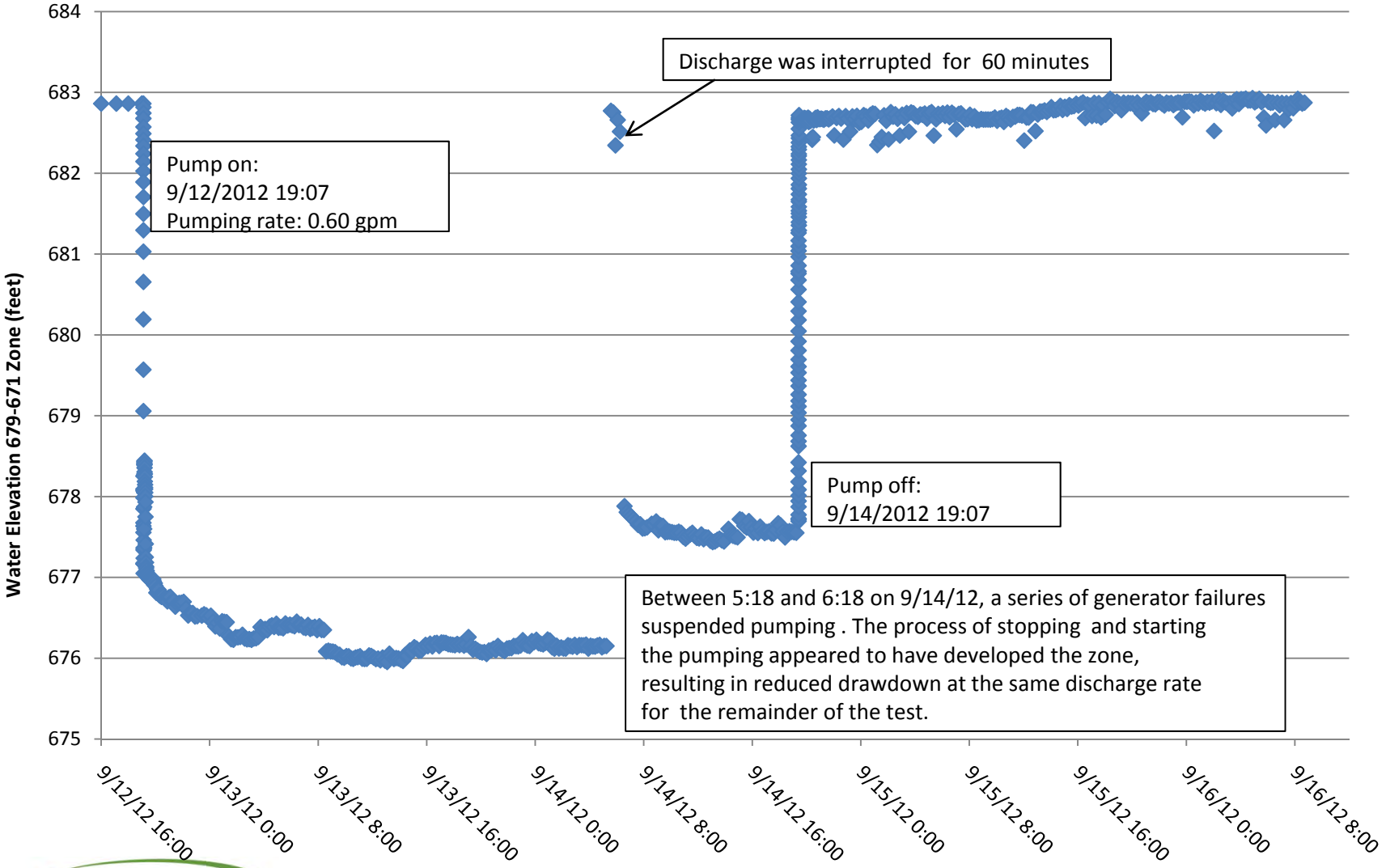


Figure 3-2 WD-PZ11C Response to WD-PZ09C (CRT 679-671 feet)

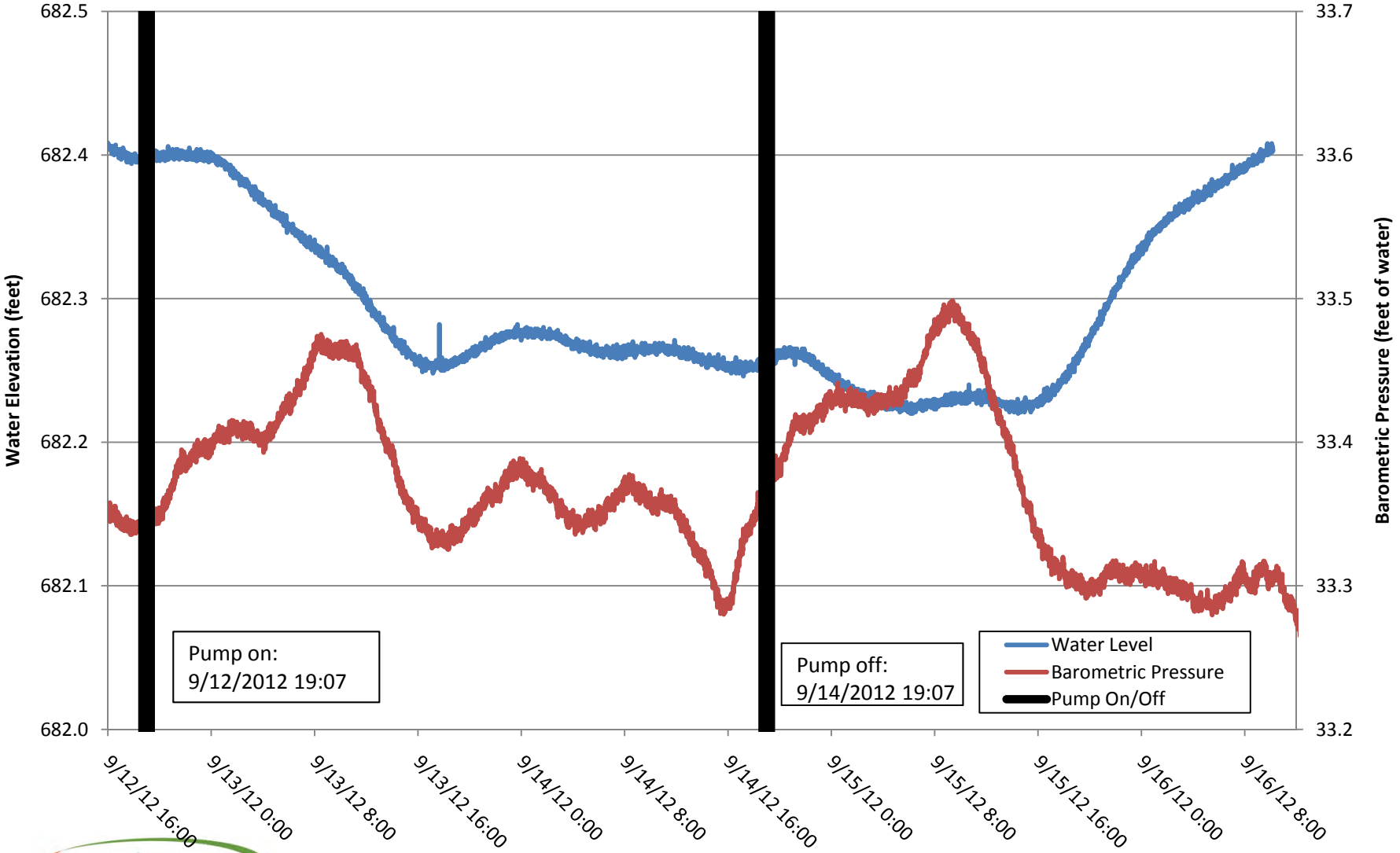


Figure 3-3 WD-PZ12C Response to WD-PZ09C (CRT 679-671 feet)

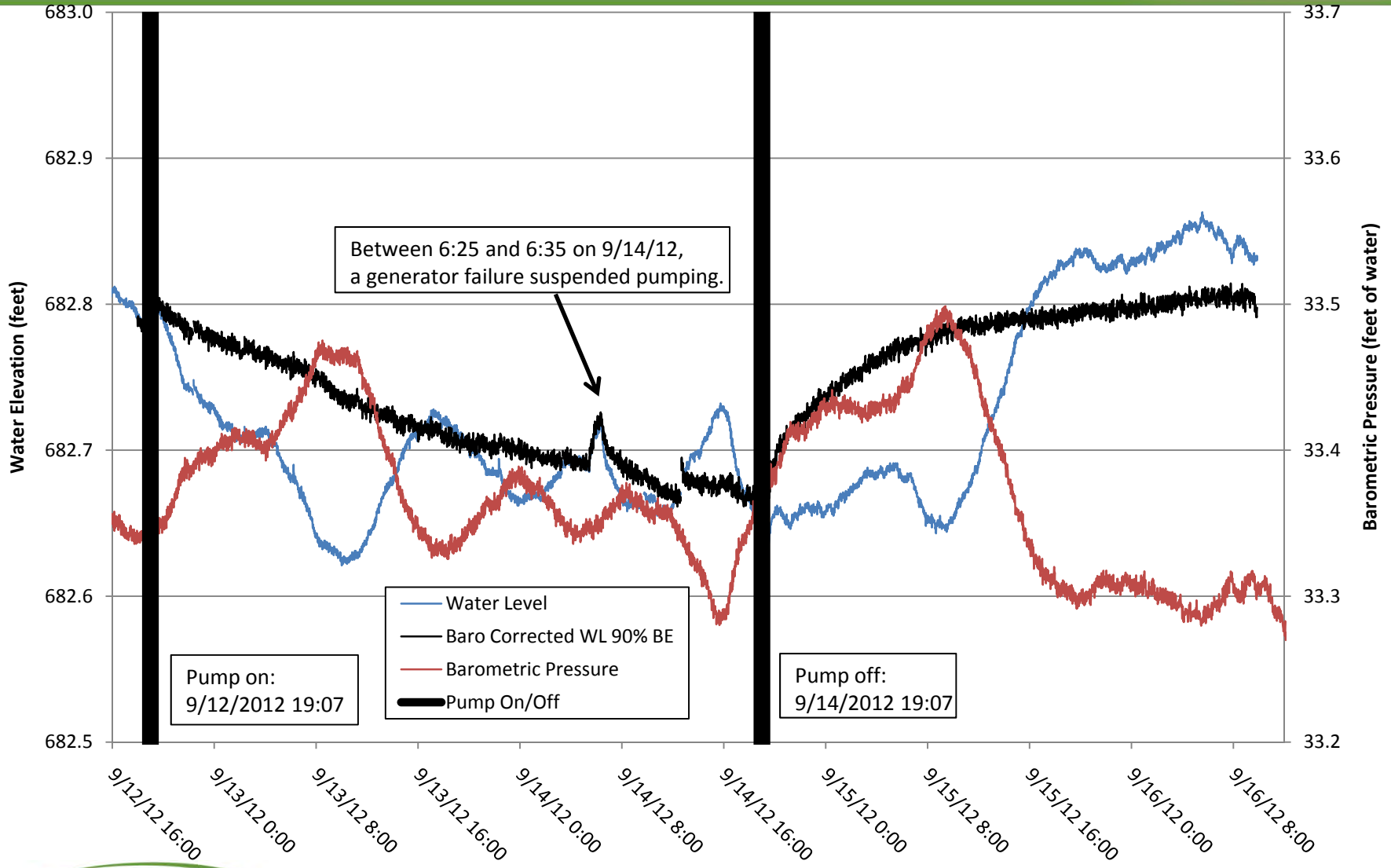


Figure 3-4 WD-PZ13C Response to WD-PZ09C (CRT 679-671 feet)

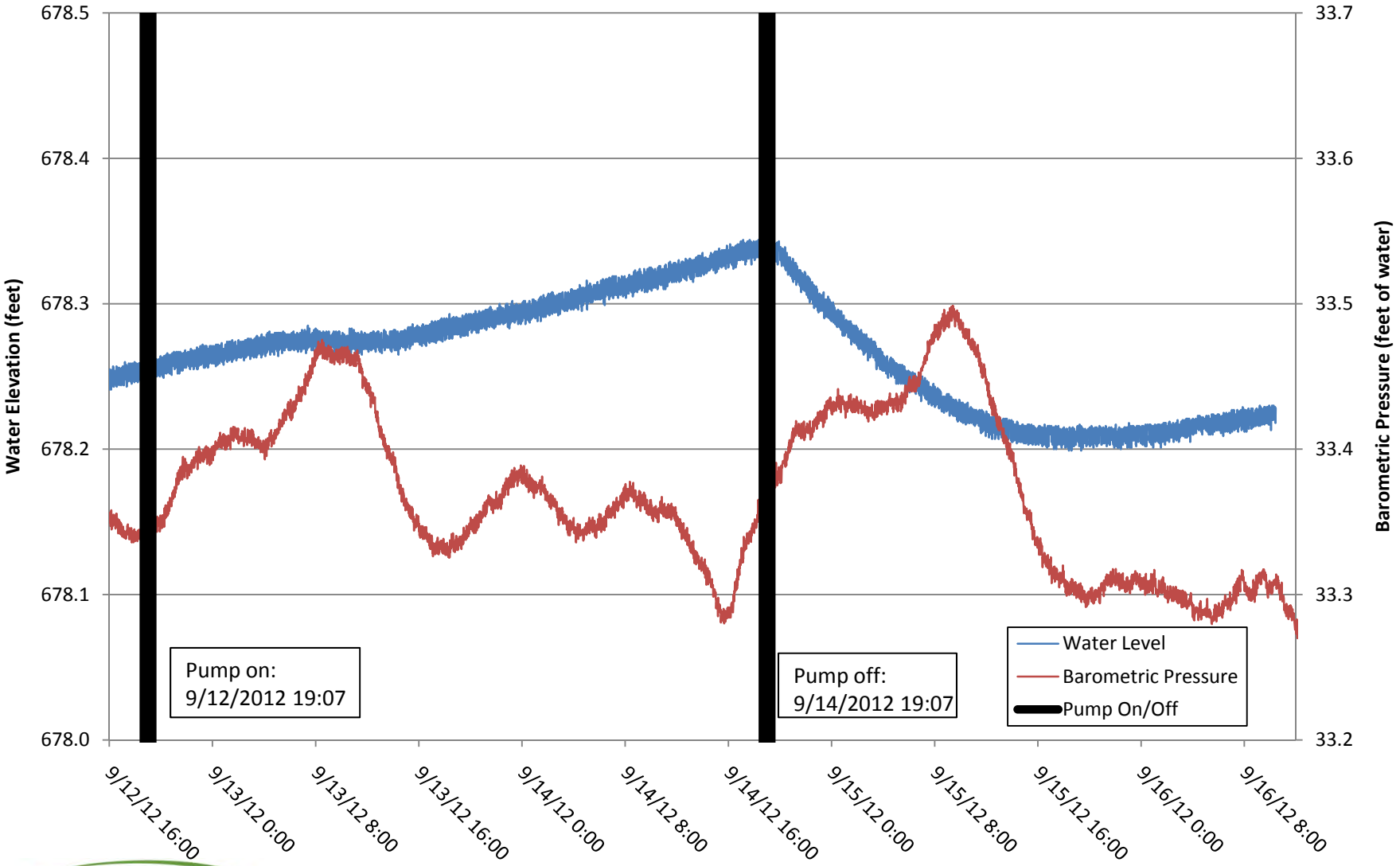


Figure 3-5 WD-PZ14C Response to WD-PZ09C (CRT 679-671 feet)

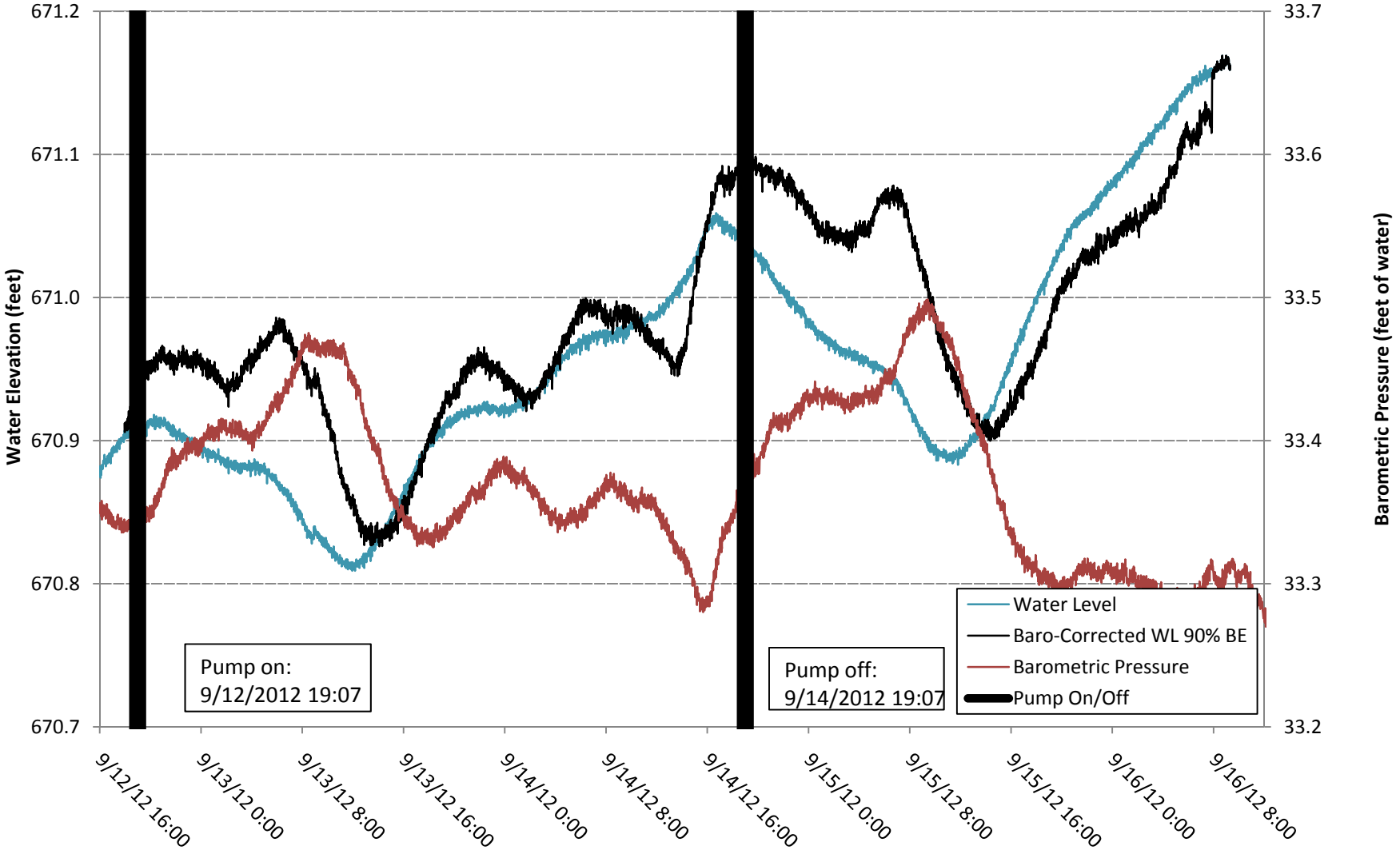


Figure 3-6 WD-MW03B Response to WD-PZ09C (CRT 679-671 feet)

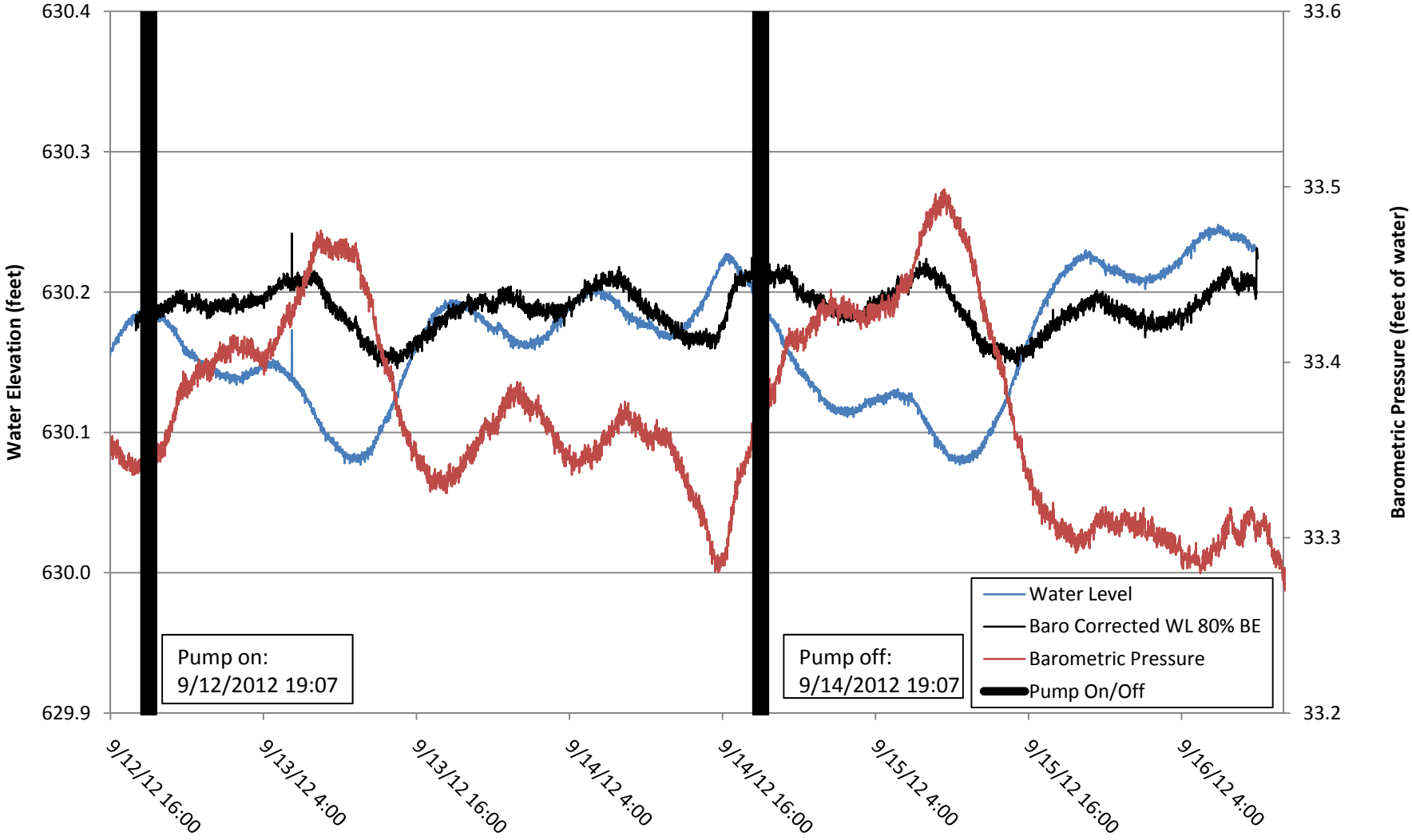


Figure 3-7 WD-MW04B Response to WD-PZ09C (CRT 679-671 feet)

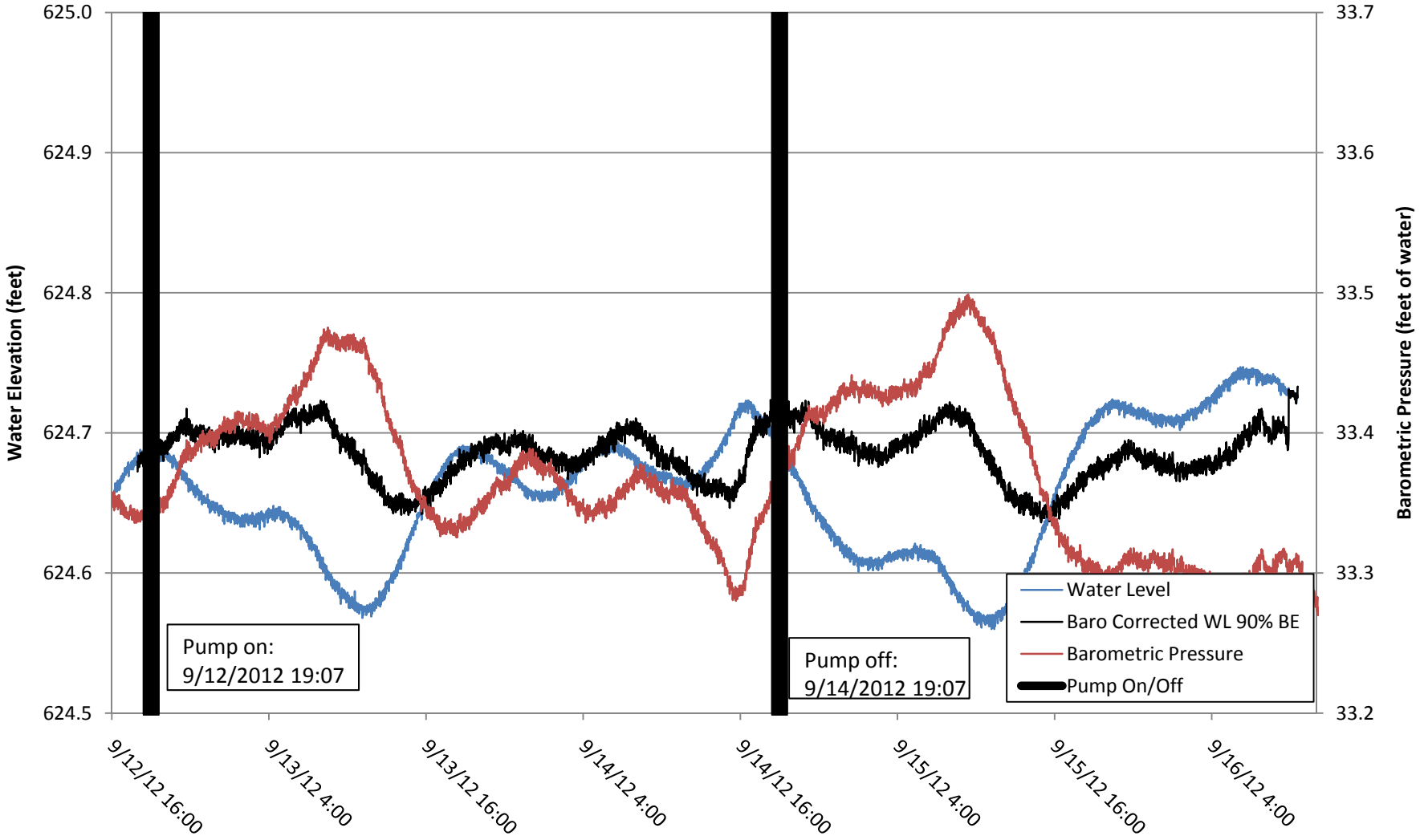


Figure 3-8 WD-MW05B Response to WD-PZ09C (CRT 679-671 feet)

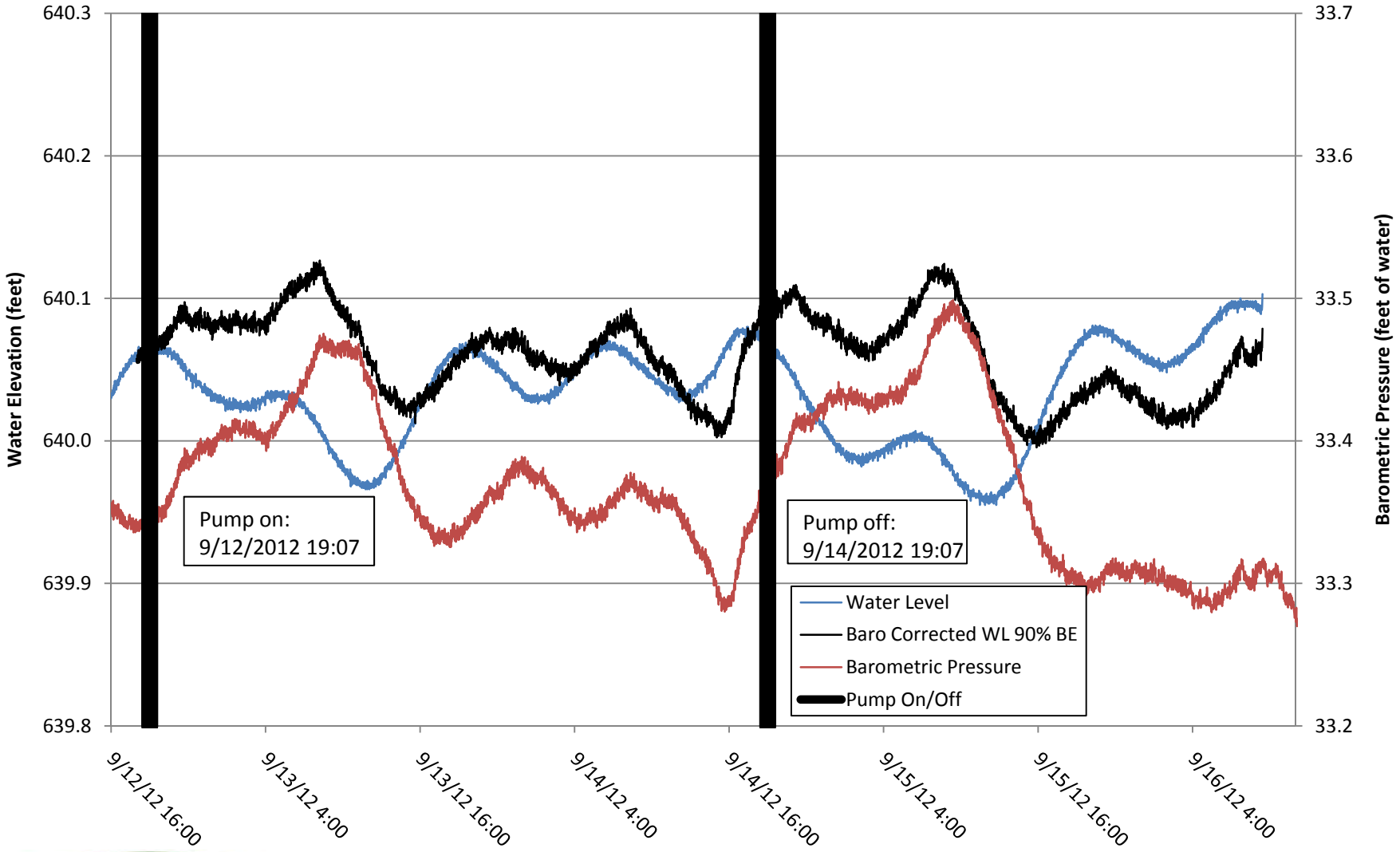


Figure 3-9 WD-MW06B Response to WD-PZ09C (CRT 679-671 feet)

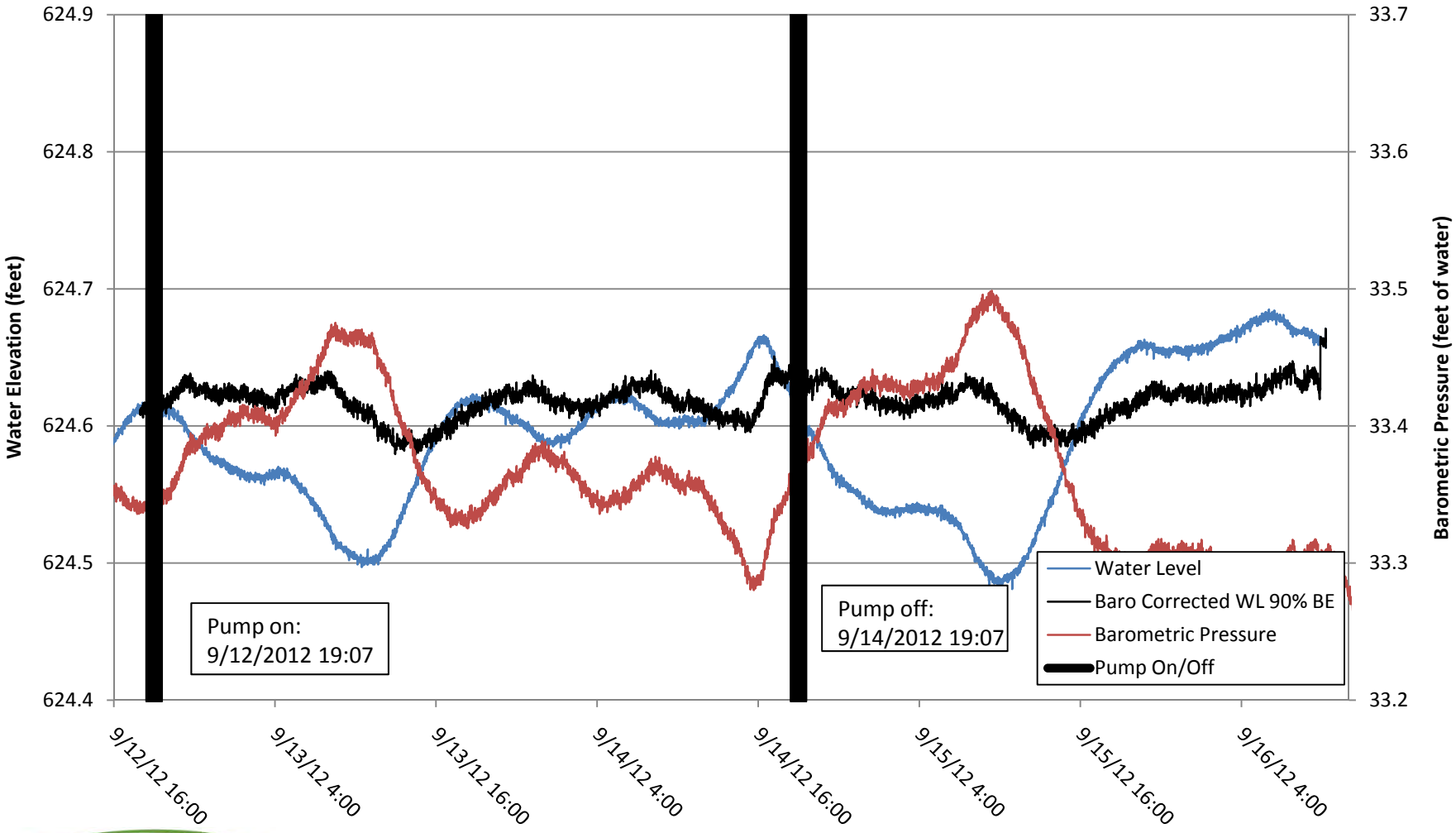


Figure 3-10
WD-PZ12C Constant Rate Test (678-663 feet)

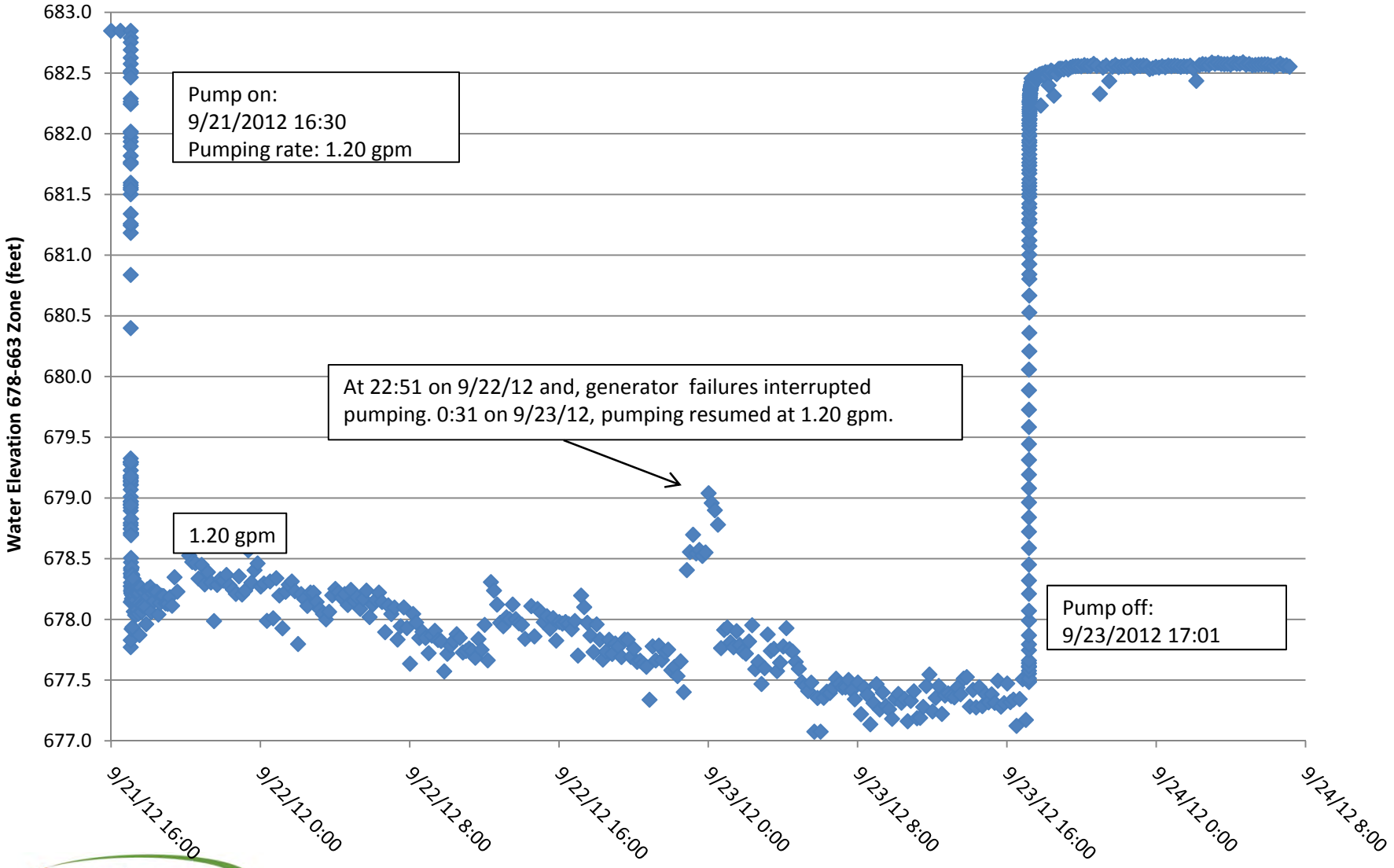


Figure 3-11
WD-PZ09C Response to WD-PZ12C (CRT 678-663 feet)

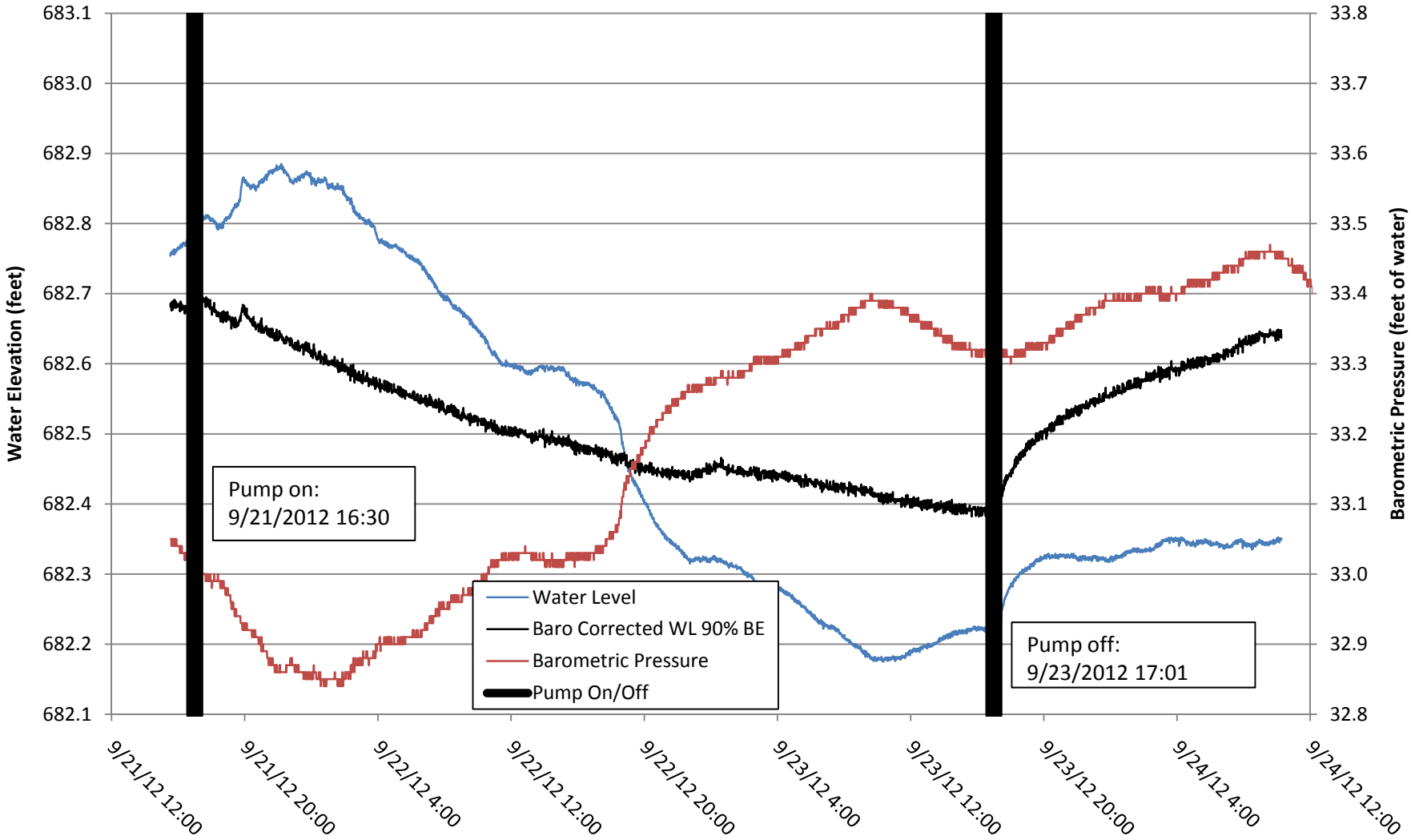


Figure 3-12
WD-PZ11C Response to WD-PZ12C (CRT 678-663 feet)

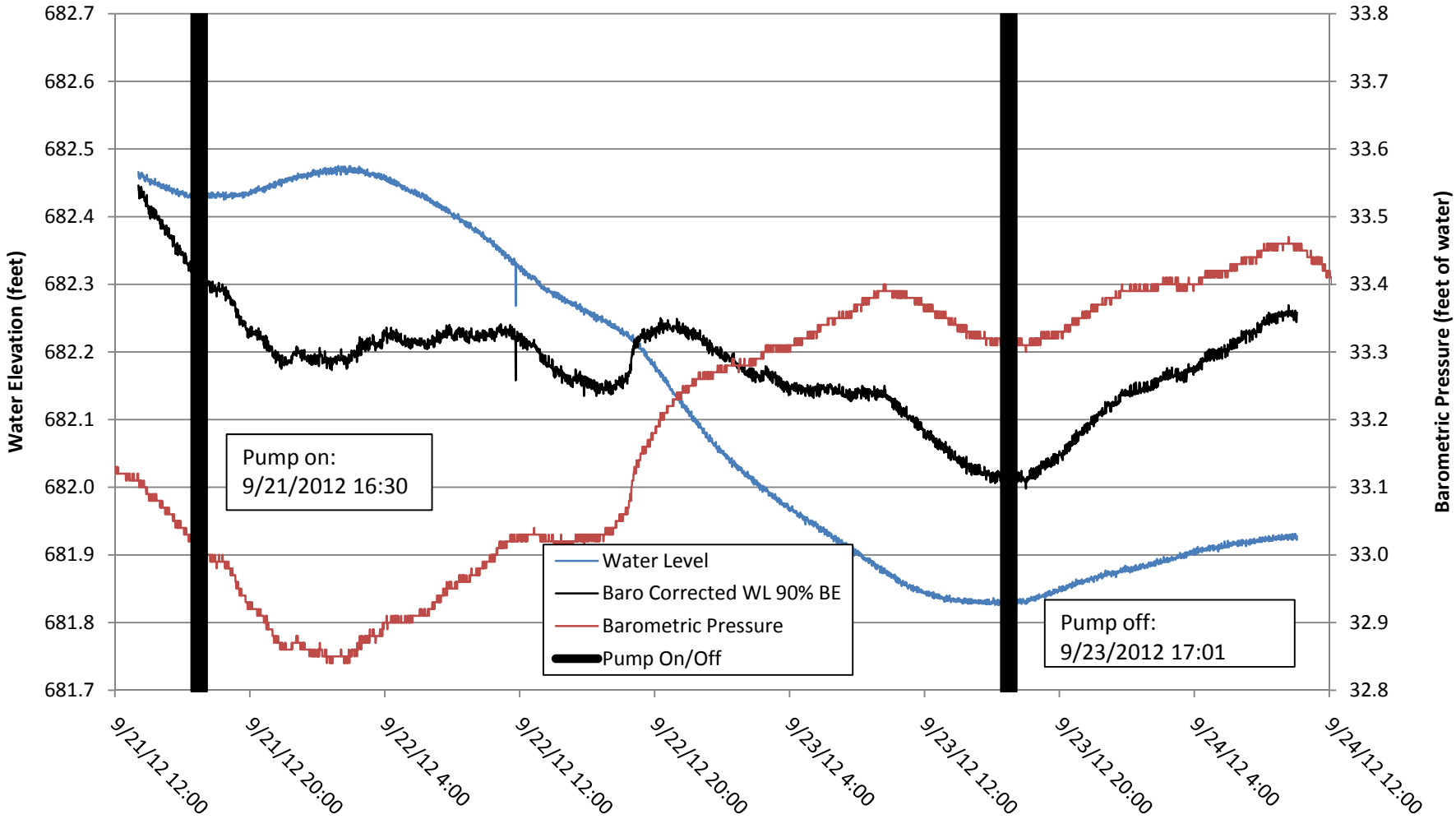


Figure 3-13
WD-PZ13C Response to WD-PZ12C (CRT 678-663 feet)

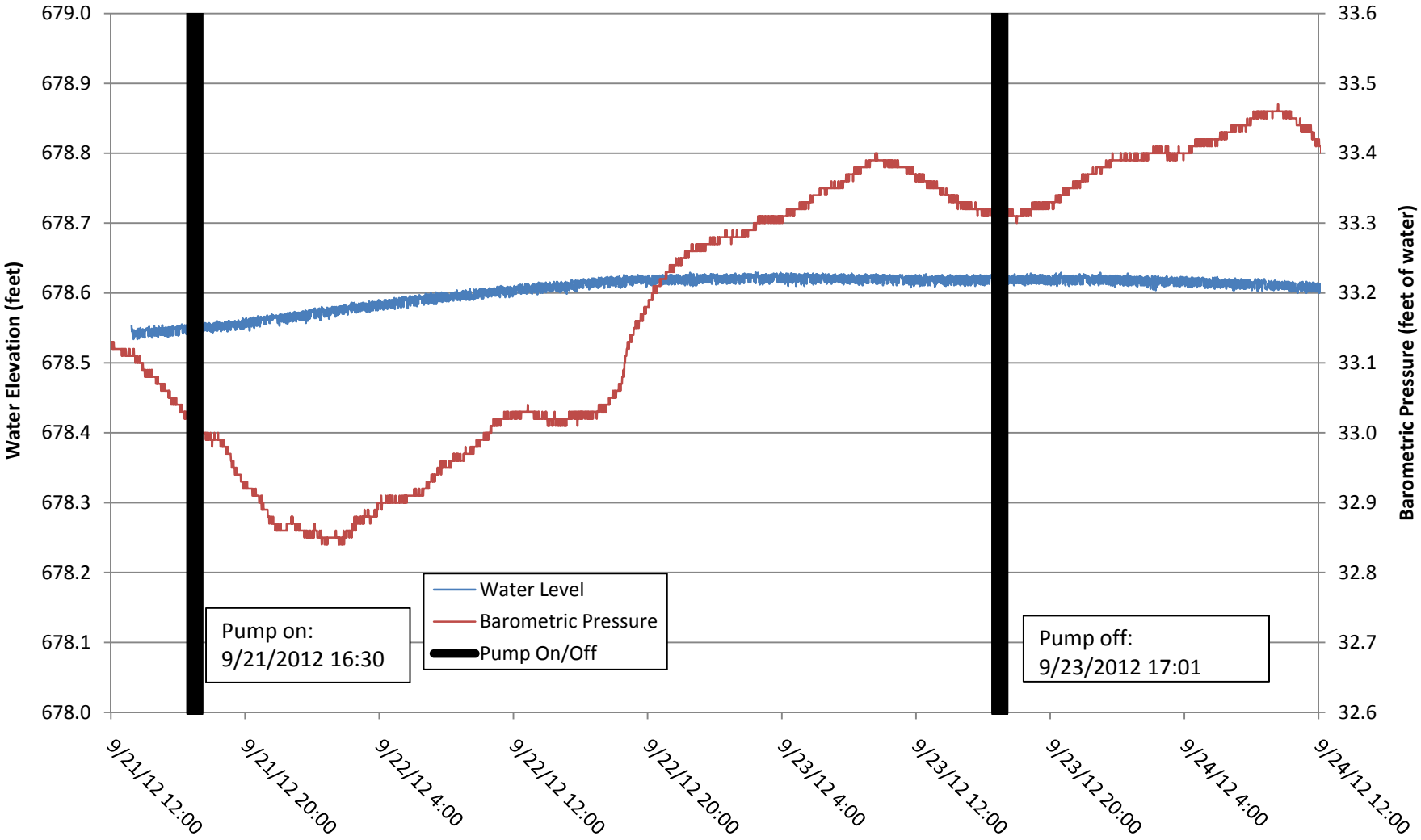


Figure 3-14
WD-PZ14C Response to WD-PZ12C (CRT 678-663 feet)

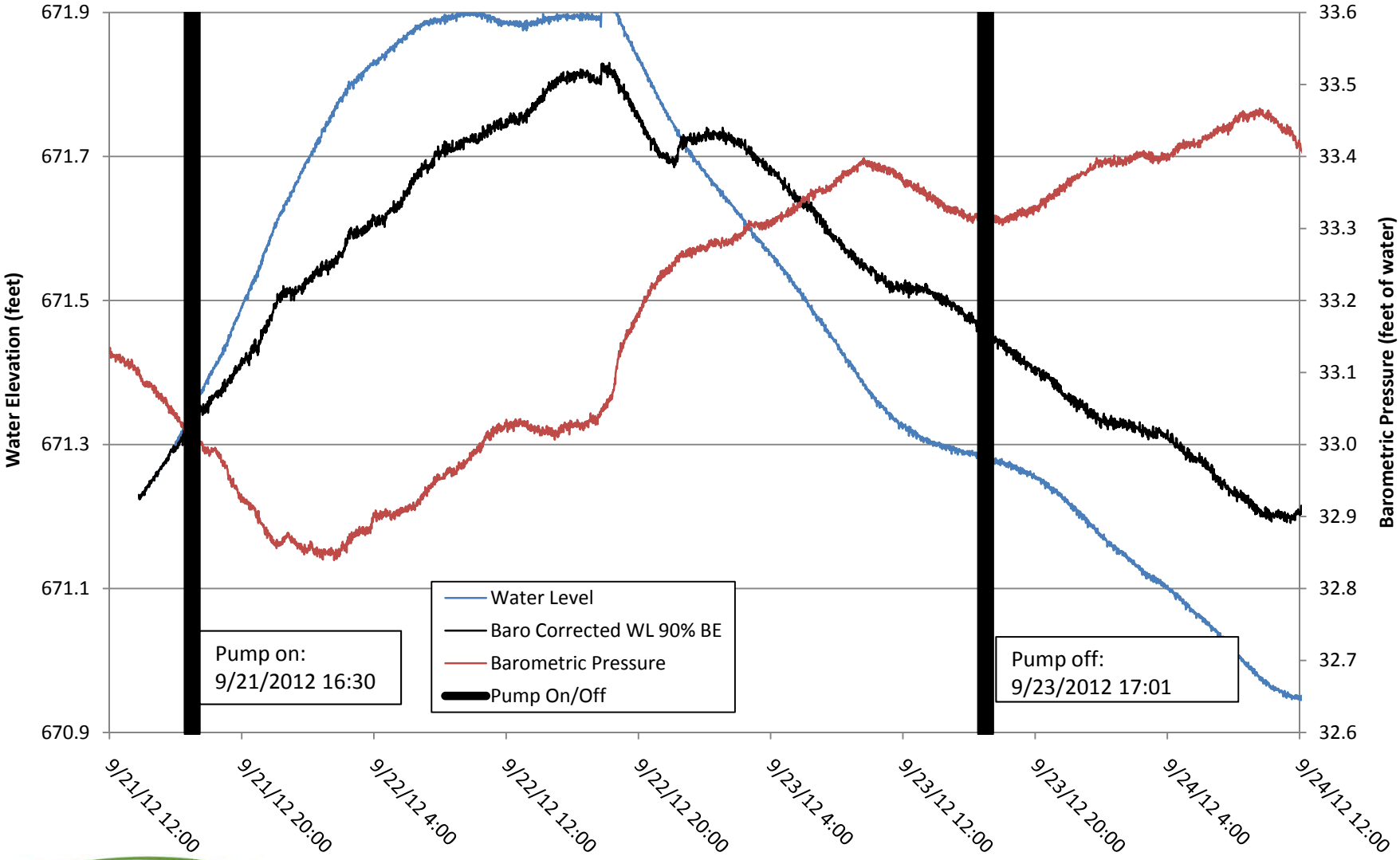


Figure 3-15 WD-MW03B Response to WD-PZ12C (CRT 20.00 feet)

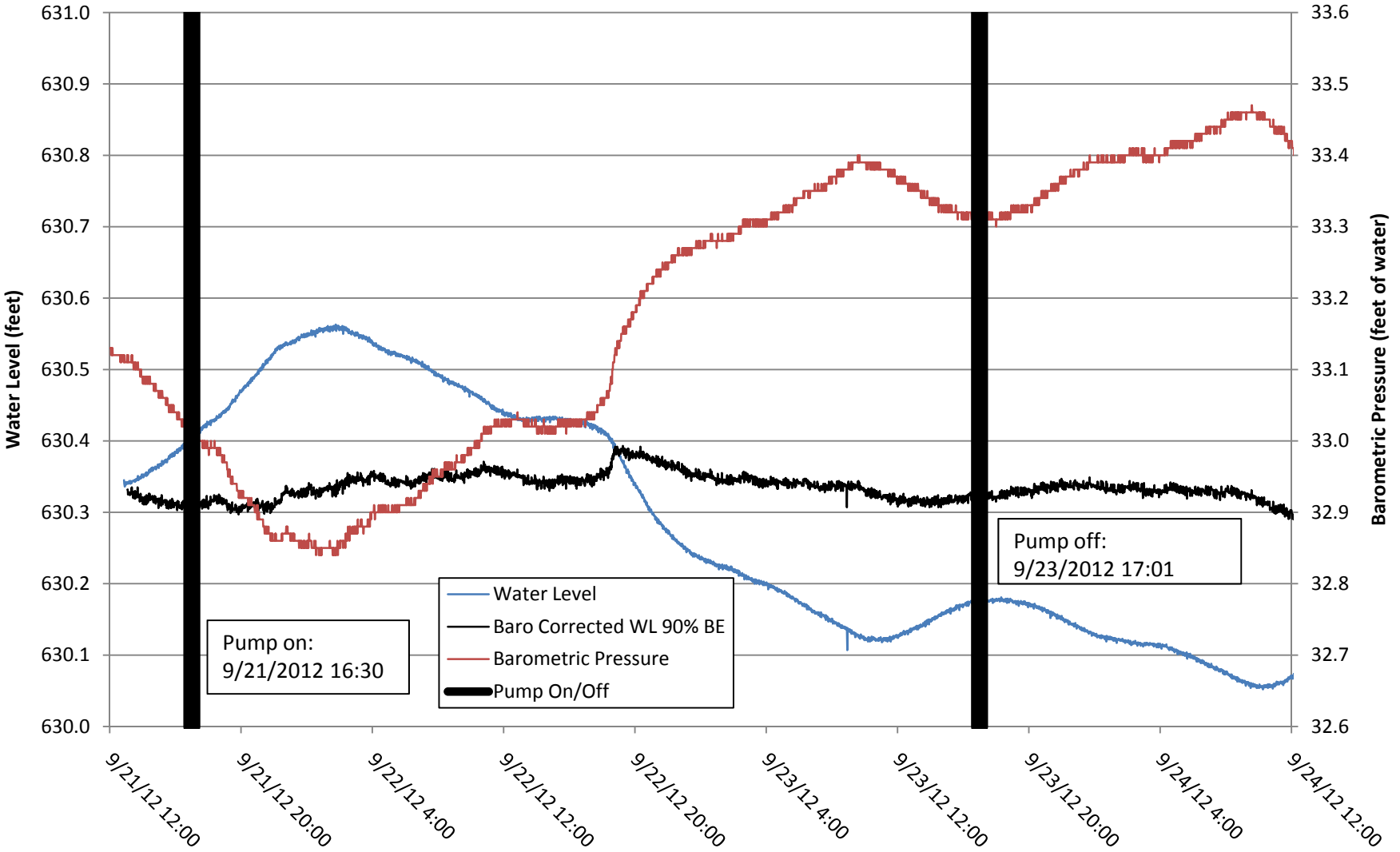


Figure 3-16 WD-MW04B Response to WD-PZ12C (CRT 678-663 feet)

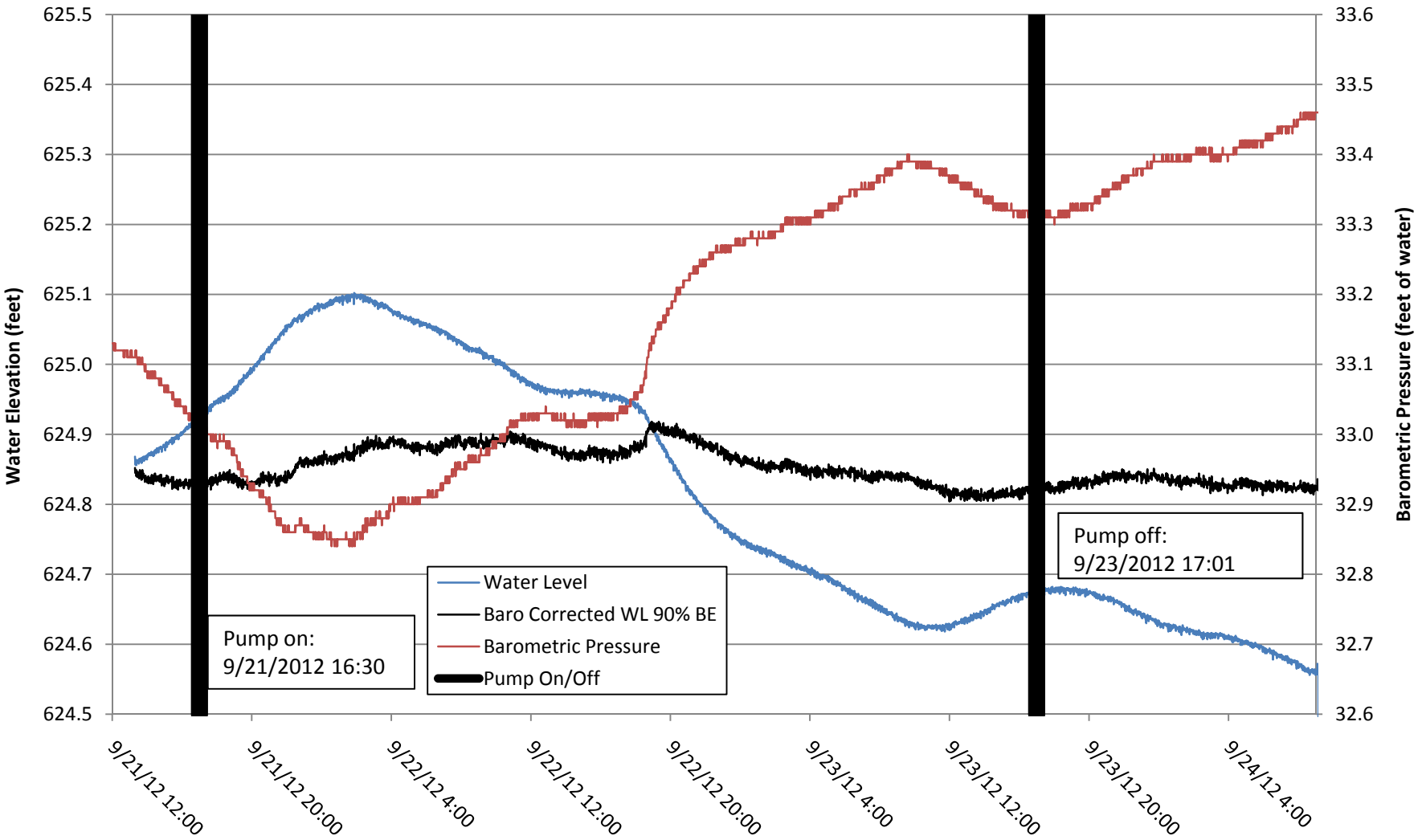


Figure 3-17 WD-MW05B Response to WD-PZ12C (CRT 678-663 feet)

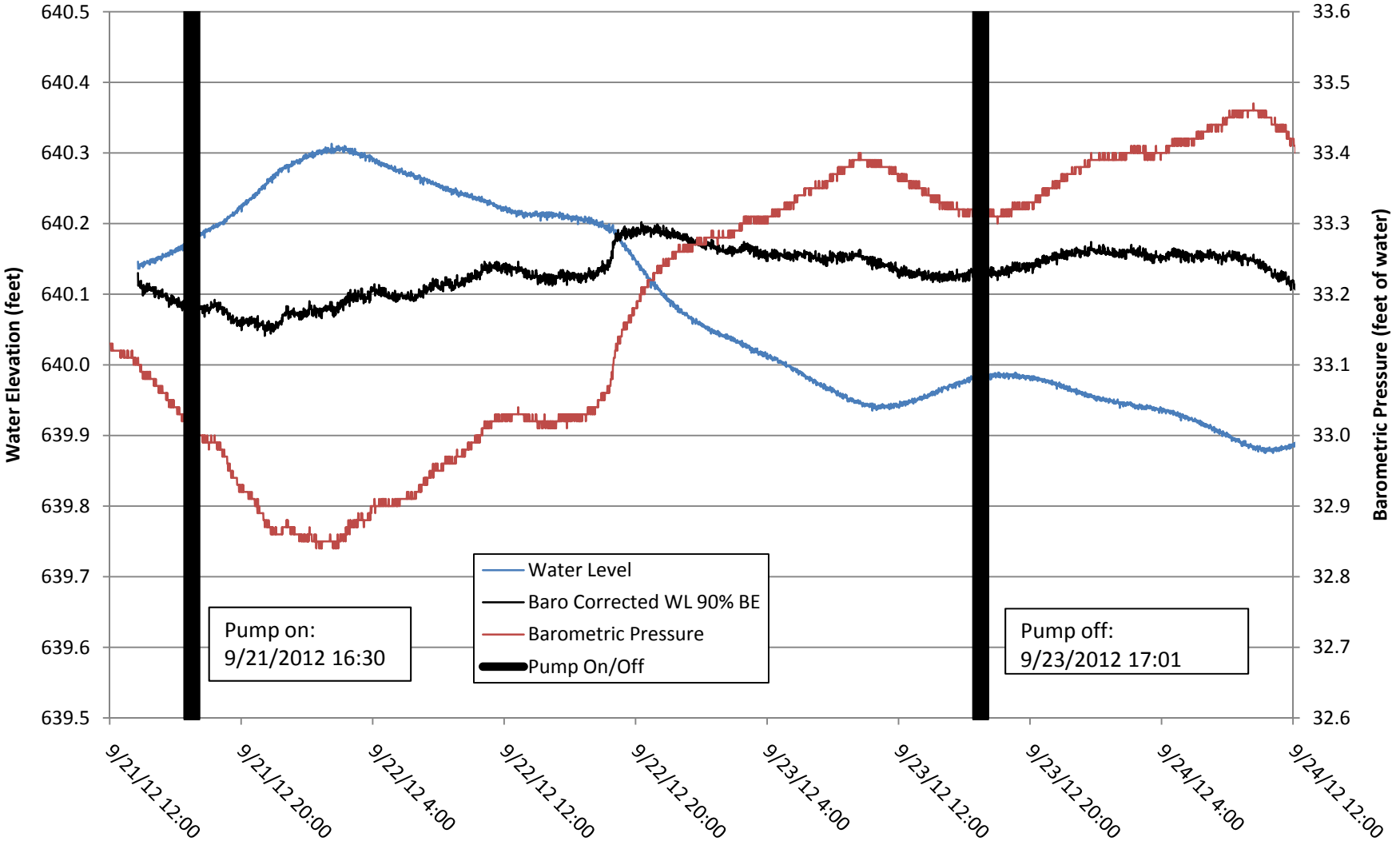


Figure 3-18 WD-MW06B Response to WD-PZ12C (CRT 678-663 feet)

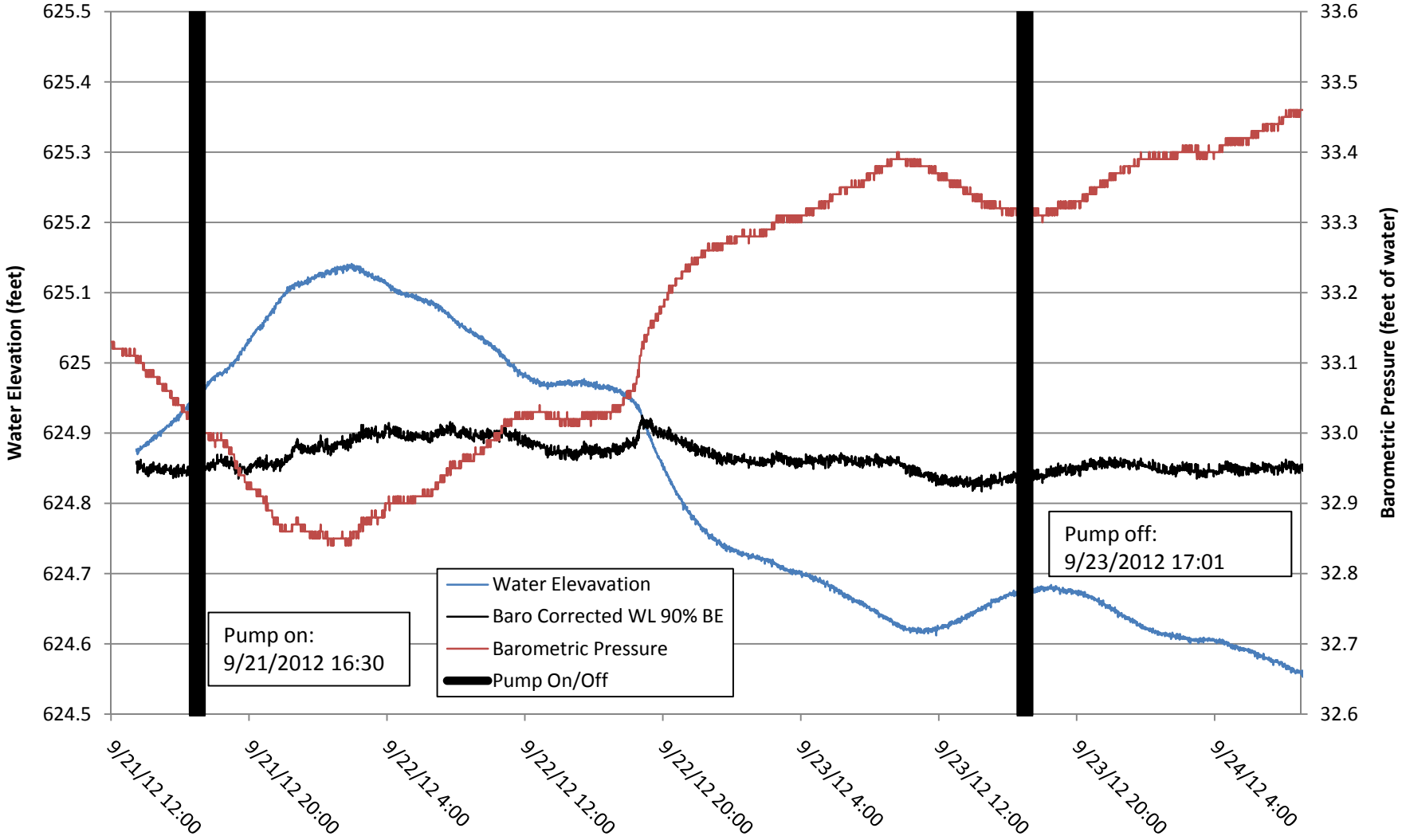


Figure 3-19
Response at WD-PZ12C While Pumping WD-PZ09C

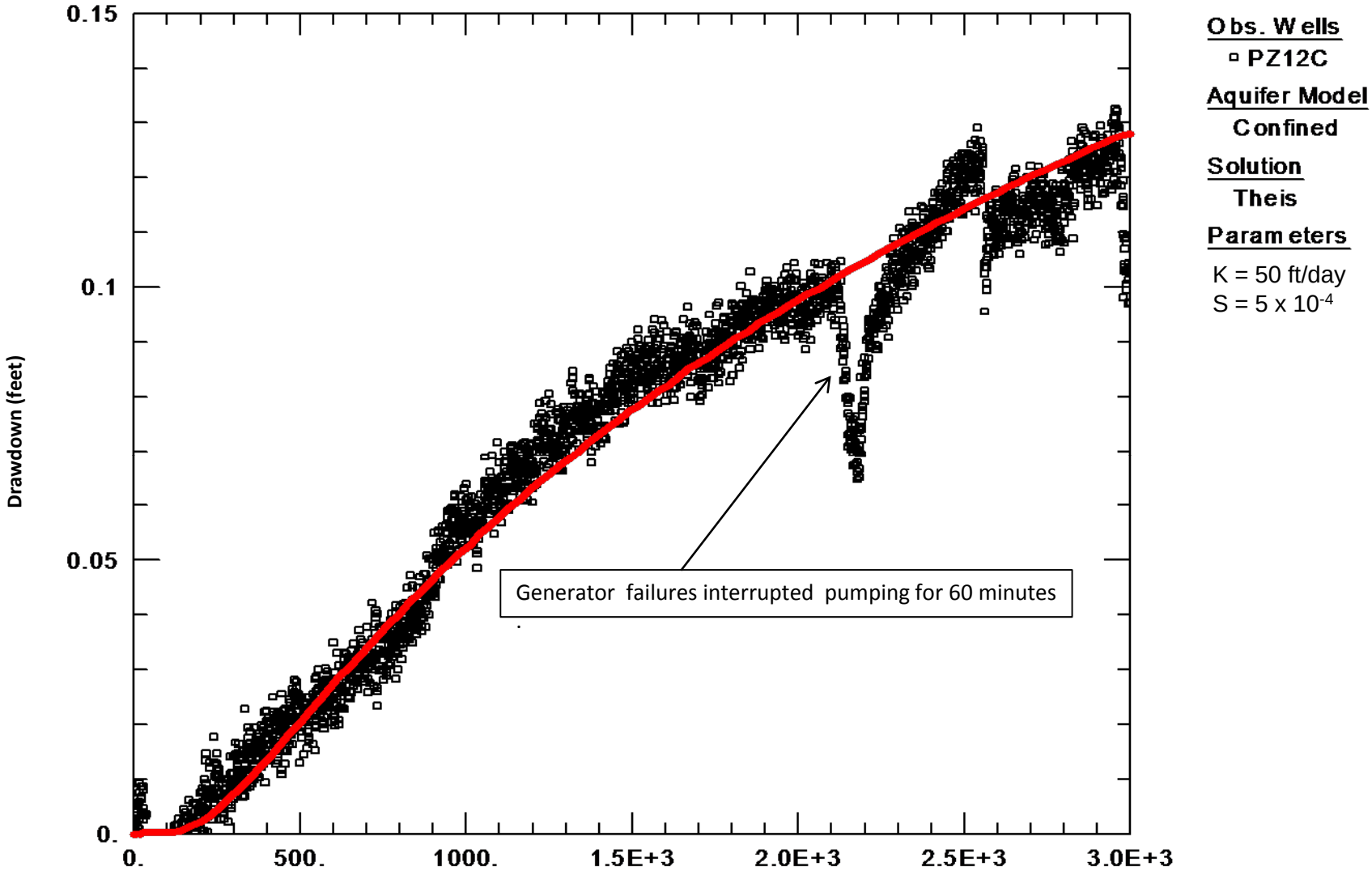
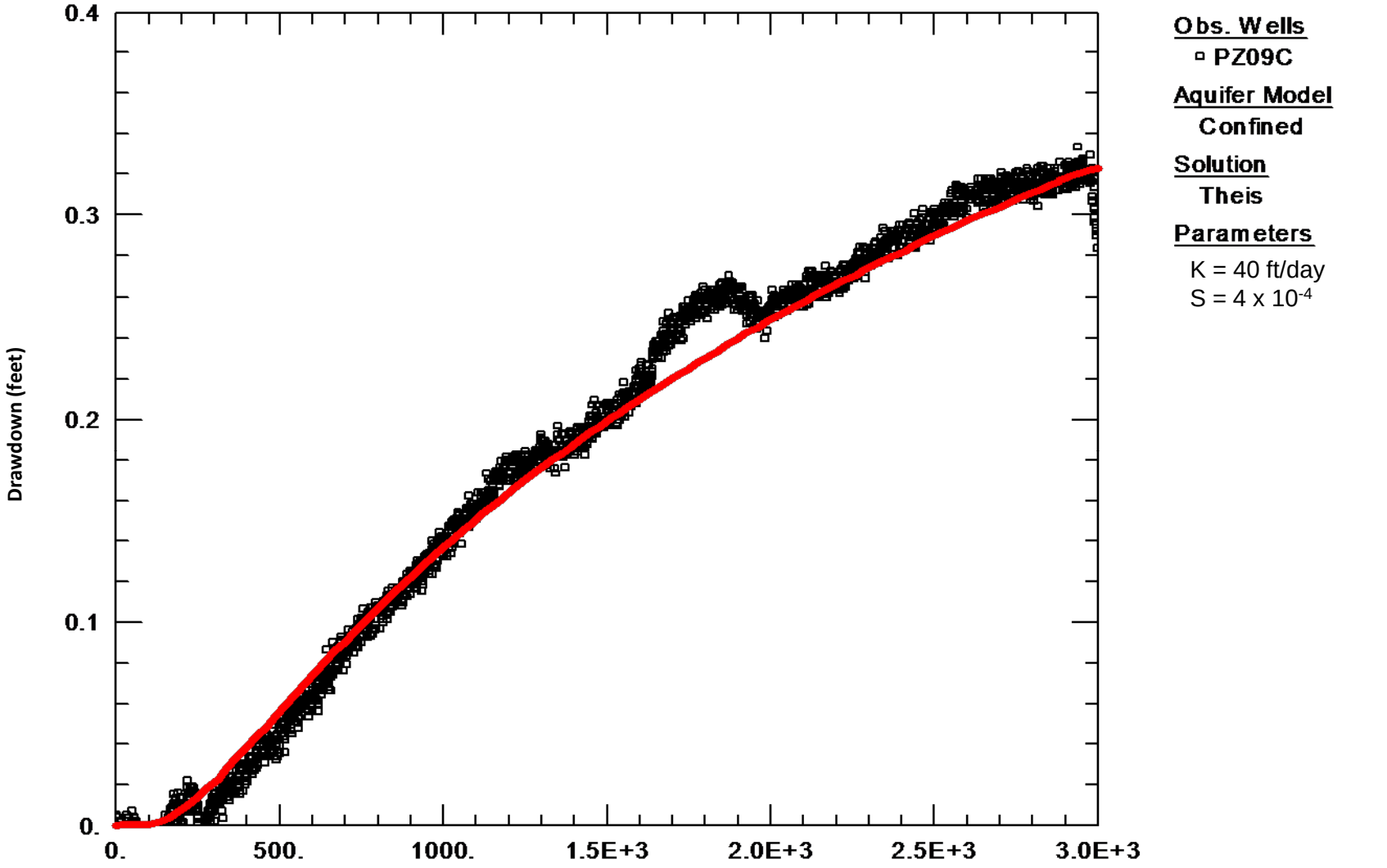


Figure 3-20
Response at WD-PZ09C While Pumping WD-PZ12C



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C-1738

680 SANDSTONE LAYER AQUIFER TEST ANALYSIS SUMMARY

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680 Sandstone Layer Aquifer Test Analysis Summary

Additional evaluation of Cuyahoga Formation aquifer performance tests (conducted by Dr. Changsheng Lu of Jacobs Engineering)

680 Sandstone Layer Aquifer Test Analysis Summary

1. The K values are in the 12-18 ft/day range. The Ks were calculated based on a 5-ft effective K zone. The testing intervals for the two tests are 8 and 15 ft, respectively.

2. Higher K range for the sandstone layer interval suggests the impact from the horizontal bedding planes existing within the test intervals (shale, sandstone). It is supported by the same K values derived used the horizontal fractured solution.

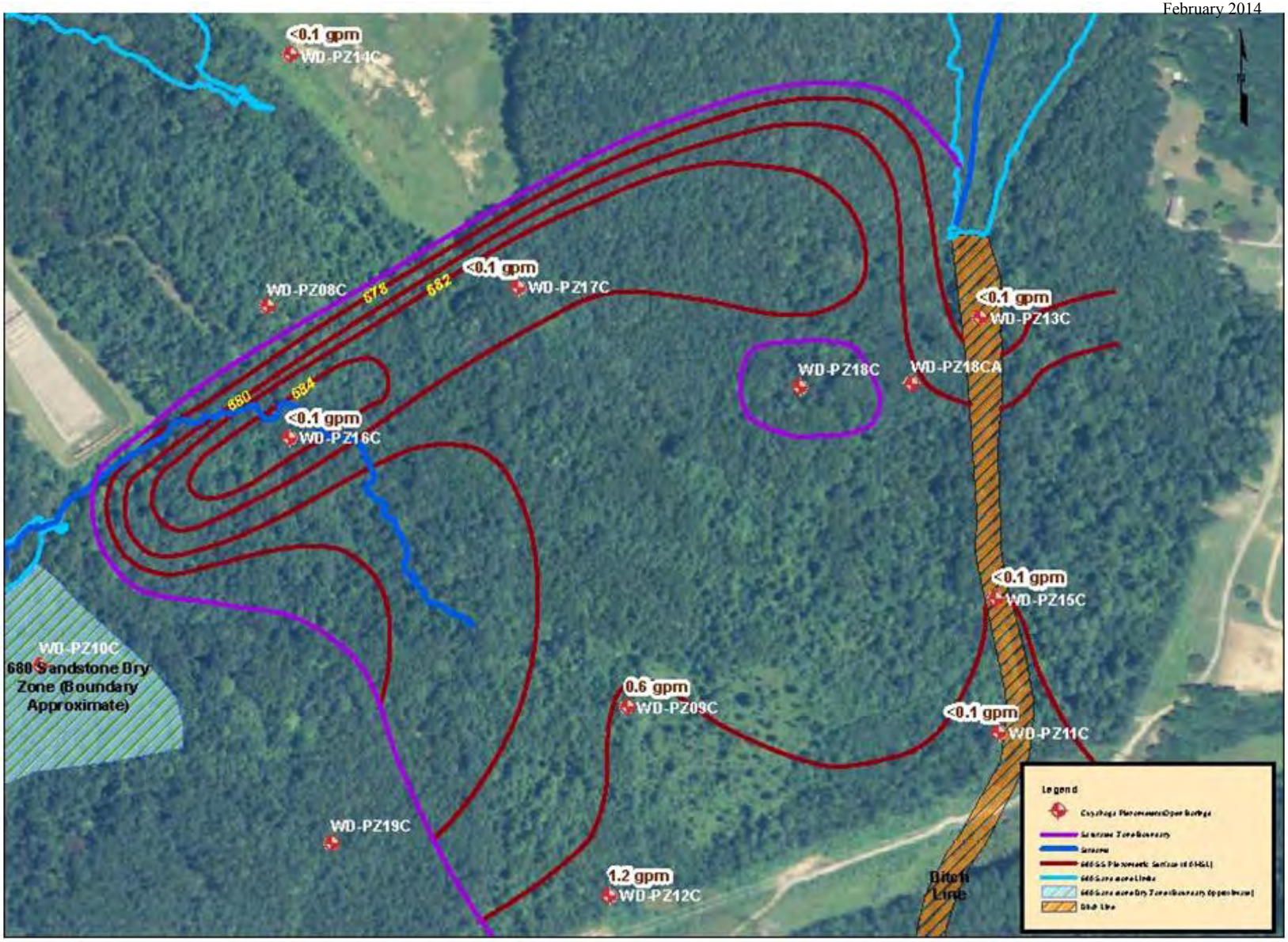
3. Leaky solution provide slightly lower K values.

4. The derived Ks are higher than the literature values of fractured sandstone (generally less than 1 ft/day). But most of the tests are based on thicker sandstone aquifer whereas this test is focused on shorter vertical interval where bedding plane is particularly abundant due to the lithology changes.

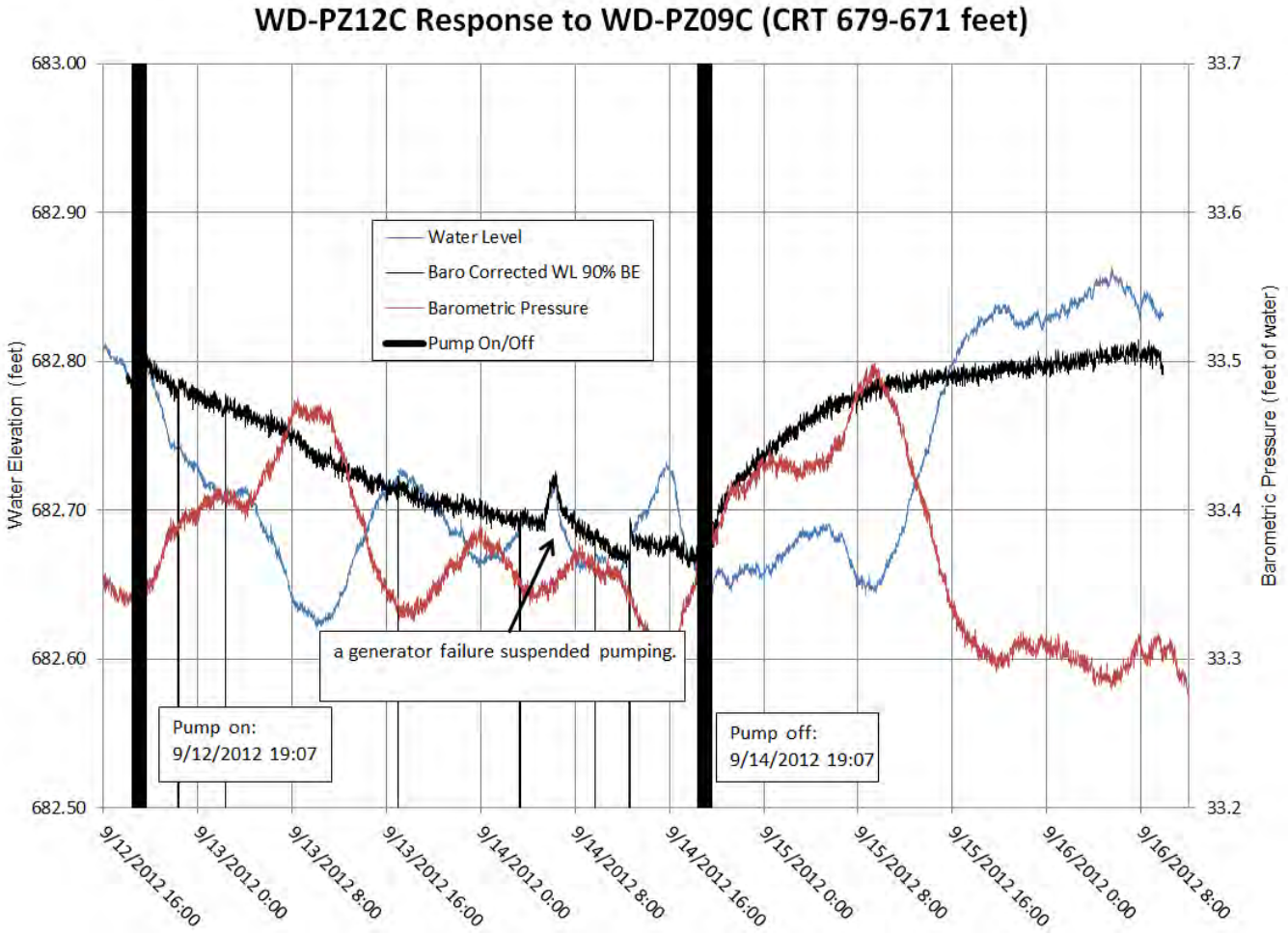
5. The lack of responses in other monitoring wells at other directions suggests the bedding planes may be controlled by localized depositional environments, such as change in layer elevation in a river delta depositional environments.

680 Sandstone Layer Aquifer Test Analysis Summary

	PZ-9C CP Test	PZ-12C CP Test
pumping interval (length)	679--671 (8)	678--663 (15)
pumping rate (gpm)	0.6	1.2
Monitoring Well	PZ-12C	PZ-9C
Monitoring Interval (length)	678--663 (15)	679--671 (8)
Hydraulic conductivity by Solutions	ft/day	ft/day
Confined (5 ft)	18	12
Leaky (5 ft)	17	8
Fractured (horizontal)	18	12

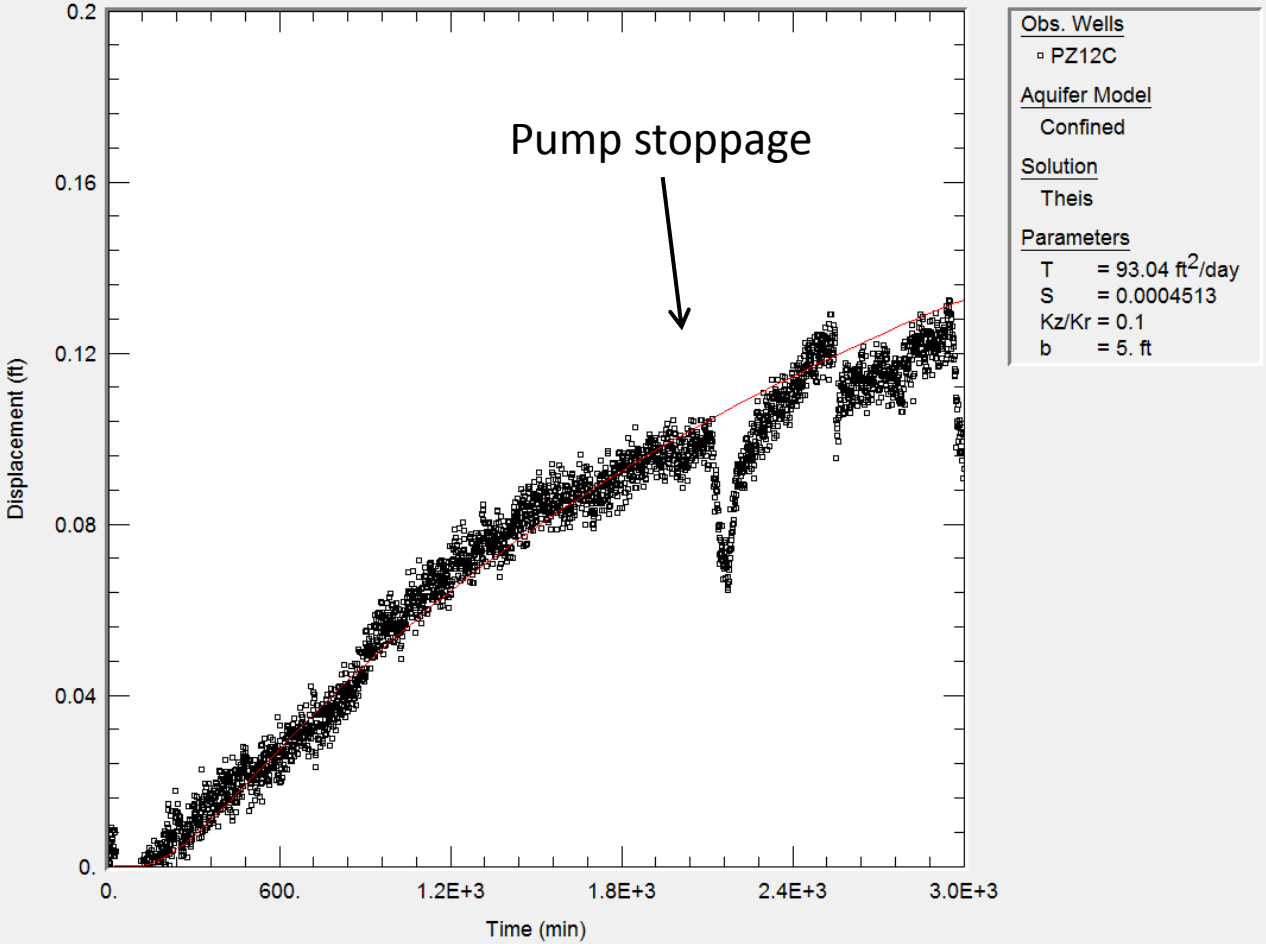

<0.1 gpm
WD-PZ14C
WD-PZ08C
678
682
<0.1 gpm
WD-PZ17C
<0.1 gpm
WD-PZ13C
WD-PZ18C
WD-PZ18CA
680
684
<0.1 gpm
WD-PZ16C
<0.1 gpm
WD-PZ15C
WD-PZ10C
680 Sandstone Dry Zone (Boundary Approximate)
0.6 gpm
WD-PZ09C
<0.1 gpm
WD-PZ11C
WD-PZ19C
1.2 gpm
WD-PZ12C
Ditch Line
Legend

Barometric effect corrected Water level (used barometric efficiency factor of 0.9)



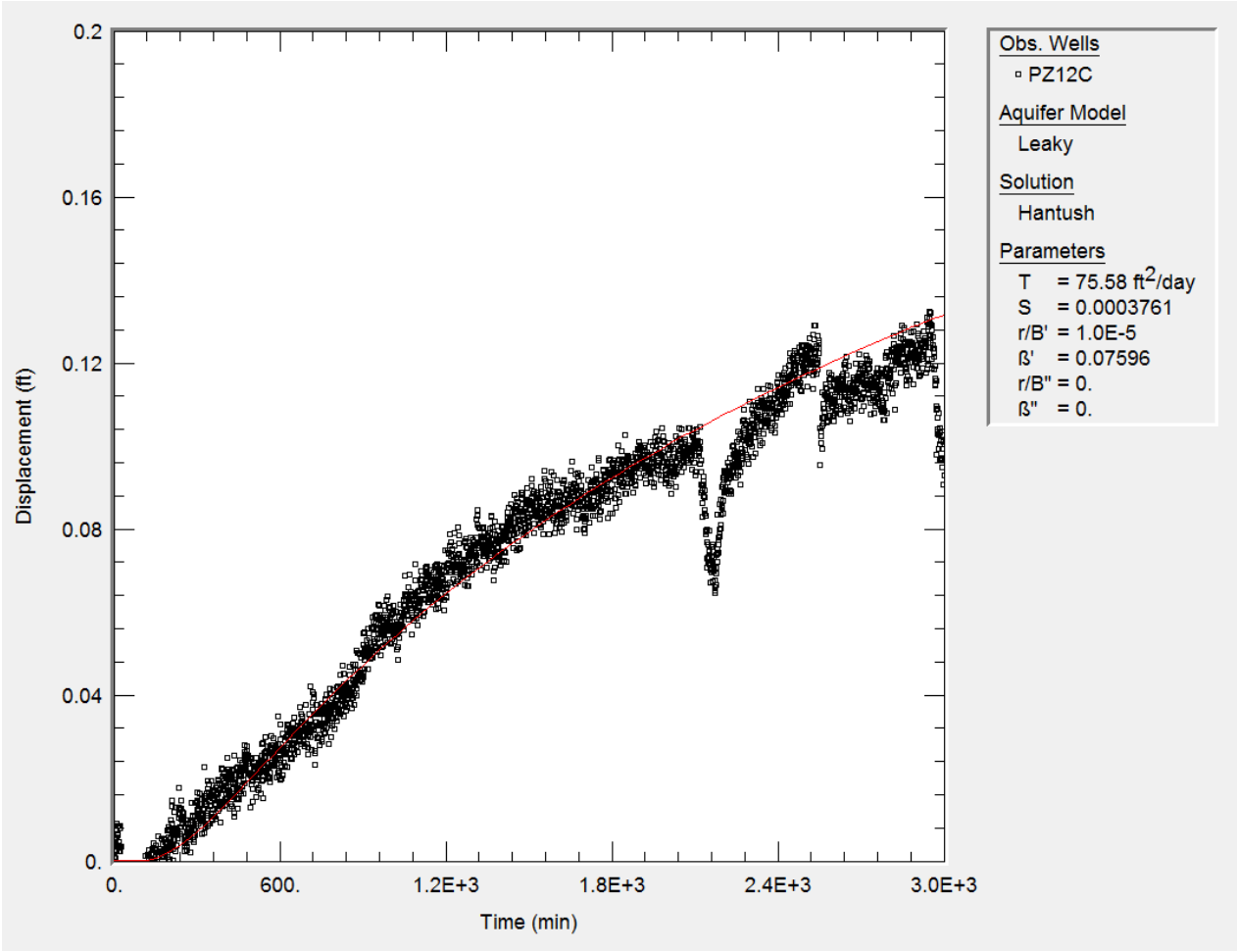
Confined aquifer solution (drawdown based on Baro corrected water drop)

K = 18 ft/day

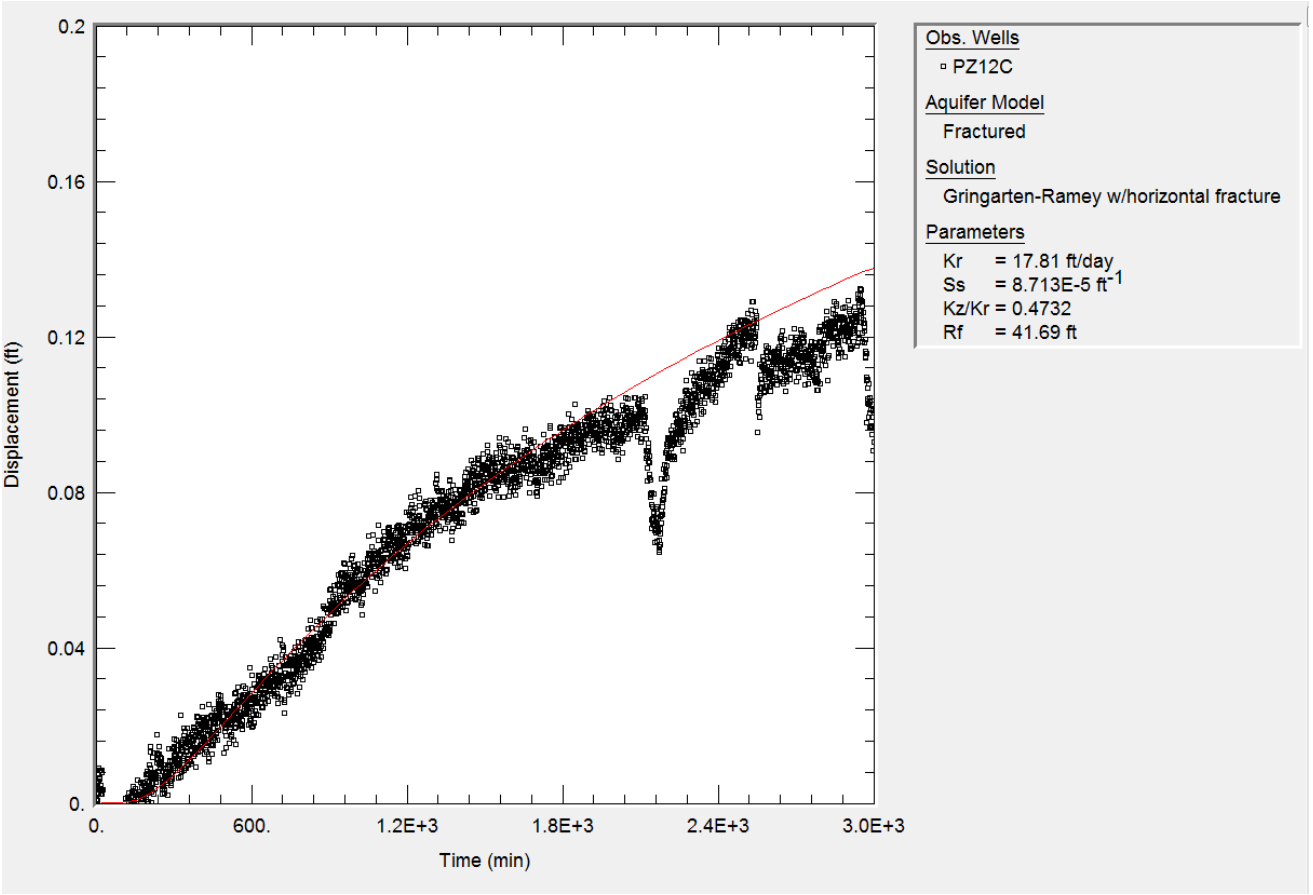


Leaky (semi-confined) aquifer solution

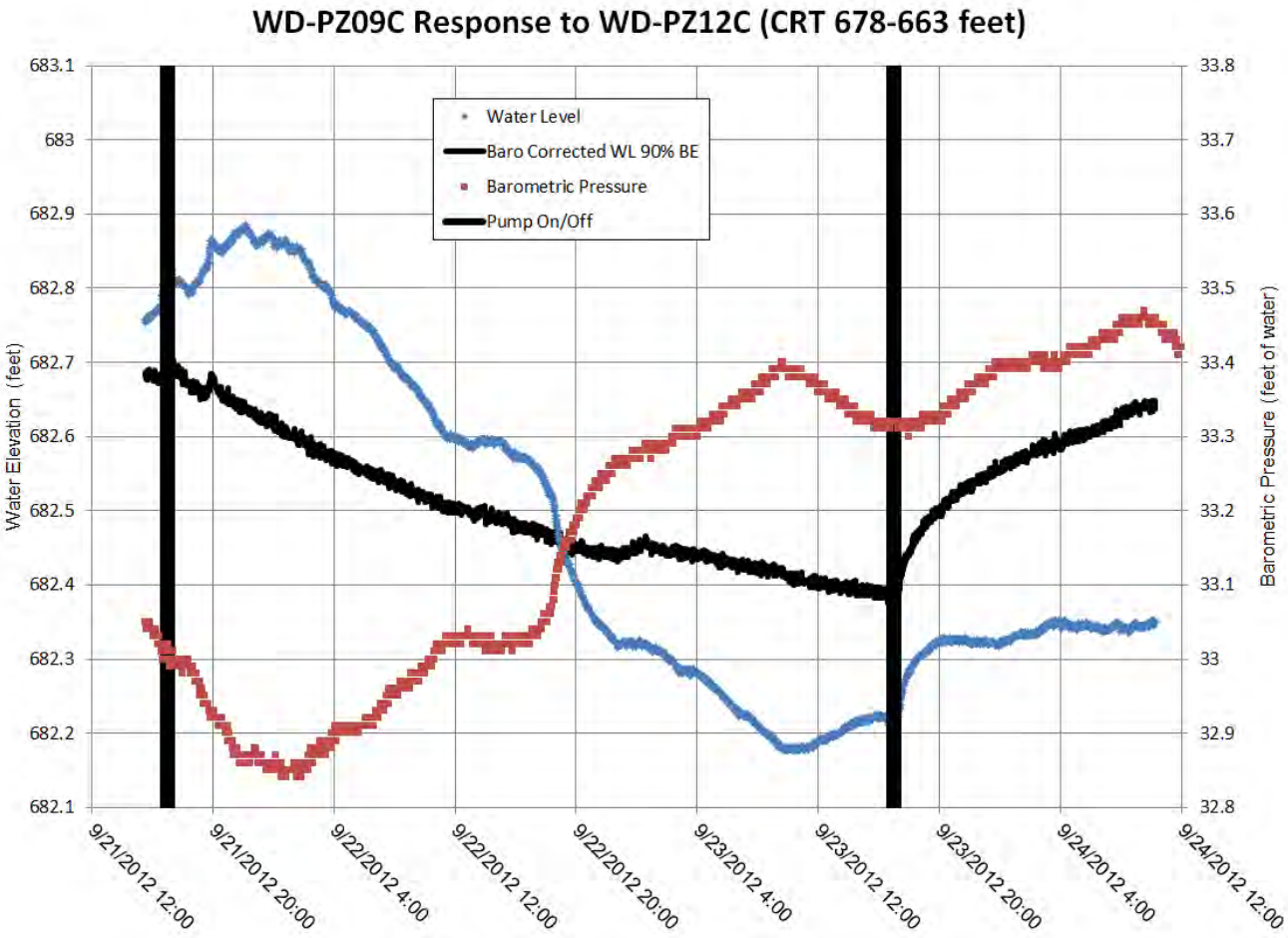
K = 17 ft/day



Fractured aquifer solution

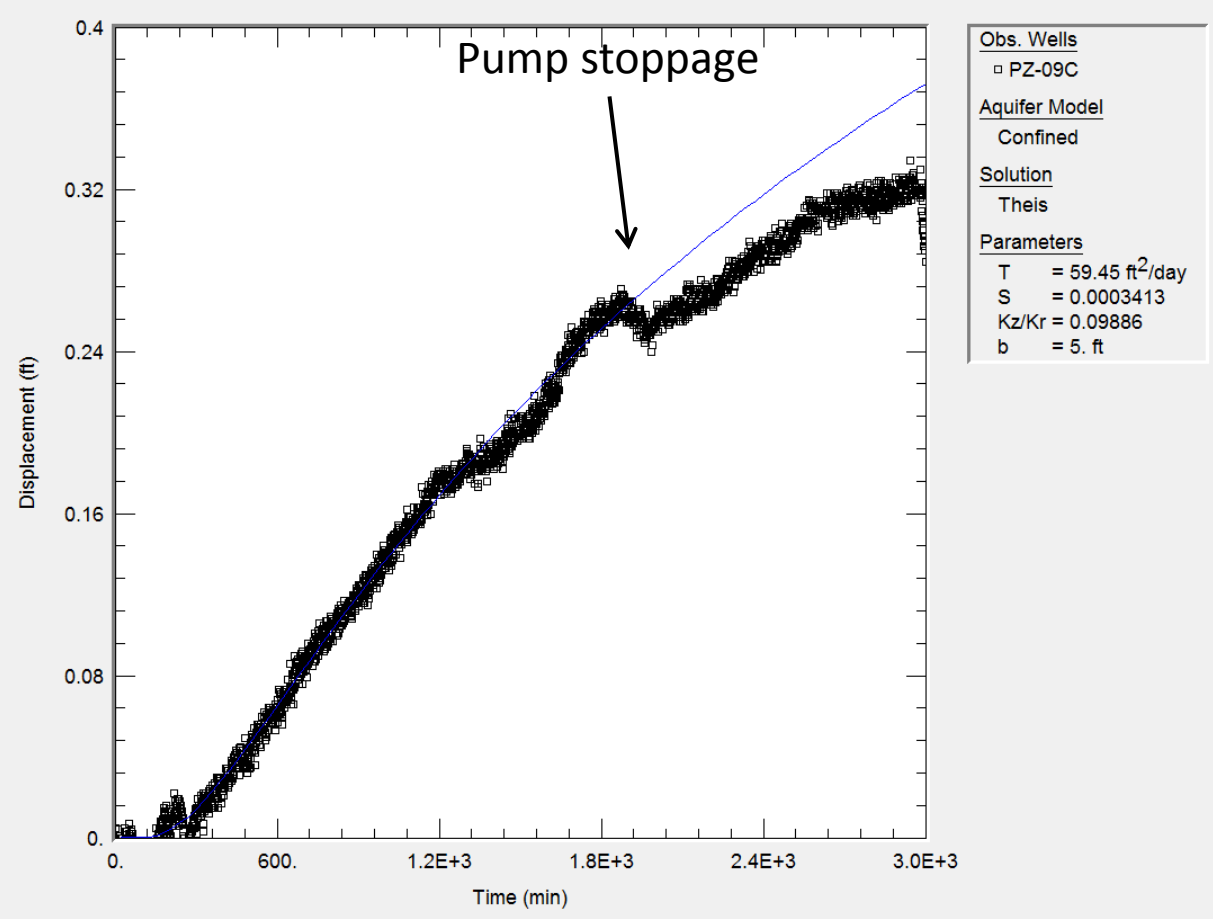


Barometric effect corrected Water level (used barometric efficiency factor of 0.9)



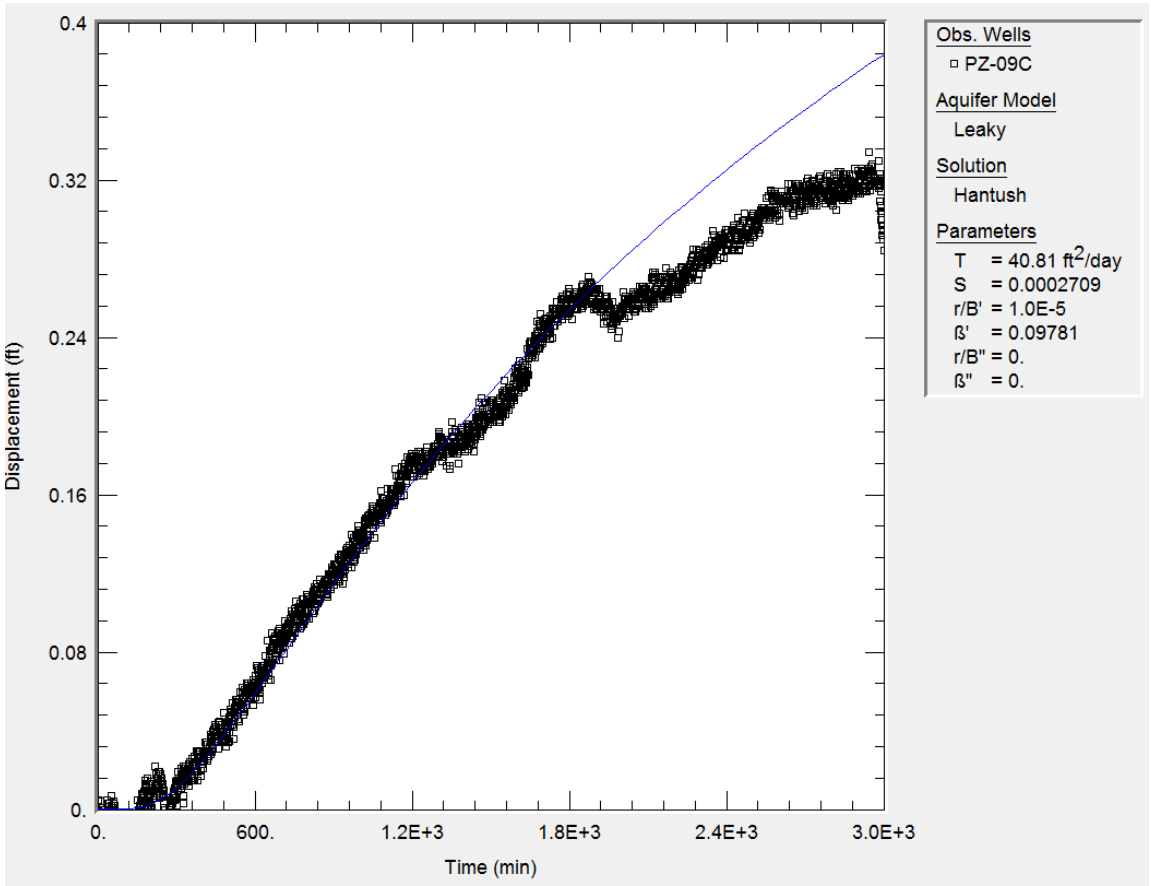
Confined aquifer solution (drawdown based on Baro corrected water drop)

K = 12 ft/day

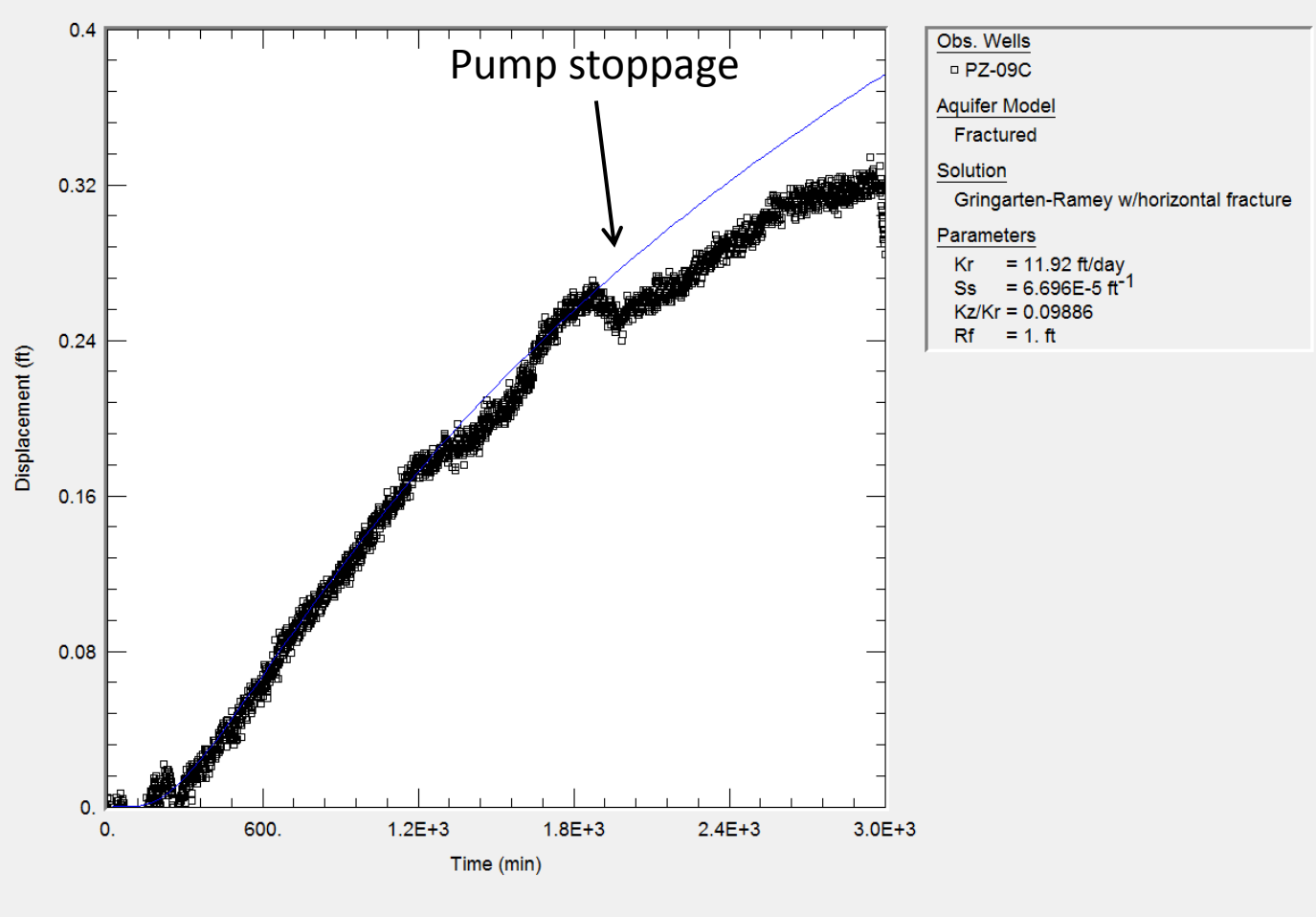


Leaky (semi-confined) aquifer solution

K = 8 ft/day



Assumed the effective 5 ft sandstone layer thickness



APPENDIX D: CHARACTERISTICS OF FINAL CANDIDATE LOCATIONS

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ACRONYMS

AMSL	above mean sea level
ARAR	applicable or relevant and appropriate requirement
BJC	Bechtel Jacobs Company LLC
CFR	*Code of Federal Regulations*
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
FS	feasibility study
LiDAR	Light Detection and Ranging
LMES	Lockheed Martin Energy Systems, Inc.
MMES	Martin Marietta Energy Systems, Inc.
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
OAC	*Ohio Administrative Code*
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSDC	on-Site disposal cell
PHWH	Primary Headwater Habitat
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976 (as amended)
RI	remedial investigation
SSAB	Site Specific Advisory Board
Stantec	Stantec Consulting Services
TBC	to-be-considered
TSCA	Toxic Substances Control Act of 1976
USDA	U.S. Department of Agriculture
WAC	waste acceptance criteria

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This appendix presents a summary of the final candidate study areas for a potential on-Site disposal cell (OSDC) at the Portsmouth Gaseous Diffusion Plant (PORTS). The U.S. Department of Energy (DOE) is evaluating waste management options for waste generated as a result of the potential decontamination and decommissioning (D&D) of facilities at PORTS. The feasibility study (FS) evaluates three alternatives for the waste: (1) no action; (2) on-Site disposal; and (3) off-Site shipment and disposal. One possible option for the on-Site disposal alternative is to design, construct, and operate a potential OSDC to accept the waste.

The evaluation of the study areas for development of a waste disposal facility, if the on-Site disposal alternative is selected, is presented in Section D.6 of this appendix. Study areas that do not merit further evaluation are first identified in a screening step after all viable areas are described. Then, those areas that are good candidates for a potential OSDC are further evaluated, and one location is selected to be a representative location for this FS. A single location is used to represent a potential OSDC in Section 8 of the remedial investigation (RI)/FS report, but other viable candidate locations could be reconsidered in the future.

The study areas were characterized to provide data to support evaluation of potential OSDC locations and to develop numerical waste acceptance criteria (WAC) for a potential OSDC (for the on-Site alternative). Important site-specific characteristics required by *Ohio Administrative Code (OAC)* 3745-27-06(C)(3) include the following:

Soil and bedrock characteristics
- Soil or rock type
- Color
- Moisture content
- Layering or interbedding
- Weathering
- Fracturing or jointing
- Mineral content
- Thickness
- Horizontal extent
- Depth and elevation.

Groundwater characteristics
- Uppermost aquifer system and significant zone of saturation
- Flow direction and rate
- Hydraulic conductivity
- Interconnection within upper aquifer system and significant zone of saturation
- Groundwater level elevation
- Temporal fluctuations
- Recharge and discharge
- Groundwater yield
- Groundwater chemistry.

Several intrusive field methods were used to obtain the required data to support the objectives, including, but not limited to, test pit excavation, cone penetration testing, hollow-stem auger drilling, and other drilling methods suitable for drilling in both unconsolidated and bedrock formations. Soil boring samples consisting of Shelby tube and split-spoon samples were collected from discrete depth intervals.

Piezometers and monitoring wells have been installed in three of the four study areas to determine depth to water and provide data on groundwater geochemistry. During the drilling program, soil/rock samples were collected for contaminant analyses (for example metals, radionuclides, volatile organics, semivolatile organics, and polychlorinated biphenyls), geochemical analyses (for example pH, cation exchange capacity, and total organic carbon), and geotechnical analyses (for example Atterberg limits, water content, consolidation, permeability, and unconfined compression). Soil/rock samples from the Minford and Gallia, as well as rock cores from the Cuyahoga Formation and Sunbury shale, were tested to determine site-specific distribution coefficients for uranium isotopes and technetium-99.

D.1 BACKGROUND

D.1.1 SUMMARY OF RESULTS OF PREVIOUS ECOLOGICAL AND CULTURAL RESOURCES STUDIES AT PORTS

Past consultations with the U.S. Fish and Wildlife Service indicate that some of the riparian areas on the PORTS Facility may be suitable summer habitat for the Indiana bat (*Myotis sodalis*), a federal- and state-listed endangered species. As a result of these consultations, DOE conducted surveys for the presence of the Indiana bat in 1994 and 1996. As part of the 1996 survey, potential summer habitat for the Indiana bat was identified in the Northwest Tributary stream corridor, particularly in an area of deciduous sugar maple forest within this corridor. Mist netting in this area was conducted in June and August 1996. Although 14 bats representing four common species were captured during the August survey, no Indiana bats were collected. Despite the position of the U.S. Fish and Wildlife Services, the survey concluded that most of the PORTS Facility has poor summer habitat for Indiana bats. The few woodlands that occur on the property are small, isolated, and not of sufficient maturity to provide good habitat for this species (Lockheed Martin Energy Systems, Inc. [LMES] 1997). Another bat mist-net survey was conducted in May 2011. During this survey, four nights of sampling resulted in the capture of eight bats, but no Indiana bats were observed (EnviroScience 2011). Additional mist netting occurred in July 2013 in Study Area D. Several bats were caught, including Northern Long-eared bats, but no Indiana bats were observed. Ohio University has completed a detailed habitat mapping study; the final report will be available early 2013. Preliminary findings from this study, using updated guidelines, are that the Indiana bat habitat may be more extensive than indicated in prior studies and in fact, the potential habitat extends over portions of both Study Area C and Study Area D (Ohio University 2012). The primary trees that produce exfoliating bark and nesting cavities (e.g., sycamore and shagbark hickory) are abundant in the older forest habitats. Additional consultation with the U.S. Fish and Wildlife Service in 2012 indicated that they had no record of Indiana bats being sighted or caught in Pike County, Ohio. They also confirmed that the species is still federally listed, and its home range does include the PORTS area.

The Carolina yellow-eyed grass, a state endangered plant species that prefers wet peaty or sandy soils typically found in marshes or bogs (U.S. Nuclear Regulatory Commission [NRC] 2006), was observed on the PORTS Facility in 1994 adjacent to the south side of the X-611B sludge lagoon. However, formal documentation of the species could not be performed because the grass was not in fruit or flower. Additional studies being completed by Ohio University may provide locations that harbor listed, high-interest plant species. No federally listed plant species have been observed during the current study but some state-listed species were tentatively identified.

The Ohio Environmental Protection Agency (Ohio EPA) previously determined that two state endangered fish species and four state threatened fish species exist near PORTS, but they are restricted to the Scioto River. Little Beaver Creek, the main body of water running through PORTS, does not provide

sufficient habitat to support threatened or endangered species of fish (NRC 2006). However, the Ohio Department of Natural Resources (ODNR) lists Little Beaver Creek as an exceptional warmwater stream.

PORTS and its surrounding area have the potential to yield both prehistoric and historic cultural resources. The studies conducted to identify archeological resources began with a Phase I literature review and archaeological reconnaissance survey conducted in 1996 and 1997 at PORTS (Schweikart et al. 1997) and concluded with recent Phase II surveys being conducted in 2012 at Study Area D (Mustain 2013). The results of all these surveys are four sites eligible for inclusion as historic properties on the National Register of Historic Places (NRHP).

No prehistoric Native American mounds had been documented on the PORTS Facility. During May and June 2011, a study was conducted of the entire PORTS Facility to determine if there were prehistoric mound-like features on the plant (Burks 2011). This study included a detailed review of the PORTS preconstruction topographic maps and the use of high-density Light Detection and Ranging (LiDAR) data. As a result, 28 topographic features (1 ft – 10 ft tall and up to 82 ft in diameter) were identified on the PORTS Facility. However, archaeological ground-truthing visits to each location indicated that all of these features were either naturally occurring features or a result of historic-era or recent activity on the PORTS Facility (Burks 2011).

The study concluded that PORTS contains no prehistoric mounds 1 ft tall or taller, which is the vertical size range of nearly all such documented mounds in Ohio. If smaller or more deflated mounds are present on PORTS, they are not detectable using LiDAR data or visual examination for topographic features.

In 1996 and 1997, an architectural survey of the PORTS plant was conducted. During this survey, 196 architectural properties were identified at 160 architectural locations throughout constructed areas of the PORTS Facility. These properties consisted of various buildings, facilities, and structures. Based on the results of this survey, DOE prepared a National Historic Preservation Act (Section 110) survey report on the identified architectural resources and submitted this report to the Ohio Historic Preservation Office (OHPO) for review and approval (DOE 2011). The OHPO accepted the final report in March 2011.

D.1.2 HISTORICAL OSDC SITING STUDY RESULTS

DOE completed a preliminary assessment of the volumes, types, and forms of waste that would be generated from plant cleanup activities, which they continue to refine. An identification and screening report (Bechtel Jacobs Company LLC [BJC] 2003a) was prepared to identify candidate locations for a potential OSDC. This report considered a potential OSDC that would consist of an above-grade, Resource Conservation and Recovery Act of 1976 (as amended) (RCRA)-compliant earthen disposal cell with a capacity for 4 million cy of waste (based on preliminary estimates in the waste volume/characteristics inventory [BJC 2003b]) and a footprint of 150 acres for landfill, buffer, and support facilities. The current conceptual design is considering a potential OSDC with a capacity of up to 5 million cy, which could contain most D&D waste plus potential waste from environmental remediation.

Sixteen candidate locations were initially identified throughout the DOE property (Figure D.1). These locations met the preliminary siting requirements and could reasonably be considered acceptable areas for placement of a potential OSDC (BJC 2003a). To be considered an initial candidate location, the area had to be located entirely within DOE-owned property, contain at least 150 contiguous acres, and not be technically or administratively impracticable or cost prohibitive. The 16 potential locations were identified and screened against individual criteria categorized as threshold, modifying, or final criteria.

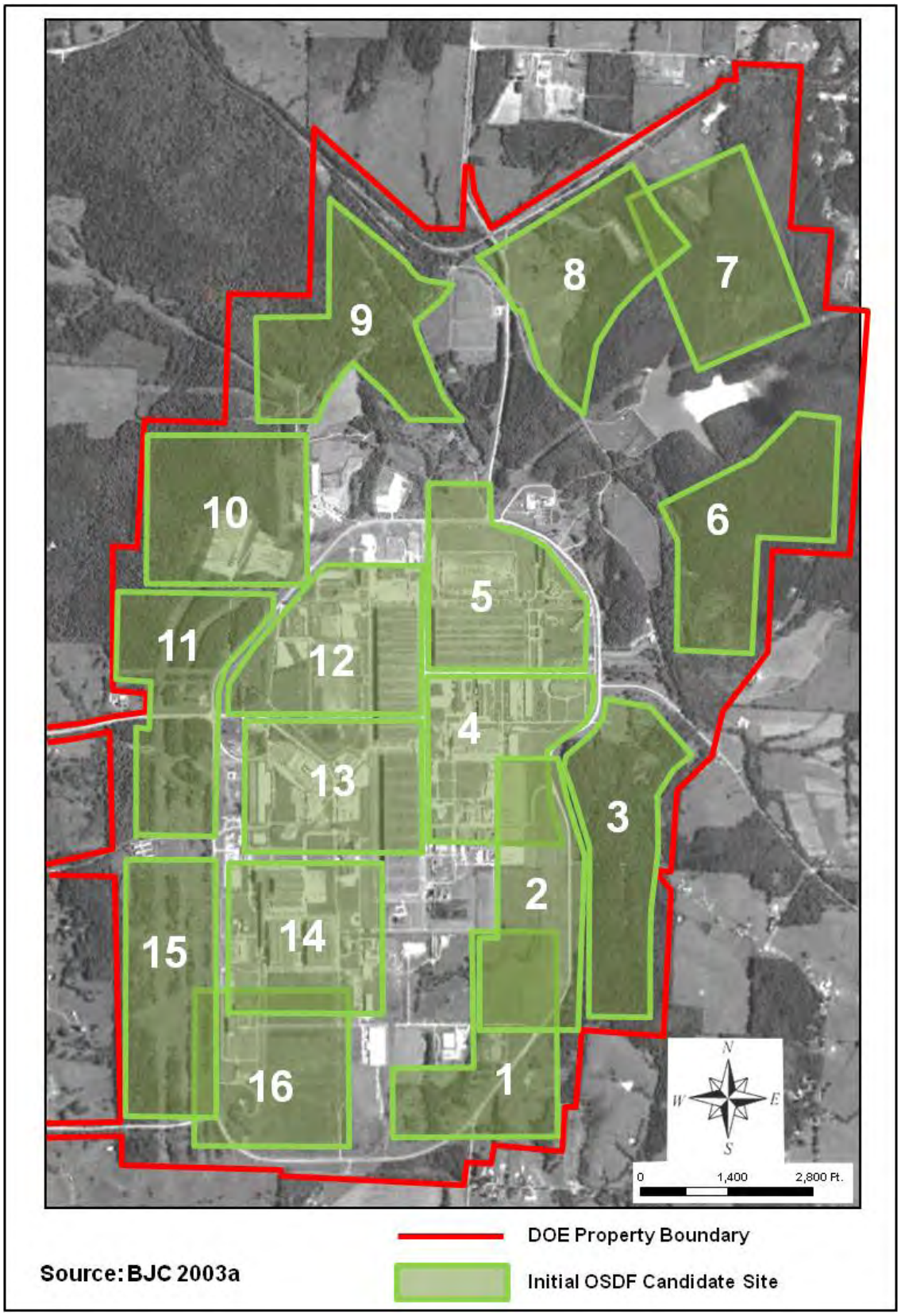

Figure D.1. Initial Candidate Locations for a Potential On-Site Waste Disposal Cell at PORTS

D.1.3 STUDY AREAS CONSIDERED IN THE RI/FS

The results of the historical screening were reviewed to determine the most suitable study areas for further evaluation in an RI/FS. Beginning in early 2011, the RI/FS project team began discussions with Ohio EPA regarding the most favorable location for a potential OSDC. The original site 2 and modified site 5 were retained for further evaluation. Sites 3 and 8 were also added for consideration because of favorable underlying geology and distance to groundwater. Site 3 was originally screened out because of its location along a ridge and topographic relief of 135 ft, which requires extensive earthwork to prepare the location for a potential OSDC. However, being located along a ridge underlain by shale provides a favorable hydrogeologic condition when combined with a potential depth to groundwater beneath the cell liner of 50 ft or greater. At the time, only one monitoring well was near this location, and the measured depth to groundwater was approximately 80 ft below the ground surface. These candidate locations, sites 2, 5, 3, and 8 (Figure D.2), were subsequently renamed for this RI/FS as Study Areas A, B, C, and D, respectively, as a means to differentiate them from the previous studies.

The following sections provide additional details for consideration with regard to these four study areas. Each study area is larger than any potential footprint of a potential OSDC. Each study area description provides a summary of the geology and hydrogeology required by *OAC* 3745-27-06(C)(3). Most of the geologic and hydrogeologic information for these areas is derived from the RCRA Facility Investigation reports completed for each quadrant (DOE 1996a, 1996b, 1996c, 1996d).

D.2 DESCRIPTION OF STUDY AREA A

Study Area A is located in the southeastern portion of the PORTS reservation. It has low to moderate topographic relief (110 ft) with topography ranging from 660 to 770 ft above mean sea level (AMSL) (Figure D.3). Study Area A has only been marginally impacted by plant operations. The only major surface structures within the area include an abandoned airstrip, parking areas, and a portion of Perimeter Road (approximately 3,800 ft) that lies along the eastern and southeastern edges of the study area. Study Area A does not contain any buildings or structures located in a land-use conflict area or scheduled for D&D, reindustrialization and reuse, or future redevelopment infrastructure. Study Area A offers engineering options such as using the existing landscape as part of the design for a potential OSDC by building the cell into the hillside and blending it with the topography.

Study Area A is in close proximity to existing utilities, which is beneficial for construction and operation of a potential OSDC. However, this area contains approximately 4,800 ft of natural gas pipeline that would need to be relocated if it were selected for a potential OSDC. This area is relatively close to the East and South Access Roads, but a portion of Perimeter Road would need to be relocated if a potential OSDC were constructed here.

Land use within Study Area A is primarily managed grassland and forest. The only developed areas are Perimeter Road, which runs north-south through the approximate center of the area, the south half of the large X-206A Parking Lot, and part of its connector road, which intersects Perimeter Road. The managed grassland is around the parking lot and roads in the central and western portions of the study area. Upland forest occupies the entire eastern portion of Study Area A.

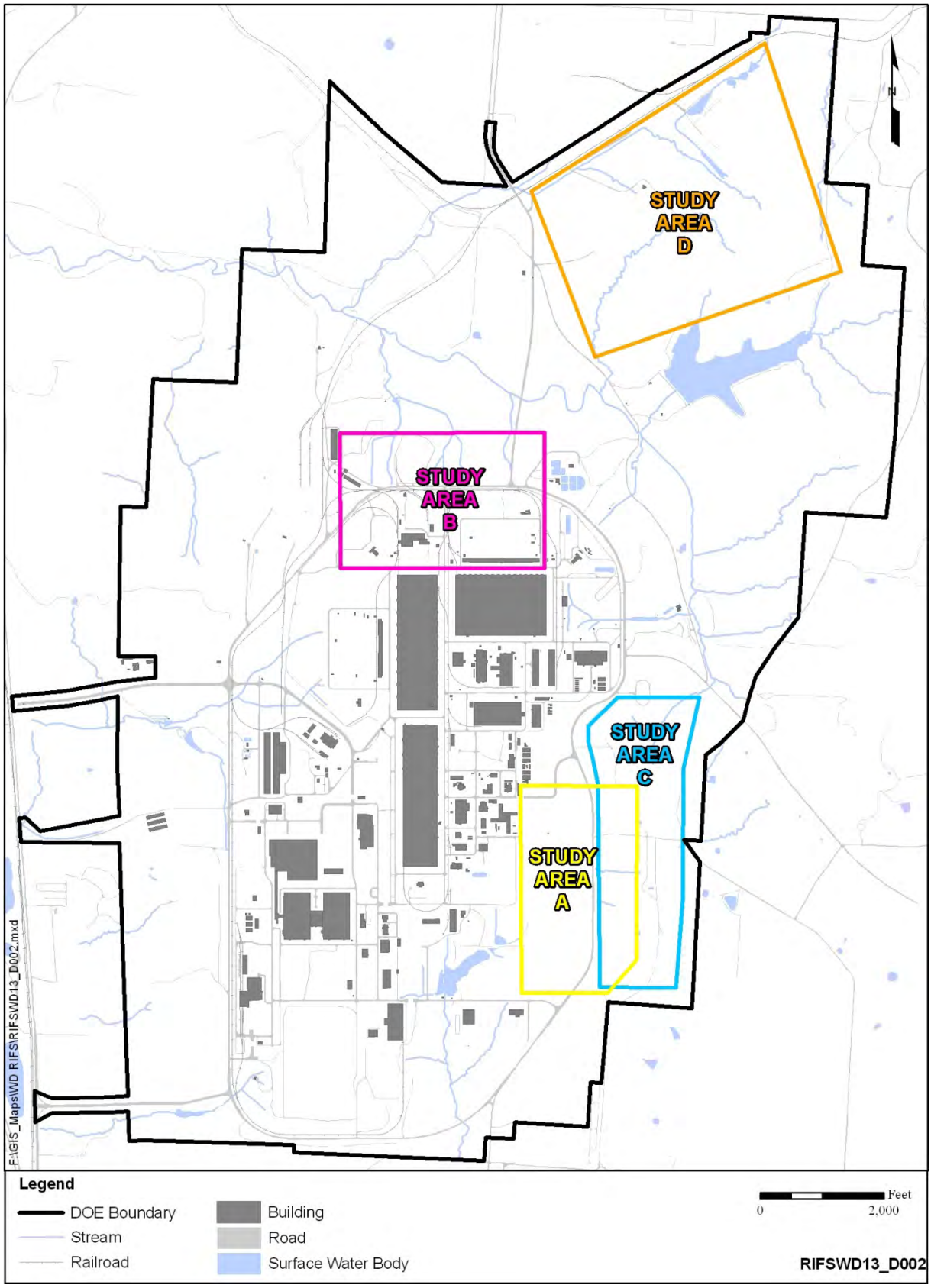

Figure D.2. Four Study Areas Being Evaluated for a Potential On-Site Waste Cell at PORTS

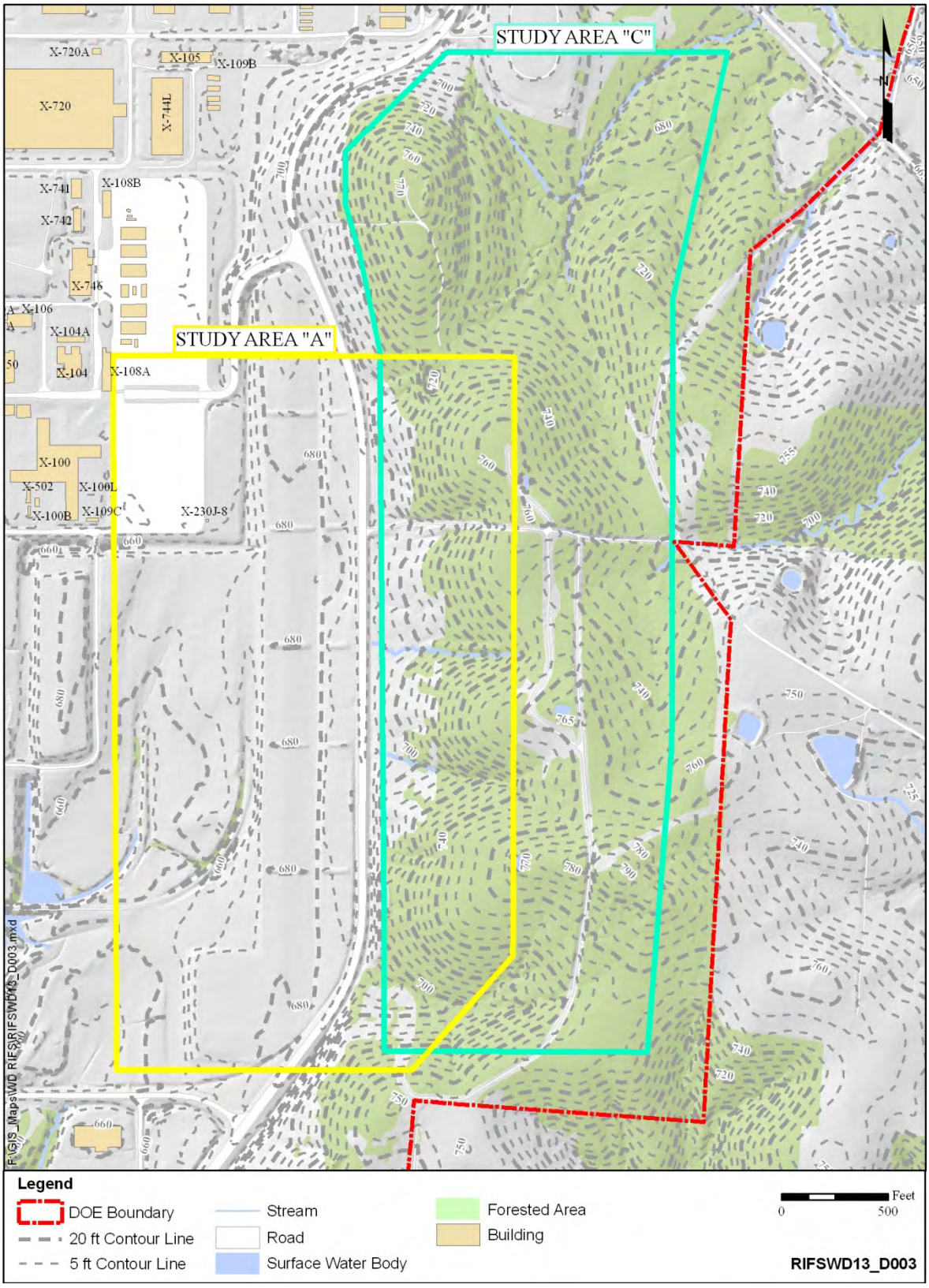

Figure D.3. Topography of Study Areas A and C at PORTS

D.2.1 GEOLOGY, HYDROGEOLOGY, AND SOILS

Study Area A lies on the eastern edge of the ancestral Portsmouth River valley. Stratigraphic units from youngest to oldest in age include the Quaternary Teays Formation (Minford Member/Gallia Member) unconformably overlying the Mississippian to Upper Devonian Cuyahoga Formation, Sunbury shale, Berea sandstone, and Bedford shale.

The Teays Formation is a 30- to 40-ft-thick unconsolidated unit consisting of fluvial Gallia sand and gravel overlain by Minford clay and silt. These units were deposited in an erosional valley cut by the ancestral Portsmouth River during the Pleistocene Epoch. The Gallia averages less than 5 ft in thickness and is characterized as reddish-brown, clayey, poorly-sorted, medium-to-coarse sand and gravel. The Minford consists of two units with a gradational contact. The upper unit is predominantly silty clay with some very fine-grained sand, and the lower silt unit is composed of clayey silt and very fine to fine-grained sand. Geotechnically, the Minford consists primarily of overconsolidated lean clays and silts (Law Engineering 1978). This overconsolidation possibly resulted from the weight of perhaps as much as 200 ft of similar material previously overlying the existing deposits. A summary of the Atterberg limits from samples collected within and near Study Area A (211 samples from 27 soil borings) is shown in Figure D.4. This plot is very similar to the one for samples collected from the Minford in the southwestern portion of PORTS near the centrifuge plant and indicates the geotechnical properties of the Minford are likely similar across the plant. The plastic limits of the clays are relatively constant with depth and average about 20 percent. As expected of highly overconsolidated soils, the Minford materials are quite strong (Law Engineering 1978).

Figure D.5 shows the locations of geologic cross sections for the study areas. Figure D.6 shows the configuration of the top of the bedrock surface within Study Area A and clearly indicates the edge of the ancestral valley against the higher ridge on the eastern edge of Study Area A. The depth to bedrock varies from less than 10 ft on the eastern portion of the study area to greater than 40 ft in the western half of the area. The Teays Formation directly overlies the Sunbury shale west of Perimeter Road and the Cuyahoga Formation east of Perimeter Road.

The topographic ridge in the eastern one-third of the study area is underlain by the Cuyahoga Formation. Thickness of the Cuyahoga Formation varies from 0 ft where it has been removed by erosion to approximately 140 ft on the extreme eastern edge of Study Area A. The Cuyahoga Formation (a moderately hard, thinly laminated shale with sandstone laminations) is then underlain by the Sunbury shale, which is approximately 20 to 25 ft thick. The Berea sandstone, with an average thickness of approximately 35 ft in the PORTS area, lies beneath the Sunbury shale. The Berea is composed of a light gray, hard, thickly bedded, fine-grained sandstone with thin shale laminations. The bedrock formations dip gently to the east-southeast at approximately 30 ft/mile. Stratigraphic relationships are shown in Figure D.7.

The groundwater flow system at Study Area A includes the aquifers consisting of the unconsolidated Gallia sand and gravel and the Berea sandstone, along with the aquitards of Cuyahoga/Sunbury shale, Bedford shale, and unconsolidated Minford clay and silt. The basal portion of the Minford is generally grouped with the Gallia to form the uppermost aquifer and primary water-bearing unit at PORTS.

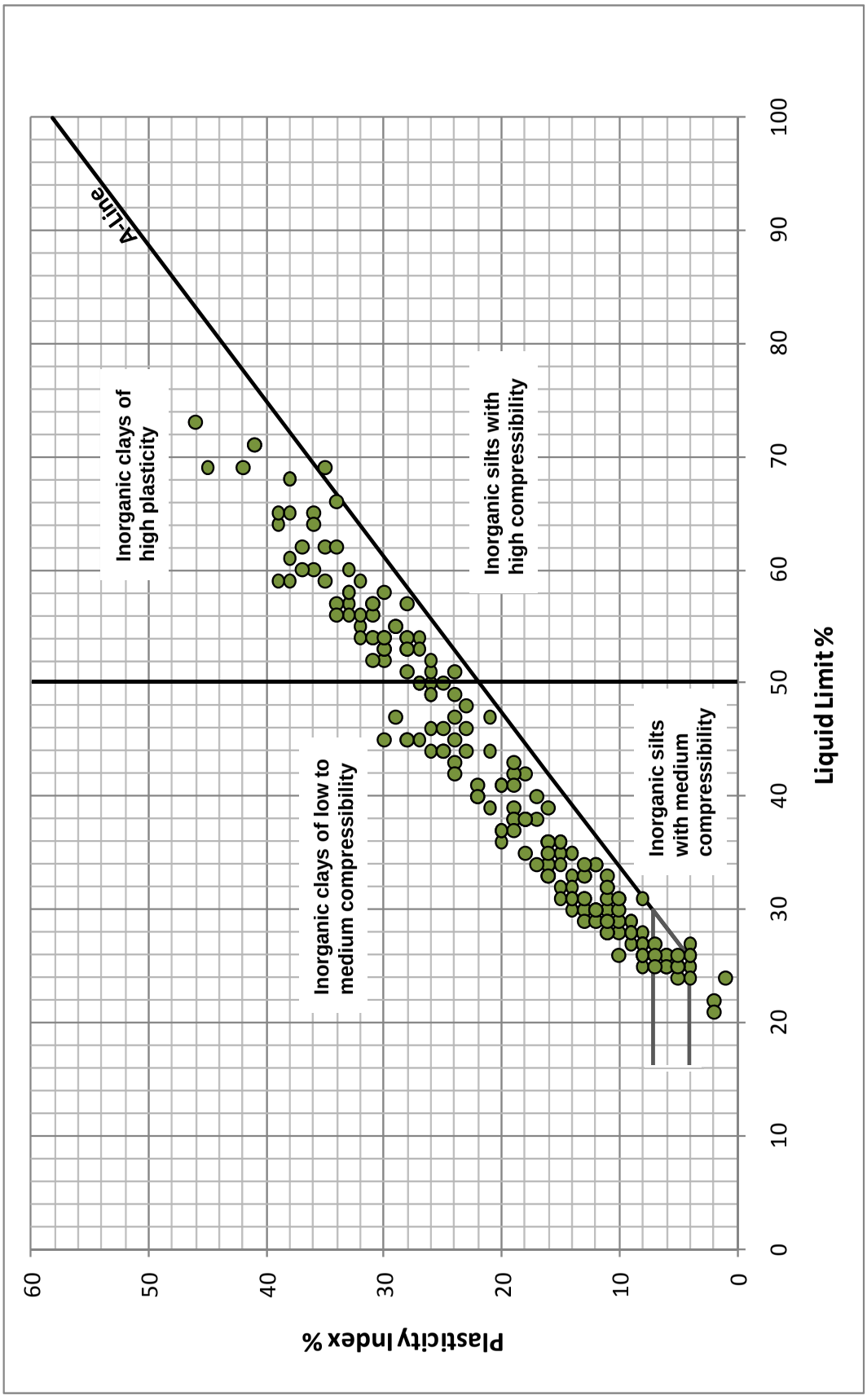

Figure D.4. Atterberg Limits of the Minford Member in Study Area A at PORTS

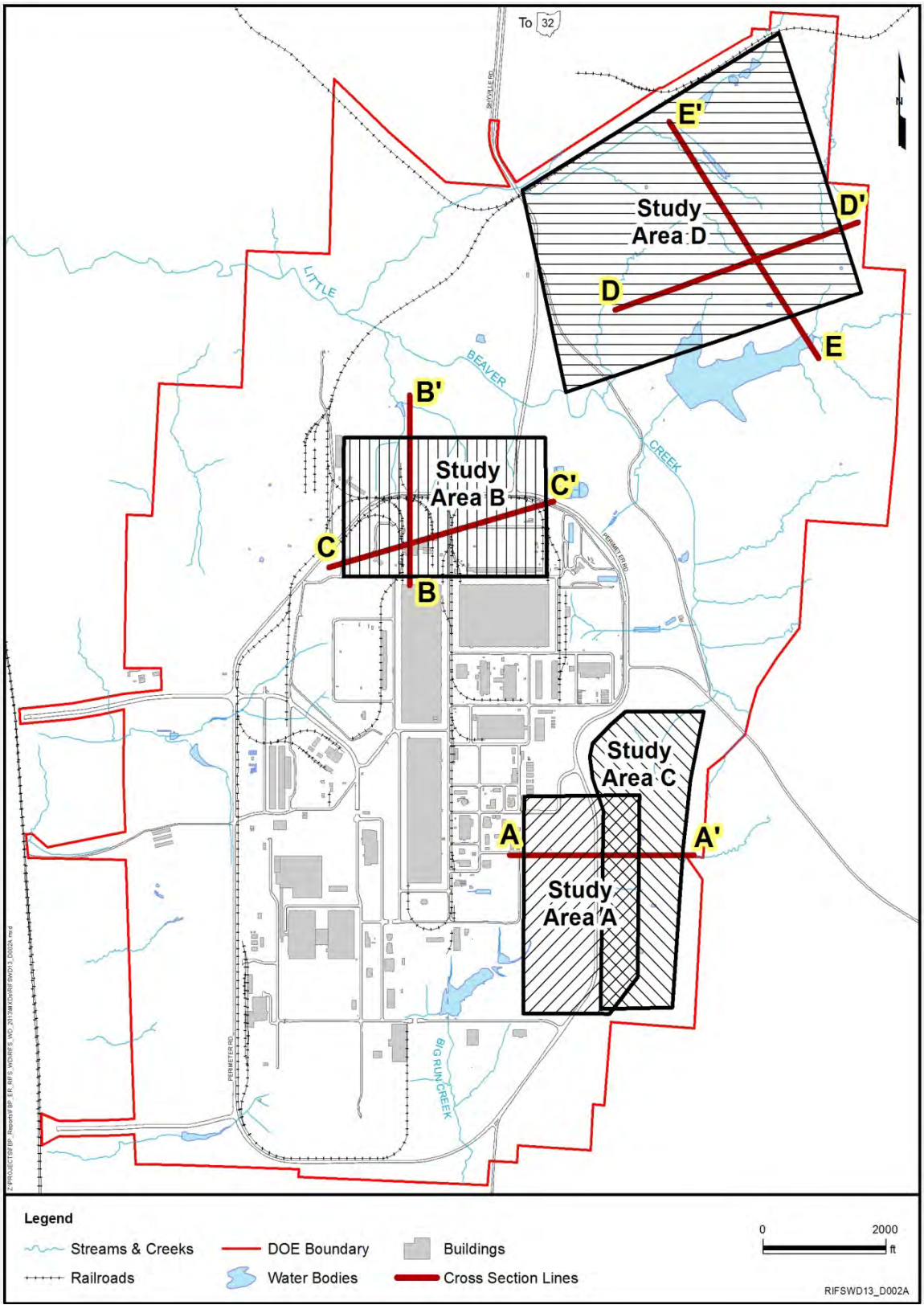

Figure D.5. Geologic Cross-section Locations

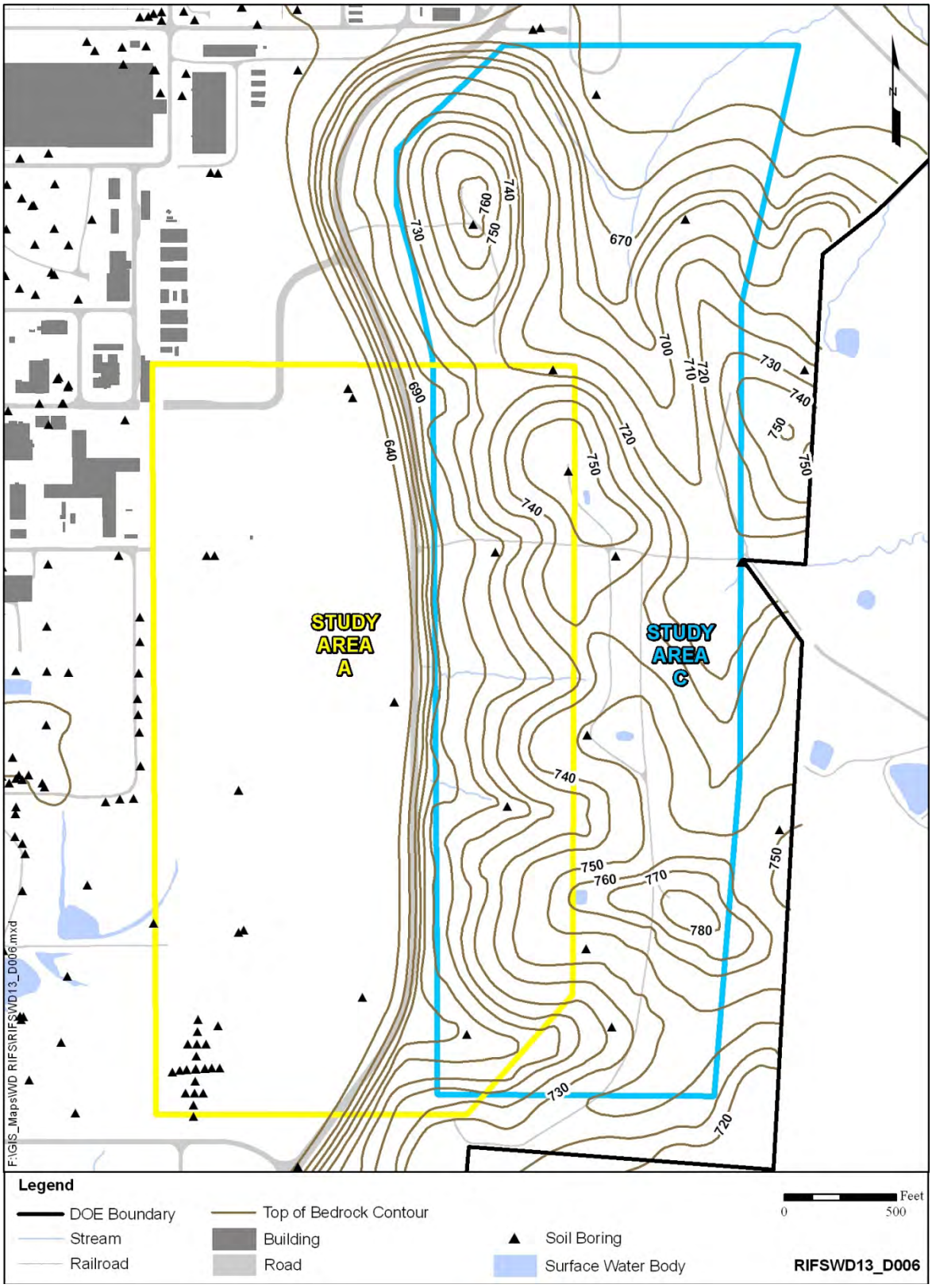

Figure D.6. Top of Bedrock in Study Areas A and C at PORTS

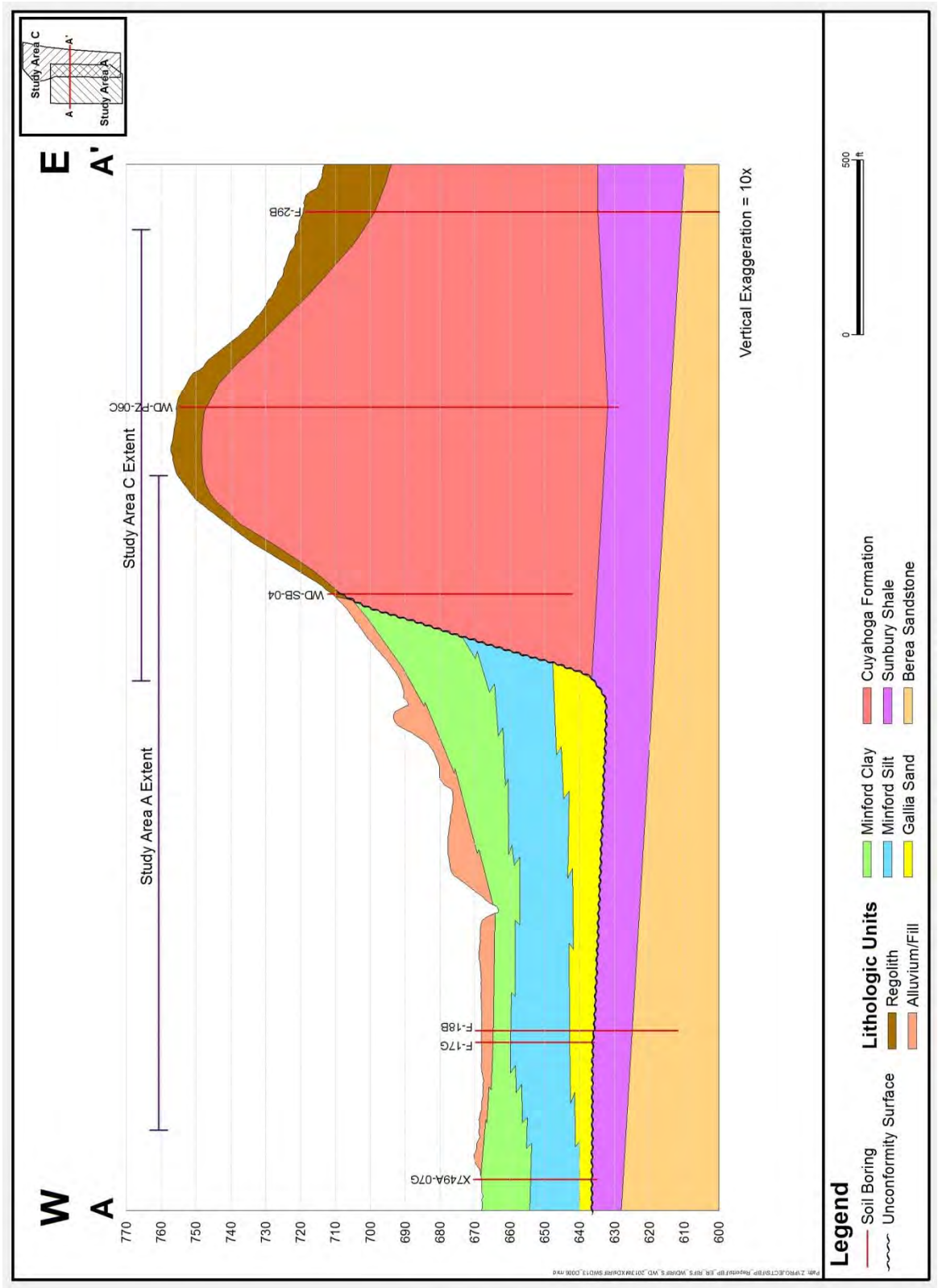

Figure D.7. Geologic Cross Section for Study Areas A and C at PORTS

Groundwater recharge and discharge areas at PORTS include both natural and man-made recharge and discharge areas. Natural recharge to the groundwater flow system comes mainly from precipitation, although land use and the presence of thick upper Minford clay deposits and the Sunbury shale effectively reduce recharge to underlying units. Discharge of groundwater to the surface occurs primarily along streams that transect the plant. Natural recharge to the central portion of the plant is approximately 4 to 7 in./year whereas recharge in the uplands (areas underlain by shale bedrock) is 2 to 4 in./year (ODNR 2003). Along the eastern portion of Study Area A, the portion underlain by the Cuyahoga Formation, shallow groundwater may be found in the lower portion of the regolith above the more impermeable bedrock. Regolith includes soil, residuum, and colluvium overlying the Cuyahoga Formation in the upland areas at PORTS. A couple of shallow-dug wells were found just to the east of Study Area A, and the depth to water in one of those wells was approximately 14 ft. (The other well, with a total depth of almost 13 ft, was dry.)

Groundwater flow within the Gallia at PORTS is generally divided into four separate flow regions, or quadrants. Study Area A lies within the southern portion of PORTS. The direction of groundwater flow in this area is controlled by the presence of surface drainages (Big Run Creek and the Southwest Drainage Ditch), the storm sewer system, and bedrock topography. In general, groundwater in the Gallia at Study Area A flows from north to south (Figure D.8) toward the X-230K Holding Pond and eventually discharges into Big Run Creek. Figure D.8 is modified from the 2012 annual groundwater report for PORTS (DOE 2013), and it shows the third quarter 2012 potentiometric surface. The depth to the Gallia potentiometric surface ranges from approximately 25 to 30 ft at WD-PZ01G and WD-PZ02G to 5 ft at WD-PZ03G, which lies at a lower elevation. The water table within the Minford generally lies 10 to 15 ft below ground surface. The hydraulic gradient is low (ranging from approximately 0.002 ft/ft to 0.005 ft/ft) because of the flat valley floor and the presence of thicker, more permeable Gallia deposits. The vertical hydraulic gradient from the Gallia to the Berea is steep, ranging from approximately 0.4 ft/ft to 0.6 ft/ft with the potentiometric surface of the Berea approximately 10 to 20 ft below that of the Gallia at Study Area A. The vertical hydraulic gradient between the Gallia and Berea decreases to the west of Study Area A as the Sunbury shale thins.

Groundwater flow in the Berea is northwest to southeast with a gradient varying from approximately 0.004 to 0.007 ft/ft (Figure D.9). Figure D.9 represents the potentiometric surface for the third quarter of 2012 (DOE 2013). The gradient in the Berea is slightly greater than the horizontal gradient observed in the Gallia. While groundwater yield in the Berea is typically lower than the yield in the Gallia, the Berea is a widespread unit and is considered to be a regional aquifer. The potentiometric surface of the Gallia fluctuates 5 ft or less on a seasonal basis with groundwater flow direction remaining essentially the same (DOE 2013). Seasonal fluctuation in the groundwater levels for the Berea are similar to the Gallia where the two aquifers are interconnected, but the Berea potentiometric surface fluctuates less on a seasonal basis where it is confined by the Sunbury Shale.

The hydraulic properties of the hydrogeologic units have been defined during previous investigations at the facility. The average hydraulic conductivity for the Minford clay is 2.3×10^{-4} ft/day, and the average hydraulic conductivity for the Minford silt is 4.3×10^{-3} ft/day. These values are based on numerous laboratory tests (DOE 1996a). The vertical hydraulic conductivities of Minford clay and Minford silt are approximately an order of magnitude lower than their horizontal hydraulic conductivities. Minford hydraulic conductivity determined during the geotechnical investigation of the centrifuge site ranged from 3.12×10^{-2} ft/day for the silty facies to 2.5×10^{-5} ft/day for the clay facies (Law Engineering 1978).

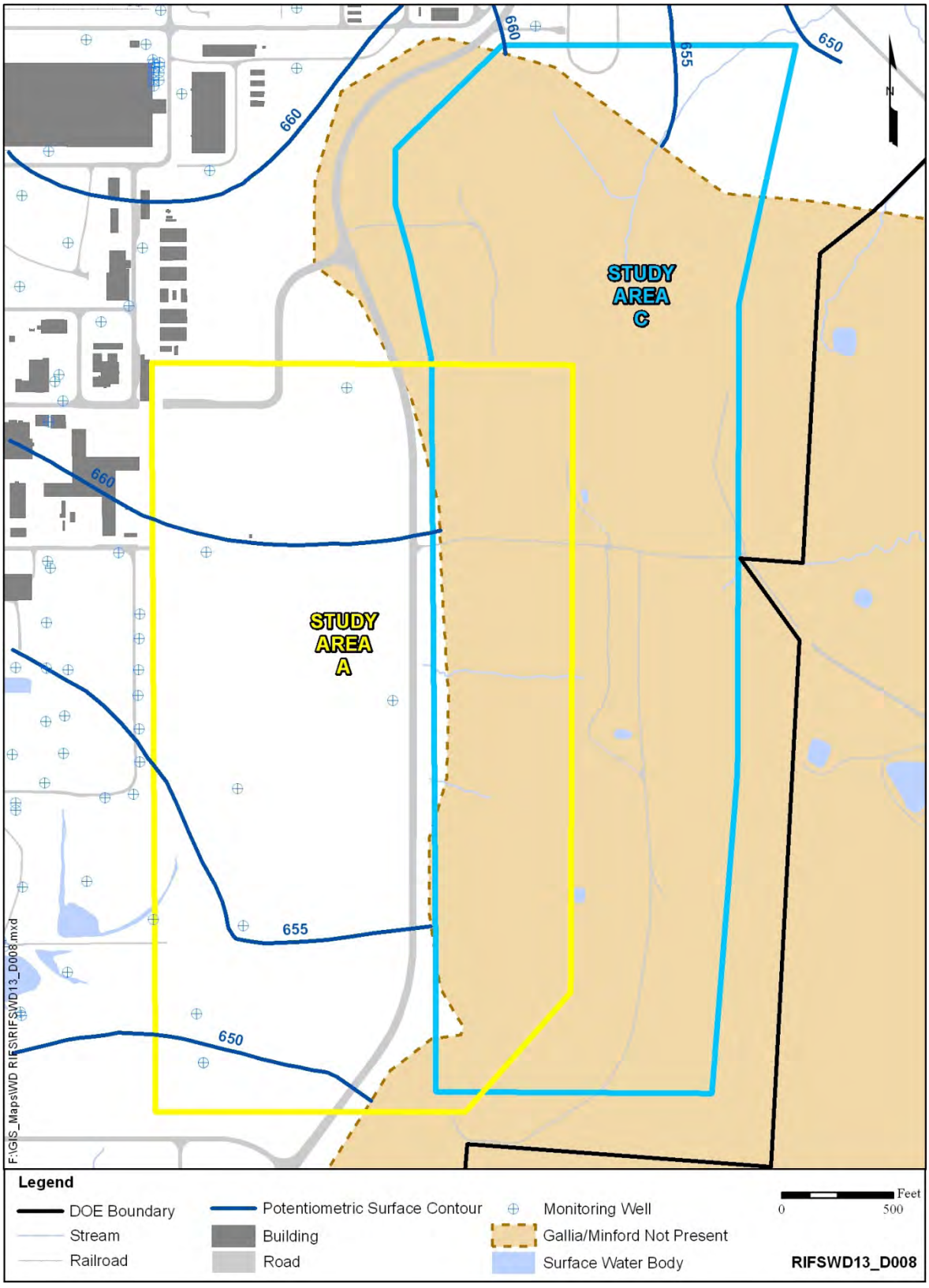

Figure D.8. Potentiometric Map of the Gallia in Study Areas A and C at PORTS

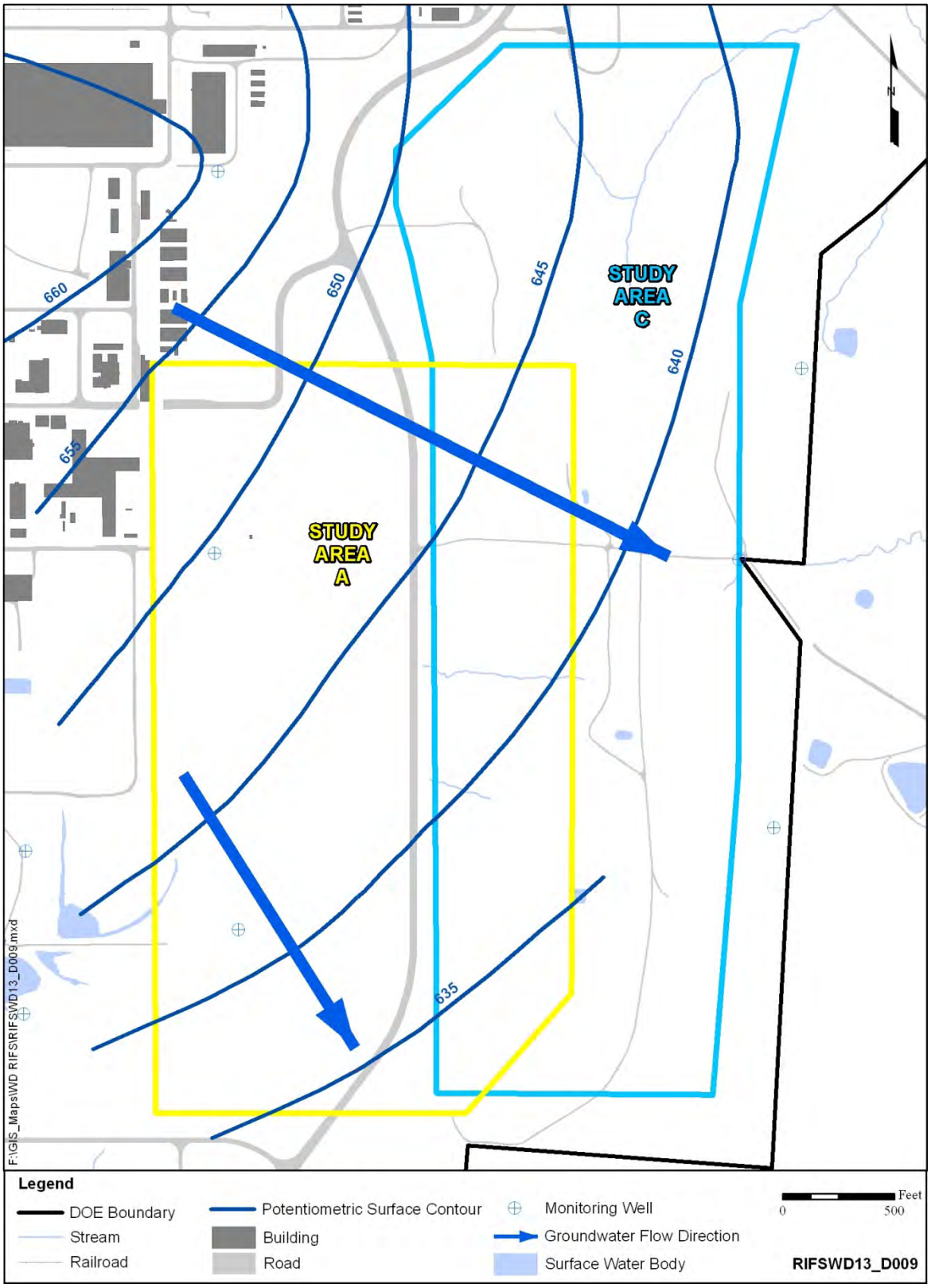

Figure D.9. Potentiometric Map of the Berea Sandstone in Study Areas A and C at PORTS

The hydraulic conductivity determined by single-well aquifer tests of the Gallia ranges from 0.11 to 150 ft/day with a mean value of 3.4 ft/day (DOE 1996a). Hydraulic conductivity tests on Gallia material from the gaseous centrifuge site averaged approximately 0.42 ft/day (Law Engineering 1978). While typically referred to as a sand and gravel unit, the Gallia has been reported to have an average clay content of 30 percent (Law Engineering 1978).

The estimated hydraulic conductivity of the Sunbury shale is based on numerical groundwater modeling with ranges from 1.6×10^{-4} to 9.6×10^{-4} ft/day (DOE 2009). The vertical hydraulic conductivity of the Sunbury shale is assumed to be an order of magnitude lower than its horizontal hydraulic conductivity. (Samples collected from Study Areas C and D provided an average vertical hydraulic conductivity of 1.2×10^{-5} ft/day.) Permeability testing on samples from the deeper Bedford shale yielded an average value of approximately 8.2×10^{-2} ft/day (Law Engineering 1978). The hydraulic conductivity determined by single-well aquifer tests of the Berea sandstone ranges from 4.5×10^{-3} to 15.0 ft/day with a mean value of 0.16 ft/day. The higher hydraulic conductivity tends to occur in areas where the Sunbury shale is absent.

In areas where stress-relief fractures occur in the Cuyahoga Formation, some of the groundwater moves downward from the regolith to provide recharge to the deeper bedrock system. (In test pits, the more brittle sandstone layers were observed to have vertical fractures that did not extend into the overlying or underlying shale.) In a previous test trench located approximately 1,400 ft south of Study Area A, a few joints were visible in the weathered shale. The joints had preferred strikes of about north 50° west, and joint spacing varied from approximately 5 ft to greater than 25 ft. A continuous 1-ft-thick sandstone at approximately 672 ft AMSL was described as highly fractured. Groundwater that migrates into the fractures eventually migrates laterally along the joints or sandstone layers and likely emerges as ephemeral seeps along the hillside downgradient from the recharge areas.

Figure D.10 is taken from a pollution potential map of Pike County (ODNR 2003). The pollution potential map ranks areas with respect to relative vulnerability to contamination of underlying groundwater based on geologic parameters (such as the higher the number, the greater potential for groundwater impacts). This figure indicates that the portion of Study Area A underlain by the Minford and Gallia has a higher relative pollution potential (relative pollution potential of 122) than the eastern portion of the study area, which is underlain by shale (relative pollution potential ranging from 95 to 103). This would be expected because the Gallia does not exist in the eastern portion of Study Area A, and the permeability of the shale bedrock reduces the overall recharge in that area. The permeability of the shale would also provide a longer travel time if a contaminant were present.

The most relevant potential contaminant migration pathway from an engineered disposal facility is by water infiltration from the waste, through the unsaturated zone, and to the groundwater system beneath the facility. Many physical, chemical, and biological processes influence the contaminant fate and transport in these zones. The major processes include advection, hydrodynamic dispersion, retardation, biodegradation, and reactive transformation. For unsaturated and saturated zones at PORTS, the fate and transport of the contaminants would be primarily controlled by the retardation process. The retardation factor (R_f) for a particular chemical species is the ratio of the rate of contaminant movement to the rate of groundwater movement. R_f is a bulk property for the entire system, combining all the effects of solution chemistry, soil properties, and chemical reactions. Both ion exchange and sorption are the processes that tend to remove specific species from solution and retard their migration through the subsurface. Sorption refers to the process where a contaminant species leaves the solution and is adsorbed onto the surface of a solid, resulting in an increase in the concentration of the contaminant in the soil and a relatively lower concentration in the groundwater. Ion exchange is important in clay minerals that are composed of layered sheets, which can have interlayered ionic species such as Na^+, Ca^{2+}, K^+, and H_2O.

These can exchange with many types of metal ions. The R_f is defined as:

$$R_f = 1 + K_d \frac{\rho_b}{n_e}$$

where: ρ_b = bulk density of the soil (g/cm^3)
n_e = effective porosity of aquifer matrix (ratio)
K_d = soil/water partition coefficient (g/mL).

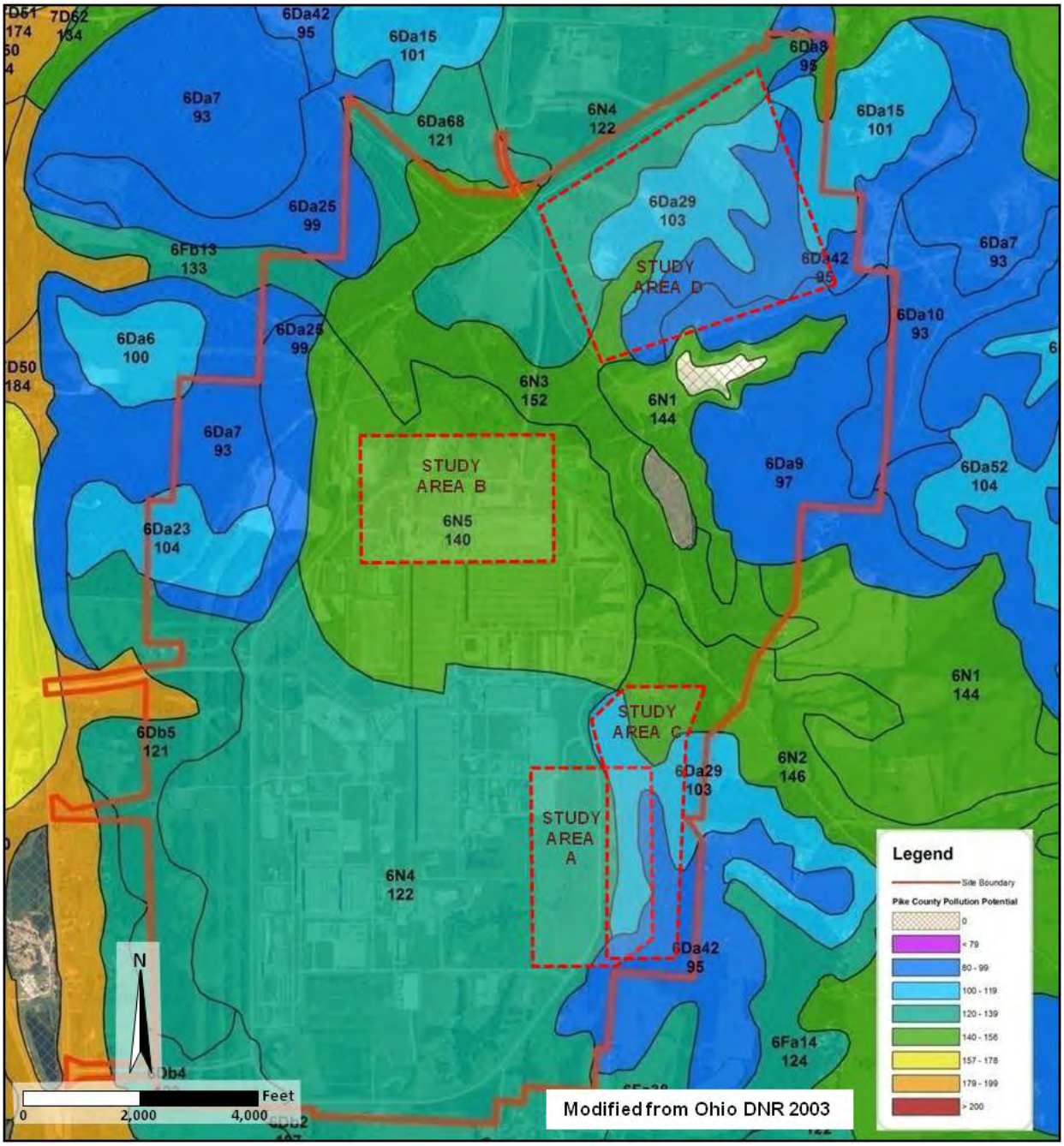

Figure D.10. Pollution Potential Map for the Four Study Areas at PORTS

For a given mass of contaminant, the fraction available for transport with the groundwater is influenced by the adsorptive properties of the soil matrix. The soil/water partition coefficient (K_d) is very important for estimating the potential for adsorption of dissolved contaminants in contact with subsurface media. Because of the retardation process, the movement of the contaminant is generally slow in the unsaturated and groundwater zones for Study Area A where a lot of clayey soil exists for the two zones. With regard to the same contaminant, the K_d for a clayey soil is generally higher than that for a sandy soil.

Contaminant travel times (time at which a constituent reached its peak concentration or dose) were simulated for several constituents as part of the development of preliminary WAC modeling (DOE 2012). The modeling for preliminary WAC considered a potential OSDC with capacities to contain 1 million cy of waste and 3 million cy of waste. Travel times were calculated for constituents (including four inorganic, six organic, and six radionuclide constituents) migrating from the waste mass to specific locations, called points of assessment, downgradient from the conceptual OSDC locations. Table D.1 provides the modeling results for Study Area A. Three compounds (1,1-dichloroethene, methylene chloride, and trichloroethene) had modeled times of peak dose between approximately 600 and 825 years. Radiological constituents such as technetium-99 and uranium had travel times to peak dose of approximately 5,800 years and 47,000 years, respectively. Based on this modeling, most of the contaminants were estimated to migrate downward into the Gallia, then laterally to discharge into Big Run Creek (DOE 2012).

Table D.1. Time of Peak Dose for a Potential OSDC at Study Area A

	1,000,000 cy		3,000,000 cy	
SRC	On-Site POA (years)	DOE Boundary POA (years)	On-Site POA (years)	DOE Boundary POA (years)
Antimony	44,133	44,133	44,039	44,039
Arsenic	44,133	44,133	44,039	44,039
Barium	126,981	126,981	126,724	126,724
Chloroform	2,200	2,200	1,823	1,823
Chromium III	23,420	23,420	23,367	23,367
Cyanide	23,190	23,190	23,138	23,138
1,1-Dichloroethene	664	664	654	654
Methylene Chloride	608	608	599	599
n-Nitroso-di-N-propylamine	1,316	1,316	1,306	1,306
Aroclor 1232	39,070	39,070	38,986	38,986
Trichloroethene	822	822	812	812
Tc-99	5,846	5,846	5,845	5,845
U-234	38,812	38,812	39,076	39,076
U-235	47,202	47,202	46,876	46,876
U-238	47,202	47,202	46,876	46,876
Np-237	84,517	84,517	85,950	85,950
Pu-239	83,170	83,170	84,512	84,512

Source: DOE 2012

DOE = U.S. Department of Energy
POA = point of assessment
SRC = site-related contaminant

Based on the soil survey of Pike County, three soil types occur within the Study Area A boundary. The predominant soil type is Omulga silt loam (U.S. Department of Agriculture [USDA] 1990). Most of the area west of Perimeter Road is classified as Urban Land-Omulga complex with a 0 to 6 percent slope, which consists of urban land and a deep, nearly level, gently sloping, moderately well-drained Omulga soil in preglacial valleys. The soil in this area has been so disturbed by previous construction activities that assignment of specific soil series is not feasible.

The surface layer of Omulga silt loam is dark grayish-brown, friable, and approximately 10 in. thick. The subsoil is approximately 54 in. thick and is composed of three portions: (1) a yellow-brown, friable silt loam; (2) a fragipan (brittle, compacted subsurface soil) of yellow-brown, mottled, firm, and brittle silty clay loam; and (3) a yellow-brown, mottled, friable silt loam approximately 20 in. thick. Well developed soil horizons may not be present in areas inside Perimeter Road because of cut and fill operations related to plant construction.

Two soil series are present in Study Area A in the upland area east of Perimeter Road. The Rarden series consists of moderately deep, moderately well-drained, slowly permeable soils formed in acid, clayey shale residuum on ridgetops and hillsides. The Coolville series, nearer the top of the ridge, consists of deep, moderately well-drained soils formed in a thin silty mantle weathered from acid shale that has thin strata of siltstone.

D.2.2 SURFACE WATER RESOURCES

There are no perennial streams within or adjacent to Study Area A. The area lies within the headwater area of Big Run Creek. Big Run Creek is the small tributary of the Scioto River that drains the southern portion of the PORTS property. This stream primarily receives outfall effluent from the X-230K South Holding Pond, which is located immediately west of Study Area A, at its headwaters. Big Run Creek flows south-southwest from the area for approximately 4 miles until it intersects the Scioto River. The substrates of Big Run Creek are predominantly gravel and cobble, and the stream channel remains unmodified. Because of the small stream size and high gradient, deep pools are absent (Ohio EPA 1993).

D.2.3 ECOLOGICAL RESOURCES

Study Area A contains forest and managed grasslands that are interspersed with man-made features such as roads and parking areas. Study Area A is primarily managed grassland with a long north-south strip of forest on its east side. In the western portion of Study Area A, managed grassland is dominant. Within this managed grassland, trees line the banks of several short drainage ditches that flow out of Study Area A and into the X-230K Holding Pond. No jurisdictional wetlands or ecologically sensitive areas are located within Study Area A.

There are no endangered species habitat areas, endangered plant species, or exceptional warmwater habitat streams with Study Area A.

D.2.4 CULTURAL RESOURCES

None of the archaeological sites identified at PORTS are located within Study Area A. Also, no architectural resources are present in Study Area A.

D.3 DESCRIPTION OF STUDY AREA B

Study Area B was selected for evaluation primarily because it represents a location impacted by plant operations. This area has low to moderate topographic relief of less than 65 ft with elevations ranging from approximately 635 to 700 ft AMSL (Figure D.11). The majority of the study area has a relief of less than 20 ft with elevations varying from 650 to 670 ft AMSL. This study area is easily accessible by road and railway and is in close proximity to existing utilities necessary for construction and operation of a potential OSDC. Major surface structures within the location include the X-344 facility, four electrical transmission towers, cylinder yards, and a portion of Perimeter Road (approximately 4,500 ft). The potential removal of these structures is part of a separate decision. The X-344 facility may be among the last facilities scheduled for D&D, which would impact construction of a potential OSDC.

Study Area B is the most developed of the four study areas, consisting mostly of man-made features and grassland. The man-made features include numerous buildings, roads, railroad tracks, and other facilities. Development is dense in the southern portion of Study Area B, which is south of Perimeter Road. The northern portion of Study Area B is primarily grassland with a few small stands of trees. Development in Study Area B consists of the X-745G-1/X-745G-2 Cylinder Storage Yard, X-747H Northwest Surplus Scrap Yard, and X-752 Warehouse. The X-206H Parking Lot is located in the south central portion of Study Area B.

D.3.1 GEOLOGY, HYDROGEOLOGY, AND SOILS

Study Area B lies near the center of the ancestral Portsmouth River valley. Stratigraphic units from youngest to oldest in age include the Quaternary Teays Formation (Minford Member/Gallia Member) unconformably overlying the Mississippian to Upper Devonian Sunbury shale, Berea sandstone, and Bedford shale.

The Teays Formation is a 30- to 40- ft-thick unconsolidated unit consisting of fluvial Gallia sand and gravel overlain by Minford clay and silt. The Gallia averages less than 5 ft in thickness and is characterized as reddish-brown, clayey, poorly-sorted, medium-to-coarse sand and gravel. The Gallia reportedly contains an average of 30 percent clay material (Law Engineering 1978). Within Study Area B, the Gallia ranges from 0 to less than 10 ft in thickness. The Minford consists of two units with a gradational contact. The upper unit is predominantly silty clay with some very fine-grained sand, and the lower silt unit is composed of clayey silt and very fine to fine-grained sand. Geotechnically, the Minford consists primarily of overconsolidated lean clays and silts (Law Engineering 1978).

The Gallia is not present in the east-central portion of Study Area B because the bedrock has a higher elevation. Figure D.12 shows the configuration of the top of the bedrock surface within Study Area B and demonstrates the higher bedrock in the eastern portion of the study area. The depth to bedrock varies from less than 20 ft on the eastern portion of the study area to greater than 30 ft in the western half of the area. The Teays Formation directly overlies the Sunbury shale across the eastern portion of the study area. However, the Sunbury has been removed by erosion along the western portion of the study area, and the Teays Formation directly overlies the Berea.

Stratigraphic relationships at Study Area B are shown in Figures D.13 and D.14, which present south-to-north and west-to-east cross sections, respectively. These cross sections illustrate the discontinuous nature of the Gallia across Study Area B and also the nature of the unconformity on the Sunbury and Berea. North of the study area, Little Beaver Creek has cut through the Berea sandstone into the underlying Bedford shale.

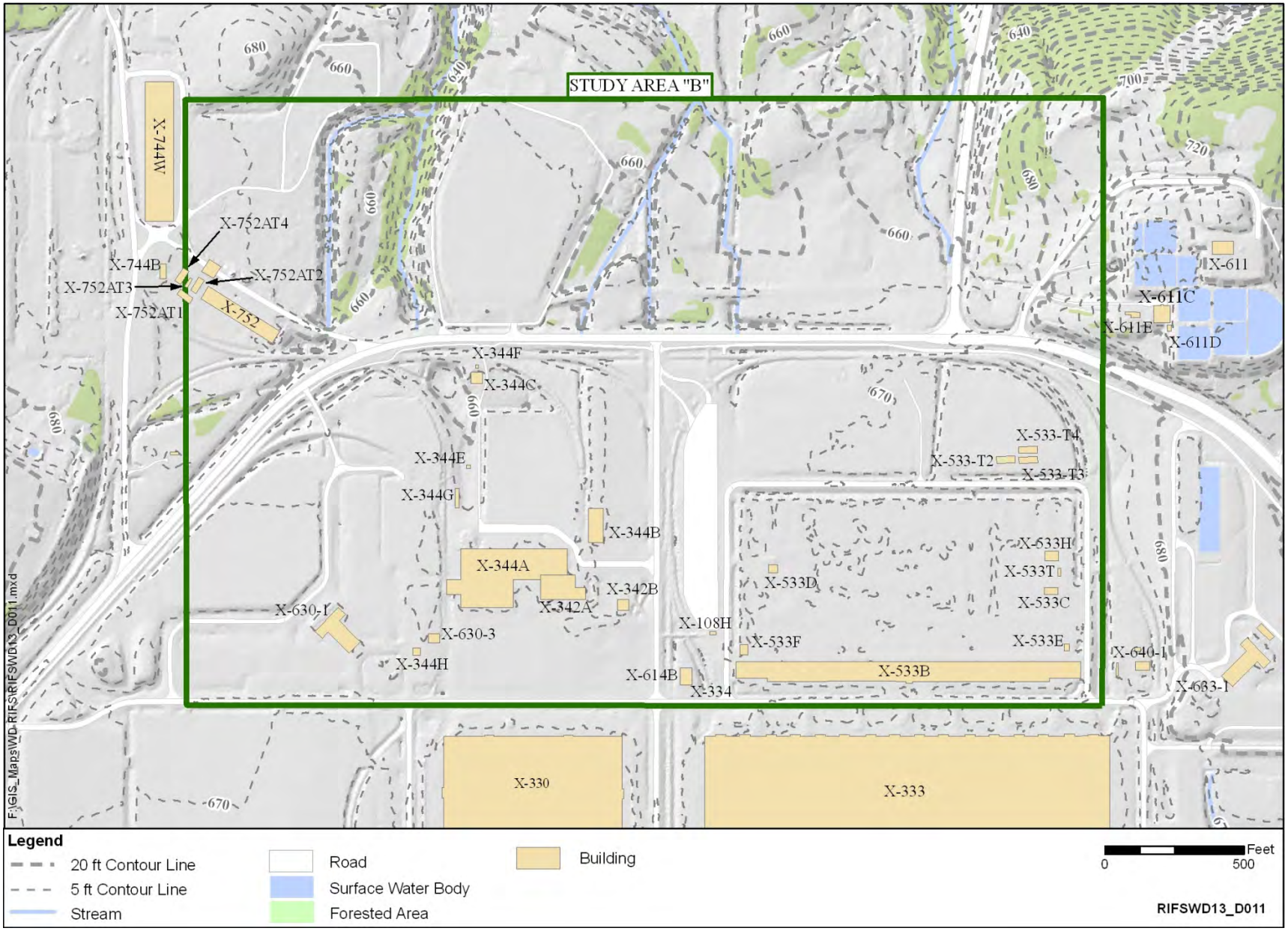

Figure D.11. Topography of Study Area B at PORTS

Figure D.12. Top of Bedrock in Study Area B at PORTS

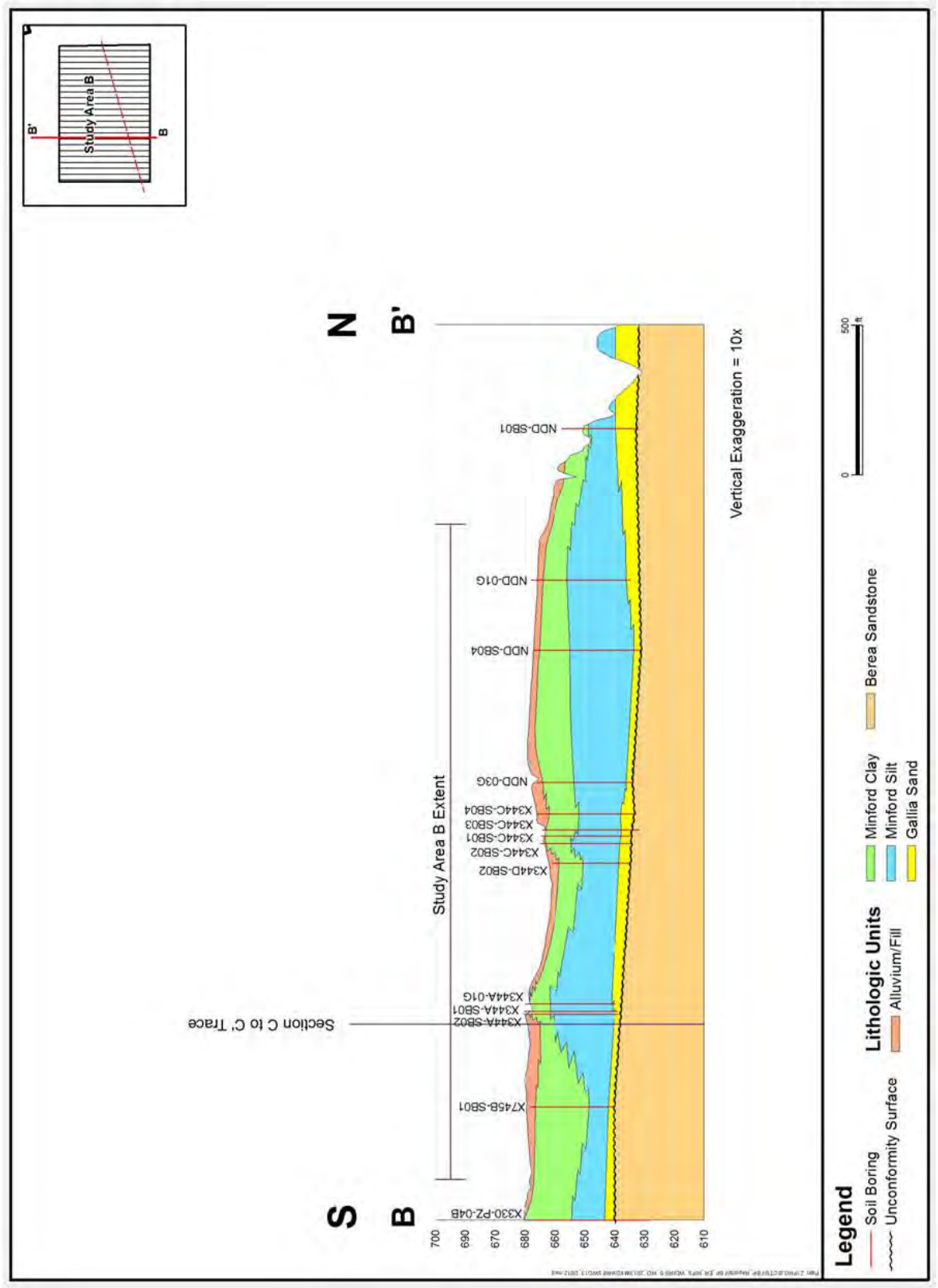

Figure D.13. South to North Geologic Cross Section of Study Area B at PORTS

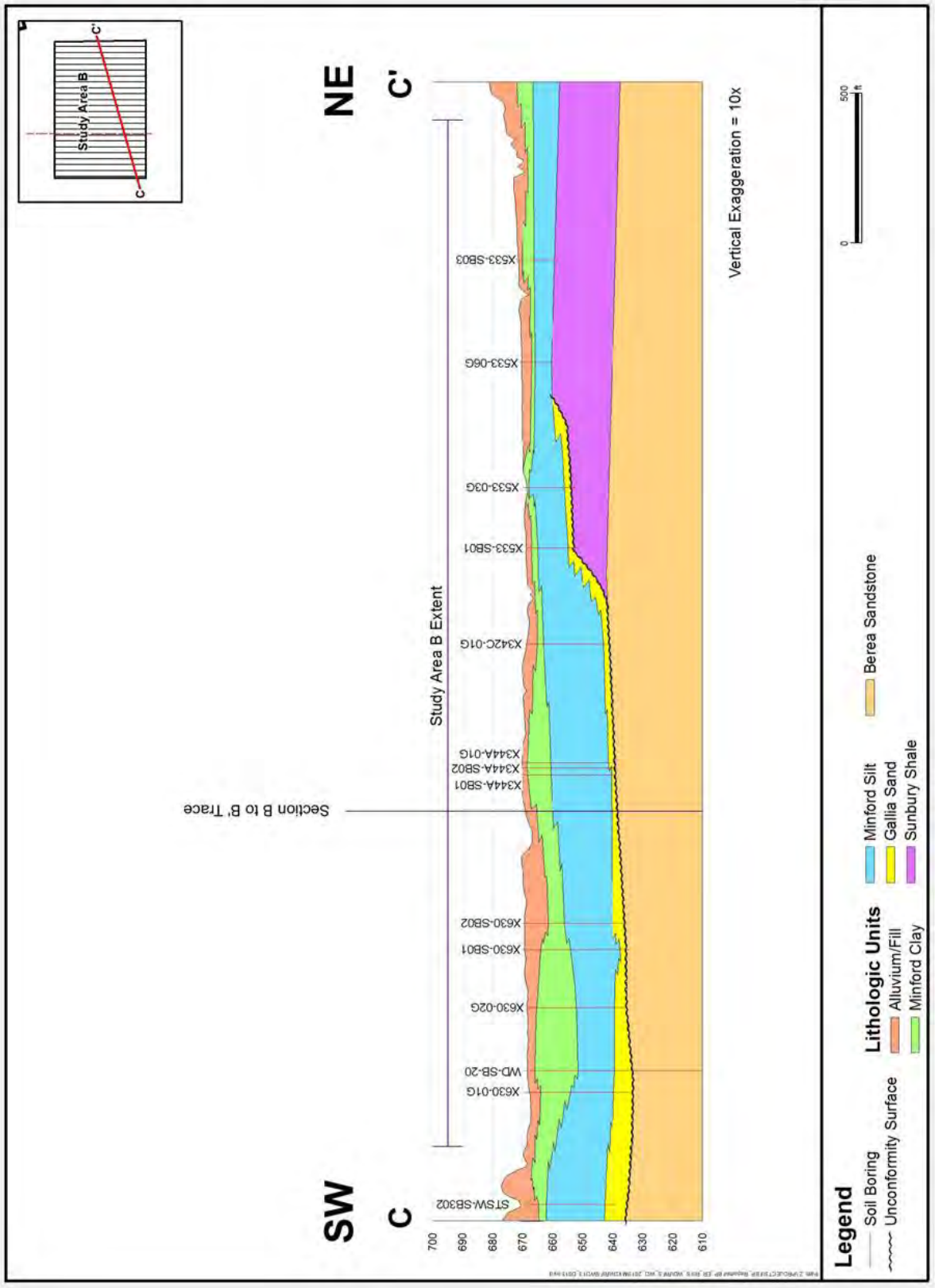

Figure D.14. West to East Geologic Cross Section of Study Area B at PORTS

The groundwater flow system at Study Area B includes the aquifers consisting of the unconsolidated Gallia sand and gravel and the Berea sandstone, along with the aquitards of Sunbury shale and unconsolidated Minford clay and silt. The basal portion of the Minford is generally grouped with the Gallia to form the uppermost aquifer and primary water-bearing unit within this study area. Groundwater flow in Study Area B is strongly controlled by the presence of surface drainages and bedrock highs (DOE 1996d). Little Beaver Creek is the surface water receptor for groundwater in both the Gallia and Berea in the area.

Groundwater flow in the Gallia (Figure D.15) is essentially parallel to that in the Berea (Figure D.16) with flow generally to the north towards Little Beaver Creek, and to a lesser extent, toward portions of the North Drainage Ditch. Both Figures D.15 and D.16 represent the potentiometric surfaces for the third quarter 2012 (DOE 2013). The depth to the Gallia potentiometric surface in Study Area B is approximately 8 to 15 ft below surface. Because the Berea underlies the Sunbury shale, groundwater flow in the Berea is unaffected by the bedrock high of the Cuyahoga Shale on the eastern end of the study area. The hydraulic gradient in the Gallia is low (ranging from approximately 0.01 ft/ft to 0.005 ft/ft) with the steeper gradients existing closer to the discharge areas. The downward vertical hydraulic gradient from the Gallia to the Berea is approximately 0.35 ft/ft in the area of the former X-533A Switchyard, but overall in and around the study area, the potentiometric surfaces of the Gallia and Berea are at similar levels. Upward gradients from the Berea into the Gallia are observed where the Sunbury shale is absent (DOE 1996d) and closer to Little Beaver Creek. Groundwater flow in the Berea is north to northeast towards Little Beaver Creek with a gradient averaging approximately 0.01 ft/ft (Figure D.16). The seasonal fluctuations of the potentiometric surfaces for both the Gallia and the Berea are less than 5 ft.

The pollution potential map (Figure D.10) indicates that Study Area B, which (1) is underlain by the Minford and Gallia, (2) has a higher recharge, and (3) would have faster contaminant travel times, has a higher relative pollution potential (140) than the other three study areas. Both ion exchange and sorption are important processes that tend to remove specific contaminant species from solution and retard their migration through the subsurface. Similar to the situation in Study Area A, because of these retardation processes, the movement of contaminants is generally slow in the unsaturated and groundwater zones for Study Area B where a lot of clayey soil exists in the two zones.

Modeling for the preliminary WAC at Study Area B (Table D.2) provided similar results as discussed previously for Study Area A. Three compounds (1,1-dichloroethene, methylene chloride, and trichloroethene) had modeled times of peak dose between approximately 500 and 725 years, slightly faster than travel times at Study Area A. Radiological constituents, such as technetium-99 and uranium, had travel times to peak dose of approximately 4,700 years and 40,000 years, respectively. Based on the modeling, most of the contaminants were estimated to migrate downward into the Gallia, then laterally to discharge into Little Beaver Creek (DOE 2012).

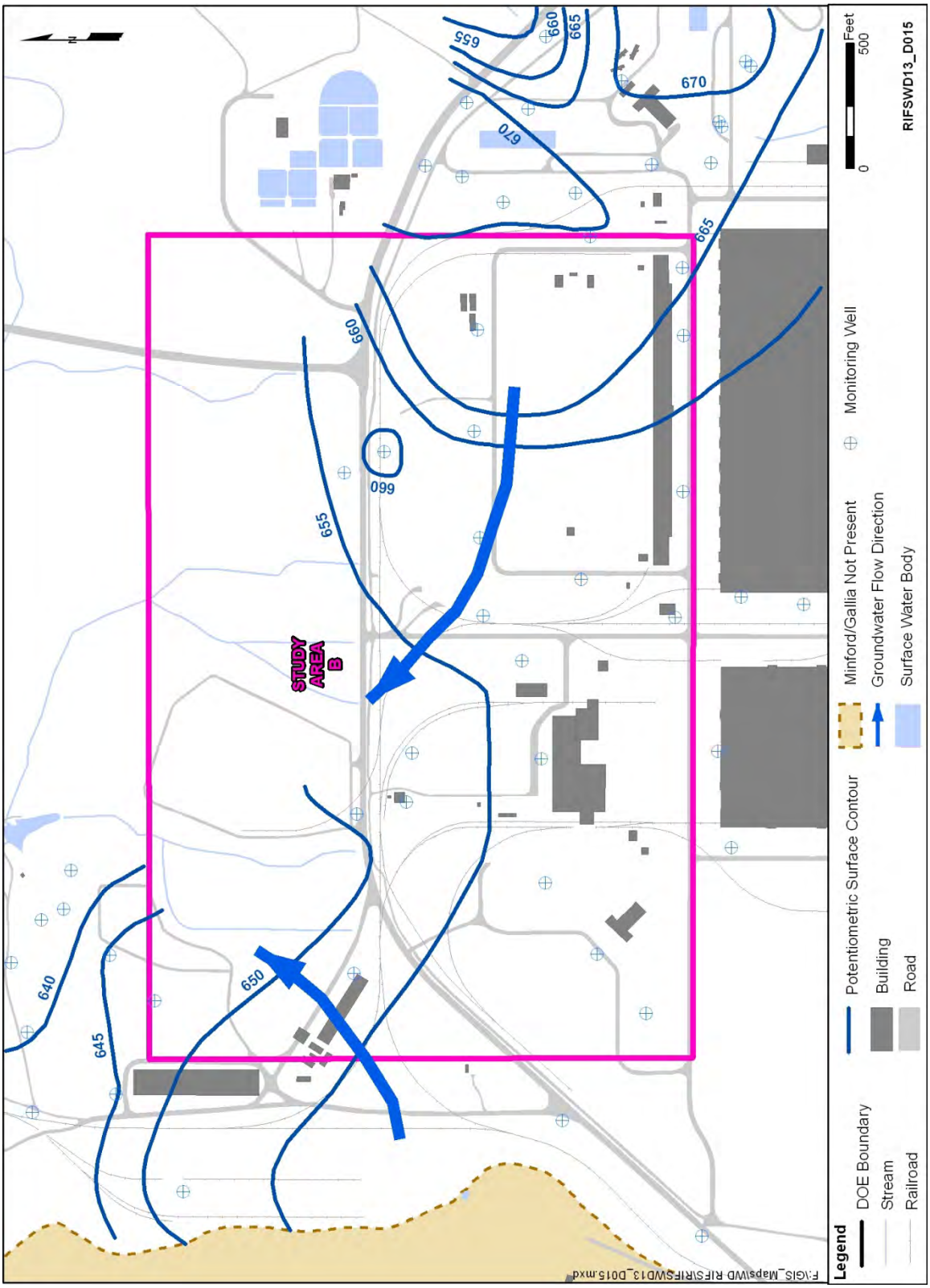

Figure D.15. Potentiometric Map of the Minford/Gallia in Study Area B at PORTS

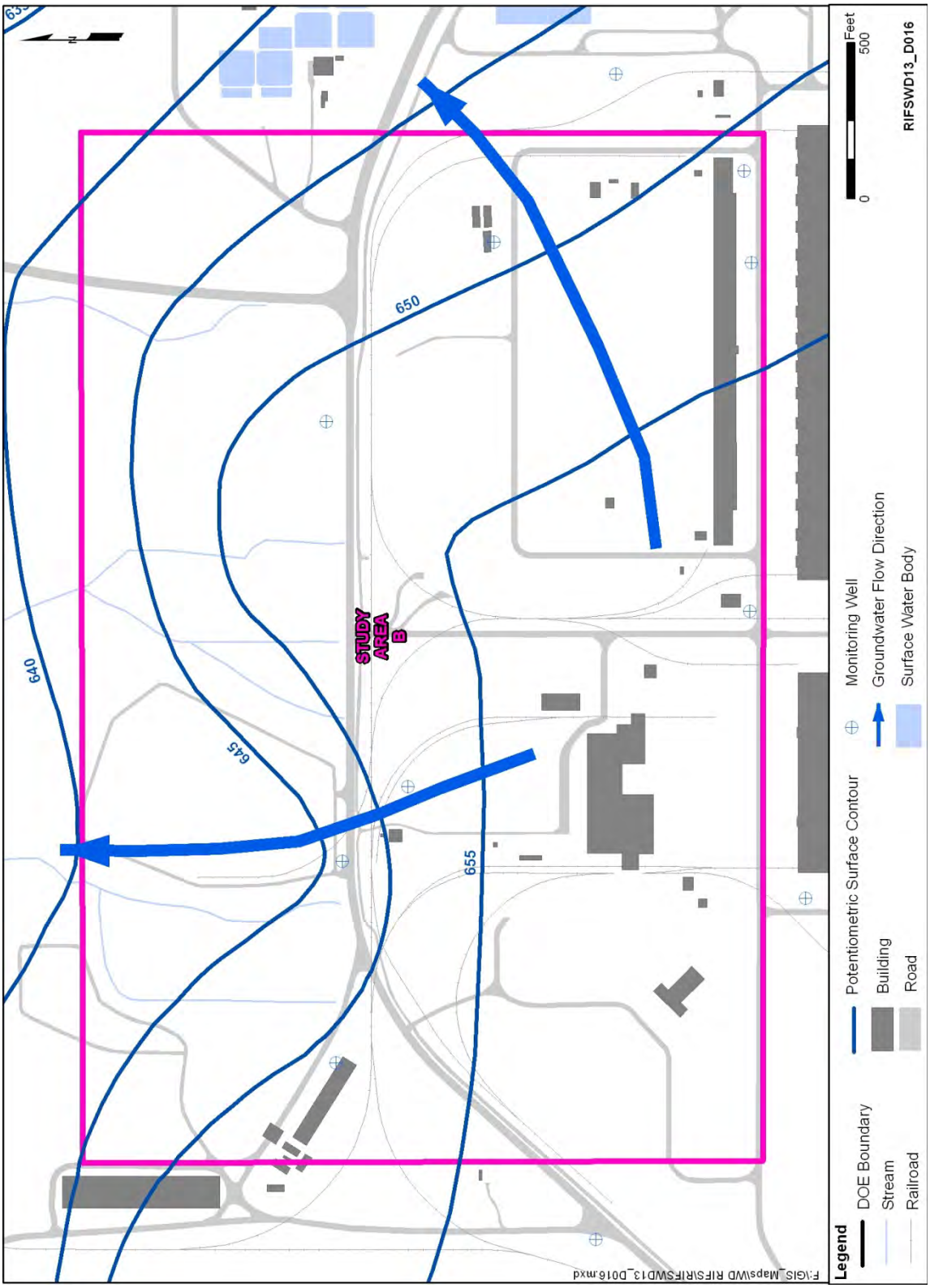

Figure D.16. Potentiometric Map of the Berea Sandstone in Study Area B at PORTS

Table D.2. Time of Peak Dose for a Potential OSDC at Study Area B

	1,000,000 cy		3,000,000 cy	
SRC	On-Site POA (years)	DOE Boundary POA (years)	On-Site POA (years)	DOE Boundary POA (years)
Antimony	35,960	35,960	35,746	35,746
Arsenic	35,960	35,960	35,746	35,746
Barium	103,379	103,379	102,793	102,793
Chloroform	1,847	1,847	1,819	1,819
Chromium III	19,106	19,106	18,985	18,985
Cyanide	18,918	18,918	18,799	18,799
1,1-Dichloroethene	497	497	479	479
Methylene Chloride	551	551	442	442
n-Nitroso-di-N-propylamine	1,128	1,128	1,103	1,103
Aroclor 1232	31,840	31,840	31,649	31,649
Trichloroethene	726	726	703	703
Tc-99	4,728	4,728	4,723	4,723
U-234	33,274	33,274	32,966	32,966
U-235	40,029	40,029	39,289	39,289
U-238	40,029	40,029	39,289	39,289
Np-237	80,003	80,003	78,258	78,258
Pu-239	77,757	77,757	75,870	75,870

Source: DOE 2012

DOE = U.S. Department of Energy
POA = point of assessment
SRC = site-related contaminant

Based on the soil survey of Pike County, the predominant soil type within Study Area B is Omulga silt loam (USDA 1990). Most of the area is classified as Urban Land-Omulga complex with a 0 to 6 percent slope, which consists of urban land and a deep, nearly level, gently sloping, moderately well-drained Omulga soil in preglacial valleys. The soil in this area has been so disturbed by previous construction activities that assignment of specific soil series is not feasible.

D.3.2 SURFACE WATER RESOURCES

There are no perennial streams within Study Area B. The area lies within the drainage area of Little Beaver Creek, which drains the eastern and northern portions of the area before discharging into Big Beaver Creek. Little Beaver Creek is a small, high-gradient, unmodified stream that receives the majority of its flow from the X-230J7 East Holding Pond discharge through the East Drainage Ditch. Little Beaver Creek also receives effluent via the Northeast Drainage Ditch through the outfall from the X-230J6 Northeast Holding Pond and via the North Drainage Ditch through the outfall from the X-230L North Holding Pond. Substrates are predominantly slab boulders and bedrock at the upper reach to gravel and sand near the mouth of the stream. During parts of the year, intermittent flow conditions exist upstream from the X-230J7 discharge. During the summer/fall low-flow time of the year, the upstream section is composed of shallow, isolated pools with intermittent flow (Ohio EPA 2006).

D.3.3 ECOLOGICAL RESOURCES

Study Area B, particularly the southern portion, is highly developed. Managed grassland is dominant among the various man-made features. A few isolated stands of trees are present within the grassland in the northern portion of Study Area B.

Three jurisdictional wetlands (Q4-18, Q4-22, and Q4-26) are located partially or entirely within Study Area B. The wetlands in Study Area B are described in Table D.3 (LMES 1996).

Table D.3. Wetlands in Study Area B

Wetland Number	Status	Acreage	Location	Comments
Q4-18	Jurisdictional	0.322	North Access Road	Drainage ditch
Q4-22	Jurisdictional	0.018	X-745G Cylinder Yard	Drainage ditch
Q4-26	Jurisdictional	0.160	X-752 Warehouse	Man-made ditch

Source: LMES 1996

LMES = Lockheed Martin Energy Systems, Inc.

No endangered species habitat areas or endangered plant species are present in Study Area B; no endangered or threatened fish species are present within the boundaries of Study Area B. Little Beaver Creek, which is classified as meeting exceptional warmwater criteria in some reaches, is outside Study Area B. Study Area B drains to Little Beaver Creek.

D.3.4 CULTURAL RESOURCES

None of the archaeological sites identified on the PORTS Facility are located within Study Area B.

Study Area B is the most densely developed of the four study areas, particularly in the portion south of Perimeter Road; therefore, it contains numerous architectural resources. Many of these have been demolished in recent times, but a number of architectural resources are still present in Study Area B.

D.4 DESCRIPTION OF STUDY AREA C

Study Area C was selected as a location for evaluation primarily because of the underlying hydrogeology. Study Area C is mostly underlain by Cuyahoga Shale, and its topographic relief (approximately 135 ft) may provide a separation of the water table from the bottom liner of a potential OSDC by more than 50 ft, required by 40 *Code of Federal Regulations* (*CFR*) 761.75(b)(3). The study area topography ranges from approximately 660 to 795 ft AMSL (Figure D.3). This area does not contain any buildings or structures in a land-use conflict area or scheduled for D&D, reindustrialization and reuse, or future redevelopment infrastructure. This location is relatively close to the East and South Access Roads.

The land in Study Area C consists almost entirely of upland forest. An isolated area of managed grassland is present along the western boundary of this study area, and small areas of grassland occupy the northern portion of it. Segments of unimproved roads are the only development features in Study Area C.

No major roads are present within Study Area C. Short segments of unimproved roads are the only transportation infrastructure in this study area.

D.4.1 GEOLOGY, HYDROGEOLOGY, AND SOILS

Study Area C lies on a ridge outside the eastern edge of the ancestral Portsmouth River valley. Stratigraphic units from youngest to oldest in age include the Mississippian to Upper Devonian Cuyahoga Formation, Sunbury shale, Berea sandstone, and Bedford shale. The Quaternary Teays Formation

(Minford Member/Gallia Member) unconformably overlies the bedrock within the ancestral valley and pinches out on the western and northern flanks of the ridge.

Figure D.6 shows the configuration of the top of the bedrock surface within Study Area C and prominently indicates the edge of the ancestral valley against the ridge that is prominent within Study Area C. The depth to bedrock is shallow in Study Area C, ranging from less than 10 ft to approximately 20 ft deep on the western and northern boundaries. The Cuyahoga is overlain by a combination of a thin veneer of Minford silt/clay (on the western portion) and regolith on the bedrock. The topographic ridge in Study Area C is underlain by the Cuyahoga Formation. The maximum thickness of the Cuyahoga Formation is approximately 140 ft where the ridge is at its greatest height.

The Cuyahoga Formation is a medium gray, hard, thinly bedded shale with occasional thin (0.5 in. to 1 ft) fine-grained sandstone and siltstone lenses and layers. The Cuyahoga Formation is underlain by the Sunbury shale, which is approximately 20 to 25 ft thick. The Berea sandstone, with an average thickness of approximately 35 ft in the PORTS area, lies beneath the Sunbury shale. The Berea is composed of a light gray, hard, thickly bedded, fine-grained sandstone with thin shale laminations. The bedrock formations dip gently to the east-southeast at approximately 30 ft/mile. Stratigraphic relationships are shown in Figure D.7.

Based on drilling in the Cuyahoga Formation in Study Area C, three zones of weathering can be recognized in the shale. The upper zone is characterized as regolith (comprised of a lean clay residual soil mixed with colluvium) that generally extends from less than 10 ft to 20 ft in depth and does not retain any of the parent shale structural characteristics. The top of the bedrock is at the base of this regolith zone. The second weathering zone is highly weathered shale that is light tan to brown in color. In this zone, although the rock structure (bedding and jointing) is still evident, the shale is very weak and generally can be broken by hand. (Auger drilling typically hits refusal at the base of this zone.) The thickness of this second zone is approximately 10 ft. The third zone of weathering consists of moderately weathered shale and extends to 30 ft below the surface. This zone exhibits tan to brown bands of weathered shale that parallel both sides of some bedding planes and/or joints, with alternating intervals of unweathered gray shale. The top of the unweathered shale has been placed at the point where the shale becomes continuously gray in color with depth and significant weathering along joints or fractures no longer occurs. Although jointing or fracturing was evident in the weathered zones, joints/fractures were less prevalent in the unweathered shale.

The groundwater flow system at Study Area C includes the groundwater system in the shallow regolith and the Berea sandstone aquifer, along with the aquitards of the Cuyahoga Formation, Sunbury shale, and Bedford shale. Natural recharge to the groundwater flow system comes mainly from precipitation, although land use and the presence of the bedrock shale units effectively reduce recharge to underlying units. Discharge of groundwater to the surface occurs primarily along streams that transect the plant. Natural recharge to the central portion of the plant is approximately 4 to 7 in./year whereas recharge in the uplands such as those at Study Area C (areas underlain by shale bedrock) is 2 to 4 in./year (ODNR 2003). The recharge is less in the uplands due to topography (steeper slopes promoting runoff) and low permeability of the bedrock and residual clayey soil in the regolith. Most of the water that infiltrates through the regolith likely moves laterally upon reaching the base of the deeply weathered zone due to the very low vertical permeability of the Cuyahoga Formation (1×10^{-3} to 1×10^{-6} ft/day). A couple of historical shallow-dug wells were found in Study Area C, and the depth to water in one of these wells, which had a total depth of approximately 28 ft, was approximately 14 ft below surface. (The other well, with a total depth of almost 13 ft, remained dry after existing water was removed.) These wells are completed in the regolith/weathered bedrock zone.

In areas where stress-relief fractures occur in the Cuyahoga Formation, some of the groundwater moves downward from the regolith to provide recharge to the deeper bedrock system. (In test pits, the more brittle sandstone layers were observed to have vertical fractures that did not extend into the overlying or underlying shale.) In a previous test trench located approximately 2,000 ft southwest of Study Area C, a few joints were visible only in the moderately weathered shale. The joints had preferred strikes of about north 50° west, and joint spacing varied from approximately 5 ft to greater than 25 ft. A continuous 1-ft-thick sandstone at approximately 672 ft AMSL was described as highly fractured. Groundwater that migrates into the fractures eventually migrates laterally along the joints or sandstone layers and likely emerges as ephemeral seeps along the hillside downgradient from the recharge areas.

Four piezometers were drilled into the Cuyahoga Formation/Sunbury Formation. The Cuyahoga/Sunbury piezometers (as well as adjacent, temporary air-rotary-drilled borings) at Study Area C often had too little water to allow a water level measurement. Only piezometers WD-PZ04C and WD-PZ05C have shown significant water level fluctuations, which were 22.3 ft and 6.2 ft, respectively. The large fluctuations in water levels in WD-PZ04C suggest this piezometer may be in hydraulic connection with a fracture/joint that is also in connection with the regolith zone. On the other hand, piezometers WD-PZ06C and WD-PZ07C exhibit water level fluctuations of only 1.1 ft and 0.5 ft, respectively. The three air-rotary borings adjacent to WD-PZ04C, WD-PZ06C, and WD-PZ07C never had sufficient water to allow a depth-to-water measurement.

Groundwater flow in the Berea is northwest to southeast with a gradient varying from approximately 0.004 to 0.007 ft/ft (Figure D.9). Seasonal fluctuation of the Berea's potentiometric surface is typically less than 2 ft with no change in groundwater flow direction. While groundwater yield in the Berea is typically lower than the yield in the Gallia, the Berea is a widespread unit and is considered to be a regional aquifer.

The estimated hydraulic conductivity of the Sunbury shale is based on numerical groundwater modeling with ranges from 1.6×10^{-4} to 9.6×10^{-4} ft/day (DOE 2009). The vertical hydraulic conductivity of the Sunbury shale is assumed to be an order of magnitude lower than its horizontal hydraulic conductivity. (Samples collected from Study Areas C and D yielded a vertical hydraulic conductivity of 1.2×10^{-5} ft/day.) Permeability testing on samples from the deeper Bedford shale yielded an average value of approximately 8.2×10^{-2} ft/day (Law Engineering 1978). The hydraulic conductivity determined by single-well aquifer tests of the Berea sandstone ranges from 4.5×10^{-3} to 15.0 ft/day with a mean value of 0.16 ft/day. The higher hydraulic conductivity tends to occur in areas west of the study area where the Sunbury shale is absent.

The pollution potential map of Pike County (ODNR 2003) indicates that most of Study Area C, which is underlain by shale, has a relative pollution potential ranging from 95 to 103. This would be expected because the unconsolidated Gallia does not exist over most of Study Area C, and the permeability of the shale bedrock reduces the overall recharge in that area. The extreme northern portion of the study area has a higher pollution potential where the Minford/Gallia exists. The rate of groundwater flow, and potential contaminant migration, vertically through the Cuyahoga Formation and Sunbury shale is expected to be very slow.

The pollution potential of the area can also be related to contaminant fate and transport migration within the subsurface at the study area. The travel time for any contaminant to migrate from a potential OSDC to an exposure point is a function of the properties of the unsaturated and aquifer zones as well as the contaminant-specific chemical properties.

Because of the presence of the thick shale and abundance of clay minerals within the unsaturated zone at Study Area C, the retardation processes for contaminants are much more predominant than they are at either Study Areas A or B. The movement of the contaminants is likely to be much slower in the unsaturated zone than at Study Areas A and B. Therefore, because of the thick shale bedrock, Study Area C will provide greater protection to groundwater than Study Areas A and B. As shown in Table D.4, modeling for the preliminary WAC indicated travel times for peak dose to the DOE property boundary for some of the more highly mobile organic compounds to take greater than 2,000 years (compared to less than 1,000 years for Study Areas A and B). The time to peak dose for technetium-99 was approximately 24,500 years and uranium was greater than 150,000 years (DOE 2012). The modeling indicated the contaminants would migrate slowly downward through the Cuyahoga and Sunbury Shale and eventually reach the Berea Sandstone.

Table D.4. Time of Peak Dose for a Potential OSDC at Study Area C

	1,000,000 cy	3,000,000 cy
SRC	**DOE Boundary POA**	**DOE Boundary POA**
Antimony	> 100,000	> 100,000
Arsenic	> 100,000	> 100,000
Barium	> 100,000	> 100,000
Chloroform	7,657	6,864
Chromium III	83,346	83,293
Cyanide	83,527	82,475
1,1-Dichloroethene	2,316	2,309
Methylene Chloride	2,108	2,101
n-Nitroso-di-N-propylamine	4,657	4,636
Aroclor 1232	> 100,000	> 100,000
Trichloroethene	3,205	3,198
Tc-99	24,500	24,400
U-234	> 150,000	> 150,000
U-235	> 150,000	> 150,000
U-238	> 150,000	> 150,000
Np-237	> 150,000	> 150,000
Pu-239	> 150,000	> 150,000

Source: DOE 2012

DOE = U.S. Department of Energy
POA = point of assessment
SRC = site-related contaminant

Based on the soil survey of Pike County, three soil types occur within the Study Area C boundary (USDA 1990). Two soil series are present in the upland area that makes up the topographic ridge. The Rarden series consists of moderately deep, moderately well-drained, slowly permeable soils formed in acid, clayey shale residuum on ridgetops and hillsides. The Coolville series, nearer the top of the ridge, consists of deep, moderately well-drained soils formed in a thin, silty mantle weathered from acid shale that has thin strata of siltstone.

The third soil type is Omulga silt loam. The surface layer of Omulga silt loam is dark grayish-brown, friable, and approximately 10 in. thick. The subsoil is approximately 54 in. thick and is composed of three portions: (1) a yellow-brown, friable silt loam; (2) a fragipan (brittle, compacted subsurface soil) of yellow-brown, mottled, firm, and brittle silty clay loam; and (3) a yellow-brown, mottled, friable silt loam

approximately 20 in. thick. The extreme northern area of Study Area C is classified as Urban Land-Omulga complex with a 0 to 6 percent slope, which consists of urban land and a deep, nearly level, gently sloping, moderately well-drained Omulga soil in preglacial valleys. The soil in this area has been disturbed by previous construction activities.

D.4.2 SURFACE WATER RESOURCES

No perennial streams are within or adjacent to Study Area C. A topographic ridge is present along this study area. It acts as a drainage divide with surface water originating on the western portion flowing toward Big Run Creek and that originating on the eastern portion flowing to Little Beaver Creek. There are three small ponds, which may be related to former farmsteads. These ponds, which seasonally contain standing water, appear to be man-made (excavated) features. They may also be considered wetlands although previous wetland surveys did not identify them as such.

Big Run Creek is the small tributary of the Scioto River that drains the southern portion of the PORTS property. This stream primarily receives outfall effluent from the X-230K South Holding Pond, which is located west of Study Area C. Big Run Creek flows south-southwest from the area for approximately 4 miles until it intersects the Scioto River. The substrates of Big Run Creek are predominantly gravel and cobble, and the stream channel remains unmodified. Because of the small stream size and high gradient, deep pools are absent (Ohio EPA 1993).

Little Beaver Creek is a small, high-gradient, unmodified stream that receives the majority of its flow from the X-230J7 East Holding Pond discharge through the East Drainage Ditch. Substrates are predominantly slab boulders and bedrock at the upper reach to gravel and sand near the mouth of the stream. During parts of the year, intermittent flow conditions exist upstream from the X-230J7 discharge. During the summer/fall low-flow time, the upstream section is composed of shallow, isolated pools with intermittent flow (Ohio EPA 2006).

D.4.3 ECOLOGICAL RESOURCES

Study Area C is almost entirely upland forest with small zones of grassland to the north and west. No wetlands have been identified in Study Area C. No endangered species habitat areas or endangered plant species are present in Study Area C. Preliminary findings from a detailed habitat mapping study being performed by Ohio University indicate Indiana bat habitat may be more extensive than identified in previous studies. The primary trees that produce exfoliating bark and nesting cavities (e.g., sycamore and shagbark hickory) are abundant in the older forest habitats, including forest habitats in Study Area C (Ohio University 2012). Figure D.17 shows the results of the preliminary habitat mapping in Study Area C. There are no endangered or threatened fish species or exceptional warmwater streams within the boundaries of Study Area C.

D.4.4 CULTURAL RESOURCES

Five of the 36 archaeological sites identified during the 1996-1997 Phase I archaeological survey are located within Study Area C. New archaeological sites were identified as a result of recent Phase I investigations in Study Area C. Of the 10 newly-identified sites, six consist of isolated finds and do not have the potential to yield additional data significant to the prehistory or history of the region. At one site, several prehistoric and historical artifacts were collected, but based on the lack of an intact cultural context, the site was not recommended as eligible for NRHP. The three remaining newly-identified sites date to the historic period and require no further investigation since they yielded low-density artifact scatter. No sites eligible for listing on the NRHP are in Study Area C.

No architectural resources are present in Study Area C.

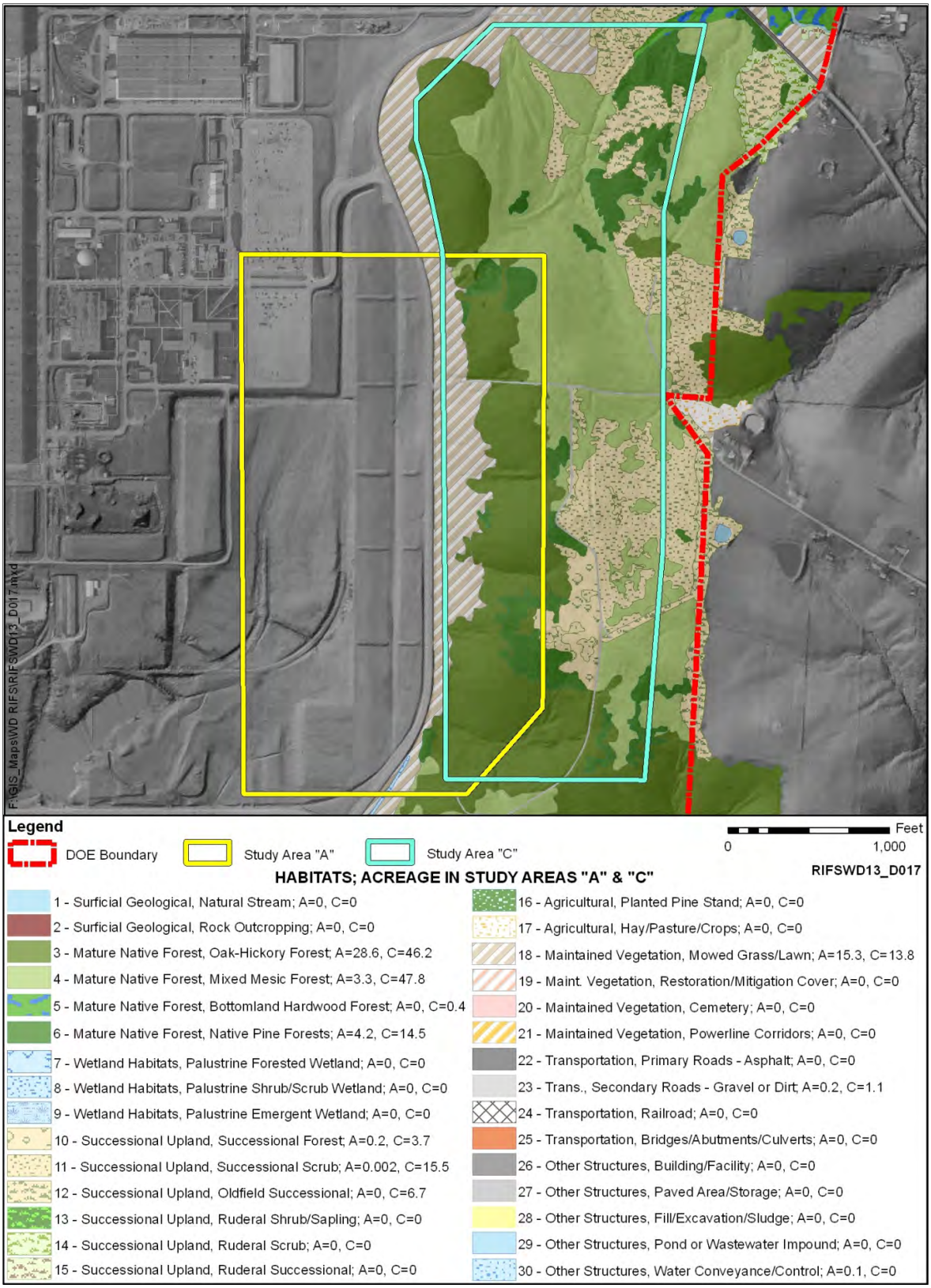

Figure D.17. Preliminary Habitats for Study Areas A and C

D.5 DESCRIPTION OF STUDY AREA D

Study Area D was selected as a location for evaluation primarily because of the underlying geology and the remote location relative to the developed portion of PORTS, despite its having a potential future land use for industrial development. Study Area D has moderate topographic relief of approximately 145 ft (elevations range from approximately 640 to a little more than 780 ft AMSL) (Figure D.18) and is mostly underlain by Cuyahoga shale. Therefore, it may provide a separation of the water table from the bottom liner of a potential OSDC per 40 *CFR* 761.75(b)(3). This area does not contain any buildings or structures except for the X-114A New Firing Range, which is identified to be demolished early.

Study Area D contains minimally developed land and consists primarily of forest growth and grassland. The only developed land consists of the X-114A New Firing Range near its center, the access road to the firing range, and two unimproved roads.

Study Area D contains most of the access road to the X-114A Firing Range. The only other transportation features are two unimproved roads and a railroad just outside the northern boundary.

D.5.1 GEOLOGY, HYDROGEOLOGY, AND SOILS

Study Area D lies in an upland area predominantly outside the ancestral Portsmouth River valley. Stratigraphic units from youngest to oldest in age include the Mississippian to Upper Devonian Cuyahoga Formation, Sunbury shale, Berea sandstone, and Bedford shale. The Quaternary Teays Formation (Minford Member/Gallia Member) unconformably overlies the bedrock within the ancestral valley and pinches out on the western and northern flanks of the uplands.

Figure D.19 is a block diagram illustrating the general surface and subsurface geologic units at Study Area D. The northern and western portions are underlain by the Minford/Gallia whereas most of the study area is underlain by the Cuyahoga Formation. The depth to bedrock in Study Area D ranges from less than 10 ft in the upland areas to up to 40 ft deep on the western and northern boundaries. The Cuyahoga Formation is overlain by a combination of a thin veneer of Minford silt/clay and regolith on the bedrock. The average depth to competent bedrock (based on auger refusal) at Study Area D was approximately 13 ft. The average depth of weathering within the Cuyahoga Formation, based primarily on color change in the rock core, was 22 ft. Figure D.20 shows the approximate elevation of the top of competent bedrock at Study Area D. The maximum thickness of the Cuyahoga Formation is estimated to be up to 120 ft where the uplands are at their greatest height. The Cuyahoga Formation is a moderately hard, thinly laminated shale with sandstone laminations. Unlike the geology at Study Area C, the Cuyahoga at Study Area D contains numerous thin (less than 3-in.-thick) sandstone layers, and borings indicate a 2-ft-thick sandstone layer at an approximate elevation of 680 ft AMSL. This layer is continuous across the study area and a thinner (0.4-ft-thick), mostly continuous sandstone is commonly found approximately 2 ft below this layer.

The 680-ft sandstone layer is continuous away from the study area except where it has been removed by erosion in the deeper valleys, such as the Big Beaver Creek valley northeast of the study area. This 2-ft-thick sandstone layer may be correlated to the 5-ft-thick “670 Sandstone Unit” at the Pike Sanitation, Inc. landfill located approximately 5 miles north-northwest of Study Area D. (Both units occur 30 to 40 ft above the contact between the Cuyahoga and Sunbury.) Figure D.21 shows the extent and top elevation of the 680-ft sandstone layer at Study Area D.

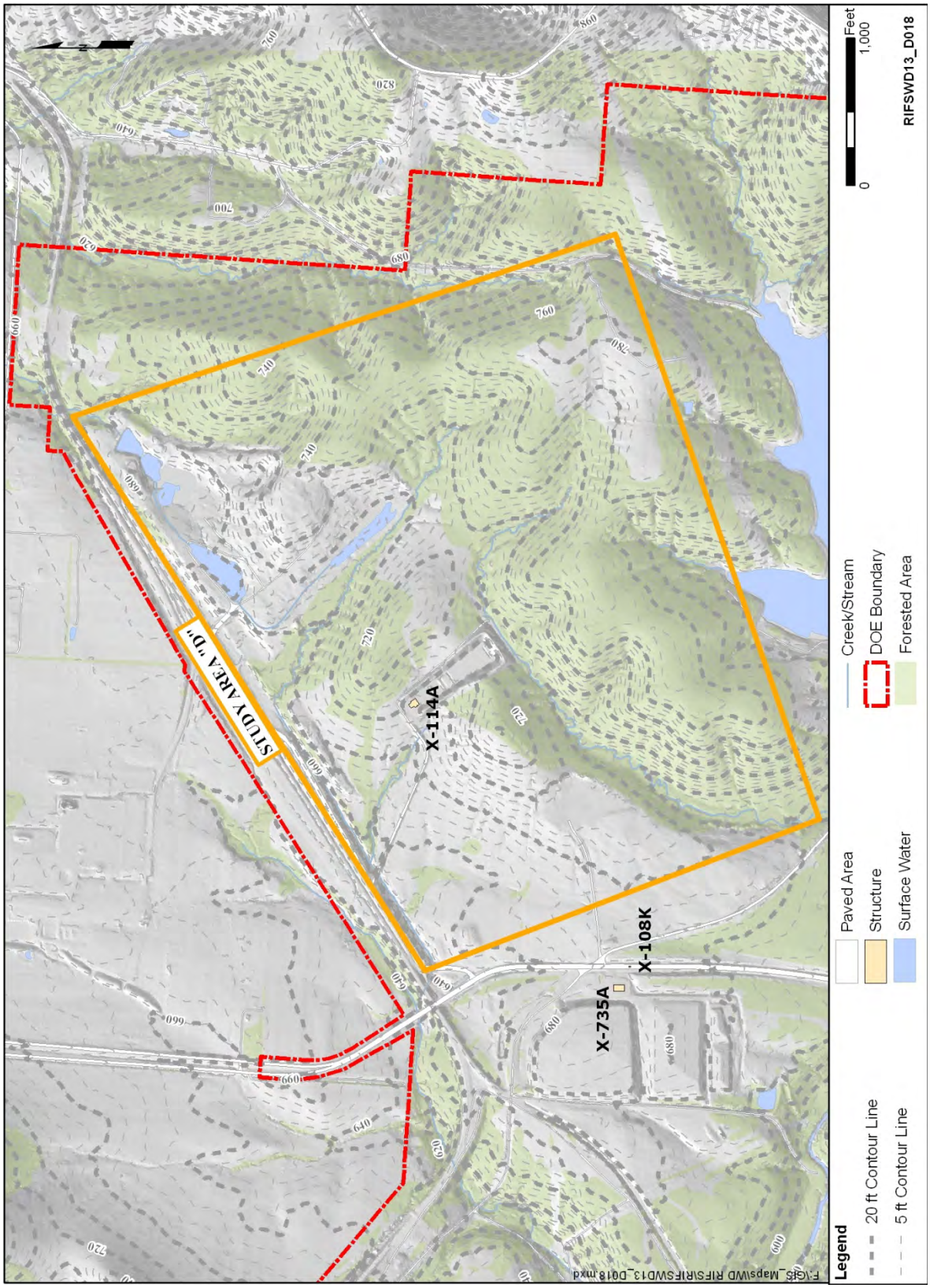

Figure D.18. Topography of Study Area D at PORTS

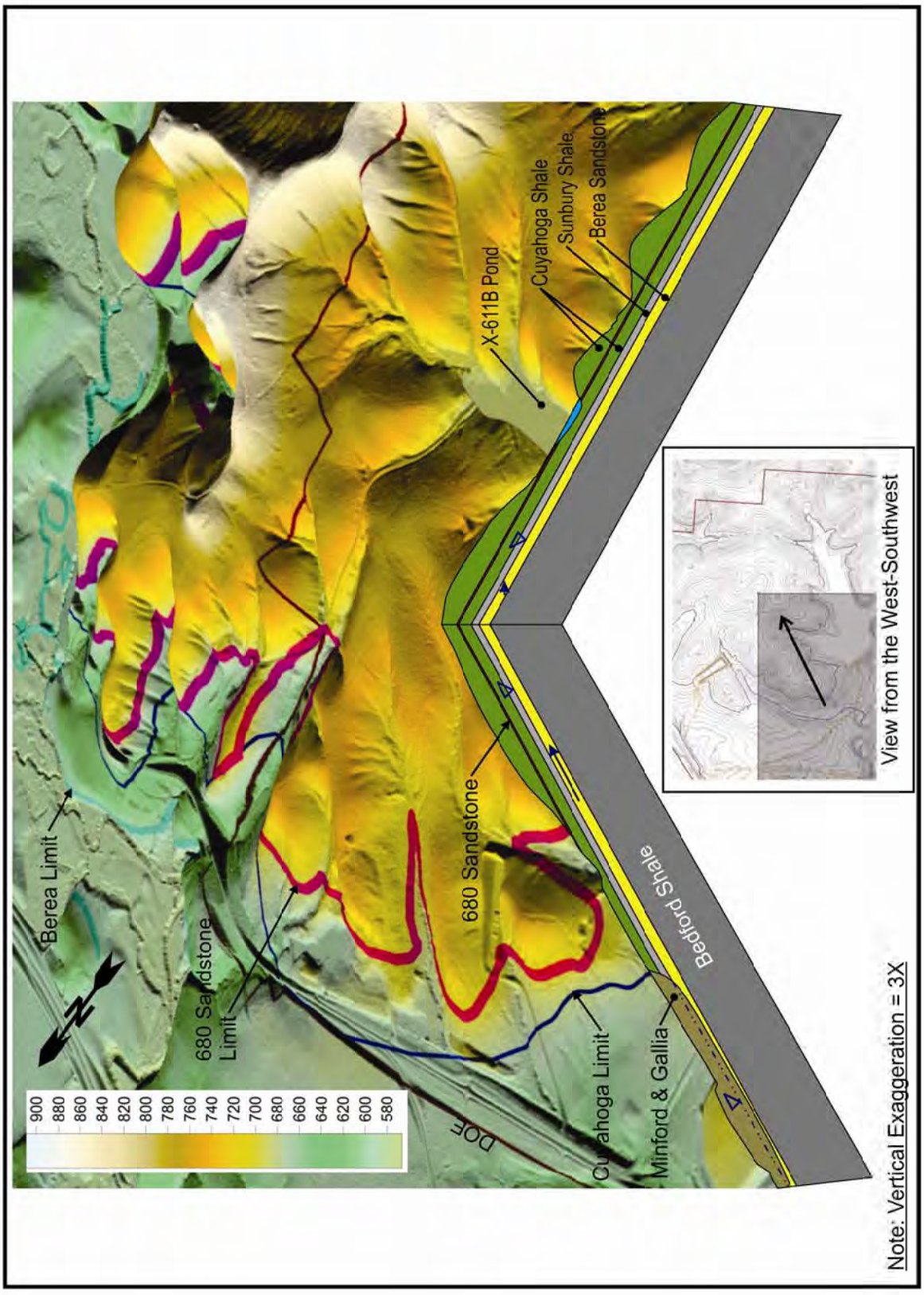

Figure D.19. Geology of Study Area D at PORTS

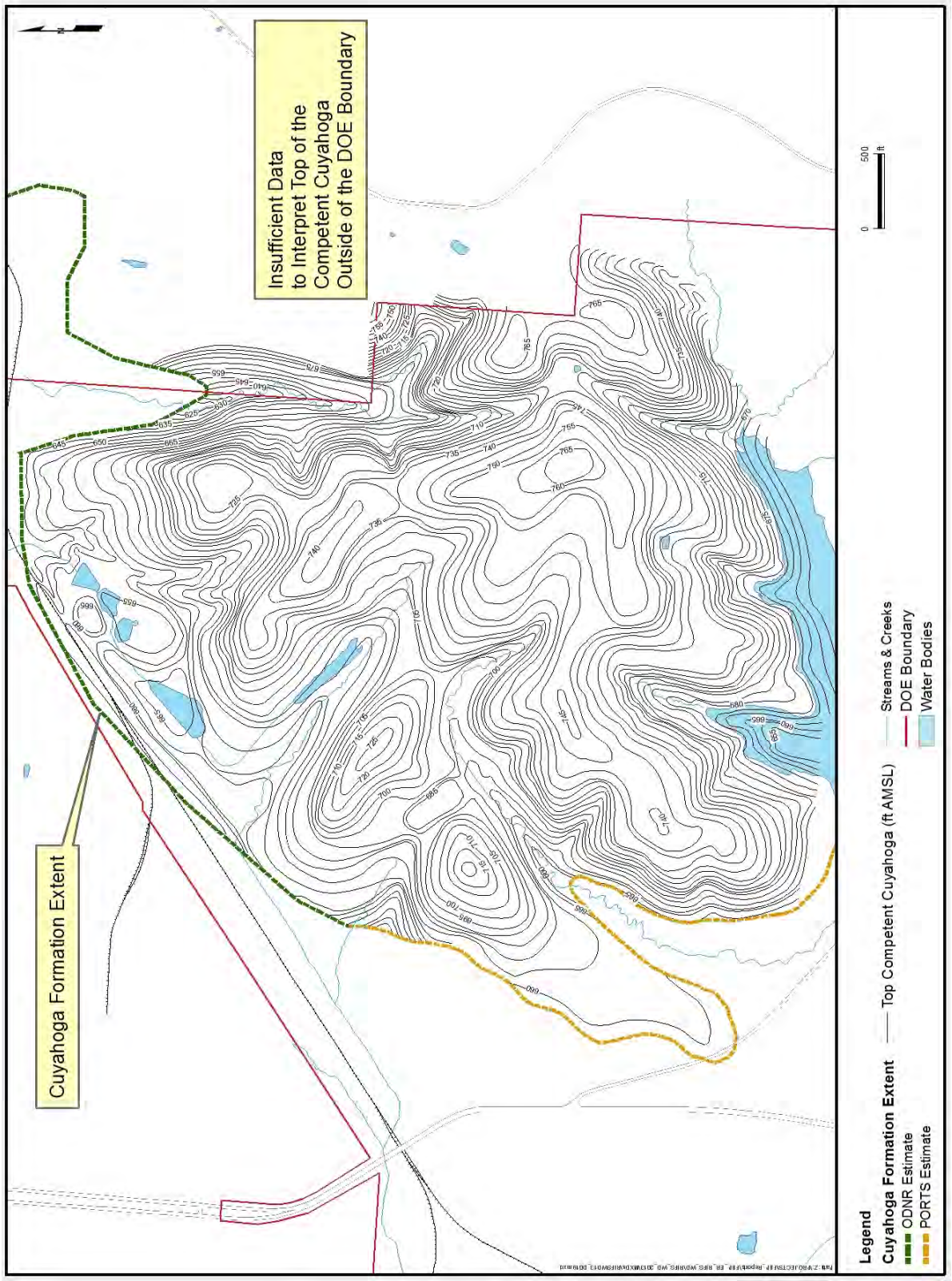

Figure D.20. Elevation of the Top of Competent Bedrock in Study Area D at PORTS

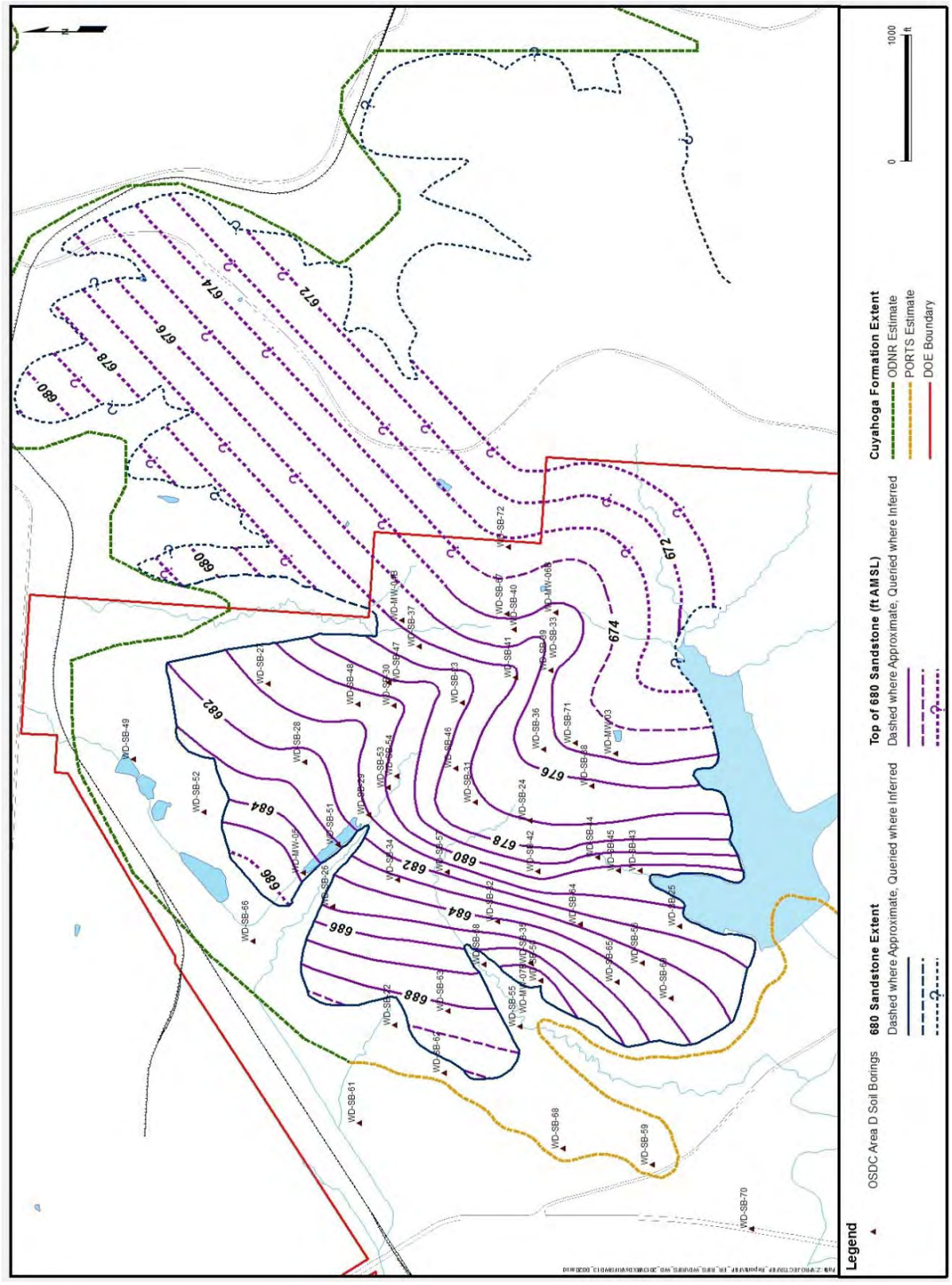

Figure D.21. Elevation of the Top of the 680-ft Sandstone Layer in the Cuyahoga Formation at Study Area D at PORTS

The Cuyahoga Formation also contains other thin sandstone layers with several layers occurring near the 720-ft AMSL horizon. These upper Cuyahoga Formation sandstones have been grouped into geologic facies, based on the presence of the different sandstone lenses (Figure D.22). These sandstone units are thinner than the 680-ft sandstone layer and are not readily correlated from one boring to the next. The thickness of the individually significant sandstone layers in the 720-ft sandstone lens zone ranges from 0.3 to 1.5 ft with an average of 0.5 ft. Several borings intersected multiple sandstone layers in this zone with WD-SB-36 intersecting five separate sandstone layers between 715 ft AMSL and 725 ft AMSL. There were a few locations where these lenses had a thickness of 1 ft or greater (borings WD-SB-23, WD-SB-33, WD-SB-65, WD-SB-69, and WD-SB-71). While this "zone" is fairly continuous across the study area, the individual sandstone lenses that comprise this zone are difficult to correlate from boring to boring and do not appear to be continuous across Study Area D.

If Study Area D is selected as the location for a potential OSDC, most of these upper sandstone lenses would be removed during construction. Figure D.23 is a histogram illustrating the thickness of all sandstone lenses encountered between 700 ft and 740 ft AMSL in soil borings in Study Area D. This figure shows that almost 75 percent of all the lenses encountered were 0.2-ft thick or less. The two thickest lenses occurred highest up in the stratigraphic sequence (a 1.5-ft-thick sandstone in WD-SB-46 at approximately 730 ft AMSL and a 1.9-ft-thick sandstone in WD-SB-42 at approximately 735 ft AMSL).

The various sandstone lenses and layers in the Cuyahoga Formation represent deposition during a series of regressive and transgressive marine events in Early Mississippian time, approximately 350 million years before present (Coogan 1996). During that time, this part of Ohio was a marginal marine environment with highlands to the east (Acadian Highlands) and north (along the Cincinnati Platform), shedding sediment to the coast by a series of stream systems.

The Cuyahoga Formation is composed of sequences of marine shales and interbedded terrestrial sandstones, with the vertical profile resembling modern sediments deposited along a prograding shoreline or in a delta. In Study Area D, the Cuyahoga contains thick gray shales and fine-grained interbedded sandstones and siltstones. As one moves stratigraphically higher in the Cuyahoga, the rocks are characterized by more frequent sandstone layers and lenses, representing the advancing near-shore environments.

The Cuyahoga is then underlain by the Sunbury shale (approximately 20 ft thick) and the Berea sandstone (average thickness of approximately 35 ft) in the PORTS area. The Berea is composed of a light gray, hard, thickly bedded, fine-grained sandstone with thin shale laminations. The Berea sandstone overlies the Bedford shale.

The geologic structure of the study area is relatively simple with the bedrock formations dipping gently to the east-southeast at approximately 30 ft/mile. Figures D.24 and D.25 show site-specific geologic cross sections across the area where a potential OSDC might be located. Two distinct joint sets are present in outcrops of thin sandstone laminations in the Cuyahoga Formation and the lower Berea/upper Bedford Formations at PORTS. The joint sets strike northeast (N65°E) and northwest (N25°W) (DOE 1996d).

The groundwater flow system at Study Area D includes the aquifers consisting of the unconsolidated Gallia sand and gravel and the Berea sandstone, along with the aquitards of Cuyahoga/Sunbury shale, Bedford shale, and unconsolidated Minford clay and silt. The basal portion of the Minford is generally grouped with the Gallia to form the uppermost aquifer and primary water-bearing unit at PORTS. (This also represents the uppermost aquifer system in the northwestern portion of Study Area D.)

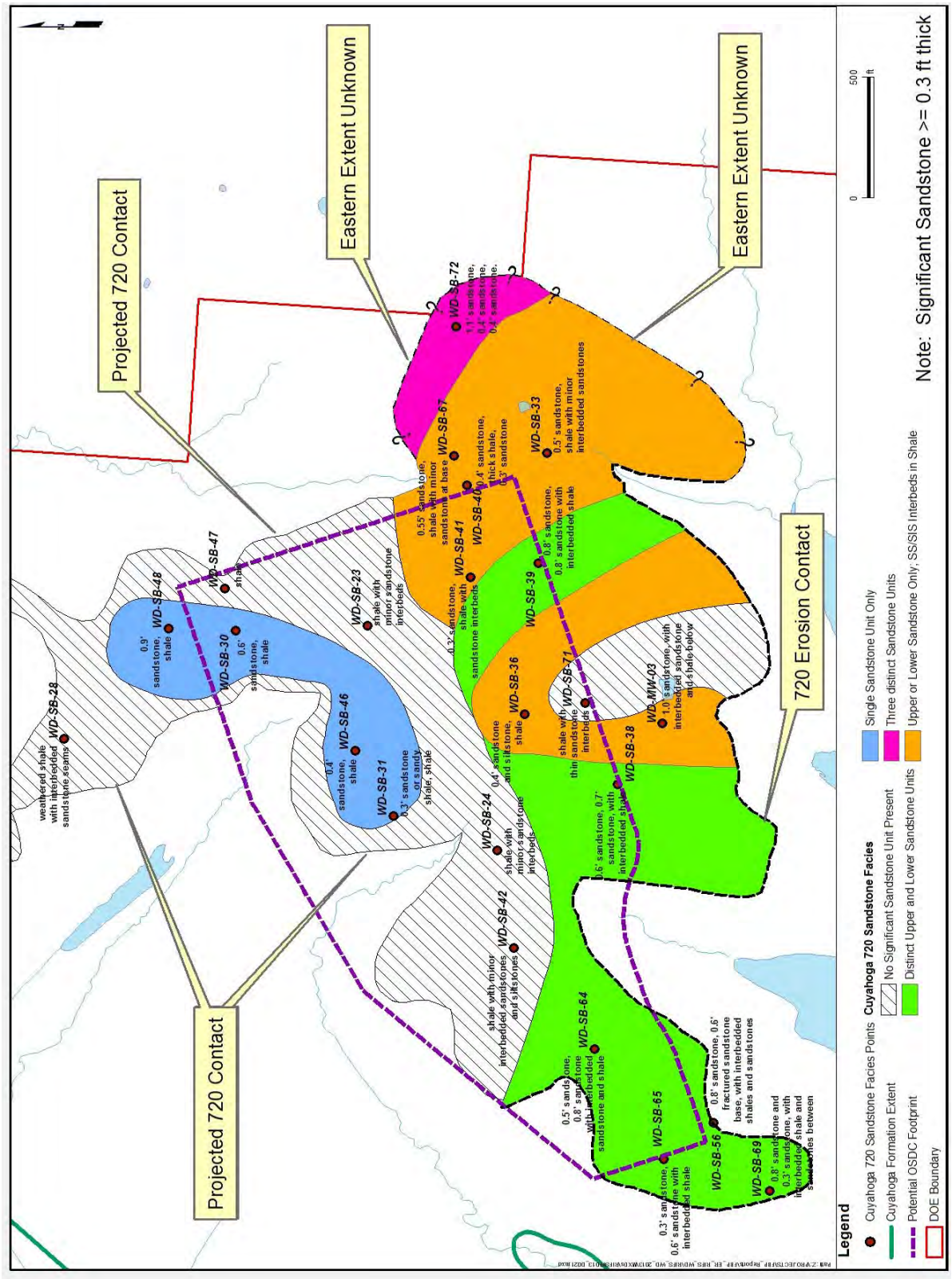

Figure D.22. Distribution of Lithologic Facies for the 720-ft Sandstone Layers in the Cuyahoga Formation at Study Area D at PORTS

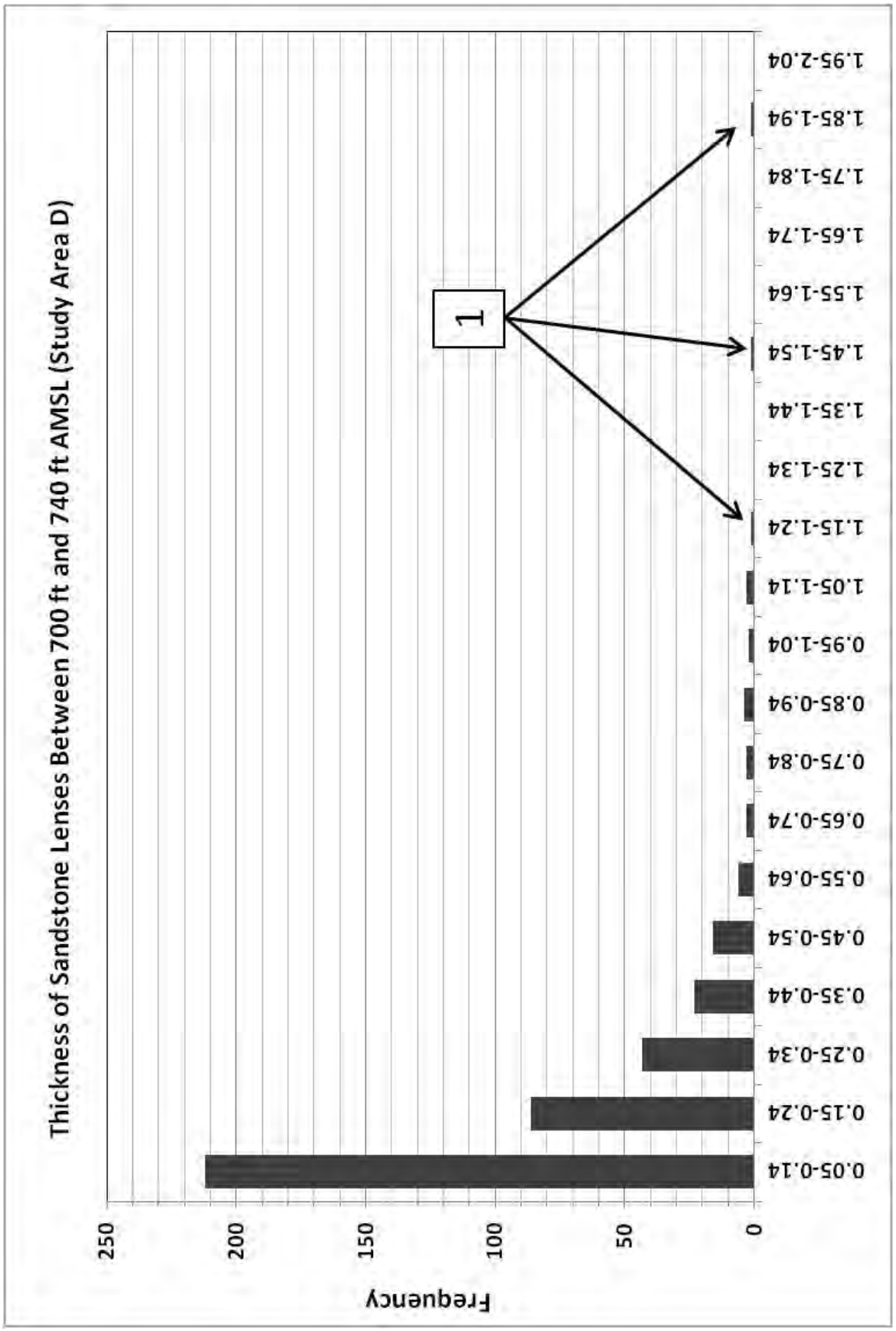

Figure D.23. Histogram of Sandstone Lense Thickness between 700 ft and 740 ft AMSL

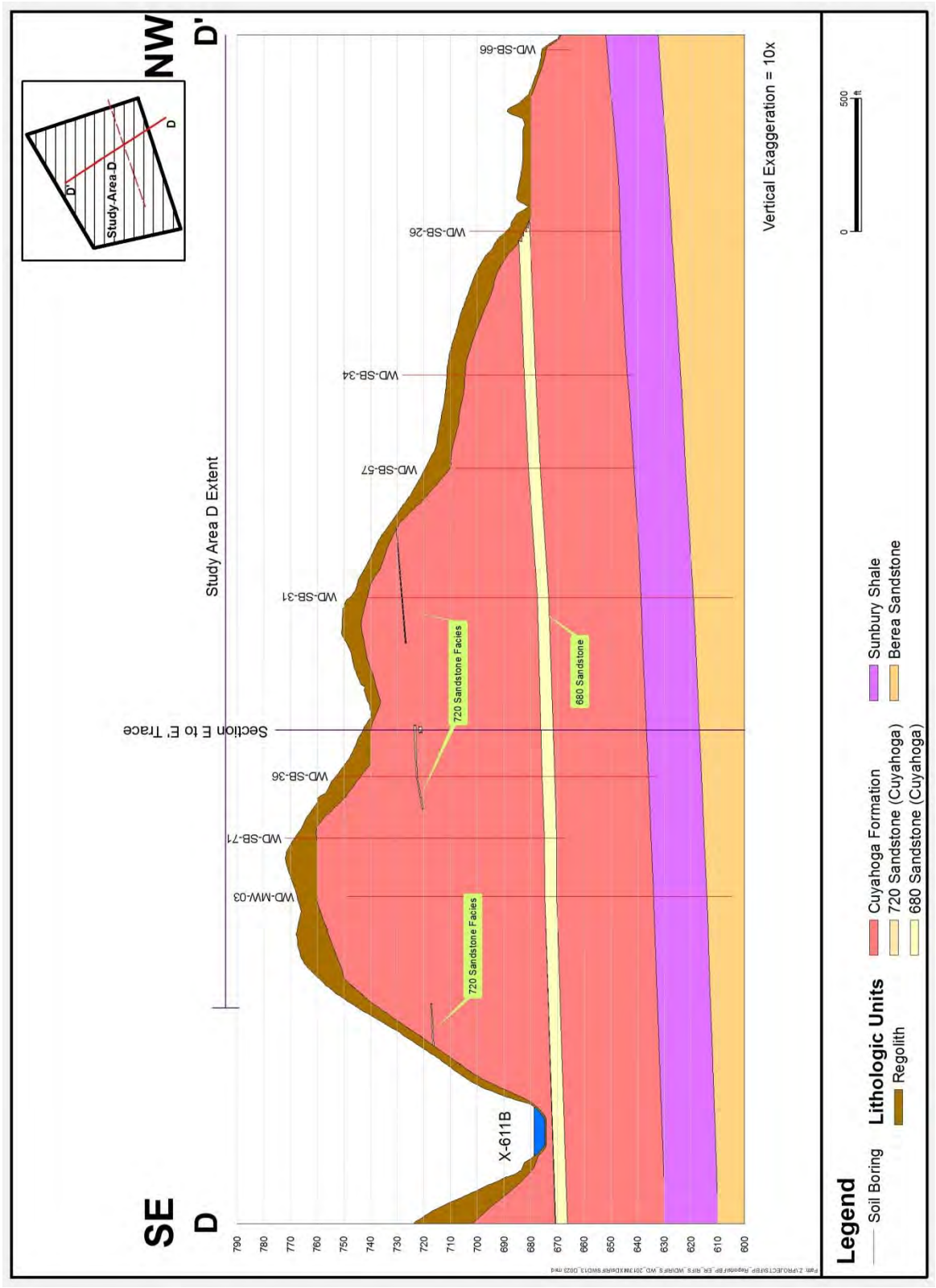

Figure D.24. Detailed Geologic Cross Section for Study Area D at PORTS

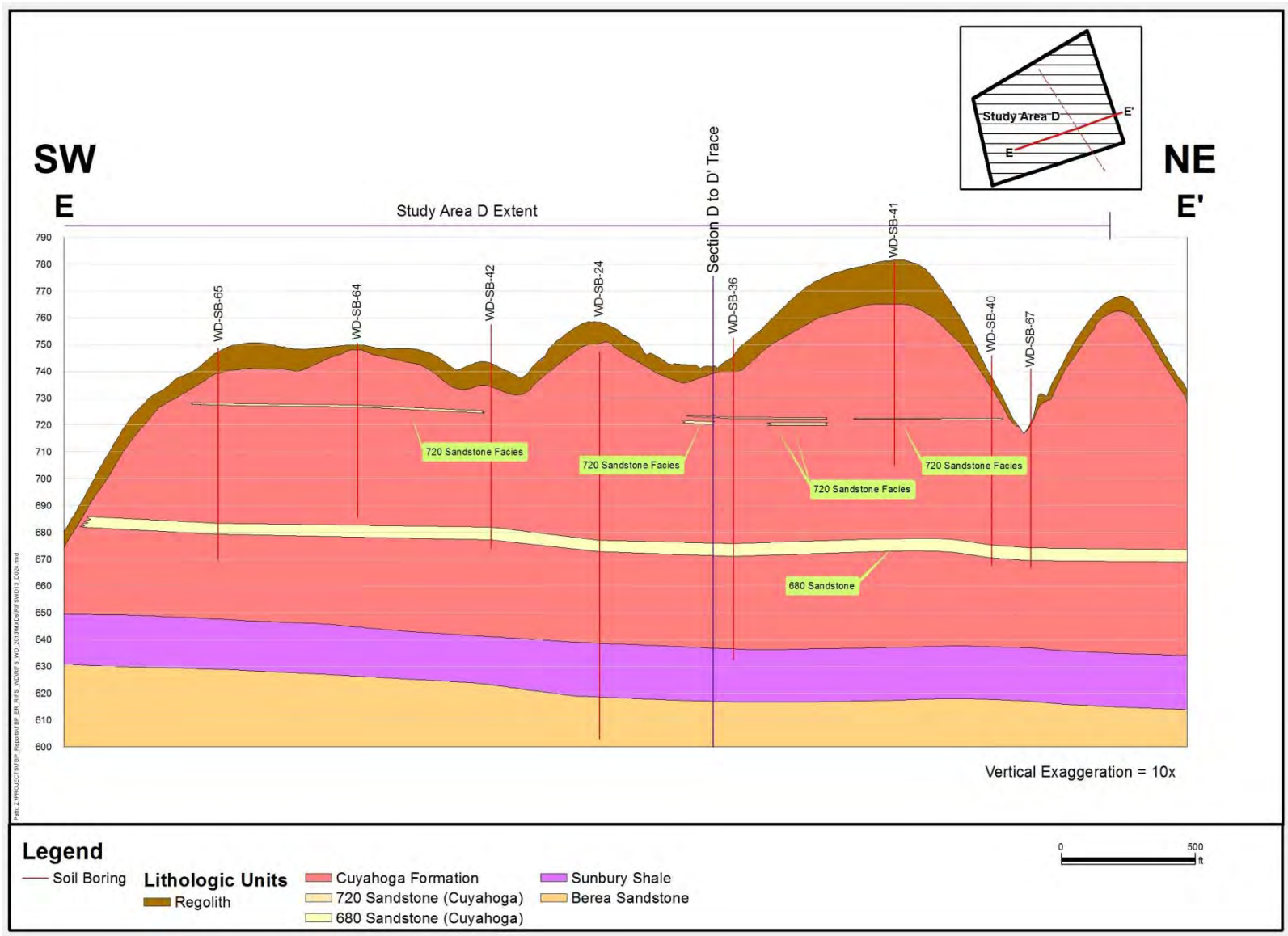

Figure D.25. Detailed Geologic Cross Section for Study Area D at PORTS

The Minford/Gallia are found only in the western and extreme northern portions of the study area and are absent in the upland areas (Figure D.19). Horizontal permeability tests on the Minford from the western portion of Study Area D ranged from 1.3×10^{-3} to 1.5×10^{-2} ft/day. Vertical permeability from the same samples ranged from 9.4×10^{-5} to 1.3×10^{-2} ft/day. Groundwater flow in the Gallia (Figure D.26) is essentially toward Little Beaver Creek and an unnamed tributary to Little Beaver Creek. This tributary lies west of the study area. The hydraulic gradient in the Gallia is low (ranging from less than 0.004 ft/ft to 0.015 ft/ft) with the steeper gradients existing closer to the discharge areas. Horizontal gradients measured in the Gallia during an 8 month period in 1994 averaged 0.0041 ft/ft (Martin Marietta Energy Systems, Inc. [MMES] 1994).

Natural recharge to the groundwater flow system comes mainly from precipitation, although land use and the presence of the bedrock shale units effectively reduce recharge to underlying units. Discharge of groundwater to the surface occurs primarily along streams that transect the plant. Natural recharge to the central portion of the plant is approximately 4 to 7 in./year whereas recharge in the uplands such as those at Study Area D (areas underlain by shale bedrock) is only 2 to 4 in./year (ODNR 2003). The recharge is less in the upland areas due to topography and low permeability of the bedrock and residual clayey soil. Water that infiltrates through the regolith likely moves laterally upon reaching the base of the deeply weathered zone due to the very low vertical permeability of the unweathered Cuyahoga Formation (1×10^{-3} to 1×10^{-6} ft/day).

Groundwater flow in the upland areas of Study Area D begins within the regolith. The movement of groundwater in the regolith is considered to be groundwater interflow and/or throughflow (i.e., subsurface stormflow). Groundwater interflow is the lateral movement of water in the soil zone, where a more permeable geologic unit (such as the regolith) overlies the less permeable bedrock. Most of the infiltrated water moves laterally and then discharges on hillsides as ephemeral seeps or directly into stream headwaters. If a disposal cell is constructed in this area, the regolith would be removed for installation of the bottom liner directly on top of competent bedrock.

In areas where stress-relief fractures occur in the bedrock, or the bedrock is sandy and more permeable, some of the groundwater in the regolith moves downward to provide recharge to the bedrock system. (In test pits, the more brittle sandstone layers were observed to have vertical fractures that did not extend into the overlying or underlying shale.) The Cuyahoga Formation contains several zones of thin sandstone layers.

The upper sandstone zone, recognized only at Study Area D, is referred to as the 720-ft sandstone lense zone. (This zone was first noted at an elevation of approximately 720 ft AMSL.) The thicknesses of the individually significant sandstone lenses in the 720-ft sandstone lense zone range from 0.3 to 1.5 ft with an average of 0.5 ft. A localized area of saturation is associated with the 720-ft sandstone lenses in the vicinity of WD-SB-40 and WD-PZ15C. The sandstone lenses receive recharge where they outcrop, or subcrop beneath the regolith (within the stream valley that WD-PZ15C is located within), or where fractures occur. The groundwater then moves laterally along the sandstone lense (or along bedding plane partings) and may re-emerge along the hillside in an ephemeral seep. None of the other open-hole piezometers had a groundwater elevation that coincided with the 720-ft sandstone zone. Hydraulic testing was conducted in two isolated zones in WD-PZ12C, which included the thin sandstone layers in the 720-ft sandstone lens zone, and neither zone could maintain a rate of 0.1 gpm. WD-PZ15C, which appears to have a water level consistent with an isolated zone of saturation in the 720-ft sandstone lens zone, had an estimated yield of 0.0007 gpm (over the entire borehole) and a conductivity of 0.001 ft/day.

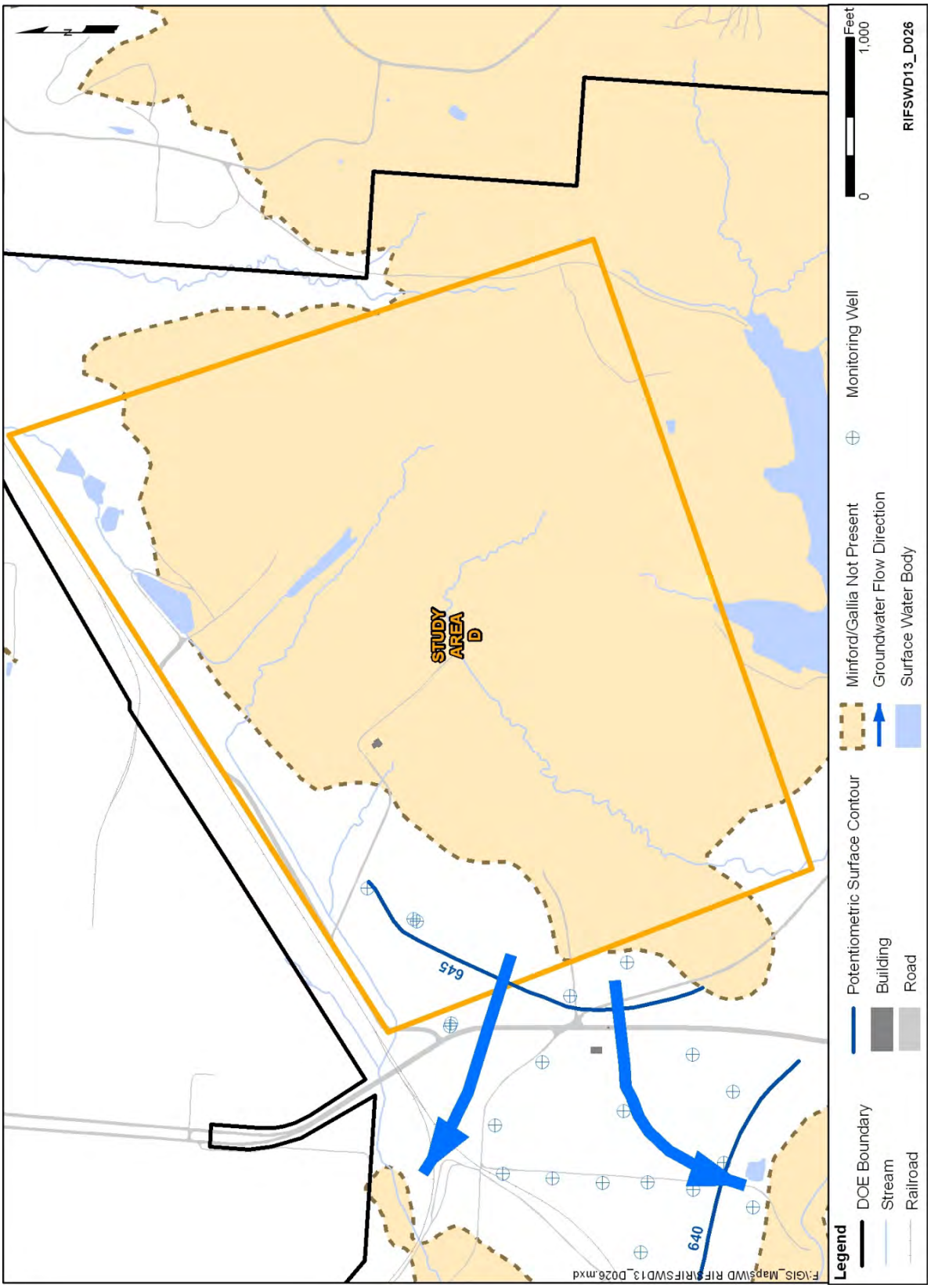

Figure D.26. Potentiometric Map of the Minford/Gallia in Study Area D at PORTS

The next recognizable zone in depth is the 680-ft sandstone zone, which was first noted at an elevation of 680 ft AMSL. This zone is comprised of an upper 2-ft-thick layer and a lower 0.4-ft-thick sandstone separated by approximately 2 ft of shale. Unlike the 720-ft sandstone zone, the individual sandstone layers in the 680-ft sandstone zone are continuous across Study Area D, except where removed by erosion to the west and north. They probably extend outside of the study area to the northeast and east, although the extent is limited by topography with the layer being eroded in the deeper valleys.

These sandstone zones in the Cuyahoga Formation are considered to be "significant zones of saturation" where they are in connection with fractures, including bedding plane partings, which facilitate groundwater flow. The vertical hydraulic conductivity of the 680-ft sandstone zone at Study Area D was determined in laboratory testing to be 0.0005 to 0.004 ft/day. The horizontal hydraulic conductivity is estimated to be 10 times that value. Eleven piezometers at Study Area D were geophysically logged to evaluate fracturing in the bedrock. The shallow weathered bedrock (to a depth of approximately 25 ft) did include some degree of fracturing. (Bedding plane partings were more recognizable in this zone.) Bedding plane fractures were noted at the top of the 680-ft sandstone in WD-PZ08C and WD-PZ13C, and a vertical fracture in the 680-ft sandstone was observed in WD-PZ09C and WD-PZ12C. These fractures in the 680-ft sandstone did not appear to extend into the shale above or below the sandstone. The shale in the Cuyahoga Formation had vertical hydraulic conductivities much lower than the sandstone (range from 0.000001 to 0.0009 ft/day), based on laboratory testing.

The water level data indicate the Cuyahoga Formation is saturated in some locations with a water table elevation varying between approximately 646 and 717 ft AMSL. The average depth to groundwater measured in the open-borehole Cuyahoga piezometers is approximately 50 ft below surface (ranges between 21 ft and 97 ft, depending on topography).

Figures D.27 and D.28 show possible groundwater flow directions for the 680-ft sandstone unit. (Figure D.27 shows current conditions, and Figure D.28 shows potential future conditions after the water level in X-611B is lowered.) A typical potentiometric map is not provided because the water level and yield data suggest there may be limited hydraulic connection across the entire area. For the future condition shown in Figure D.28, it is assumed the water level in X-611B is 660 ft AMSL or lower. Throughout the study period, the depth to the potentiometric surface as measured in the piezometers and monitoring wells was relatively consistent. The southern area near WD-PZ09C and WD-PZ12C appears to be influenced by interconnected fractures providing recharge, and bedding plane partings and fractures within the 680-ft sandstone (allowing greater transmissivity). During the wetter times of the year, recharge occurs where the 680-ft sandstone is closer to the surface, and stress-relief fractures provide a pathway for water in the regolith to recharge the upper bedrock. This is most evident near WD-PZ16C, which often has the highest water levels in the 680-ft sandstone. WD-PZ16C lies in a valley, and the sandstone subcrops beneath the regolith just below the surface. The hydraulic gradient in the center of the area is very small, and WD-PZ23C is slow to stabilize. Groundwater moves towards areas of lower hydraulic head along valleys where the sandstone outcrops and towards the east-southeast in a structurally down-dip direction.

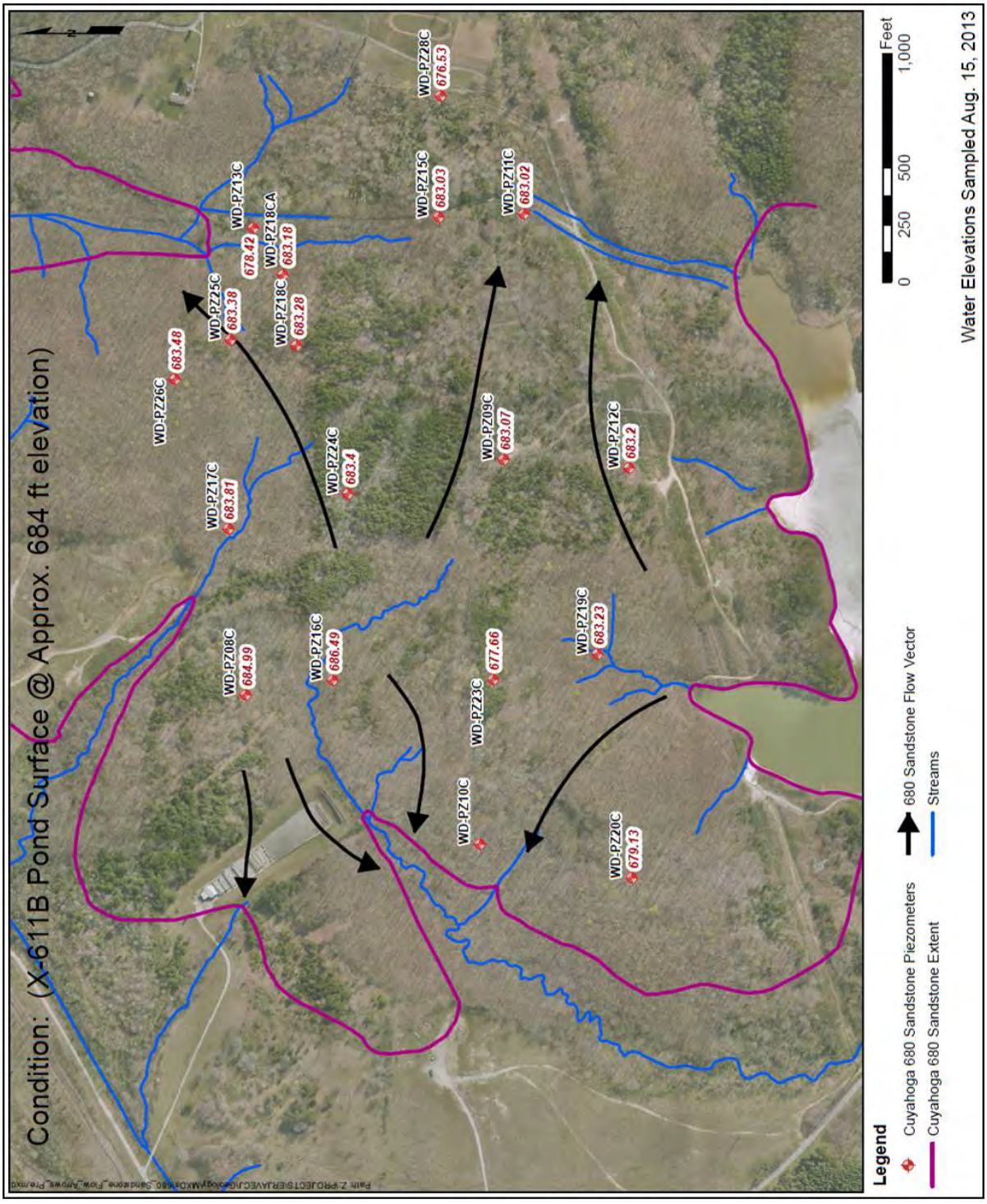

Figure D.27. Groundwater Flow in the 680-ft Sandstone Unit under Current Conditions

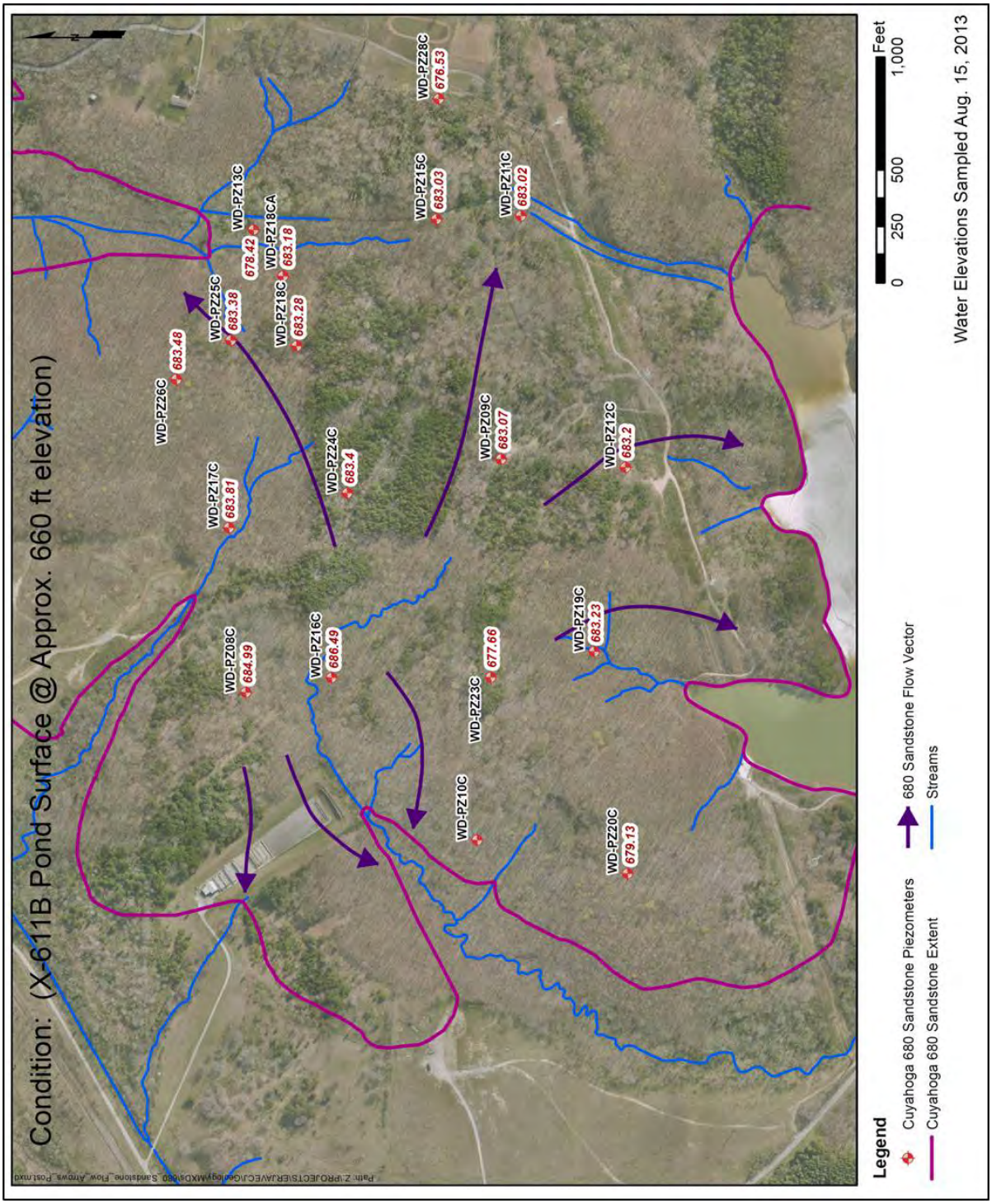

Figure D.28. Groundwater Flow in the 680-ft Sandstone Unit under Future Conditions

Hydraulic testing was performed in several of the Cuyahoga piezometers to determine yield and hydraulic conductivity of the 680-ft sandstone layer, and to investigate the connectivity of the saturated zones in the Cuyahoga Formation with the deeper Berea sandstone. Only two piezometers yielded greater than 0.1 gpm. WD-PZ09C and WD-PZ12C yielded 0.6 gpm and 1.2 gpm, respectively, while yields at WD-PZ11C, WD-PZ13C, WD-PZ14C, WD-PZ15C, WD-PZ16C, and WD-PZ17C were four orders of magnitude less (ranging from 0.0007 to 0.05 gpm) (Figure D.29). The average of all Cuyahoga piezometer yields was 0.16 gpm with a median yield of 0.002 gpm. The logarithmic mean, which may be more appropriate given the distribution, is less than 0.01 gpm. WD-PZ09C and WD-PZ12C also exhibited high barometric efficiency (approximately 90 percent), which suggests the tested zone is confined to a high degree. (Barometric efficiency is related to the magnitude of water level response due to changes in barometric pressure.) The hydraulic conductivity of the 680-ft sandstone layer, determined from preliminary evaluation of constant rate testing in WD-PZ09C and WD-PZ12C, was estimated to be in the range of 40 to 50 ft/day. This conductivity is higher than would be expected, based on literature values for fractured sandstone. The limited response to pumping observed in other, nearby piezometers would also suggest a lower hydraulic conductivity. Hydraulic conductivity in piezometers WD-PZ15C, WD-PZ16C, and WD-PZ17C was estimated to be much lower, ranging from 0.001 to 0.004 ft/day, but this may have been related to formation damage (skin effect) during drilling and poor piezometer development due to little water being produced from the formation. These piezometers also exhibited lower barometric efficiencies. In addition, testing indicated no hydraulic communication between the Cuyahoga Formation and the Berea sandstone. The 680-ft sandstone in the Cuyahoga Formation occurs approximately 55 to 60 ft above the Berea sandstone, which represents the uppermost aquifer system in this area.

The weathered/jointed zone in the Cuyahoga Formation at Study Area D also exhibited a shallow groundwater table lying above the unweathered shale at some locations (near WD-PZ12C in the southern portion of Study Area D, WD-PZ15C and SB-40 in the eastern portion of Study Area D, and WD-PZ14C on the northern side of the hill in Study Area D). These saturated zones appear to be more localized than the 680-ft sandstone layer. (The 720-ft zone appears to be locally saturated in the vicinity of WD-PZ15C and SB-40.)

The water level in WD-PZ12C, which is located near a small pond on the south side of Study Area D, was approximately 717 ft AMSL until the boring was extended to a depth just above the 680-ft sandstone. After being extended, the groundwater level stabilized at approximately 684 ft AMSL. The initial water level at an approximate elevation of 720 ft AMSL appears to be related to the thin, mostly discontinuous, sandstone layers in the upper Cuyahoga Formation. Any saturated conditions above the 680-ft sandstone layer appear to be very limited. Also, if a potential OSDC is constructed at Study Area D, much of the weathered bedrock, including much of the 720-ft sandstone facies, would be removed for installation of the bottom liner on top of competent bedrock.

At piezometer WD-PZ14C, on the northern side of the hill in Study Area D, the water level is at an elevation of approximately 670 ft AMSL. This elevation is below the occurrence of the 680-ft sandstone described above. The area appears to be a localized saturated zone, within the Cuyahoga shale, that is not continuous to the south in areas of higher topography, as observed in WD-PZ17C. A review of historical aerial photographs shows that WD-PZ14C is located within the area of a backfilled pond that was associated with the activities in a former borrow area. This piezometer has an open-borehole design with the surface casing set in the top of competent bedrock. The disturbed soil immediately overlying the bedrock likely has a higher storage capacity (due to higher porosity) and may allow higher infiltration rates, creating a localized saturated condition in the shallow bedrock.

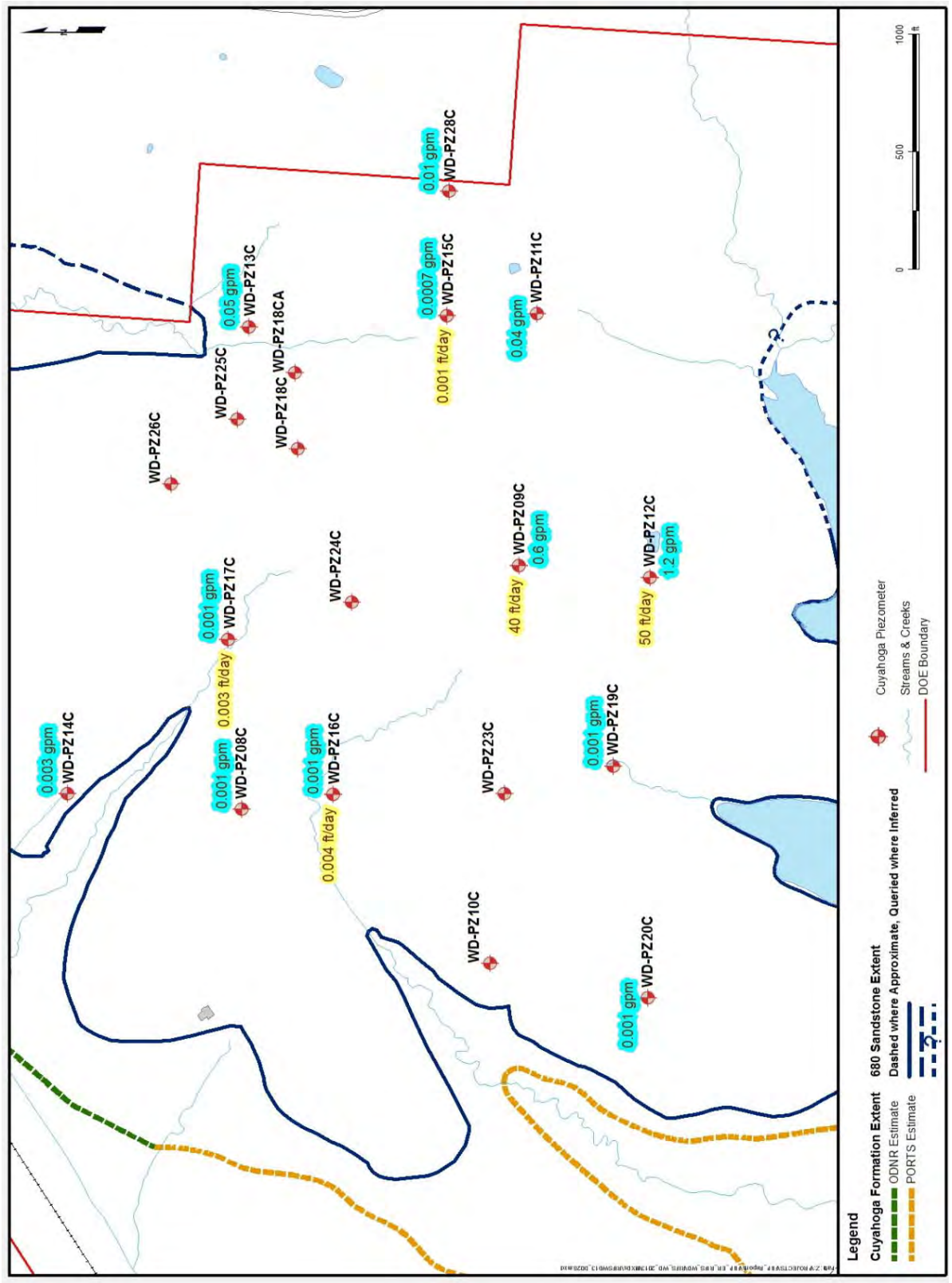

Figure D.29. Yield and Hydraulic Conductivity of Piezometers in the 680-ft Sandstone Unit

The Berea sandstone, occurring at an average elevation of approximately 619 ft AMSL in Study Area D, is considered to be the uppermost aquifer system in this area. The upper 10 to 15 ft of the Berea, which has a total thickness of approximately 35 ft, consists of a massive sandstone bed. The hydraulic conductivity determined by single-well aquifer tests of the Berea sandstone ranges from 4.5×10^{-3} to 15.0 ft/day with a mean value of 0.16 ft/day. The higher hydraulic conductivity tends to occur in areas where the Sunbury shale is absent and the Berea has been weathered. The Berea typically has yields greater than 1 gpm. Yield measurements are available for three wells (two residential wells and one PORTS Berea monitoring well) within a 1-mile radius around Study Area D. Based on these three wells, the average yield is 1.0 gpm. Table D.5 provides data on the residential wells within 1 mile of Study Area D, and these data are based on ODNR records. Low yields in the monitoring wells tested at Study Area D (logarithmic mean of 0.01 gpm) may be attributed to those wells having smaller diameters and shorter screened intervals (5 ft) when compared to a typical water supply well.

Table D.5. Residential Wells within 1 Mile of Study Area D (Based on ODNR Records)

ODNR Well	Surface Elev. (ft AMSL)	Total Depth (ft)	Casing Depth (ft)	Static Water Level (ft)	Yield (gpm)	Type of Well	Screened Formation	Description
112503	662	55	21	12	<1	Open Hole	Cuyahoga	Developed Yield at 50 gal/hour
124078	616	68	25	NM	NM	Open Hole	Berea	Sandstone
845220	860	170	28	50	1	Open Hole	Cuyahoga	Sandstone and shale, water at the sandstone/shale interface

Note: While the driller's log shows Well 112503 in shale, regional stratigraphic relationships suggest it is open to the Berea.

AMSL = above mean sea level
NM = not measured
ODNR = Ohio Department of Natural Resources

The horizontal permeability determined on tests of Berea sandstone cores ranges from 5.4×10^{-3} to 9.9×10^{-2} ft/day with a mean value of 2.0×10^{-2} ft/day. Vertical permeability was slightly less than horizontal permeability with a mean value of 1.0×10^{-2} ft/day (MMES 1994). Based on tests of Berea cores from the X-737 area, the horizontal conductivity varied from 1 to 2.5 times greater than the vertical conductivity. Porosity of the Berea, measured in the western portion of Study Area D, was approximately 15 to 20 percent. Yield testing in four Berea monitoring wells at Study Area D ranged from 0.008 gpm at WD-MW05B to 0.02 gpm at WD-MW06B with an average yield (and logarithmic mean) of 0.01 gpm.

In the far western portion of Study Area D, groundwater flow in the Berea is towards the south-southwest, also discharging to Little Beaver Creek, with a gradient varying from less than 0.002 to 0.004 ft/ft (Figure D.30). Horizontal gradients measured in the Berea in 1994 averaged 0.0025 ft/ft. Monitoring wells in the western portion of Study Area D showed no difference in water level elevation between the Gallia and Berea and suggest free groundwater exchange between the two units in this area (MMES 1994). Within the remaining portion of Study Area D, groundwater flow in the Berea is predominantly east-southeast with a horizontal hydraulic gradient of approximately 0.006 ft/ft.

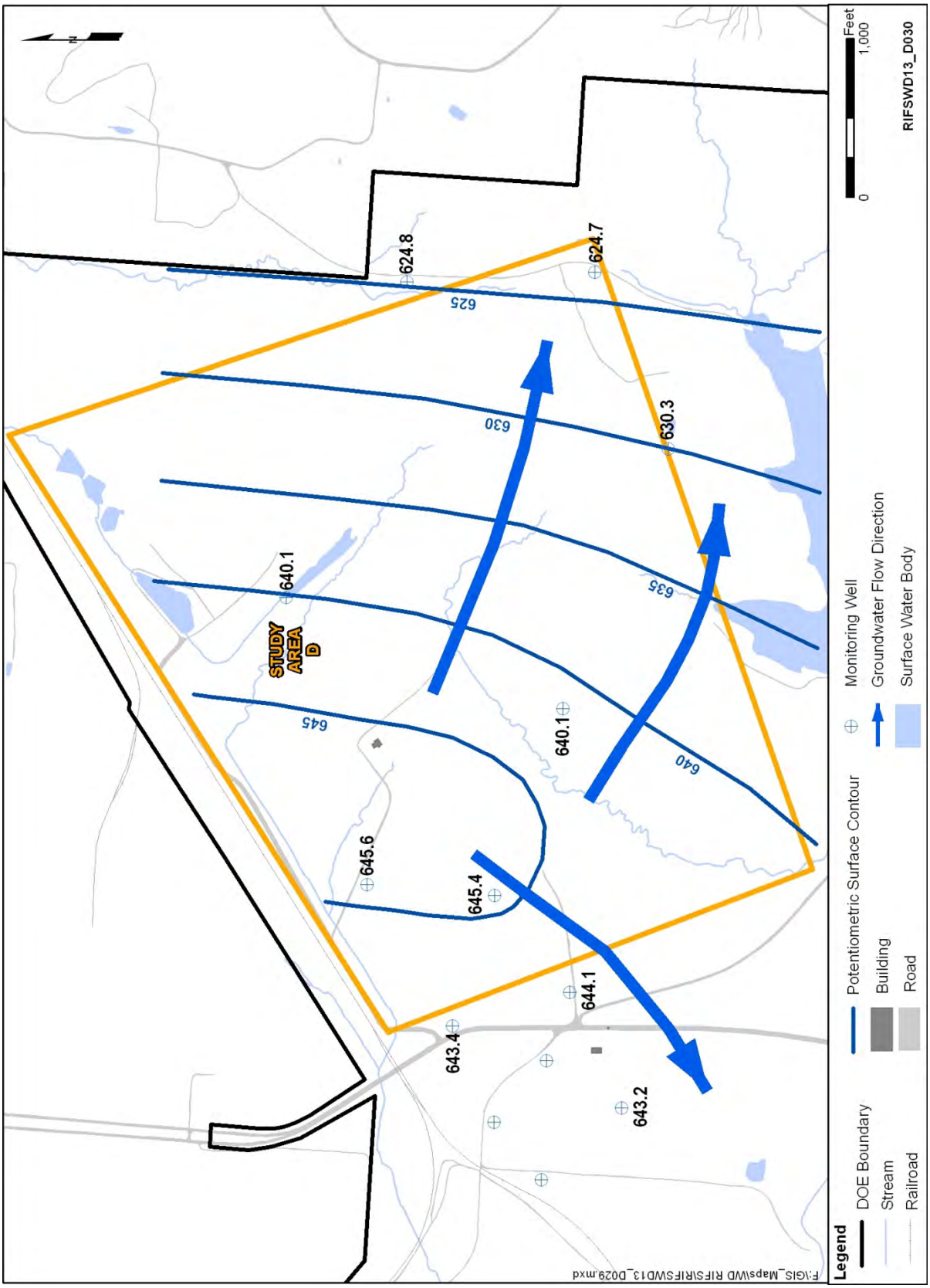

Figure D.30. Potentiometric Map of the Berea Sandstone in Study Area D at PORTS (Based on August 2012 Data)

Figure D.10 indicates that most of Study Area D, which is underlain by shale, has a relative pollution potential ranging from 95 to 103. This would be expected because the unconsolidated Gallia does not exist over the upland areas of Study Area D, and the permeability of the shale bedrock reduces the overall recharge in that area. The rate of groundwater flow, and potential contaminant migration, vertically through the Cuyahoga Formation and the Sunbury shale is expected to be very slow. Even where sandstone lenses occur within the Cuyahoga, they are thin (2 ft thick or less) and often not continuous over wide areas, with the exception of the 680-ft sandstone. The northern and western portions of the study area have a higher pollution potential where the Minford/Gallia exists.

Similar to Study Area C, Study Area D is underlain by thick shale that is composed mostly of clay minerals within the unsaturated zone. The retardation process for contaminants will be a very important process. The movement of a contaminant from a disposal facility at Study Area D is likely much slower in the unsaturated zone than at Study Areas A and B. While this area was not specifically modeled for the preliminary WAC developed in the work plan, the results would be similar to Study Area C due to the geologic characteristics of the location. Because of the thick shale present, Study Area D, similar to Study Area C, will provide greater protection to groundwater than Study Areas A and B.

Based on the soil survey of Pike County, four soil types occur within the Study Area D boundary (USDA 1990). The two most common soil series are present in the upland area that makes up most of the study area. The Rarden series consists of moderately deep, moderately well-drained, slowly permeable soils formed in acid, clayey shale residuum on ridgetops and hillsides. The Coolville series, nearer the tops of the ridges, consists of deep, moderately well-drained soils formed in a thin silty mantle weathered from acid shale that has thin strata of siltstone.

Another soil type present within Study Area D is Omulga silt loam in the northwestern portion of the study area. The surface layer of Omulga silt loam is dark grayish-brown, friable, and approximately 10 in. thick. The subsoil is approximately 54 in. thick and is composed of three portions: (1) a yellow-brown, friable silt loam; (2) a fragipan (brittle, compacted subsurface soil) of yellow-brown, mottled, firm, and brittle silty clay loam; and (3) a yellow-brown, mottled, friable silt loam approximately 20 in. thick.

The fourth soil type found in Study Area D is the Latham-Wharton silt loam. The Latham and Wharton series are characterized as moderately deep, slowly permeable soils formed in colluviums and residuum derived from acid shale with thin layers of siltstone and fine-grained sandstone. In Study Area D, the Latham-Wharton silt loam is found along the intermittent drainages formed on hillsides.

D.5.2 SURFACE WATER RESOURCES

There are no perennial streams within Study Area D. The area lies mostly within the drainage area of Little Beaver Creek, which drains the eastern and northern portions of PORTS before discharging into Big Beaver Creek.

The western portion of Study Area D is drained by an approximately 0.8-mile-long, unnamed, intermittent/ephemeral tributary to Little Beaver Creek. Portions of this stream have been tentatively classified as a Class IIIA Primary Headwater Habitat (PHWH) stream. Class III PHWH streams are defined as perennial streams with moderately to highly diverse biologic communities (Ohio EPA 2012a). On April 9-10, 2012, a Level 1 Assessment of the physical habitat and geomorphic characteristics of several streams in Study Area D was performed by DOE. A total of eight PHWH stream systems were identified with a total of 22 individual streams present within Study Area D. The stream discussed above, south and southwest of the X-114A New Firing Range, was classified as a probable Class III PHWH

in a 1,672 ft reach downstream of the firing range. Approximately 1,250 ft of the same stream was preliminarily identified as a Class II interstitial PHWH stream system. A Level 2 Assessment was performed in 2013 to support the final determination of stream classification. Other than the presence of the two-lined salamander, physical and biological data for the streams classified as Class IIIA would have indicated a Class II designation. No streams in Study Area D were assigned a provisional Class IIIB PHWH classification, which would indicate high quality, coldwater habitat conditions. Section 2 of the RI/FS report contains more detail on the stream study in Study Area D.

A small portion of Study Area D along the eastern boundary drains to an unnamed tributary to Big Beaver Creek. This unnamed tributary joins Big Beaver Creek approximately 750 ft downstream from the DOE property boundary.

Little Beaver Creek is a small, high-gradient, unmodified stream that receives the majority of its flow from the X-230J7 East Holding Pond discharge through the East Drainage Ditch. Little Beaver Creek also receives effluent via the Northeast Drainage Ditch through the outfall from the X-230J6 Northeast Holding Pond and via the North Drainage Ditch through the outfall from the X-230L North Holding Pond. Substrates are predominantly slab boulders and bedrock at the upper reach to gravel and sand near the mouth of the stream. During parts of the year, intermittent flow conditions exist upstream from the X-230J7 discharge. During the summer/fall low-flow time of the year, the upstream section is composed of shallow, isolated pools with intermittent flow (Ohio EPA 2006).

Several seeps have been observed in Study Area D. These seeps appear to be ephemeral in nature and primarily occur as interflow and/or throughflow (i.e., subsurface stormflow) following precipitation events. Water infiltrates laterally into the regolith for a relatively short distance and discharges on hillsides as ephemeral seeps (throughflow returning as wet weather conveyances) or directly into streams (interflow). Based on the variability of the seep elevations, most of the seeps do not appear to be associated with any particular sandstone lenses or layers, but they are generally found at the interface above the weathered bedrock surface. In some instances, groundwater may discharge from either sandstone lenses or bedding plane partings in the weathered bedrock to create seeps along the hillside. Of the 56 seeps identified to date, fewer than 10 appear to be related to specific sandstone layers (either the 720-ft sandstone lenses or the 680-ft sandstone layer). Section 2.2.2.3 of the RI/FS report provides additional information on the investigation of these seeps. If a potential disposal cell were to be constructed in this area, it is important to note that the regolith (and this interflow zone) would be removed for installation of the bottom liner directly on top of competent bedrock.

D.5.3 ECOLOGICAL RESOURCES

Study Area D is primarily forest with two large areas of grassland. Man-made features are sparse in this study area, consisting only of the X-114A New Firing Range (near the center), its access road, and two unimproved roads.

Six jurisdictional wetlands (Q4-17, Q4-19, Q4-20, Q4-46, Q4-47, and Q4-48) are located partially or entirely within Study Area D. The wetlands in Study Area D, identified in a previous study, are described in Table D.6 (LMES 1996).

Table D.6. Wetlands in Study Area D

Wetland Number	Status	Acreage	Location	Comments
Q4-15	Nonjurisdictional	0.114	X-611B	Sludge lagoon
Q4-17	Jurisdictional	0.229	Fog Road	Natural area; past disturbance
Q4-19	Jurisdictional	0.447	North Borrow Area	Part drainage ditch
Q4-20	Jurisdictional	0.389	North Borrow Area	Drainage ditch
Q4-46	Jurisdictional	0.040	North Borrow Area	Borrow area
Q4-47	Jurisdictional	0.499	North Borrow Area	Drainage ditch
Q4-48	Jurisdictional	0.564	North Borrow Area	Drainage ditch; beaver activity

Source: LMES 1996

LMES = Lockheed Martin Energy Systems, Inc.

An updated wetland evaluation of Study Area D was conducted in 2013; Section 2 of this RI/FS report provides more details on this study. Of the 24 wetlands identified in this study, 10 were designated as Category 1 (0.285 total acres), eight were designated as Category 2 (3.369 total acres), and six were designated as a Modified Category 2 (0.549 total acres). No high-quality Category 3 wetlands were identified in Study Area D. There is relatively good correlation to the jurisdictional wetlands identified in the 1996 study, but generally, those wetlands are now smaller (Stantec Consulting Services [Stantec] 2013).

No endangered species habitat areas or endangered plant species are present in Study Area D; there are no endangered or threatened fish species or exceptional warmwater streams within the boundaries of Study Area D. Ohio University is conducting a detailed habitat mapping study that will be completed in early 2013. Preliminary findings from this study, using updated guidelines, are that Indiana bat habitat may be more extensive than indicated in prior studies. The primary trees that produce exfoliating bark and nesting cavities (e.g., sycamore and shagbark hickory) are abundant in the older forest habitats, including forest habitats in Study Area D (Ohio University 2012). Figure D.31 shows the results of the preliminary habitat mapping in Study Area D.

D.5.4 CULTURAL RESOURCES

Three of the 36 archaeological sites identified during the 1996-1997 Phase I archaeological survey are located within Study Area D. In the January-February 2012 Phase I archaeological survey in Survey Areas 1 and 2, which encompassed all of Study Area D, 15 additional archaeological sites were identified (Mustain 2013). Seven of these sites are located entirely within Study Area D with one located partially within Study Area D.

One site appears to be located immediately outside the east boundary of Study Area D, but the formal boundaries of Study Area D have not been precisely determined on the ground by a civil land survey. Therefore, a future land survey could determine that a portion of that site actually lies within Study Area D. This site appears to have a substantial historic component and a minor prehistoric component represented by a single isolated find of one chert artifact.

Three sites had potential historic properties and additional Phase II archaeological testing was conducted to further evaluate their eligibility for listing on the NRHP. Two of the sites are recommended as eligible for listing on the NRHP.

The only architectural resource identified in Study Area D is the X-114A New Firing Range, which is located near its center.

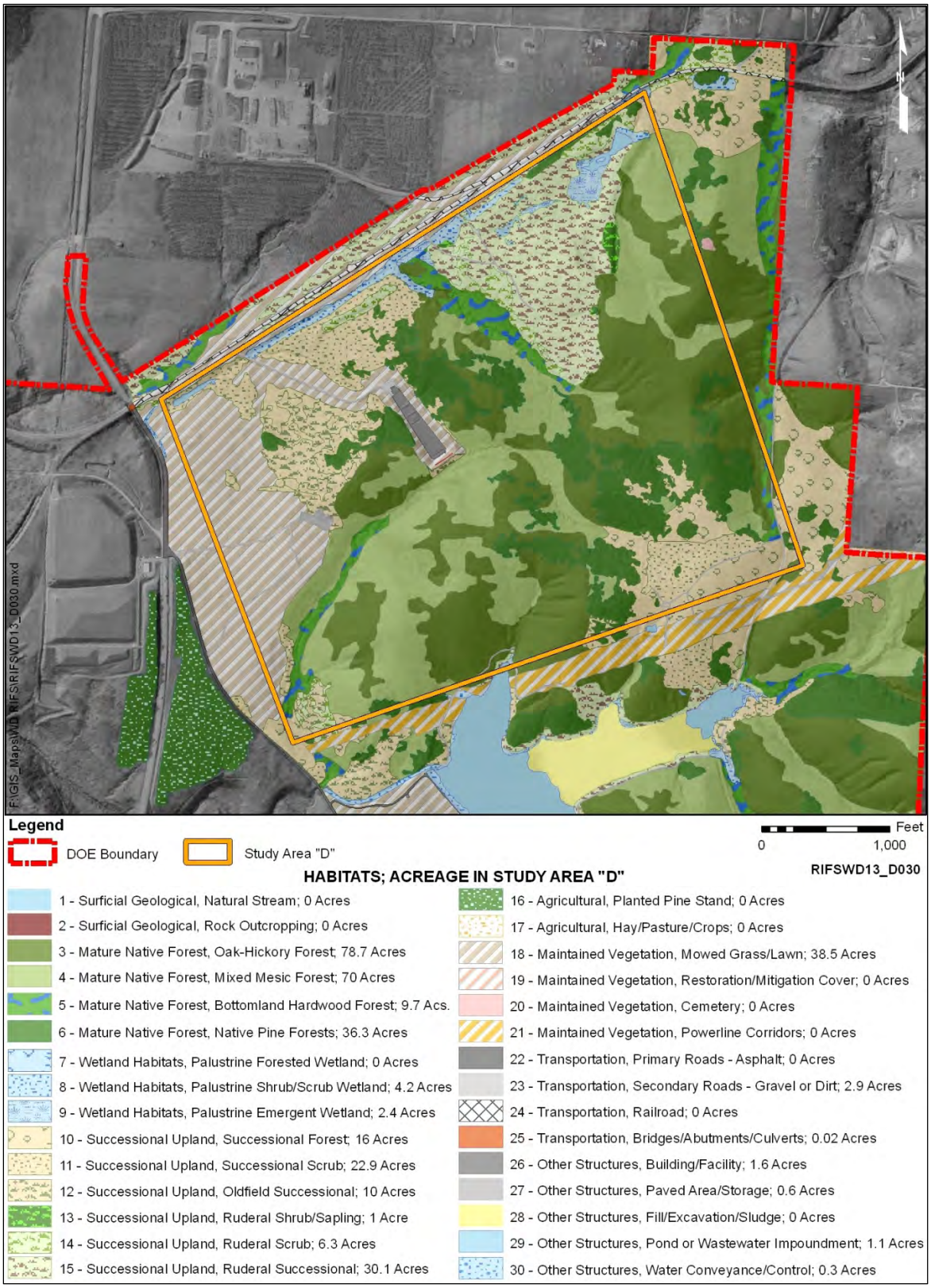

Figure D.31. Preliminary Habitats for Study Area D

D.6 LOCATION SELECTION

This section presents a summary of the siting requirements and provides an evaluation of the four study areas to determine which study area will be the representative location for evaluation in the RI/FS. The areas first undergo a screening to identify those areas considered preferable for further evaluation. Areas that do not pass this screen are dropped from further consideration in the RI/FS or design process.

The remaining areas are then evaluated further to determine which area will be considered for development of a potential OSDC. The final selection criteria were derived from the *April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) (Ohio EPA 2012b) requirements (protective of human health and the environment and compliance with applicable or relevant and appropriate requirements [ARARs]) and other important constructability and operational factors, as well as stakeholder input. For construction/operational objectives, it is important that the selected study area be available to meet the overall PORTS D&D schedule, that it accommodates a reasonable construction schedule, that it be sufficiently distant from the DOE boundary to provide an adequate buffer zone, that it minimizes site preparation activities, that it is near the D&D activities to minimize hauling efforts, and that it can accommodate a large enough cell to meet projected future disposal needs.

D.6.1 SITING REQUIREMENTS

The ARARs and to-be-considered (TBCs) identified in Appendix F address siting, design, construction, operation, capping, and post-operations care for a potential OSDC. These ARARs and TBCs include landfill siting requirements under Toxic Substances Control Act of 1976 (TSCA), Subtitle C of RCRA (federal and analogous state regulations), and DOE Order 435.1-1, as well as certain State of Ohio regulations (*OAC* 3745-27) deemed applicable or relevant and appropriate by the DFF&O parties for siting solid waste disposal facilities. Appendix F also includes location-specific ARARs and TBCs that include siting considerations to protect sensitive resources (such as wetlands, floodplains, critical habitats, streams).

The siting requirements and considerations can be grouped generally as floodplains, wetlands, seismic considerations, hydrologic considerations, suitable terrain, land use, buffers, and ecological and cultural considerations.

TSCA. The TSCA chemical waste landfill design requirements in 40 *CFR* 761.75 generally follow the RCRA hazardous waste landfill design requirements but TSCA also specifies that the bottom of the landfill liner system must be located 50 ft above the historical high groundwater mark and that there must be no hydrologic connection between the disposal facility and any surface water (40 *CFR* 761.75[b][3]). If the on-Site waste disposal alternative is selected, a waiver of the TSCA requirement that the bottom of a landfill liner be 50 ft above the historical high groundwater table may need to be sought, depending on the candidate location that is chosen, or disposal of TSCA waste would be forbidden in the area of the cell that cannot meet this requirement.

RCRA. The federal and State of Ohio regulations for siting RCRA Subtitle C hazardous waste disposal landfills include floodplain and seismic considerations, as well as siting restrictions. Hazardous waste disposal facilities must not be located within 200 ft of a fault that had displacement in Holocene time and must not be located within the boundaries of a state park or state park purchase area or national park or recreation area or national park candidate area. The RCRA regulations don't forbid locating a facility

in a 100-year floodplain, but do require that such a facility be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood.

Ohio solid waste regulations. Ohio's rules (*OAC* 3745-27) for siting solid waste disposal facilities identify five location restriction demonstrations: airport safety, regulatory floodplain, Holocene fault, seismic impact zone and unstable area. A landfill cannot be located within a "regulatory floodplain," in a "seismic impact zone," or in an "unstable area" as these terms are defined in *OAC* 3745-27-01. A landfill cannot be located within 200 ft of a Holocene fault, within 10,000 ft of any airport runway end used by turbojet aircraft, or within 5,000 ft of any airport runway end used by only piston-type aircraft. Ohio does not identify wetlands as a location restriction demonstration, but does address the federal requirements as a prohibition from the construction of new units in a location until the Clean Water Act requirements are satisfied for that location. Floodplain, fault area, seismic impact zone, and unstable area restrictions address conditions that may have adverse effects on landfill performance that could lead to releases to the environment or disruptions of natural functions (for example floodplain flow restrictions). Airport safety, floodplain, and wetlands criteria are intended to restrict landfill units in areas where sensitive natural environments and/or the public may be adversely affected.

New solid waste landfills also cannot be in a national park or recreational area, sand or gravel pit, or limestone or sandstone quarry. New solid waste landfills cannot be within 1,000 ft of a national or state nature/wildlife preserve, national or state scenic river, special interest or research area, or stream area designated by Ohio EPA as a cold or warmwater habitat. Solid waste cannot be placed within 300 ft of a landfill's property line, within 1,000 ft of a residence, or within 200 ft of a stream, lake or natural wetland. A solid waste landfill cannot be located above a sole source aquifer (a sole source aquifer is federally designated as an area's primary source of water), in areas surrounding a public water supply well, or above an unconsolidated source of water, like sand or gravel beds, that are capable of supplying 100 gpm of water to a well that is within 1,000 ft of where solid waste is placed. Table D.7 provides a preliminary screening of the four study areas against the applicable siting ARARs from *OAC* 3745-27. Figures D.32 and D.33 show the proximity of the potential waste boundaries to many of these items.

Low-level radioactive waste. DOE Order 435.1-1 does not set specific siting restrictions for low-level radioactive waste disposal facilities but does require that potential locations be evaluated considering environmental characteristics, geotechnical characteristics, and human activities, including whether it is located in a floodplain, a tectonically active area, or in a zone of water table fluctuation. The Order also requires that potential locations with environmental and geotechnical characteristics, and human activities for which adequate protection cannot be provided through the facility design be deemed unsuitable for the location of the facility.

Additional location-specific restrictions. Certain location-specific ARARs included in Appendix F also restrict waste disposal activities that would have an impact on sensitive local resources such as wetlands or aquatic resources, state- or federal-listed threatened or endangered species or their habitat, or archeological or cultural artifacts or historic sites or Native American remains. A combination of state and federal regulations regulate such activities in order to minimize adverse impacts and provide for mitigation of unavoidable impacts.

Table D.7. Applicable Siting ARARs from *OAC* 3745-27

Requirement	Study Area A	Study Area B	Study Area C	Study Area D
The limits of solid waste placement of the landfill cannot be:				
Within 1,000 ft of or within a national park or recreation area or candidate area for potential inclusion in the national park system; or a state park or state park purchase area; or any property that lies within the boundaries of a national park or recreation area but that has not been acquired or is not administered by the secretary of the DOI (1,000-ft setback does not apply if obtain written authorization from the owner to locate within 1,000 ft);	✓	✓	✓	✓
In a sand or gravel pit;	✓	✓	✓	✓
In a limestone or sandstone quarry;	✓	✓	✓	✓
Above a federally designated sole source aquifer, unless granted an exemption by Ohio EPA;	✓	✓	✓	✓
Above an unconsolidated aquifer system capable of sustaining a yield of 100 gpm for a 24-hour period to a well located within 1,000 ft of where solid waste is placed, unless deemed acceptable by Ohio EPA.	**Note *a***	**Note *a***	✓	✓
The isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner of the landfill must be not less than 15 ft of in situ or added geologic material deemed acceptable by Ohio EPA.	✗	✗	✓	✓
The limits of solid waste placement of the landfill and any leachate ponds or lagoons cannot be located within the surface and subsurface areas of the following:				
Surrounding a public water supply well through which contaminants may move toward and may reach the well through underground geologic or man-made pathways within a period of 5 years;	✓	✓	✓	✓
A wellhead protection area or a drinking water source protection area for a public water system using groundwater.	✓	✓	✓	✓
Landfill cannot be located within an area of potential subsidence due to an underground mine or within the angle of draw of an underground mine unless the potential impact to the facility due to subsidence is minimized.	✓	✓	✓	✓
The limits of solid waste placement of the landfill cannot be within 1,000 ft of a water supply well or a developed spring unless one or more of the conditions listed in *OAC* 3745-27-07(H)(3)(c)(i) – (iv) is met.	✓	✓	✓	✓
Solid waste cannot be placed within 1,000 ft of the following natural areas:				
National or state nature/wildlife refuge or preserve;	✓	✓	✓	✓
National or state wild, scenic, or recreational river;	✓	✓	✓	✓
Special interest or research area; or	✓	✓	✓	✓
Stream area designated by Ohio EPA as a coldwater or exceptional warmwater habitat. (**Note *b*)**	✓	✗	✓	✓

Table D.7. Applicable Siting ARARs from *OAC* 3745-27 (Continued)

Requirement	Study Area A	Study Area B	Study Area C	Study Area D
Solid waste cannot be placed:				
Within 300 ft of the landfill facility's property line, unless deemed acceptable by Ohio EPA;	✓	✓	✓	✓
Within 1,000 ft of a residence whose owner has not consented in writing to its location;	✓	✓	✗	✓
Within 200 ft of a stream;	✓	**Note *c***	✓	**Note *c***
Within 200 ft of a lake;	✓	✓	✓	✓
Within 200 ft of a wetland;	✓	✗	✓	✓
In a regulatory floodplain (as defined in *OAC* 3745-27-01) unless demonstrated that unit(s) will not restrict flow of the 100-yr flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health and the environment;	✓	✓	✓	✓
Within 200 ft of a fault that has had displacement in Holocene time unless it is demonstrated that a distance of less than 200 ft will prevent damage to the structural integrity of the facility and will be protective of human health and the environment;	✓	✓	✓	✓
In a "seismic impact zone" (as defined in *OAC* 3745-27-01) unless demonstrated that all containment structures, including liners, leachate collection systems, sedimentation ponds, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the location;	✓	✓	✓	✓
In an "unstable area" (as defined in *OAC* 3745-27-01) unless demonstrated that engineering measures have been incorporated into the design of the facility to ensure that the integrity of the structural components will not be disrupted.	✓	✓	✓	✓

Note *a* – Both Study Areas A and B overlie an unconsolidated aquifer system; however, this aquifer is not capable of a sustained yield of 100 gpm for a 24-hour period.

Note *b* – Little Beaver Creek is formally classified pursuant to *OAC* 3745-1-09 (Table 9-1) as, among other uses, Warmwater Habitat. However, Ohio EPA's *Biological and Water Quality Study of Portsmouth Gaseous Diffusion Plant Streams* (2006) states that Little Beaver Creek meets criteria for warmwater habitat, and portions may attain "exceptional warmwater habitat" criteria. Only Study Area B lies within 1,000 ft of Little Beaver Creek.

Note *c* - Both Study Areas B and D include ephemeral to intermittent streams, which may be within 200 ft of the planned limits of waste. Portions of the intermittent streams in Study Area D have been identified as meeting the criteria for a Class IIIA Primary Headwater Habitat.

DOI = U.S. Department of the Interior
OAC = *Ohio Administrative Code*
Ohio EPA = Ohio Environmental Protection Agency

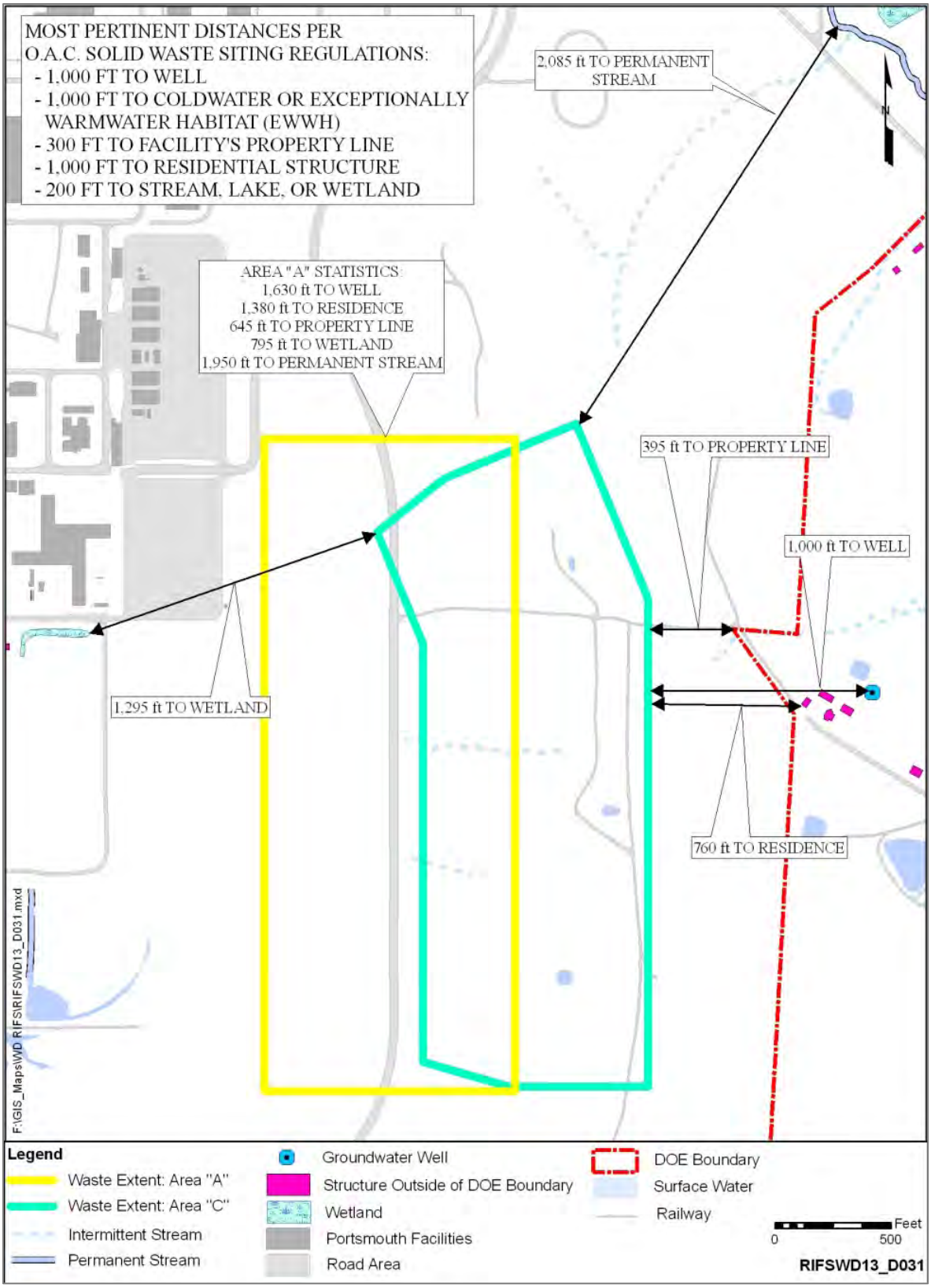

Figure D.32. Siting Considerations for Study Areas A and C at PORTS

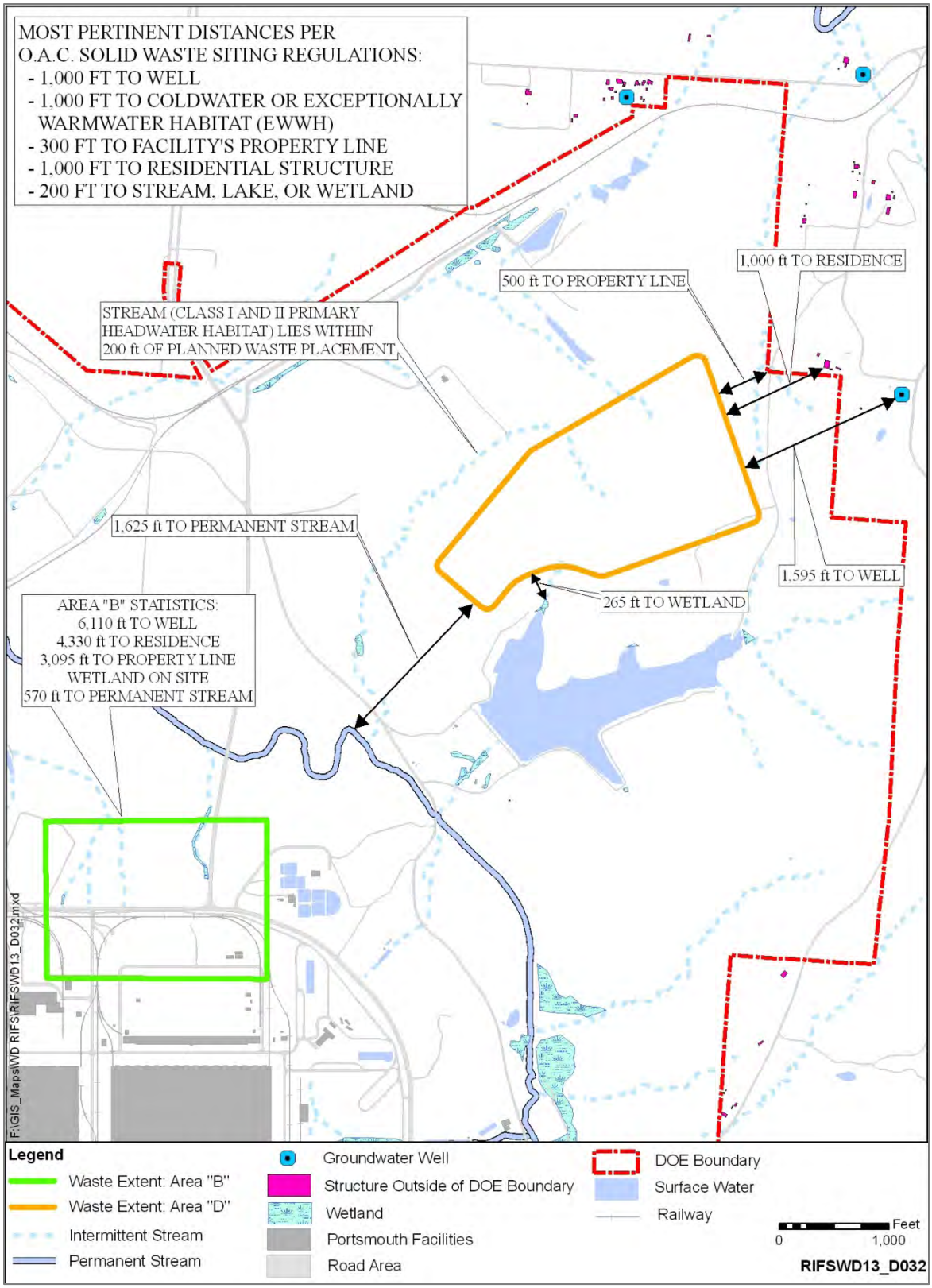

Figure D.33. Siting Considerations for Study Areas B and D at PORTS

D.6.2 SITE SCREENING

One of the primary criteria identified in the DFF&O for consideration of a potential OSDC (or any remedial action) is that it must be protective of human health and the environment. Any properly designed OSDC would be considered protective of human health and the environment because of the design of the impermeable cap and liner systems. However, within the compliance timeframe of 1,000 years or longer, the natural hydrogeologic conditions at each location must be further analyzed in differentiating the degree of protectiveness of the different study areas. Hydrogeologic conditions at each location determine the depth and migration (direction and rate) of groundwater. In the event contaminants migrate through the liner over time, the fate and transport of those contaminants will depend on the hydrogeologic and geochemical conditions of the underlying strata. While a shallow groundwater zone may exist within the regolith and weathered/jointed bedrock, most of this zone would be removed during construction of a potential OSDC. Table D.8 provides a comparison of the protectiveness of each of the study areas relative to each other.

Table D.8. Comparison of Protectiveness at Each Study Area

Criteria	Study Area A	Study Area B	Study Area C	Study Area D
Hydrogeologic Conditions	Study Area A overlies the ancestral river valley with the Gallia sand aquifer. Groundwater moves through the sand towards nearby surface water discharge in Big Run Creek. Minford water table is approximately 15 ft below surface.	Study Area B, similar to Study Area A, overlies the ancestral river valley with the Gallia sand aquifer. Groundwater moves through the sand towards nearby surface water discharge in Little Beaver Creek. Minford water table is less than 15 ft below surface.	Study Area C is underlain by low permeability bedrock. The uppermost aquifer at this study area, the Berea sandstone, is overlain by over 100 ft of low permeability Cuyahoga and Sunbury shale.	Study Area D is similar to Study Area C in that it is underlain by low permeability bedrock. The uppermost aquifer at this study area, the Berea sandstone, is overlain by up to 100 ft of low permeability Cuyahoga and Sunbury shale.
Contaminant Fate and Transport	pWAC modeling indicated Study Area A had travel times to reach peak dose similar to Study Area B (a few organic compounds reached the point of exposure in less than 1,000 years).	pWAC modeling indicated Study Area B had the fastest travel times to reach peak dose compared to the other locations (a few organic compounds reached the point of exposure in less than 1,000 years).	pWAC modeling indicated Study Area C had travel times to reach peak dose several times longer than either Study Areas A or B. No constituents reached peak dose in less than 1,000 years and many constituents took more than 150,000 years.	Study Area D was not modeled for the RI/FS work plan but since the hydrogeology is similar to Study Area C, and the distance to the DOE boundary is greater than Study Area C, the contaminant travel times should be similar, if not greater, than those at Study Area C.
Protectiveness Compared to Other Study Areas	Similar protectiveness as Study Area B; less protective than Study Areas C and D	Similar protectiveness as Study Area A; less protective than Study Areas C and D	Similar protectiveness as Study Area D; more protective than Study Areas A and B	Similar protectiveness as Study Area C; more protective than Study Areas A and B

DOE = U.S. Department of Energy
RI/FS = remedial investigation/feasibility study
pWAC = preliminary waste acceptance criteria (model results reported in the waste disposition RI/FS Work Plan [DOE 2012])

Based on the above analysis, Study Areas C and D are more protective of human health and the environment than Study Areas A and B, therefore Study Areas A and B may be eliminated from further consideration in the context of this siting study. While Study Areas C and D have private groundwater

supplies located at closer distances than Study Areas A and B, the underlying hydrogeologic conditions favor much longer travel times for contaminants if released from a potential OSDC. While the differences in protectiveness between Study Areas C and D are not significant enough to eliminate either from further consideration, those differences are discussed in the following section.

D.6.3 EVALUATION OF REMAINING LOCATIONS

This section evaluates the effectiveness and implementability of the two remaining locations as a means to differentiate between them. The purpose of this evaluation is to assess the advantages and disadvantages of the two locations with respect to these general criteria to select a representative location for development of a potential OSDC for this RI/FS.

The effectiveness criterion considers the short- and long-term aspects of the protectiveness, compliance with siting requirements included in the ARARs, and ability to achieve remedial action objectives. As discussed in the previous section, the differences between protectiveness for Study Areas C and D are minor. Both locations have similar hydrogeologic conditions, and contaminant fate and transport at each location would therefore be similar. One area where the two areas differ is in the distances from the extent of waste placement to various points as described in the siting requirements (Table D.9). A greater distance to a point described in the siting requirements represents an additional measure of protectiveness within a given timeframe. As shown in Table D.9, a waste cell in Study Area D is located farther from the DOE boundary, nearest residence, and the nearest private well. A waste cell in Study Area C would be farther from the nearest perennial stream (with potential exceptional warmwater aquatic habitat status) and wetland. The limit of waste at Study Area D would be within 200 ft from an intermittent stream segment preliminarily identified as a Class IIIA PHWH stream. (Both Study Areas C and D include intermittent and/or ephemeral streams within their boundaries.) A waste cell in Study Area C would require a waiver of the siting ARARs because the edge of waste placement would be less than 1,000 ft from the nearest residence, while a waste cell in Study Area D would require a waiver of the siting ARARs because the edge of waste placement would be less than 200 ft from a surface stream. Figure D.34 shows private groundwater wells located near Study Areas C and D, based on water well records from the ODNR.

Table D.9. Criteria for Evaluating Effectiveness of the Study Areas

Criteria	Study Area C (ft)	Study Area D (ft)
Distance to DOE Boundary	395	500
Distance to nearest residence	760*	1,000
Distance to nearest private groundwater supply	1,000	1,595
Distance to nearest stream (with potential exceptional warmwater aquatic habitat status)	2,085	1,625
Distance to nearest wetland	1,295	265

Distances are measured from “edge of waste placement” based on conceptual design.

*Required distance is 1,000 ft.

DOE = U.S. Department of Energy

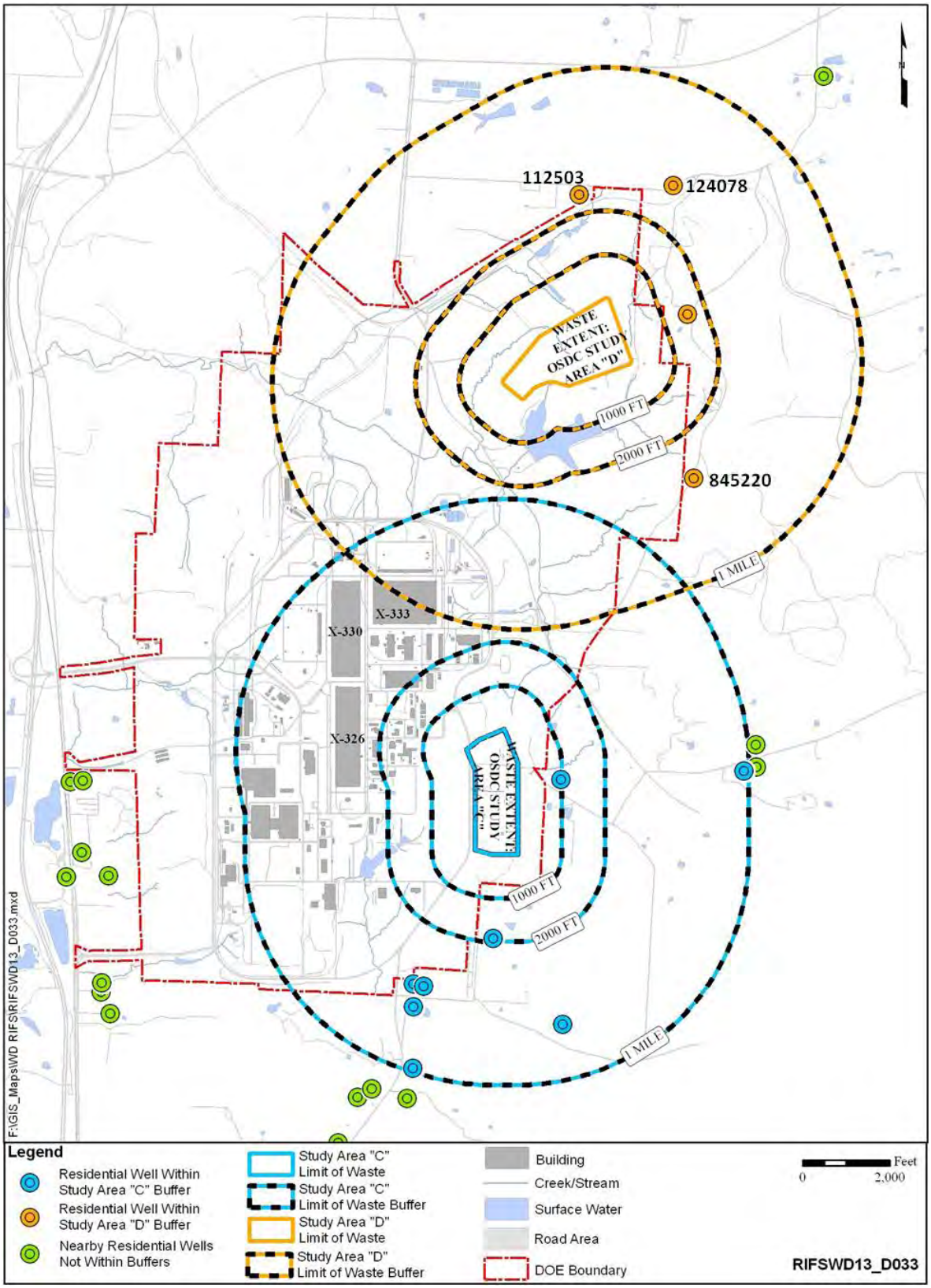

Figure D.34. Private Groundwater Wells Located Near Study Areas C and D at PORTS

The implementability criterion primarily considers the construction and operational considerations of the two locations. This criterion evaluates the amount of site preparation needed for the two locations, the ease of access from the D&D project activities, and the potential for expansion in the event that other wastes from PORTS need disposal in such a facility. Table D.10 compares these criteria for the two study areas.

Table D.10. Criteria for Evaluating Implementability of the Study Areas

Criteria	Study Area C	Study Area D
Site preparation for construction	Similar to Study Area D but would also require relocation of a natural gas pipeline and a portion of Perimeter Road	Requires removal of weathered bedrock to a stable depth with sufficient area for installation of a liner; no infrastructure removal or relocation required
Ease of access from future D&D activities	Closer to the D&D work than Study Area D; requires overpass installation	Farther from the D&D work than Study Area C; requires overpass installation
Potential for expansion to 5 million cy	No space for additional expansion beyond FS D&D capacity requirements (3.9 million cy)	Suitable space for expansion up to 5 million cy

D&D = decontamination and decommissioning
FS = feasibility study

The topography of both Study Areas C and D is hilly, and the areas are heavily wooded with thick vegetation in some areas. For site preparation at Study Area C, clearing and grubbing would be required across the entire area, with approximately 180 acres requiring tree removal. At Study Area D, there are areas of partial clearing, although clearing and grubbing would be required across most of the study area, with approximately 160 acres requiring tree removal. Because both Study Areas C and D contain mature forest habitat, avoiding any clearing during the months of April through September would protect the Indiana bat (even though one has never been seen at PORTS).

Construction of a potential OSDC at Study Area D would require much less overburden soil excavation than at Study Area C, but the amount of bedrock that must be ripped out is greater for the same depth below surface. This quantity can be modified by raising or lowering the base of the waste. The amount of landfill construction materials is comparable between the two locations.

The areal extent of competent bedrock for a potential OSDC at Study Area C is limited. To keep as much of the cell as possible over bedrock and still keep an acceptable distance from the PORTS eastern boundary, the capacity of the cell on bedrock is 2.4 million cy. To achieve sufficient capacity to allow most of the D&D waste to be disposed on Site, the cell would have to extend beyond the bedrock. This extension provides an additional capacity of 1.1 million cy, but the waste that is allowed in this lower area cannot be TSCA-regulated unless a waiver is obtained. The construction of two cells with different WAC could result in more operational complications during waste placement. Additional waste segregation would be required to ensure wastes that cannot meet the administrative WAC for the lower area are not placed there. Additionally, since a potential OSDC is smaller at Study Area C, a higher volume of waste would be required to be shipped off Site.

A potential OSDC at Study Area D has a larger waste storage capacity than the potential OSDC at Study Area C. Based on the location and geological subsurface, it is estimated that roughly 5.0 million cy of capacity is available, if needed. Therefore, the quantity of waste requiring off-Site disposal is far less

than that for Study Area C. Further, the operation of a potential OSDC at Study Area D is less complicated than at Study Area C because all cells would have the same WAC, and no additional segregation of waste would be needed. Conceptual OSDC layouts at each study area are provided in Figures D.35 and D.36.

This analysis reflects the high significance placed on both study areas' underlying hydrogeology for limiting the migration of contamination in the event contaminants ever leached through the bottom composite liner. At Study Area D, excavation of much of the 720-ft sandstone lens zone during construction of the bottom liner, and isolation of any of this zone that remains beyond the footprint, will be specified in the final design of the sub-grade to sufficiently eliminate this layer from becoming a lateral pathway for migration of any contaminants outside of the OSDC footprint. Monitoring of the remaining portions of the 720-ft sandstone lens zone will be conducted as part of the overall OSDC monitoring system. Both study areas are considered to be more protective of human health and the environment and generally in compliance with ARARs. (Both Study Area C and D would require a waiver of one of the siting requirements.) Both areas could be developed to accommodate a cell with sufficiently high WAC to allow maximum use of a potential OSDC for containing waste generated from the D&D of the PORTS Facility. Several negative issues with Study Area C include insufficient room to build a potential OSDC that could eventually be expanded to accommodate up to 5 million cy of waste and fill and still keep the beneficial geologic conditions, the fact that more waste would require off-Site disposal, and that the facility at this location encroaches on the required distance to the nearest residence. Therefore, based on this siting analysis, Study Area D is selected as the representative location for alternative development in the RI/FS.

Siting Criteria Summary Relative to Study Area D

Criteria for siting a disposal cell are listed in *OAC* 3745-27-07(H). The proposed limits of waste placement at Study Area D in relation to these criteria are summarized below.

National Parks, National Recreation Areas, and State Parks

The proposed limits of waste placement would not be located within 1,000 ft of a national park or recreation area, candidate park for potential inclusion in the national park system, state park, or established state park purchase area.

Groundwater Aquifer Protection

The proposed disposal facility location is not located in a sand or gravel pit, in a sandstone or limestone quarry, over a sole source aquifer, or above an aquifer capable of producing 100 gpm for a 24-hour period to an existing or future water supply well within 1,000 ft of the limits of waste placement. The isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner would be greater than 15 ft. (The distance between the bottom of the liner to the top of the Berea sandstone, the uppermost aquifer system at Study Area D, is greater than 70 ft.)

Groundwater Setbacks

The proposed limits of waste would not be located within a 5-year time of travel to any existing or proposed public water supply well, wellhead protection area, or drinking water source protection area for a public water system using groundwater.

The proposed disposal facility location is not located within an area that has been mined underground.

The limits of waste placement would not be located within 1,000 ft of a water supply well or a developed spring.

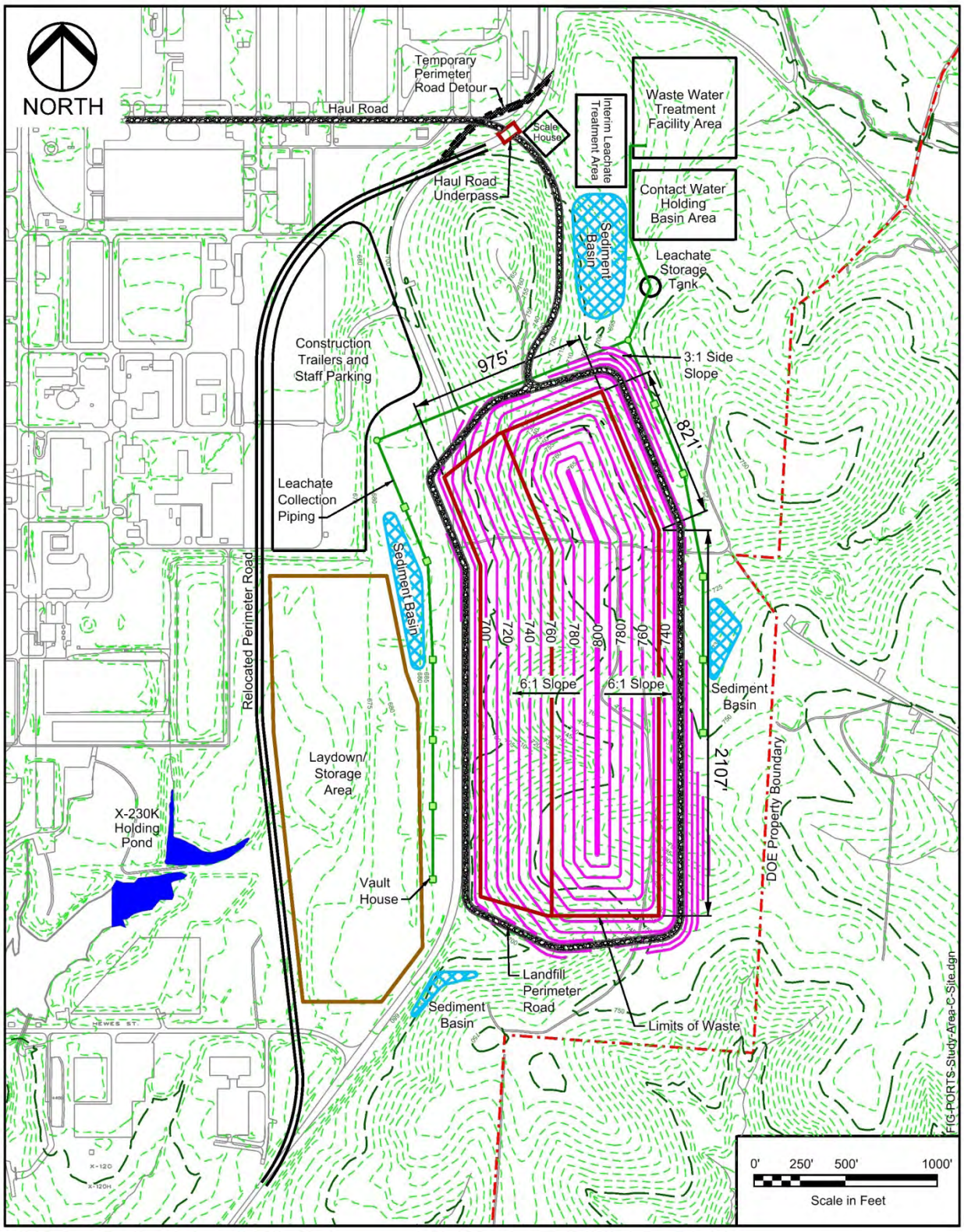

Figure D.35. Landfill Plan View – Finished Grading Plan for Study Area C at PORTS

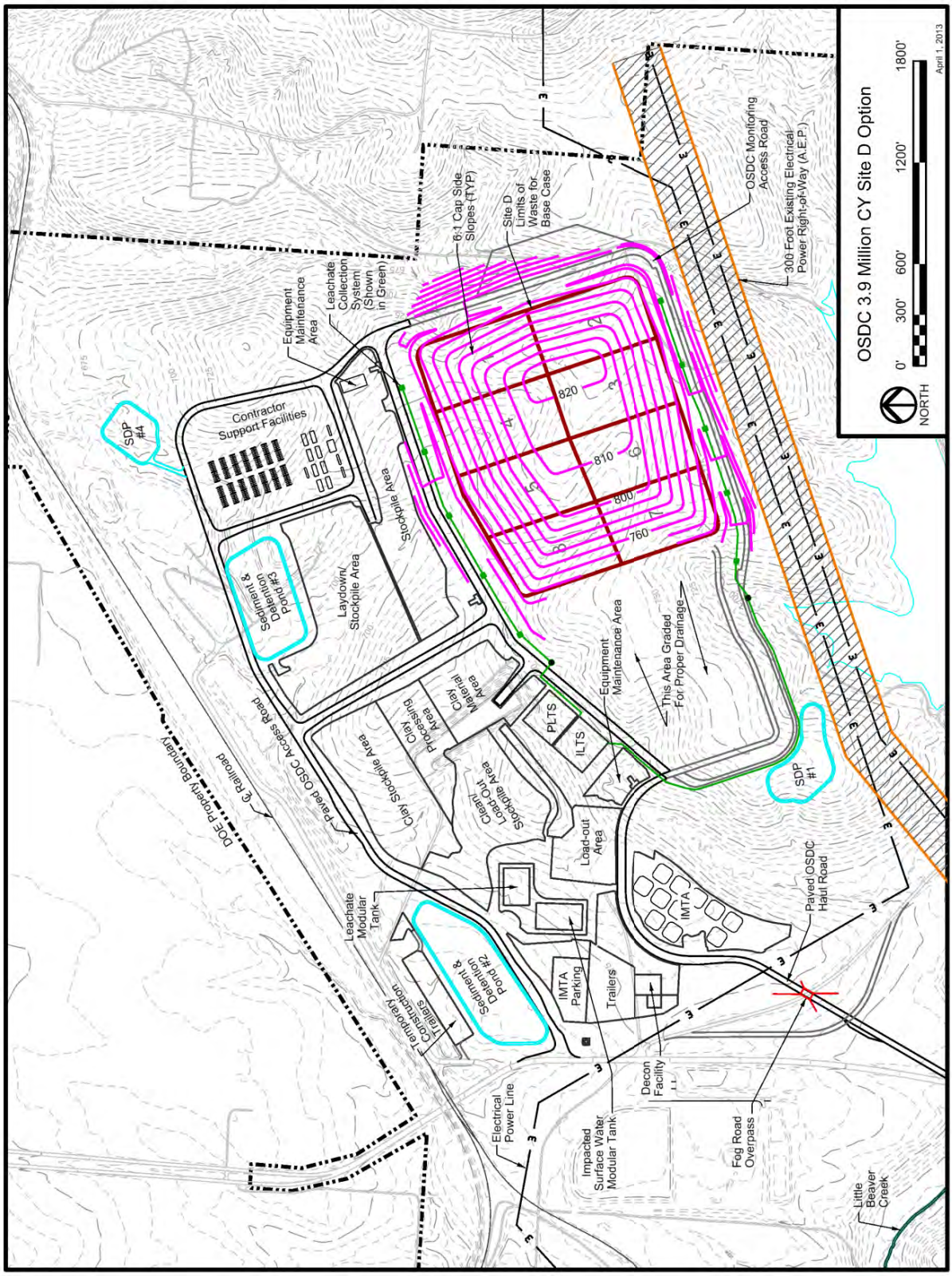

Figure D.36. Landfill Plan View – Finished Grading Plan for Study Area D at PORTS

General Setbacks

The limits of waste placement would not be located within 1,000 ft of areas designated by the ODNR as a state nature or wildlife preserve; a national or state wild, scenic, or recreational river; or an area designated as a special interest or research area.

The proposed disposal facility location is not located within 1,000 ft of a stream designated by Ohio EPA as a coldwater or exceptional warmwater habitat. The nearest streams, Little Beaver Creek and Beaver Creek, are designated as warmwater habitat in *OAC* 3745-0-09.

The limits of waste placement would not be located within 300 ft of the property line.

The limits of waste placement would not be located within 1,000 ft of a domicile.

The proposed limits of waste placement would not be within 200 ft of a lake or wetland. There is a stream in Study Area D, including portions that are designated as Class IIIA PHWH, that would be within 200 ft of the waste placement. The only ARAR waiver required is for the siting requirements in relation to this stream.

OAC 3745-27-20(C) requires a demonstration be made to show that the facility meets location restrictions for airports, floodplains, faults, seismic impact zones, and unstable areas. The following paragraphs provide the location restriction information.

The nearest airport, the Pike County Airport, is located approximately 9.1 miles (48,050 ft) from the proposed disposal facility location. This exceeds the 10,000-ft minimum distance required by *OAC* 3745-27-20(C)(1).

OAC 3745-27-20(C)(2) prohibits the limits of waste placement from being in a regulatory floodplain. The proposed disposal facility location is on the upland areas of the DOE property and does not lie within a 100-year floodplain as depicted on a Federal Insurance Administration flood map.

There are no fault zones with Holocene age displacement in the vicinity of Pike County. The proposed location meets the requirements of *OAC* 3745-27-20(C)(3).

The proposed disposal facility location meets the requirements of *OAC* 3745-27-20(C)(4) with regard to seismic impact zones. The peak ground acceleration is based on a U.S. Geological Survey National Seismic Hazard Map for Ohio (U.S. Geological Survey 2013), which shows a peak acceleration ranging from 0.06 g to 0.08 g with a 2 percent probability in 50 years.

The proposed disposal facility location meets the requirements of *OAC* 3745-27-20(C)(5). The location is not in an area prone to landslides or characterized by poor foundation or subsoil conditions, nor is it characterized as having karst geology. No landslides (historic or current) or areas of susceptibility to landsliding were identified during a field reconnaissance of Study Area D.

Public participation is integral to the DFF&O process. Soliciting public preference on the location of a potential OSDC is critical to the current evaluation of waste disposal alternatives at PORTS. The general siting approach and considerations have been discussed at the PORTS Site Specific Advisory Board (SSAB) meetings and recommendations from the SSAB on siting an on-Site landfill have been received. (The PORTS SSAB also has a subcommittee that is focused on on-Site waste disposition.) The SSAB recommended the following criteria be considered in siting a potential OSDC:

- Possible use of multiple smaller cells
- Ensure minimal footprint/waste minimization/recycling
- Reuse existing landfills if possible
- Areas not conducive for reuse should be considered
- Consider impact on cultural resources
- Blend with existing terrain
- No off-Site waste accepted
- Community benefit-land use management plans should be developed
- Cells should be latest cell technology
- Additional education for community members
- Complimentary use of cell space (solar panels, wind farms, etc.)
- Industrial use clean-up standard.

While no single location can accommodate all of these recommendations, they will be considered in the final selection and design. These criteria do not distinguish between the relative merits of Study Areas C and D; both meet these criteria equally.

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APPENDIX E: WASTE VOLUMES

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ACRONYMS

ACM	asbestos-containing material
ACR	Area Control Room
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
EBS	evacuation booster station
EC	engineering category
ERP	extended range product
FBP	Fluor-B&W Portsmouth LLC
FS	Feasibility Study
FY	fiscal year
HVAC	heating, ventilation, and air conditioning
LLW	low-level (radioactive) waste
MCC	Master Control Center
MLLW	mixed low-level (radioactive) waste
OSDC	on-Site disposal cell
PCB	polychlorinated biphenyl
PG	process gas
PGM	process gas mover
PORTS	Portsmouth Gaseous Diffusion Plant
PW	product withdrawal
QI	Quadrant I
QII	Quadrant II
QIII	Quadrant III
QIV	Quadrant IV
RA	remediation area
RC	regulatory category
RCRA	Resource Conservation and Recovery Act of 1976 (as amended)
RCW	recirculating cooling water
RI	Remedial Investigation
SWMU	solid waste management unit
TCA	trichloroethane
TCE	trichloroethene
TSCA	Toxic Substances Control Act of 1976

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This appendix presents a detailed breakdown of decontamination and decommissioning (D&D) (regulatory category [RC]-1) and non-D&D (RC-2) waste volumes used to develop each alternative described in this waste disposition Remedial Investigation/Feasibility Study (RI/FS) report.

The waste volume information presented in this appendix is a waste generation forecast based on a "snap-shot" in time, but it is based on the best professional judgment of the U.S. Department of Energy (DOE), including lessons learned from similar DOE projects. The information in this section is consistent with planning assumptions established in the waste disposition RI/FS Work Plan (DOE 2011). The waste forecast for the Portsmouth Gaseous Diffusion Plant (PORTS) has been developed and examined over many years and was most recently formalized in the Fluor B&W Portsmouth LLC (FBP) project baseline for PORTS. The waste generation forecast will continue to be reviewed extensively as preparations and plans for PORTS D&D mature.

Currently, the waste generation forecast is 1.47 million cy of waste to be generated from D&D of the three large gaseous diffusion buildings and numerous smaller buildings and/or facilities at PORTS (RC-1, engineering category [EC]-1 and EC-2). The volume of waste aligns with the present scope of *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) agreement between DOE and the Ohio Environmental Protection Agency. During demolition, approximately 53,000 cy of residual soil (RC-1, EC-1) are anticipated to be generated. This soil volume is included in the 1.47 million cy volume estimate.

The vast majority of waste expected to be generated during D&D of the PORTS Facility (RC-1) will originate from the three large gaseous diffusion process buildings: X-326, X-330, and X-333. The waste volumes include the structure of each facility, all process and industrial equipment within each facility, and the facility slabs (Attachments E.1, E.2, and E.3). The balance of plant effort consists of hundreds of smaller facilities and includes waste that may be generated before the waste disposition decision is final (Attachment E.4). In this case, the waste will be disposed off Site under an earlier DFF&O decision document. Residual soil (RC-1, EC-1) has been separated in the accompanying tables (Attachment E.5).

The RI/FS also evaluates the impacts of potentially disposing of the Ohio Consent Decree waste (RC-2 as shown in Attachment E.6). An estimate of 710,000 cy is used to represent this volume. Placement of such non-D&D waste as fill would need to meet the requirements of the waste acceptance criteria for the potential on-Site disposal cell (OSDC) in order to be protective of human health and the environment, although additional regulatory approval would be necessary for such excavation of non-D&D waste and the subsequent placement of non-D&D waste in a potential OSDC.

This waste forecast estimate is reasonably conservative, with appropriate accuracy and precision for assessing and estimating remedial alternatives developed in this waste disposition RI/FS report. The volume estimate evolves from field studies, process knowledge, facility walkdowns (including measurements of building structures and components), and engineering studies (including review of as-built drawings).

The accompanying tables are reports from the draft FBP Mass Flow Database, used to support development of the project baseline. These tables provide a detailed breakdown of the waste, by facility and commodity type, expected to be generated by each of the major projects during D&D of the PORTS Facility.

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ATTACHMENT E.1: X-326 BUILDING VOLUMES (SUBSET OF RC-1, EC-2)

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X-326 Building Volumes

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Junk Removal	X-326	LLW	67,798.5	2,511.1
Junk Removal	X-326	LLW	67,798.5	2,511.1
Mercury Lamps	X-326	Haz	400	14.8
Mercury Lamps	X-326	Haz	400	14.8
Mercury Switches	X-326	Haz	3	0.1
Mercury Switches	X-326	Haz	3	0.1
PCB Ballasts	X-326	Haz	47.25	1.8
PCB Ballasts	X-326	Haz	47.25	1.8
PCB Ballasts	X-326	Haz	47.25	1.8
PCB Ballasts	X-326	Haz	47.25	1.8
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
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27-Size Converters	X-326	LLW	11,100	411.1
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27-Size Converters	X-326	LLW	11,100	411.1
27-Size Converters	X-326	LLW	11,100	411.1
25-Size Converters	X-326	LLW	12,800	474.1
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25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
25-Size Converters	X-326	LLW	12,800	474.1
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
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27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
27-Size Compressors	X-326	LLW	7,981.2	295.6
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
25-Size Compressors	X-326	LLW	4,105.7	152.1
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Converters	X-326	LLW	432	16.0
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Compressors	X-326	LLW	396	14.7
Purge Cascade Condensers	X-326	LLW	44	1.6
Purge Cascade Condensers	X-326	LLW	44	1.6
Purge Cascade Condensers	X-326	LLW	44	1.6
External Stage Coolers	X-326	LLW	23,420	867.4
External Stage Coolers	X-326	LLW	23,420	867.4
External Stage Coolers	X-326	LLW	23,420	867.4
External Stage Coolers	X-326	LLW	23,420	867.4
Purge Cascade Motors	X-326	LLW	151.25	5.6
Purge Cascade Motors	X-326	LLW	151.25	5.6
Purge Cascade Motors	X-326	LLW	151.25	5.6
Purge Cascade Motors	X-326	LLW	151.25	5.6
Purge Cascade Speed Increasers	X-326	LLW	55	2.0
Purge Cascade Speed Increasers	X-326	LLW	55	2.0
Purge Cascade Speed Increasers	X-326	LLW	55	2.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Purge Cascade Speed Increasers	X-326	LLW	55	2.0
Purge Cascade Alumina Traps	X-326	MLLW	14	0.5
Purge Cascade Alumina Traps	X-326	MLLW	14	0.5
Purge Cascade Alumina Traps	X-326	MLLW	14	0.5
Purge Cascade Alumina Traps	X-326	MLLW	14	0.5
Purge Cascade Vacuum Pumps	X-326	LLW	32	1.2
Purge Cascade Vacuum Pumps	X-326	LLW	32	1.2
Purge Cascade Vacuum Pumps	X-326	LLW	32	1.2
Purge Cascade Vacuum Pumps	X-326	LLW	32	1.2
Process Gas Valves (G17)	X-326	LLW	35,891.5	1,329.3
Process Gas Valves (G17)	X-326	LLW	35,891.5	1,329.3
Process Gas Valves (G17)	X-326	LLW	35,891.5	1,329.3
Process Gas Valves (G17)	X-326	LLW	35,891.5	1,329.3
Process 'S' Type valves	X-326	LLW	121.75	4.5
Process 'S' Type valves	X-326	LLW	121.75	4.5
Process 'S' Type valves	X-326	LLW	121.75	4.5
Process 'S' Type valves	X-326	LLW	121.75	4.5
Process Gas Piping	X-326	LLW	6,589.75	244.1
Process Gas Piping	X-326	LLW	6,589.75	244.1
Process Gas Piping	X-326	LLW	6,589.75	244.1
Process Gas Piping	X-326	LLW	6,589.75	244.1
ERP High-speed Worthington Compressors	X-326	LLW	591.75	21.9
ERP High-speed Worthington Compressors	X-326	LLW	591.75	21.9
ERP High-speed Worthington Compressors	X-326	LLW	591.75	21.9
ERP High-speed Worthington Compressors	X-326	LLW	591.75	21.9
27-Size Condensers	X-326	LLW	1,238.46	45.9
27-Size Condensers	X-326	LLW	1,238.46	45.9
27-Size Condensers	X-326	LLW	1,238.46	45.9
27-Size Condensers	X-326	LLW	844.63	31.3
25-Size Condensers	X-326	LLW	393.22	14.6
25-Size Condensers	X-326	LLW	393.22	14.6
25-Size Condensers	X-326	LLW	393.22	14.6
25-Size Condensers	X-326	LLW	500.35	18.5
27-Size Motors	X-326	LLW	1,959.25	72.6
27-Size Motors	X-326	LLW	1,959.25	72.6
27-Size Motors	X-326	LLW	1,959.25	72.6
27-Size Motors	X-326	LLW	1,382.25	51.2
25-Size Motors	X-326	LLW	3,284.33	121.6
25-Size Motors	X-326	LLW	3,284.33	121.6
25-Size Motors	X-326	LLW	3,284.33	121.6
25-Size Motors	X-326	LLW	677.02	25.1
Local Cell Control Centers	X-326	LLW	5,322.71	197.1
Local Cell Control Centers	X-326	LLW	5,322.71	197.1
Local Cell Control Centers	X-326	LLW	5,322.71	197.1
Local Cell Control Centers	X-326	LLW	3,631.88	134.5
Cell Valve Motor Control Centers	X-326	LLW	5,561.69	206.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Cell Valve Motor Control Centers	X-326	LLW	5,561.69	206.0
Cell Valve Motor Control Centers	X-326	LLW	5,561.69	206.0
Cell Valve Motor Control Centers	X-326	LLW	3,794.94	140.6
375-hp Motors for PG Mover Station	X-326	LLW	5.16	0.2
375-hp Motors for PG Mover Station	X-326	LLW	5.16	0.2
375-hp Motors for PG Mover Station	X-326	LLW	5.16	0.2
375-hp Motors for PG Mover Station	X-326	LLW	3.52	0.1
Supply Fans	X-326	LLW	28,500	1,055.6
Supply Fans	X-326	LLW	28,500	1,055.6
Supply Fans	X-326	LLW	28,500	1,055.6
Exhaust Fans	X-326	MLLW	560	20.7
Exhaust Fans	X-326	MLLW	560	20.7
Exhaust Fans	X-326	MLLW	560	20.7
Exhaust Fans	X-326	MLLW	560	20.7
Ductwork	X-326	MLLW	35,619.75	1,319.3
Ductwork	X-326	MLLW	35,619.75	1,319.3
Ductwork	X-326	MLLW	35,619.75	1,319.3
Ductwork	X-326	MLLW	35,619.75	1,319.3
Air Filters	X-326	LLW	1,214.68	45.0
Air Filters	X-326	LLW	1,214.68	45.0
Air Filters	X-326	LLW	1,214.68	45.0
Air Conditioning Units	X-326	LLW	85.33	3.2
Air Conditioning Units	X-326	LLW	85.33	3.2
Air Conditioning Units	X-326	LLW	85.33	3.2
Roof Ventilators	X-326	LLW	62,720	2,323.0
Roof Ventilators	X-326	LLW	62,720	2,323.0
Roof Ventilators	X-326	LLW	62,720	2,323.0
Transformers (750-2000KVA)	X-326	MLLW	82,560	3,057.8
Transformers (750-2000KVA)	X-326	MLLW	82,560	3,057.8
MCC Associated #52	X-326	LLW	7,174.52	265.7
MCC Associated #52	X-326	LLW	7,174.52	265.7
MCC Associated #52	X-326	LLW	7,174.52	265.7
MCC Associated #52	X-326	LLW	4,895.44	181.3
Transformers (112-150KVA)	X-326	MLLW	270	10.0
Transformers (112-150KVA)	X-326	MLLW	270	10.0
MCC	X-326	LLW	5,214.08	193.1
MCC	X-326	LLW	5,214.08	193.1
MCC	X-326	LLW	5,214.08	193.1
MCC	X-326	LLW	3,557.76	131.8
Diesel Generator	X-326	LLW	381.28	14.1
Diesel Generator	X-326	LLW	381.28	14.1
Diesel Generator	X-326	LLW	381.28	14.1
Diesel Generator	X-326	LLW	260.16	9.6
Wiring, Conductor	X-326	LLW	16,974.27	628.7
Wiring, Conductor	X-326	LLW	16,974.27	628.7
Wiring, Conductor	X-326	LLW	16,974.27	628.7

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Wiring, Conductor	X-326	LLW	11,582.18	429.0
Cable Trays	X-326	LLW	3,652.07	135.3
Cable Trays	X-326	LLW	3,652.07	135.3
Cable Trays	X-326	LLW	3,652.07	135.3
Cable Trays	X-326	LLW	2,491.95	92.3
Transite Cable Trays	X-326	MLLW	1,672	61.9
Wireways	X-326	LLW	38,019.33	1,408.1
Wireways	X-326	LLW	38,019.33	1,408.1
Wireways	X-326	LLW	38,019.33	1,408.1
Wireways	X-326	LLW	25,942	960.8
Lighting Fixtures	X-326	LLW	1,139.32	42.2
Lighting Fixtures	X-326	LLW	1,139.32	42.2
Lighting Fixtures	X-326	LLW	1,139.32	42.2
Lighting Fixtures	X-326	LLW	688.03	25.5
Surge Drums	X-326	LLW	3,259.1	120.7
Surge Drums	X-326	LLW	3,259.1	120.7
Surge Drums	X-326	LLW	3,259.1	120.7
Surge Drums	X-326	LLW	2,222.71	82.3
Lube Oil Pumps	X-326	MLLW	86.9	3.2
Lube Oil Pumps	X-326	MLLW	86.9	3.2
Lube Oil Pumps	X-326	MLLW	86.9	3.2
Lube Oil Pumps	X-326	MLLW	59.29	2.2
Lube Oil Tanks	X-326	MLLW	17,761.2	657.8
Lube Oil Tanks	X-326	MLLW	17,761.2	657.8
Lube Oil Tanks	X-326	MLLW	17,761.2	657.8
Lube Oil Tanks	X-326	MLLW	12,116.4	448.8
Auxiliary Piping Systems	X-326	MLLW	25,269.98	935.9
Auxiliary Piping Systems	X-326	MLLW	25,269.98	935.9
Auxiliary Piping Systems	X-326	MLLW	25,269.98	935.9
Auxiliary Piping Systems	X-326	MLLW	17,238.07	638.4
Seal Exhaust (Vacuum) Pumps	X-326	MLLW	343.27	12.7
Seal Exhaust (Vacuum) Pumps	X-326	MLLW	343.27	12.7
Seal Exhaust (Vacuum) Pumps	X-326	MLLW	343.27	12.7
Seal Exhaust (Vacuum) Pumps	X-326	MLLW	234.19	8.7
Sprinklers and Interior Building Roof Drains	X-326	LLW	418.77	15.5
Sprinklers and Interior Building Roof Drains	X-326	LLW	418.77	15.5
Sprinklers and Interior Building Roof Drains	X-326	LLW	418.77	15.5
Sprinklers and Interior Building Roof Drains	X-326	LLW	285.7	10.6
Dry Air Plant	X-326	LLW	882.61	32.7
Dry Air Plant	X-326	LLW	882.61	32.7
Dry Air Plant	X-326	LLW	882.61	32.7
Dry Air Plant	X-326	LLW	602.16	22.3
Freon Storage Tanks	X-326	LLW	34.13	1.3
Freon Storage Tanks	X-326	LLW	34.13	1.3
Freon Storage Tanks	X-326	LLW	34.13	1.3
Freon Storage Tanks	X-326	LLW	25.6	0.9

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Freon Valves	X-326	LLW	47.29	1.8
Freon Valves	X-326	LLW	47.29	1.8
Freon Valves	X-326	LLW	47.29	1.8
Freon Valves	X-326	LLW	31.14	1.2
Freon Pumps and Motors	X-326	LLW	205.14	7.6
Freon Pumps and Motors	X-326	LLW	205.14	7.6
Freon Pumps and Motors	X-326	LLW	205.14	7.6
Freon Pumps and Motors	X-326	LLW	104.57	3.9
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Channel	X-326	LLW	297.55	11.0
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Rack	X-326	LLW	236.25	8.8
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
Instruments and Instrument Lines--Tubing	X-326	LLW	7,264.85	269.1
ACR Roof Square Footage	X-326	LLW	1,357.87	50.3
ACR Roof Square Footage	X-326	LLW	1,357.87	50.3
ACR Roof Square Footage	X-326	LLW	1,357.87	50.3
ACR Roof Square Footage	X-326	LLW	926.4	34.3
B-4 Pumps	X-326	LLW	0.54	0.0
B-4 Pumps	X-326	LLW	0.54	0.0
B-4 Pumps	X-326	LLW	0.54	0.0
B-4 Pumps	X-326	LLW	0.37	0.0
Battery Rooms	X-326	LLW	14.94	0.6
Battery Rooms	X-326	LLW	14.94	0.6
Battery Rooms	X-326	LLW	14.94	0.6
Battery Rooms	X-326	LLW	10.19	0.4
Process Electrical Heaters	X-326	LLW	9,407.3	348.4
Process Electrical Heaters	X-326	LLW	9,407.3	348.4
Process Electrical Heaters	X-326	LLW	9,407.3	348.4
Process Electrical Heaters	X-326	LLW	6,418.1	237.7
5 Ton Bridge Cranes	X-326	LLW	48,272.31	1,787.9
5 Ton Bridge Cranes	X-326	LLW	48,272.31	1,787.9
5 Ton Bridge Cranes	X-326	LLW	48,272.31	1,787.9
5 Ton Bridge Cranes	X-326	LLW	32,927.08	1,219.5
Process Equipment Power System Cable	X-326	LLW	749.19	27.7
Process Equipment Power System Cable	X-326	LLW	749.19	27.7
Process Equipment Power System Cable	X-326	LLW	749.19	27.7
Process Equipment Power System Cable	X-326	LLW	452.43	16.8
Auxiliary Power System Cable	X-326	LLW	981.44	36.3
Auxiliary Power System Cable	X-326	LLW	981.44	36.3
Auxiliary Power System Cable	X-326	LLW	981.44	36.3
Auxiliary Power System Cable	X-326	LLW	592.68	22.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
ACM Floor Tile	X-326	MLLW	134.5	5.0
ACM Floor Tile	X-326	MLLW	134.5	5.0
ACM Pipe Insulation	X-326	MLLW	921	34.1
ACM Pipe Insulation	X-326	MLLW	921	34.1
Concrete and Reinforcing Steel	X-326	LLW	4,413.33	163.5
Concrete and Reinforcing Steel	X-326	LLW	152,259.75	5,639.3
Concrete and Reinforcing Steel	X-326	LLW	4,413.33	163.5
Concrete and Reinforcing Steel	X-326	LLW	152,259.75	5,639.3
Concrete and Reinforcing Steel	X-326	LLW	4,413.33	163.5
Concrete and Reinforcing Steel	X-326	LLW	152,259.75	5,639.3
Concrete and Reinforcing Steel	X-326	LLW	189,773	7,028.6
Concrete and Reinforcing Steel	X-326	LLW	152,259.75	5,639.3
Structural Steel	X-326	LLW	81,633	3,023.4
Process Equipment Foundations	X-326	LLW	0.35	0.0
Process Equipment Foundations	X-326	LLW	12.75	0.5
Process Equipment Foundations	X-326	LLW	0.35	0.0
Process Equipment Foundations	X-326	LLW	12.75	0.5
Process Equipment Foundations	X-326	LLW	0.35	0.0
Process Equipment Foundations	X-326	LLW	12.75	0.5
Process Equipment Foundations	X-326	LLW	11.71	0.4
Process Equipment Foundations	X-326	LLW	12.75	0.5
Catwalks and Platforms	X-326	LLW	1,613.11	59.7
Catwalks and Platforms	X-326	LLW	1,613.11	59.7
Catwalks and Platforms	X-326	LLW	1,613.11	59.7
Catwalks and Platforms	X-326	LLW	1,100.68	40.8
Building Roof	X-326	LLW	341,766.65	12,658.0
Building Roof	X-326	LLW	341,766.65	12,658.0
Building Roof	X-326	LLW	341,766.65	12,658.0
Building Roof	X-326	LLW	233,200.05	8,637.0
Acoustical Tile	X-326	LLW	3,697.92	137.0
Acoustical Tile	X-326	LLW	3,697.92	137.0
Acoustical Tile	X-326	LLW	3,697.92	137.0
Acoustical Tile	X-326	LLW	2,523.23	93.5
Asphalt Tile	X-326	LLW	209.11	7.7
Asphalt Tile	X-326	LLW	209.11	7.7
Asphalt Tile	X-326	LLW	209.11	7.7
Asphalt Tile	X-326	LLW	142.68	5.3
Masonry Blocks	X-326	LLW	12,537.75	464.4
Masonry Blocks	X-326	LLW	12,537.75	464.4
Masonry Blocks	X-326	LLW	12,537.75	464.4
Masonry Blocks	X-326	LLW	12,537.75	464.4
Ceiling	X-326	LLW	26,070.4	965.6
Ceiling	X-326	LLW	26,070.4	965.6
Ceiling	X-326	LLW	26,070.4	965.6
Ceiling	X-326	LLW	17,788.8	658.8
Face Tile	X-326	LLW	80.38	3.0
Face Tile	X-326	LLW	80.38	3.0
Face Tile	X-326	LLW	80.38	3.0
Face Tile	X-326	LLW	54.85	2.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Ribbed Metal Lath	X-326	LLW	342.99	12.7
Ribbed Metal Lath	X-326	LLW	342.99	12.7
Ribbed Metal Lath	X-326	LLW	342.99	12.7
Ribbed Metal Lath	X-326	LLW	234.03	8.7
PW Area Walls	X-326	LLW	2,987.23	110.6
PW Area Walls	X-326	LLW	2,987.23	110.6
PW Area Walls	X-326	LLW	2,987.23	110.6
PW Area Walls	X-326	LLW	2,038.3	75.5
ERP Station Walls	X-326	LLW	59.74	2.2
ERP Station Walls	X-326	LLW	59.74	2.2
ERP Station Walls	X-326	LLW	59.74	2.2
ERP Station Walls	X-326	LLW	40.77	1.5
Building Exterior (Transite)	X-326	MLLW	4,270	158.1
Building Exterior (Transite)	X-326	MLLW	4,270	158.1
Building Exterior (Transite)	X-326	MLLW	4,270	158.1
Building Exterior (Transite)	X-326	MLLW	4,270	158.1
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Cell & Bypass Housings - Steel	X-326	LLW	15,372	569.3
Elevators	X-326	LLW	300.62	11.1
Elevators	X-326	LLW	300.62	11.1
Elevators	X-326	LLW	300.62	11.1
Elevators	X-326	LLW	205.13	7.6
Metal Doors	X-326	LLW	445.37	16.5
Metal Doors	X-326	LLW	445.37	16.5
Metal Doors	X-326	LLW	445.37	16.5
Metal Doors	X-326	LLW	303.89	11.3
Instrument Tunnel	X-326	Clean	40,945.5	1,516.5
Instrument Tunnel	X-326	Clean	40,945.5	1,516.5
Instrument Tunnel	X-326	Clean	40,945.5	1,516.5
Instrument Tunnel	X-326	Clean	40,945.5	1,516.5
Slab	X-326	LLW	181,089	6,707.0

X-326 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Slab	X-326	LLW	181,089	6,707.0
Slab	X-326	LLW	181,089	6,707.0
Slab	X-326	LLW	181,089	6,707.0
Footers, Piers, Grade Beams, and Walls	X-326	Crush and recycle 75% Clean, 25% LLW	118,692	4,396.0
Footers, Piers, Grade Beams, and Walls	X-326	Crush and recycle 75% Clean, 25% LLW	118,692	4,396.0
Footers, Piers, Grade Beams, and Walls	X-326	Crush and recycle 75% Clean, 25% LLW	118,692	4,396.0
Footers, Piers, Grade Beams, and Walls	X-326	Crush and recycle 75% Clean, 25% LLW	118,692	4,396.0
Rebar	X-326	LLW	353.47	13.1
Rebar	X-326	LLW	353.47	13.1
Rebar	X-326	LLW	2,365.53	87.6
Rebar	X-326	LLW	2,365.53	87.6
Truck Alley Concrete	X-326	LLW	2,700	100.0
Truck Alley Concrete	X-326	LLW	2,700	100.0
Truck Alley Concrete	X-326	LLW	2,700	100.0
Truck Alley Concrete	X-326	LLW	2,700	100.0
Truck Alley Steel	X-326	LLW	5.9	0.2
Truck Alley Steel	X-326	LLW	5.9	0.2
Truck Alley Steel	X-326	LLW	5.9	0.2
Truck Alley Steel	X-326	LLW	31.31	1.2
Underground Cooling Water Piping	X-326	LLW	1,649.85	61.1
Underground Cooling Water Piping	X-326	LLW	1,649.85	61.1
Underground Cooling Water Piping	X-326	LLW	1,649.85	61.1
Underground Cooling Water Piping	X-326	LLW	1,125.45	41.7
		Total Cubic Yardage		**246,850**

ATTACHMENT E.2: X-330 BUILDING VOLUMES (SUBSET OF RC-1, EC-2)

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X-330 Building Volumes

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Junk Removal	X-330	LLW	74,507	2,759.5
Junk Removal	X-330	LLW	74,507	2,759.5
Lube Oil	X-330	Haz	391.5	14.5
Lube Oil	X-330	Haz	391.5	14.5
Mercury Lamps	X-330	Haz	400.01	14.8
Mercury Lamps	X-330	Haz	400.01	14.8
Mercury Switches	X-330	Haz	3.24	0.1
Mercury Switches	X-330	Haz	3.24	0.1
PCB Ballasts	X-330	Haz	47.25	1.8
PCB Ballasts	X-330	Haz	47.25	1.8
PCB Ballasts	X-330	Haz	47.25	1.8
PCB Ballasts	X-330	Haz	47.25	1.8
Capacitors	X-330	Haz	5,400	200.0
Capacitors	X-330	Haz	5,400	200.0
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
00' Converters	X-330	LLW	34,492.5	1,277.5
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'0' Converters	X-330	LLW	32,531.95	1,204.9
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'00' Compressors	X-330	LLW	17,606.77	652.1
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
'0' Compressors	X-330	LLW	20,754.55	768.7
Process Piping and Fittings	X-330	LLW	94,605	3,503.9
Process Piping and Fittings	X-330	LLW	94,605	3,503.9
Process Piping and Fittings	X-330	LLW	94,605	3,503.9
Process Piping and Fittings	X-330	LLW	94,605	3,503.9
'00' Recycle Coolers	X-330	LLW	1,807	66.9
'00' Recycle Coolers	X-330	LLW	1,807	66.9
'00' Recycle Coolers	X-330	LLW	1,807	66.9
'00' Recycle Coolers	X-330	LLW	1,807	66.9
'0' Recycle Cooler	X-330	LLW	2,085	77.2
'0' Recycle Cooler	X-330	LLW	2,085	77.2
'0' Recycle Cooler	X-330	LLW	2,085	77.2
'0' Recycle Cooler	X-330	LLW	2,085	77.2
Process Gas Valves	X-330	LLW	71,783.25	2,658.6
Process Gas Valves	X-330	LLW	71,783.25	2,658.6
Process Gas Valves	X-330	LLW	71,783.25	2,658.6
Process Gas Valves	X-330	LLW	71,783.25	2,658.6
EBS	X-330	LLW	500	18.5
EBS	X-330	LLW	500	18.5
EBS	X-330	LLW	500	18.5
EBS	X-330	LLW	500	18.5
Cold Trap Holding Drums	X-330	LLW	600	22.2
Cold Trap Holding Drums	X-330	LLW	600	22.2
Cold Trap Holding Drums	X-330	LLW	600	22.2
Cold Trap Holding Drums	X-330	LLW	600	22.2
Cold Trap Systems (cold recovery, drums, fittings)	X-330	LLW	1,000	37.0
Cold Trap Systems (cold recovery, drums, fittings)	X-330	LLW	1,000	37.0
Cold Trap Systems (cold recovery, drums, fittings)	X-330	LLW	1,000	37.0
Cold Trap Systems (cold recovery, drums, fittings)	X-330	LLW	1,000	37.0
Seal Exhaust/Wet Air Piping and Fittings	X-330	MLLW	1,675	62.0
Seal Exhaust/Wet Air Piping and Fittings	X-330	MLLW	1,675	62.0
Seal Exhaust/Wet Air Piping and Fittings	X-330	MLLW	1,675	62.0
Seal Exhaust/Wet Air Piping and Fittings	X-330	MLLW	1,675	62.0
Tails Withdrawal	X-330	LLW	591.75	21.9
Tails Withdrawal	X-330	LLW	591.75	21.9
Tails Withdrawal	X-330	LLW	591.75	21.9
Tails Withdrawal	X-330	LLW	591.75	21.9
Seal Exhaust/Wet Air Piping and Fittings	X-330	LLW	3,630	134.4

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Seal Exhaust/Wet Air Piping and Fittings	X-330	LLW	3,630	134.4
Seal Exhaust/Wet Air Piping and Fittings	X-330	LLW	3,630	134.4
Seal Exhaust/Wet Air Piping and Fittings	X-330	LLW	3,630	134.4
Surge Drums	X-330	LLW	37,000	1,370.4
Surge Drums	X-330	LLW	37,000	1,370.4
Surge Drums	X-330	LLW	37,000	1,370.4
Surge Drums	X-330	LLW	37,000	1,370.4
B-4 Pumps	X-330	LLW	0.5	0.0
B-4 Pumps	X-330	LLW	0.5	0.0
B-4 Pumps	X-330	LLW	0.5	0.0
B-4 Pumps	X-330	LLW	0.5	0.0
00' Condensers	X-330	LLW	2,363.76	87.5
00' Condensers	X-330	LLW	2,363.76	87.5
00' Condensers	X-330	LLW	2,363.76	87.5
00' Condensers	X-330	LLW	6,584.73	243.9
'0' Condensers	X-330	LLW	1,905.56	70.6
'0' Condensers	X-330	LLW	1,905.56	70.6
'0' Condensers	X-330	LLW	1,905.56	70.6
'0' Condensers	X-330	LLW	5,308.33	196.6
'00' Motors	X-330	LLW	6,935.19	256.9
'00' Motors	X-330	LLW	6,935.19	256.9
'00' Motors	X-330	LLW	6,935.19	256.9
'00' Motors	X-330	LLW	19,319.43	715.5
'0' Motors	X-330	LLW	5,707.17	211.4
'0' Motors	X-330	LLW	5,707.17	211.4
'0' Motors	X-330	LLW	5,707.17	211.4
'0' Motors	X-330	LLW	15,898.5	588.8
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Tubing and Racks	X-330	LLW	550	20.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Enclosures and Racks (ACR)	X-330	LLW	227.27	8.4
Supply Fans	X-330	LLW	17,283.97	640.1
Supply Fans	X-330	LLW	17,283.97	640.1
Supply Fans	X-330	LLW	48,148.1	1,783.3
Supply Fans	X-330	LLW	17,283.97	640.1
Ductwork	X-330	LLW	12,708.77	470.7
Ductwork	X-330	LLW	12,708.77	470.7
Ductwork	X-330	LLW	35,402.93	1,311.2
Ductwork	X-330	LLW	12,708.77	470.7
Exhaust Fans	X-330	MLLW	17,500	648.1
Exhaust Fans	X-330	MLLW	17,500	648.1
Exhaust Fans	X-330	MLLW	17,500	648.1
Exhaust Fans	X-330	MLLW	17,500	648.1
Ductwork	X-330	MLLW	19,856.91	735.4
Ductwork	X-330	MLLW	19,856.91	735.4
Ductwork	X-330	MLLW	19,856.91	735.4
Ductwork	X-330	MLLW	19,856.91	735.4
PCB Collection System	X-330	MLLW	1,250	46.3
PCB Collection System	X-330	MLLW	1,250	46.3
PCB Collection System	X-330	MLLW	1,250	46.3
PCB Collection System	X-330	MLLW	1,250	46.3
Air Filters	X-330	LLW	10,844.65	401.7
Air Filters	X-330	LLW	10,844.65	401.7
Air Filters	X-330	LLW	30,210.04	1,118.9
Air Filters	X-330	LLW	10,844.65	401.7

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Air Grills	X-330	LLW	1,155.11	42.8
Air Grills	X-330	LLW	1,155.11	42.8
Air Grills	X-330	LLW	3,217.8	119.2
Air Grills	X-330	LLW	1,155.11	42.8
Air Conditioning Units	X-330	LLW	99.56	3.7
Air Conditioning Units	X-330	LLW	99.56	3.7
Air Conditioning Units	X-330	LLW	277.33	10.3
Air Conditioning Units	X-330	LLW	99.56	3.7
Roof Fans and Ventilators	X-330	LLW	1,216.79	45.1
Roof Fans and Ventilators	X-330	LLW	1,216.79	45.1
Roof Fans and Ventilators	X-330	LLW	3,389.63	125.5
Roof Fans and Ventilators	X-330	LLW	1,216.79	45.1
PCB Transformers	X-330	MLLW	16,500	611.1
PCB Transformers	X-330	MLLW	16,500	611.1
Dry Type Transformers	X-330	Recycle	38,500	1,425.9
Dry Type Transformers	X-330	Recycle	38,500	1,425.9
Auxiliary Transformers	X-330	LLW	7,560	280.0
Auxiliary Transformers	X-330	LLW	7,560	280.0
Switchgear	X-330	LLW	6,388.15	236.6
Switchgear	X-330	LLW	6,388.15	236.6
Switchgear	X-330	LLW	6,388.15	236.6
Switchgear	X-330	LLW	17,795.54	659.1
MCC	X-330	LLW	2,661.73	98.6
MCC	X-330	LLW	2,661.73	98.6
MCC	X-330	LLW	2,661.73	98.6
MCC	X-330	LLW	7,414.81	274.6
Diesel Generator	X-330	LLW	259.26	9.6
Diesel Generator	X-330	LLW	259.26	9.6
Diesel Generator	X-330	LLW	259.26	9.6
Diesel Generator	X-330	LLW	722.22	26.7
Wiring, Conductor	X-330	LLW	10,052.01	372.3
Wiring, Conductor	X-330	LLW	10,052.01	372.3
Wiring, Conductor	X-330	LLW	10,052.01	372.3
Wiring, Conductor	X-330	LLW	28,001.97	1,037.1
Additional Cable from X-533 Shutdown	X-330	LLW	2.77	0.1
Additional Cable from X-533 Shutdown	X-330	LLW	2.77	0.1
Additional Cable from X-533 Shutdown	X-330	LLW	2.77	0.1
Additional Cable from X-533 Shutdown	X-330	LLW	7.7	0.3
Cable Trays	X-330	LLW	30,672.93	1,136.0
Cable Trays	X-330	LLW	30,672.93	1,136.0
Cable Trays	X-330	LLW	30,672.93	1,136.0
Cable Trays	X-330	LLW	85,445.85	3,164.7
Transite Cable Trays	X-330	MLLW	1,923	71.2
X-533 Shutdown Cable Tray (24')	X-330	LLW	12.1	0.4
X-533 Shutdown Cable Tray (24')	X-330	LLW	12.1	0.4
X-533 Shutdown Cable Tray (24')	X-330	LLW	12.1	0.4

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
X-533 Shutdown Cable Tray (24')	X-330	LLW	33.7	1.2
X-533 Shutdown Cable Tray (12')	X-330	LLW	2.59	0.1
X-533 Shutdown Cable Tray (12')	X-330	LLW	2.59	0.1
X-533 Shutdown Cable Tray (12')	X-330	LLW	2.59	0.1
X-533 Shutdown Cable Tray (12')	X-330	LLW	7.22	0.3
Lighting Fixtures	X-330	LLW	611.33	22.6
Lighting Fixtures	X-330	LLW	611.33	22.6
Lighting Fixtures	X-330	LLW	611.33	22.6
Lighting Fixtures	X-330	LLW	1,703	63.1
Lube Oil Pumps	X-330	MLLW	60.84	2.3
Lube Oil Pumps	X-330	MLLW	60.84	2.3
Lube Oil Pumps	X-330	MLLW	60.84	2.3
Lube Oil Pumps	X-330	MLLW	169.48	6.3
Lube Oil Tanks	X-330	MLLW	6,499.65	240.7
Lube Oil Tanks	X-330	MLLW	6,499.65	240.7
Lube Oil Tanks	X-330	MLLW	6,499.65	240.7
Lube Oil Tanks	X-330	MLLW	18,106.06	670.6
Lube Oil Piping	X-330	MLLW	508.67	18.8
Lube Oil Piping	X-330	MLLW	508.67	18.8
Lube Oil Piping	X-330	MLLW	508.67	18.8
Lube Oil Piping	X-330	MLLW	1,417	52.5
Hydraulic Piping and Fittings	X-330	MLLW	571.06	21.2
Hydraulic Piping and Fittings	X-330	MLLW	571.06	21.2
Hydraulic Piping and Fittings	X-330	MLLW	571.06	21.2
Hydraulic Piping and Fittings	X-330	MLLW	1,590.81	58.9
Seal Exhaust (Vacuum) Pumps	X-330	MLLW	1,641.98	60.8
Seal Exhaust (Vacuum) Pumps	X-330	MLLW	1,641.98	60.8
Seal Exhaust (Vacuum) Pumps	X-330	MLLW	1,641.98	60.8
Seal Exhaust (Vacuum) Pumps	X-330	MLLW	4,574.06	169.4
Sprinklers and Interior Building Roof Drains	X-330	LLW	1,098.23	40.7
Sprinklers and Interior Building Roof Drains	X-330	LLW	1,098.23	40.7
Sprinklers and Interior Building Roof Drains	X-330	LLW	1,098.23	40.7
Sprinklers and Interior Building Roof Drains	X-330	LLW	3,059.32	113.3
Dry Air Plant	X-330	LLW	2,325.56	86.1
Dry Air Plant	X-330	LLW	2,325.56	86.1
Dry Air Plant	X-330	LLW	2,325.56	86.1
Dry Air Plant	X-330	LLW	6,478.31	239.9
Nitrogen Plant	X-330	LLW	775.19	28.7
Nitrogen Plant	X-330	LLW	775.19	28.7
Nitrogen Plant	X-330	LLW	775.19	28.7
Nitrogen Plant	X-330	LLW	2,159.44	80.0
Freon Storage and Handling	X-330	LLW	3,595.07	133.2
Freon Storage and Handling	X-330	LLW	3,595.07	133.2
Freon Storage and Handling	X-330	LLW	3,595.07	133.2
Freon Storage and Handling	X-330	LLW	10,014.78	370.9
Freon Pumps and Motors	X-330	LLW	56	2.1

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Freon Pumps and Motors	X-330	LLW	56	2.1
Freon Pumps and Motors	X-330	LLW	56	2.1
Freon Pumps and Motors	X-330	LLW	156	5.8
Sight glass Piping	X-330	LLW	3,460.26	128.2
Sight glass Piping	X-330	LLW	3,460.26	128.2
Sight glass Piping	X-330	LLW	3,460.26	128.2
Sight glass piping	X-330	LLW	9,639.23	357.0
Enclosures (Panels)	X-330	LLW	10,061.36	372.6
Enclosures (Panels)	X-330	LLW	10,061.36	372.6
Enclosures (Panels)	X-330	LLW	10,061.36	372.6
Enclosures (Panels)	X-330	LLW	28,027.91	1,038.1
Seal Exhaust Cabinets	X-330	LLW	3,041.98	112.7
Seal Exhaust Cabinets	X-330	LLW	3,041.98	112.7
Seal Exhaust Cabinets	X-330	LLW	3,041.98	112.7
Seal Exhaust Cabinets	X-330	LLW	8,474.05	313.9
Utilities (Dry Air, Nitrogen, and ClF3)	X-330	LLW	2,179.86	80.7
Utilities (Dry Air, Nitrogen, and ClF3)	X-330	LLW	2,179.86	80.7
Utilities (Dry Air, Nitrogen, and ClF3)	X-330	LLW	2,179.86	80.7
Utilities (Dry Air, Nitrogen, and ClF3)	X-330	LLW	6,072.43	224.9
Battery Rooms	X-330	LLW	10.54	0.4
Battery Rooms	X-330	LLW	10.54	0.4
Battery Rooms	X-330	LLW	10.54	0.4
Battery Rooms	X-330	LLW	29.37	1.1
Dry Pipe Enclosures	X-330	LLW	5,487.32	203.2
Dry Pipe Enclosures	X-330	LLW	5,487.32	203.2
Dry Pipe Enclosures	X-330	LLW	5,487.32	203.2
Dry Pipe Enclosures	X-330	LLW	15,286.03	566.1
Process Steam Heaters	X-330	LLW	412.05	15.3
Process Steam Heaters	X-330	LLW	412.05	15.3
Process Steam Heaters	X-330	LLW	412.05	15.3
Process Steam Heaters	X-330	LLW	1,147.85	42.5
RCW Service Pipe, Fittings, and Valves	X-330	LLW	10,513.31	389.4
RCW Service Pipe, Fittings, and Valves	X-330	LLW	10,513.31	389.4
RCW Service Pipe, Fittings, and Valves	X-330	LLW	10,513.31	389.4
RCW Service Pipe, Fittings, and Valves	X-330	LLW	29,288.07	1,084.7
Steam and Condensate Piping, Fittings, and Valves	X-330	LLW	208.1	7.7
Steam and Condensate Piping, Fittings, and Valves	X-330	LLW	208.1	7.7
Steam and Condensate Piping, Fittings, and Valves	X-330	LLW	208.1	7.7
Steam and Condensate Piping, Fittings, and Valves	X-330	LLW	579.7	21.5

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
20 Ton Outdoor Bridge Cranes (Tails)	X-330	LLW	38,401.59	1,422.3
20 Ton Outdoor Bridge Cranes (Tails)	X-330	LLW	38,401.59	1,422.3
20 Ton Outdoor Bridge Cranes (Tails)	X-330	LLW	38,401.59	1,422.3
20 Ton Outdoor Bridge Cranes (Tails)	X-330	LLW	106,975.23	3,962.0
ACM Floor Tile	X-330	MLLW	134.5	5.0
ACM Floor Tile	X-330	MLLW	134.5	5.0
ACM Pipe Insulation	X-330	MLLW	2,986.5	110.6
ACM Pipe Insulation	X-330	MLLW	2,986.5	110.6
Concrete and Reinforcing Steel	X-330	LLW	35,909.46	1,330.0
Concrete and Reinforcing Steel	X-330	LLW	167,808.19	6,215.1
Concrete and Reinforcing Steel	X-330	LLW	35,909.46	1,330.0
Concrete and Reinforcing Steel	X-330	LLW	167,808.19	6,215.1
Concrete and Reinforcing Steel	X-330	LLW	35,909.46	1,330.0
Concrete and Reinforcing Steel	X-330	LLW	167,808.19	6,215.1
Concrete and Reinforcing Steel	X-330	LLW	116,015.87	4,296.9
Concrete and Reinforcing Steel	X-330	LLW	167,808.19	6,215.1
Structural Steel	X-330	LLW	15,040.95	557.1
Structural Steel	X-330	LLW	15,040.95	557.1
Structural Steel	X-330	LLW	15,040.95	557.1
Structural Steel	X-330	LLW	48,594.14	1,799.8
Process Equipment Foundations	X-330	LLW	4,964.54	183.9
Process Equipment Foundations	X-330	LLW	23,199.75	859.3
Process Equipment Foundations	X-330	LLW	4,964.54	183.9
Process Equipment Foundations	X-330	LLW	23,199.75	859.3
Process Equipment Foundations	X-330	LLW	4,964.54	183.9
Process Equipment Foundations	X-330	LLW	23,199.75	859.3
Process Equipment Foundations	X-330	LLW	16,039.38	594.1
Process Equipment Foundations	X-330	LLW	23,199.75	859.3
Catwalks and Platforms	X-330	LLW	953.33	35.3
Catwalks and Platforms	X-330	LLW	953.33	35.3
Catwalks and Platforms	X-330	LLW	953.33	35.3
Catwalks and Platforms	X-330	LLW	3,080.01	114.1
Building Roof	X-330	LLW	224,162.64	8,302.3
Building Roof	X-330	LLW	224,162.64	8,302.3
Building Roof	X-330	LLW	224,162.64	8,302.3
Building Roof	X-330	LLW	724,222.07	26,823.0
Masonry Blocks	X-330	LLW	33,333.25	1,234.6
Masonry Blocks	X-330	LLW	33,333.25	1,234.6
Masonry Blocks	X-330	LLW	33,333.25	1,234.6
Masonry Blocks	X-330	LLW	33,333.25	1,234.6
Wood Framing, Construction Debris	X-330	LLW	8,939.64	331.1
Wood Framing, Construction Debris	X-330	LLW	8,939.64	331.1
Wood Framing, Construction Debris	X-330	LLW	8,939.64	331.1
Wood Framing, Construction Debris	X-330	LLW	28,882.08	1,069.7
Building Exterior	X-330	MLLW	5,219	193.3
Building Exterior	X-330	MLLW	5,219	193.3

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Building Exterior	X-330	MLLW	5,219	193.3
Building Exterior	X-330	MLLW	5,219	193.3
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Transite	X-330	MLLW	2,417.89	89.6
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Cell and Bypass Housings - Steel	X-330	LLW	14,633.2	542.0
Elevators	X-330	LLW	577.78	21.4
Elevators	X-330	LLW	577.78	21.4
Elevators	X-330	LLW	577.78	21.4

X-330 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Elevators	X-330	LLW	1,866.67	69.1
Instrument Tunnel	X-330	Clean	54,594	2,022.0
Instrument Tunnel	X-330	Clean	54,594	2,022.0
Instrument Tunnel	X-330	Clean	54,594	2,022.0
Instrument Tunnel	X-330	Clean	54,594	2,022.0
Slab	X-330	LLW	225,531	8,353.0
Slab	X-330	LLW	225,531	8,353.0
Slab	X-330	LLW	225,531	8,353.0
Slab	X-330	LLW	225,531	8,353.0
Footers, Piers, Grade Beams, and Walls	X-330	Crush and recycle 75% Clean, 25% LLW	128,250	4,750.0
Footers, Piers, Grade Beams, and Walls	X-330	Crush and recycle 75% Clean, 25% LLW	128,250	4,750.0
Footers, Piers, Grade Beams, and Walls	X-330	Crush and recycle 75% Clean, 25% LLW	128,250	4,750.0
Footers, Piers, Grade Beams, and Walls	X-330	Crush and recycle 75% Clean, 25% LLW	128,250	4,750.0
Rebar	X-330	LLW	1,605	59.4
Rebar	X-330	LLW	1,605	59.4
Rebar	X-330	LLW	1,605	59.4
Rebar	X-330	LLW	1,605	59.4
Truck Alley Concrete	X-330	LLW	2,700	100.0
Truck Alley Concrete	X-330	LLW	2,700	100.0
Truck Alley Concrete	X-330	LLW	2,700	100.0
Truck Alley Concrete	X-330	LLW	2,700	100.0
Tuck Alley Steel	X-330	LLW	12.25	0.5
Tuck Alley Steel	X-330	LLW	12.25	0.5
Tuck Alley Steel	X-330	LLW	12.25	0.5
Tuck Alley Steel	X-330	LLW	12.25	0.5
Underground Cooling Water Piping	X-330	LLW	1,049.98	38.9
Underground Cooling Water Piping	X-330	LLW	1,049.98	38.9
Underground Cooling Water Piping	X-330	LLW	1,049.98	38.9
Underground Cooling Water Piping	X-330	LLW	2,925.05	108.3

Total Cubic Yardage **354,595**

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ATTACHMENT E.3: X-333 BUILDING VOLUMES (SUBSET OF RC-1, EC-2)

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X-333 Building Volumes

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Junk Removal	X-333	LLW	93,055.5	3,446.5
Junk Removal	X-333	LLW	93,055.5	3,446.5
Lube Oil	X-333	Haz	391.5	14.5
Lube Oil	X-333	Haz	391.5	14.5
Mercury Lamps	X-333	Haz	400	14.8
Mercury Lamps	X-333	Haz	400	14.8
Mercury Switches	X-333	Haz	3.24	0.1
Mercury Switches	X-333	Haz	3.24	0.1
PCB Ballasts	X-333	Haz	94.5	3.5
PCB Ballasts	X-333	Haz	94.5	3.5
Capacitors	X-333	Haz	7,344	272.0
Capacitors	X-333	Haz	7,344	272.0
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Converters	X-333	LLW	267,783.3	9,917.9
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Compressors	X-333	LLW	102,178.8	3,784.4
Process Piping and Fittings	X-333	LLW	169,411.5	6,274.5
Process Piping and Fittings	X-333	LLW	169,411.5	6,274.5
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Cell Instrumentation	X-333	LLW	216	8.0
Process Gas Valves	X-333	LLW	52,555.5	1,946.5
Process Gas Valves	X-333	LLW	52,555.5	1,946.5
Recycle/Precoolers	X-333	LLW	21,735	805.0
Recycle/Precoolers	X-333	LLW	21,735	805.0

X-333 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Freezer Sublimer Piping and Fittings	X-333	LLW	1,795.5	66.5
Freezer Sublimer Piping and Fittings	X-333	LLW	1,795.5	66.5
A/B Booster Piping and Fittings	X-333	LLW	881.4	32.6
A/B Booster Piping and Fittings	X-333	LLW	881.4	32.6
PGM Station	X-333	LLW	337.5	12.5
PGM Station	X-333	LLW	337.5	12.5
EBS	X-333	LLW	337.5	12.5
EBS	X-333	LLW	337.5	12.5
Booster Station	X-333	LLW	1,147.5	42.5
Booster Station	X-333	LLW	1,147.5	42.5
Cold Trap Holding Drums	X-333	LLW	86.22	3.2
Cold Trap Holding Drums	X-333	LLW	86.22	3.2
Cold Trap Systems (Cold Recovery, Drums, Fittings)	X-333	LLW	1,053	39.0
Cold Trap Systems (Cold Recovery, Drums, Fittings)	X-333	LLW	1,053	39.0
Seal Exhaust/Wet Air Piping and Fittings	X-333	LLW	4,995	185.0
Seal Exhaust/Wet Air Piping and Fittings	X-333	LLW	4,995	185.0
Low Assay Withdrawal	X-333	LLW	1,188	44.0
Low Assay Withdrawal	X-333	LLW	1,188	44.0
Seal Exhaust (Vacuum) Pumps	X-333	MLLW	1,876.5	69.5
Seal Exhaust (Vacuum) Pumps	X-333	MLLW	1,876.5	69.5
Surge Drums	X-333	LLW	39,987	1,481.0
Surge Drums	X-333	LLW	39,987	1,481.0
B-4 Pumps	X-333	LLW	13.5	0.5
B-4 Pumps	X-333	LLW	13.5	0.5
Motors	X-333	LLW	57,483	2,129.0
Motors	X-333	LLW	57,483	2,129.0
Condensers	X-333	LLW	19,548	724.0
Condensers	X-333	LLW	19,548	724.0
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Tubing and Racks	X-333	LLW	2,413.8	89.4
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3

X-333 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Enclosures and Racks (ACR)	X-333	LLW	251.1	9.3
Supply Fans	X-333	LLW	44,000	1,629.6
Supply Fans	X-333	LLW	44,000	1,629.6
Ductwork	X-333	LLW	38,500.78	1,426.0
Ductwork	X-333	LLW	38,500.78	1,426.0
Exhaust Fans	X-333	MLLW	64,000	2,370.4
Exhaust Fans	X-333	MLLW	64,000	2,370.4
Ductwork	X-333	MLLW	63,310.22	2,344.8
Ductwork	X-333	MLLW	63,310.22	2,344.8
PCB Collection System	X-333	MLLW	2,500	92.6
PCB Collection System	X-333	MLLW	2,500	92.6
Air Filters	X-333	LLW	39,216	1,452.4
Air Filters	X-333	LLW	39,216	1,452.4
Air Grills	X-333	LLW	972	36.0
Air Grills	X-333	LLW	972	36.0
Ventilation Dampers	X-333	LLW	1,217	45.1
Ventilation Dampers	X-333	LLW	1,217	45.1
Air Conditioning Units	X-333	LLW	224	8.3
Air Conditioning Units	X-333	LLW	224	8.3
Roof Fans and Ventilators	X-333	LLW	2,560	94.8
Roof Fans and Ventilators	X-333	LLW	2,560	94.8
PCB Transformers	X-333	MLLW	40,000.5	1,481.5
PCB Transformers	X-333	MLLW	40,000.5	1,481.5
Dry Type Transformers	X-333	Recycle	40,000.5	1,481.5
Dry Type Transformers	X-333	Recycle	40,000.5	1,481.5
Switchgear	X-333	LLW	72,373.5	2,680.5
Switchgear	X-333	LLW	72,373.5	2,680.5
MCC	X-333	LLW	8,410.5	311.5
MCC	X-333	LLW	8,410.5	311.5
Auxiliary Transformer	X-333	MLLW	7,344	272.0
Auxiliary Transformer	X-333	MLLW	7,344	272.0
Diesel Generator	X-333	LLW	499.5	18.5
Diesel Generator	X-333	LLW	499.5	18.5
Wiring, Conductor	X-333	LLW	26,433	979.0
Wiring, Conductor	X-333	LLW	26,433	979.0
Additional Cable from X-533 Shutdown	X-333	LLW	189	7.0
Additional Cable from X-533 Shutdown	X-333	LLW	189	7.0
X-533 Shutdown Cable Tray (24")	X-333	LLW	81	3.0
X-533 Shutdown Cable Tray (24")	X-333	LLW	81	3.0
X-533 Shutdown Cable Tray (12")	X-333	LLW	270	10.0
X-533 Shutdown Cable Tray (12")	X-333	LLW	270	10.0
Cable Trays	X-333	LLW	64,751.16	2,398.2
Cable Trays	X-333	LLW	64,751.16	2,398.2
Transite Cable Trays	X-333	MLLW	962	35.6
Lighting Fixtures	X-333	LLW	2,632.5	97.5
Lighting Fixtures	X-333	LLW	2,632.5	97.5

X-333 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Lube Oil Pumps	X-333	MLLW	257	9.5
Lube Oil Tanks	X-333	MLLW	41,580	1,540.0
Lube Oil Roof Tanks	X-333	MLLW	5,373	199.0
Portable Lube Oil Tanks	X-333	MLLW	918	34.0
Lube Oil Piping	X-333	MLLW	2,943	109.0
Lube Oil Coolers	X-333	MLLW	999	37.0
Hydraulic Piping and Fittings	X-333	MLLW	2,403	89.0
Pyranol Tanks	X-333	MLLW	13.5	0.5
Pyranol Tanks	X-333	MLLW	13.5	0.5
Sprinklers and Interior Building Roof Drains	X-333	LLW	16,240.5	601.5
Sprinklers and Interior Building Roof Drains	X-333	LLW	16,240.5	601.5
Dry Air Plant	X-333	LLW	2,254.5	83.5
Dry Air Plant	X-333	LLW	2,254.5	83.5
Freon Storage and Handling	X-333	LLW	67.5	2.5
Freon Storage and Handling	X-333	LLW	67.5	2.5
Freon Pumps and Motors	X-333	LLW	162	6.0
Freon Pumps and Motors	X-333	LLW	162	6.0
Freon Liquid Piping and Fittings	X-333	LLW	39,501	1,463.0
Freon Liquid Piping and Fittings	X-333	LLW	39,501	1,463.0
Freon Gas Piping and Fittings	X-333	LLW	26,838	994.0
Freon Gas Piping and Fittings	X-333	LLW	26,838	994.0
Sight Glass Piping	X-333	LLW	81	3.0
Enclosures (Panels)	X-333	LLW	8,059.5	298.5
Enclosures (Panels)	X-333	LLW	8,059.5	298.5
Seal Exhaust Cabinets	X-333	LLW	1,998	74.0
Seal Exhaust Cabinets	X-333	LLW	1,998	74.0
Utilities (Dry Air, Nitrogen, and ClF3)	X-333	LLW	1,026	38.0
Utilities (Dry Air, Nitrogen, and ClF3)	X-333	LLW	1,026	38.0
Battery Rooms	X-333	LLW	594	22.0
Battery Rooms	X-333	LLW	594	22.0
Dry Pipe Enclosures	X-333	LLW	15,876	588.0
Dry Pipe Enclosures	X-333	LLW	15,876	588.0
Drain Lines	X-333	LLW	67.5	2.5
Drain Lines	X-333	LLW	67.5	2.5
Process Steam Heaters	X-333	LLW	877.5	32.5
Process Steam Heaters	X-333	LLW	877.5	32.5
RCW Service Pipe, Fittings, and Valves	X-333	LLW	120,123	4,449.0
Steam & Condensate Piping, Fittings, and Valves	X-333	LLW	337.5	12.5
Steam & Condensate Piping, Fittings, and Valves	X-333	LLW	337.5	12.5
38 Ton Bridge Cranes	X-333	LLW	51,880.5	1,921.5
38 Ton Bridge Cranes	X-333	LLW	51,880.5	1,921.5
ACM Floor Tile	X-333	MLLW	135	5.0
ACM Floor Tile	X-333	MLLW	135	5.0

X-333 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
ACM Pipe Insulation	X-333	MLLW	918	34.0
ACM Pipe Insulation	X-333	MLLW	918	34.0
Concrete and Reinforcing Steel	X-333	LLW	772,389	28,607.0
Concrete and Reinforcing Steel	X-333	LLW	772,389	28,607.0
Structural Steel	X-333	LLW	73,116	2,708.0
Structural Steel	X-333	LLW	73,116	2,708.0
Process Equipment Foundations	X-333	LLW	100,440	3,720.0
Process Equipment Foundations	X-333	LLW	100,440	3,720.0
Catwalks and Platforms	X-333	LLW	3,253.5	120.5
Catwalks and Platforms	X-333	LLW	3,253.5	120.5
Building Roof	X-333	LLW	706,158	26,154.0
Building Roof	X-333	LLW	706,158	26,154.0
Masonry Blocks	X-333	LLW	38,394	1,422.0
Masonry Blocks	X-333	LLW	38,394	1,422.0
Wood Framing Construction Debris	X-333	LLW	7,843.5	290.5
Wood Framing Construction Debris	X-333	LLW	7,843.5	290.5
Building Exterior - Transite	X-333	LLW	12,204	452.0
Building Exterior - Transite	X-333	LLW	12,204	452.0
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Transite	X-333	MLLW	3,245.3	120.2
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Cell and Bypass Housings - Steel	X-333	LLW	58,644.1	2,172.0
Elevators	X-333	LLW	1,795.5	66.5
Elevators	X-333	LLW	1,795.5	66.5
Instrument Tunnel	X-333	Clean	54,594	2,022.0
Instrument Tunnel	X-333	Clean	54,594	2,022.0
Slab	X-333	LLW	463,387.5	17,162.5
Slab	X-333	LLW	463,387.5	17,162.5
Footers, Piers, Grade Beams, and Walls	X-333	75% Clean, 25% LLW	645,705	23,915.0
Footers, Piers, Grade Beams, and Walls	X-333	75% Clean, 25% LLW	645,705	23,915.0
Rebar	X-333	LLW	5,035.5	186.5

X-333 Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Rebar	X-333	LLW	5,035.5	186.5
Truck Alley Concrete	X-333	LLW	10,800	400.0
Truck Alley Concrete	X-333	LLW	10,800	400.0
Truck Alley Steel	X-333	LLW	54	2.0
Truck Alley Steel	X-333	LLW	54	2.0
Underground Cooling Water Piping	X-333	LLW	6,075	225.0
		Total Cubic Yardage		**468,277**

ATTACHMENT E.4: BALANCE OF PLANT BUILDING VOLUMES (SUBSET OF RC-1, EC-2)

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Balance of Plant Building Volumes

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Junk Removal	X-100	Industrial	7,725	286.1
Fluorescent Light Bulbs	X-100	Universal	50	1.9
PCB Liquids/Oils	X-100	TSCA	64	2.4
Building Exterior - Transite	X-100	Sanitary-ACM	636	23.6
ACM Floor Tile	X-100	Sanitary-ACM	2,109	78.1
ACM Pipe Insulation	X-100	Sanitary-ACM	340	12.6
Misc. Equipment/Structure	X-100	Industrial	205,296	7,603.6
Concrete	X-100	Industrial	87,891	3,255.2
Slab/Below Grade Concrete	X-100	Industrial	36,010	1,333.7
Junk Removal	X-111A	Industrial	49	1.8
ACM Floor Tile	X-111A	Sanitary-ACM	27	1.0
Misc. Equipment/Structure	X-111A	Industrial	2,555	94.6
Slab/Below Grade Concrete	X-111A	Industrial	631	23.4
Junk Removal	X-111B	Industrial	17	0.6
ACM Floor Tile	X-111B	Sanitary-ACM	9	0.3
Misc. Equipment/Structure	X-111B	Industrial	1,485	55.0
Slab/Below Grade Concrete	X-111B	Industrial	235	8.7
Misc. Equipment/Structure	X-230J4	Industrial	0	0.0
Slab/Below Grade Concrete	X-230J4	Industrial	0	0.0
Junk Removal	X-342A	LLW	787	29.1
PCB and Contaminated Materials	X-342A	LLW-PCB	4,000	148.1
PCB Liquids/Oils	X-342A	TSCA	16	0.6
Building Exterior - Transite	X-342A	Sanitary-ACM	706	26.1
ACM Floor Tile	X-342A	LLW-ACM	9	0.3
ACM Pipe Insulation	X-342A	LLW-ACM	4,692	173.8
Transite Cable Trays	X-342A	LLW-ACM	587	21.7
Building Exterior - Transite	X-342A	LLW-ACM	35	1.3
Misc. Equipment/Structure	X-342A	LLW	71,819	2,660.0
Slab/Below Grade Concrete	X-342A	LLW	16,606	615.0
Junk Removal	X-342B	LLW	87	3.2
Fluorescent Light Bulbs	X-342B	Universal	5	0.2
Tanks	X-342B	TSCA	600	22.2
ACM Pipe Insulation	X-342B	LLW-ACM	234	8.7
Misc. Equipment/Structure	X-342B	LLW	156	5.8
Misc. Equipment/Structure	X-342B	LLW	4,527	167.7
Slab/Below Grade Concrete	X-342B	LLW	919	34.0
Junk Removal	X-343	LLW	842	31.2
PCB and Contaminated Materials	X-343	LLW-PCB	4,000	148.1
PCB Liquids/Oils	X-343	TSCA	32	1.2
Building Exterior - Transite	X-343	LLW-ACM	730	27.0
ACM Floor Tile	X-343	LLW-ACM	9	0.3
ACM Pipe Insulation	X-343	LLW-ACM	4,853	179.7

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Transite Cable Trays	X-343	LLW-ACM	607	22.5
Building Exterior - Transite	X-343	LLW-ACM	37	1.4
Misc. Equipment/Structure	X-343	LLW	92,678	3,432.5
Slab/Below Grade Concrete	X-343	LLW	21,754	805.7
Junk Removal	X-344A	LLW	5,241	194.1
PCB and Contaminated Materials	X-344A	LLW-PCB	4,000	148.1
PCB Liquids/Oils	X-344A	TSCA	32	1.2
Building Exterior - Transite	X-344A	LLW-ACM	1,858	68.8
ACM Floor Tile	X-344A	LLW-ACM	57	2.1
ACM Pipe Insulation	X-344A	LLW-ACM	9,684	358.7
Transite Cable Trays	X-344A	LLW-ACM	757	28.0
Building Exterior - Transite	X-344A	LLW-ACM	93	3.4
Misc. Equipment/Structure	X-344A	LLW	297,404	11,015.0
Concrete	X-344A	LLW	15,264	565.3
Slab/Below Grade Concrete	X-344A	LLW	80,569	2,984.0
Slab/Below Grade Concrete	X-344B	Industrial	0	0.0
Junk Removal	X-345	LLW	2,063	76.4
Misc. Equipment/Structure	X-345	LLW	1,269	47.0
Misc. Equipment/Structure	X-345	LLW	93,363	3,457.9
Slab/Below Grade Concrete	X-345	LLW	180,305	6,678.0
Slab/Below Grade Concrete	X-345	LLW	1,496	55.4
Junk Removal	X-605	Industrial	29	1.1
Misc. Equipment/Structure	X-605	Industrial	1,126	41.7
Slab/Below Grade Concrete	X-605	Industrial	500	18.5
Slab/Below Grade Concrete	X-605H	Industrial	600	22.2
Slab/Below Grade Concrete	X-605I	Industrial	212	7.9
Slab/Below Grade Concrete	X-605J	Industrial	200	7.4
Junk Removal	X-624-1	Industrial	212	7.9
Possible Rad Contamination from Floor	X-624-1	LLW	27	1.0
Misc. Equipment/Structure	X-624-1	Industrial	6,878	254.7
Slab/Below Grade Concrete	X-624-1	Industrial	1,852	68.6
Junk Removal	X-625	Industrial	69	2.6
Misc. Equipment/Structure	X-625	Industrial	2,218	82.1
Slab/Below Grade Concrete	X-625	Industrial	1,200	44.4
Junk Removal	X-626-1	Industrial	401	14.9
Batteries	X-626-1	Universal	25	0.9
Building Exterior - Transite	X-626-1	Sanitary-ACM	251	9.3
ACM Pipe Insulation	X-626-1	Sanitary-ACM	1,000	37.0
Mercury Switches	X-626-1	Universal	14	0.5
Transformers	X-626-1	Recycle	160	5.9
Misc. Equipment/Structure	X-626-1	Industrial	1,500	55.6
Misc. Equipment/Structure	X-626-1	Industrial	36,669	1,358.1
Slab/Below Grade Concrete	X-626-1	Industrial	9,832	364.1
Building Exterior - Transite	X-626-2	Sanitary-ACM	548	20.3
Misc. Equipment/Structure	X-626-2	Industrial	11,588	429.2
Slab/Below Grade Concrete	X-626-2	Industrial	18,683	692.0
Junk Removal	X-630-1	Industrial	0	0.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Batteries	X-630-1	Universal	0	0.0
Mercury Switches	X-630-1	Universal	0	0.0
Transformers	X-630-1	Recycle	0	0.0
Misc. Equipment/Structure	X-630-1	Industrial	0	0.0
Building Exterior - Transite	X-630-1	Sanitary-ACM	0	0.0
ACM Pipe Insulation	X-630-1	Sanitary-ACM	0	0.0
Misc. Equipment/Structure	X-630-1	Industrial	0	0.0
Slab/Below Grade Concrete	X-630-1	Industrial	13,698	507.3
Slab/Below Grade Concrete	X-630-2A	Industrial	21,375	791.7
Slab/Below Grade Concrete	X-630-2B	Industrial	41,250	1,527.8
Slab/Below Grade Concrete	X-630-3	Industrial	905	33.5
Slab/Below Grade Concrete	X-633-1	Industrial	14,895	551.7
Slab/Below Grade Concrete	X-633-2A	Industrial	82,420	3,052.6
Slab/Below Grade Concrete	X-633-2B	Industrial	82,420	3,052.6
Slab/Below Grade Concrete	X-633-2C	Industrial	30,974	1,147.2
Slab/Below Grade Concrete	X-633-2D	Industrial	30,974	1,147.2
Junk Removal	X-701E	LLW	0	0.0
Fluorescent Light Bulbs	X-701E	Universal	0	0.0
Misc. Equipment/Structure	X-701E	LLW	0	0.0
Slab/Below Grade Concrete	X-701E	LLW	0	0.0
Fluorescent Light Bulbs	X-744G	Universal	64	2.4
Misc. Equipment/Structure	X-744G	LLW	1,372	50.8
Misc. Equipment/Structure	X-744G	LLW	123,870	4,587.8
Slab/Below Grade Concrete	X-744G	LLW	79,954	2,961.3
Misc. Equipment/Structure	X-744S	Industrial	19,342	716.4
Slab/Below Grade Concrete	X-744S	Industrial	26,915	996.9
Misc. Equipment/Structure	X-744T	Industrial	0	0.0
Slab/Below Grade Concrete	X-744T	Industrial	0	0.0
Misc. Equipment/Structure	X-744U	Industrial	0	0.0
Slab/Below Grade Concrete	X-744U	Industrial	0	0.0
Slab/Below Grade Concrete	X-746	Industrial	7,631	282.6
Fluorescent Light Bulbs	X-752	Universal	64	2.4
Concrete	X-752	Industrial	38	1.4
Misc. Equipment/Structure	X-752	Industrial	20,605	763.1
Slab/Below Grade Concrete	X-752	Industrial	9,867	365.4
Concrete	X-701D	LLW	0	0.0
Demolition Debris	X-701D	LLW	0	0.0
Concrete	X-701F	LLW	216	8.0
Demolition Debris	X-701F	LLW	0	0.0
Scrap Metal	X-705E	LLW	2,295	85.0
Concrete	X-720A	LLW	0	0.0
Demolition Debris	X-720A	LLW	0	0.0
Concrete	X-740	LLW	0	0.0
Demolition Debris	X-740	LLW	0	0.0
Concrete	X-770	LLW	0	0.0
Demolition Debris	X-770	LLW	0	0.0
Dry Solids	X-770	LLW	0	0.0
Process Equipment	X-770	LLW	0	0.0
Scrap Metal	X-770	LLW	0	0.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Scrap Metal	X-770	LLW	0	0.0
Industrial Garbage	X-100	Industrial	82,909	3,070.7
Industrial Garbage	X-343	LLW	1,260	46.7
Misc. Equipment	X-343	LLW	720	26.7
Industrial Garbage	X-343	LLW	1,125	41.7
Misc. Equipment	X-343	LLW	540	20.0
Industrial Garbage	X-344A	LLW	2,610	96.7
Misc. Equipment	X-344A	LLW	1,980	73.3
Industrial Garbage	X-344A	LLW	19,890	736.7
Misc. Equipment	X-344A	LLW	4,590	170.0
Industrial Garbage	X-600	Industrial	7,322	271.2
Industrial Garbage	X-700	LLW	55	2.0
Misc. Equipment	X-700	LLW	100	3.7
Industrial Garbage	X-700	LLW	228	8.4
Misc. Equipment	X-700	LLW	339	12.6
Industrial Garbage	X-710	LLW	45,708	1,692.9
Misc. Equipment	X-710	LLW	21,268	787.7
Flourine Tank	X-710	LLW	260	9.6
Industrial Garbage	X-720	LLW	135	5.0
TCE Tanks	X-720	RCRA	2	0.1
Industrial Garbage	X-720	LLW	1,907	70.6
Misc. Equipment	X-720	Industrial	240	8.9
Industrial Garbage	X-720C	Industrial	60	2.2
Industrial Garbage	X-744H	Industrial	22,347	827.7
Misc. Equipment	X-744H	Industrial	4,700	174.1
Industrial Garbage	X-744J	Industrial	20,702	766.7
Misc. Equipment	X-744J	Recycle	475	17.6
Misc. Equipment	X-744J	LLW	955	35.4
Industrial Garbage	X-744L	Industrial	27,610	1,022.6
Batteries	X-744W	Universal	196	7.3
Fluorescent Light Bulbs	X-744W	Universal	380	14.1
Industrial Garbage	X-744W	Industrial	33,918	1,256.2
Misc. Equipment	X-744W	Recycle	387	14.3
Industrial Garbage	X-744W	Industrial	6,330	234.4
Industrial Garbage	X-747F	Industrial	0	0.0
Misc. Equipment	X-747F	Recycle	0	0.0
Industrial Garbage	X-747-A	Industrial	19,944	738.7
Misc. Equipment	X-747-A	Industrial	2,485	92.0
Misc. Equipment	X-747-A	Recycle	285	10.6
Misc. Equipment	X-747-A	LLW	855	31.7
Industrial Garbage	X-747C	Industrial	2,240	83.0
Misc. Equipment	X-747C	LLW	1,650	61.1
Industrial Garbage	X-747D	Industrial	2,175	80.6
Misc. Equipment	X-747D	LLW	360	13.3
Industrial Garbage	X-750	Industrial	337	12.5
Industrial Garbage	X-750	Industrial	42,283	1,566.0
Misc. Equipment	X-750	Recycle	135	5.0
Junk Removal	X-101	Industrial	590	21.9
Fluorescent Light Bulbs	X-101	Universal	50	1.9

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Gas/Nitrogen/Argon Cylinders	X-101	Industrial	150	5.6
Building Exterior - Transite	X-101	Sanitary-ACM	183	6.8
ACM Floor Tile	X-101	Sanitary-ACM	161	6.0
Concrete	X-101	Industrial	2,507	92.9
Misc. Equipment/Structure	X-101	Industrial	22,885	847.6
Slab/Below Grade Concrete	X-101	Industrial	5,774	213.9
Junk Removal	X-100B	Industrial	46	1.7
Building Exterior - Transite	X-100B	Sanitary-ACM	59	2.2
Concrete	X-100B	Industrial	90	3.3
Misc. Equipment/Structure	X-100B	Industrial	4,493	166.4
Slab/Below Grade Concrete	X-100B	Industrial	626	23.2
Junk Removal	X-102	Industrial	1,081	40.0
Fluorescent Light Bulbs	X-102	Universal	32	1.2
Building Exterior - Transite	X-102	Sanitary-ACM	289	10.7
ACM Floor Tile	X-102	Sanitary-ACM	148	5.5
ACM Pipe Insulation	X-102	Sanitary-ACM	204	7.6
Concrete	X-102	Industrial	1,913	70.9
Misc. Equipment/Structure	X-102	Industrial	41,350	1,531.5
Slab/Below Grade Concrete	X-102	Industrial	10,383	384.6
Junk Removal	X-104	Industrial	521	19.3
ACM Floor Tile	X-104	Sanitary-ACM	85	3.1
ACM Pipe Insulation	X-104	Sanitary-ACM	1,527	56.6
Concrete	X-104	Industrial	922	34.1
Misc. Equipment/Structure	X-104	Industrial	11,966	443.2
Slab/Below Grade Concrete	X-104	Industrial	9,675	358.3
Junk Removal	X-104A	Industrial	208	7.7
Misc. Equipment/Structure	X-104A	Industrial	5,329	197.4
Concrete	X-104A	Industrial	369	13.7
Slab/Below Grade Concrete	X-104A	Industrial	3,881	143.7
Junk Removal	X-106	Industrial	356	13.2
Fluorescent Light Bulbs	X-106	Universal	32	1.2
Building Exterior - Transite	X-106	Sanitary-ACM	168	6.2
ACM Floor Tile	X-106	Sanitary-ACM	49	1.8
ACM Pipe Insulation	X-106	Sanitary-ACM	136	5.0
Concrete	X-106	Industrial	1,957	72.5
Misc. Equipment Structure	X-106	Industrial	17,889	662.6
Slab/Below Grade Concrete	X-106	Industrial	4,900	181.5
Concrete	X-106C	Industrial	122	4.5
Misc. Equipment/Structure	X-106C	Industrial	1,286	47.6
Slab/Below Grade Concrete	X-106C	Industrial	698	25.9
Junk Removal	X-108A	Industrial	574	21.3
Fluorescent Light Bulbs	X-108A	Universal	9	0.3
Transformers	X-108A	Recycle	48	1.8
ACM Floor Tile	X-108A	Sanitary-ACM	31	1.1
Concrete	X-108A	Industrial	451	16.7
Misc. Equipment/Structure	X-108A	Industrial	20,945	775.7
Slab/Below Grade Concrete	X-108A	Industrial	10,435	386.5
Junk Removal	X-108B	Industrial	17	0.6

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Fluorescent Light Bulbs	X-108B	Universal	9	0.3
Transformers	X-108B	Recycle	48	1.8
ACM Floor Tile	X-108B	Sanitary-ACM	9	0.3
Concrete	X-108B	Industrial	122	4.5
Misc. Equipment/Structure	X-108B	Industrial	1,485	55.0
Slab/Below Grade Concrete	X-108B	Industrial	269	10.0
Junk Removal	X-108E	Industrial	35	1.3
Fluorescent Light Bulbs	X-108E	Universal	9	0.3
Building Exterior - Transite	X-108E	Sanitary-ACM	41	1.5
ACM Floor Tile	X-108E	Sanitary-ACM	19	0.7
Concrete	X-108E	Industrial	249	9.2
Misc. Equipment/Structure	X-108E	Industrial	2,075	76.9
Slab/Below Grade Concrete	X-108E	Industrial	714	26.4
Junk Removal	X-108H	Industrial	6	0.2
Fluorescent Light Bulbs	X-108H	Universal	3	0.1
Transformers	X-108H	Recycle	48	1.8
Building Exterior - Transite	X-108H	Sanitary-ACM	12	0.4
ACM Floor Tile	X-108H	Sanitary-ACM	3	0.1
Misc. Equipment/Structure	X-108H	Industrial	947	35.1
Slab/Below Grade Concrete	X-108H	Industrial	87	3.2
Junk Removal	X-109A	Industrial	62	2.3
Concrete	X-109A	Industrial	109	4.0
Misc. Equipment/Structure	X-109A	Industrial	1,993	73.8
Slab/Below Grade Concrete	X-109A	Industrial	1,206	44.7
Junk Removal	X-109B	Industrial	19	0.7
Fluorescent Light Bulbs	X-109B	Universal	32	1.2
ACM Floor Tile	X-109B	Sanitary-ACM	10	0.4
Misc. Equipment/Structure	X-109B	Industrial	828	30.7
Slab/Below Grade Concrete	X-109B	Industrial	324	12.0
Junk Removal	X-109C	Industrial	41	1.5
Fluorescent Light Bulbs	X-109C	Universal	32	1.2
ACM Floor Tile	X-109C	Sanitary-ACM	23	0.9
Misc. Equipment/Structure	X-109C	Industrial	1,471	54.5
Misc. Equipment/Structure	X-120H	Industrial	0	0.0
Slab/Below Grade Concrete	X-120H	Industrial	0	0.0
Junk Removal	X-230J2	Industrial	6	0.2
Transformers	X-230J2	Recycle	48	1.8
Misc. Equipment/Structure	X-230J2	Industrial	404	15.0
Slab/Below Grade Concrete	X-230J2	Industrial	110	4.1
Junk Removal	X-230J3	Industrial	6	0.2
Transformers	X-230J3	Recycle	48	1.8
Misc. Equipment/Structure	X-230J3	Industrial	404	15.0
Slab/Below Grade Concrete	X-230J3	Industrial	110	4.1
Junk Removal	X-230J5	Industrial	8	0.3
Transformers	X-230J5	Recycle	48	1.8
Misc. Equipment/Structure	X-230J5	Industrial	480	17.8
Slab/Below Grade Concrete	X-230J5	Industrial	144	5.3
Junk Removal	X-230J6	Industrial	8	0.3
Transformers	X-230J6	Recycle	48	1.8

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Misc. Equipment/Structure	X-230J6	Industrial	480	17.8
Slab/Below Grade Concrete	X-230J6	Industrial	144	5.3
Junk Removal	X-230J7	Industrial	8	0.3
Transformers	X-230J7	Recycle	48	1.8
Misc. Equipment/Structure	X-230J7	Industrial	480	17.8
Slab/Below Grade Concrete	X-230J7	Industrial	144	5.3
Junk Removal	X-300	LLW	916	33.9
Batteries	X-300	Universal	49	1.8
ACM Floor Tile	X-300	LLW-ACM	250	9.3
ACM Pipe Insulation	X-300	LLW-ACM	500	18.5
Transite Cable Trays	X-300	LLW-ACM	63	2.3
Concrete	X-300	LLW	8,648	320.3
Misc. Equipment/Structure	X-300	LLW	121,160	4,487.4
Slab/Below Grade Concrete	X-300	LLW	43,584	1,614.2
Junk Removal	X-300A	Industrial	82	3.0
Concrete	X-300A	Industrial	771	28.6
Misc. Equipment/Structure	X-300A	Industrial	5,008	185.5
Slab/Below Grade Concrete	X-300A	Industrial	1,102	40.8
Misc. Equipment/Structure	X-300B	Industrial	1,760	65.2
Slab/Below Grade Concrete	X-300B	Industrial	646	23.9
Misc. Equipment/Structure	X-300C	Industrial	50	1.9
Slab/Below Grade Concrete	X-300C	Industrial	140	5.2
Junk Removal	X-530B	Industrial	8,512	315.3
Batteries and Mercury Switches	X-530B	Universal	150	5.6
Piping	X-530B	Industrial	10,000	370.4
HVAC Duct w/Lithium Paint	X-530B	Industrial	1,000	37.0
Building Exterior - Transite	X-530B	Sanitary-ACM	802	29.7
ACM Floor Tile	X-530B	Sanitary-ACM	1,162	43.0
ACM Pipe Insulation	X-530B	Sanitary-ACM	10,200	377.8
Transite Cable Trays	X-530B	Sanitary-ACM	1,250	46.3
Concrete	X-530B	Industrial	50,205	1,859.4
Misc. Equipment/Structure	X-530B	Industrial	741,553.08	27,464.9
Slab/Below Grade Concrete	X-530B	Industrial	114,176	4,228.7
Junk Removal	X-530C	Industrial	72	2.7
Building Exterior - Transite	X-530C	Sanitary-ACM	78	2.9
Concrete	X-530C	Industrial	394	14.6
Misc. Equipment/Structure	X-530C	Industrial	4,652	172.3
Slab/Below Grade Concrete	X-530C	Industrial	975	36.1
Junk Removal	X-530D	Industrial	11	0.4
Misc. Equipment/Structure	X-530D	Industrial	1,532	56.7
Slab/Below Grade Concrete	X-530D	Industrial	190	7.0
Mercury Switches	X-530E	Universal	28	1.0
Misc. Equipment/Structure	X-530E	Industrial	672	24.9
Misc. Equipment/Structure	X-530E	Industrial	365	13.5
Slab/Below Grade Concrete	X-530E	Industrial	542	20.1
Misc. Equipment/Structure	X-530F	Industrial	672	24.9
Mercury Switches	X-530F	Universal	28	1.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Misc. Equipment/Structure	X-530F	Industrial	365	13.5
Slab/Below Grade Concrete	X-530F	Industrial	542	20.1
Junk Removal	X-530G	Industrial	72	2.7
Fluorescent Light Bulbs	X-530G	Universal	64	2.4
Misc. Equipment/Structure	X-530G	Industrial	2,007	74.3
Slab/Below Grade Concrete	X-530G	Industrial	766	28.4
Junk Removal	X-600	Industrial	1,116	41.3
Mercury Switches	X-600	Universal	14	0.5
Building Exterior - Transite	X-600	Sanitary-ACM	667	24.7
ACM Floor Tile	X-600	Sanitary-ACM	122	4.5
ACM Pipe Insulation	X-600	Sanitary-ACM	1,700	63.0
Concrete	X-600	Industrial	2,633	97.5
Misc. Equipment/Structure	X-600	Industrial	130,806	4,844.7
Slab/Below Grade Concrete	X-600	Industrial	6,957	257.7
Junk Removal	X-600B	Industrial	86	3.2
Fluorescent Light Bulbs	X-600B	Universal	32	1.2
Misc. Equipment/Structure	X-600B	Industrial	2,584	95.7
Slab/Below Grade Concrete	X-600B	Industrial	1,500	55.6
Junk Removal	X-600C	Industrial	69	2.6
Fluorescent Light Bulbs	X-600C	Universal	32	1.2
Building Exterior - Transite	X-600C	Sanitary-ACM	73	2.7
ACM Pipe Insulation	X-600C	Sanitary-ACM	554	20.5
Concrete	X-600C	Industrial	122	4.5
Misc. Equipment/Structure	X-600C	Industrial	3,297	122.1
Slab/Below Grade Concrete	X-600C	Industrial	1,200	44.4
Junk Removal	X-608	Industrial	664	24.6
Batteries	X-608	Universal	10	0.4
PCB Liquids/Oils	X-608	TSCA	7	0.3
ACM Pipe Insulation	X-608	Sanitary-ACM	340	12.6
Concrete	X-608	Industrial	5,220	193.3
Misc. Equipment/Structure	X-608	Industrial	13,712	507.9
Slab/Below Grade Concrete	X-608	Industrial	20,848	772.1
Junk Removal	X-611	Industrial	458	17.0
Batteries	X-611	Universal	15	0.6
PCBs	X-611	TSCA	9	0.3
Piping	X-611	LLW	45,000	1,666.7
ACM Pipe Insulation	X-611	Sanitary-ACM	204	7.6
Concrete	X-611	Industrial	900	33.3
Misc. Equipment/Structure	X-611	Industrial	30,156	1,116.9
Slab/Below Grade Concrete	X-611	Industrial	3,426	126.9
Junk Removal	X-611B	Industrial	22	0.8
Misc. Equipment/Structure	X-611B	Industrial	903	33.4
Slab/Below Grade Concrete	X-611B	Industrial	192	7.1
Junk Removal	X-611C	Industrial	435	16.1
Fluorescent Light Bulbs	X-611C	Universal	32	1.2
Misc. Equipment/Structure	X-611C	Industrial	13,334	493.9
Slab/Below Grade Concrete	X-611C	Industrial	12,532	464.1
Junk Removal	X-611D	Industrial	14	0.5
Fluorescent Light Bulbs	X-611D	Universal	32	1.2

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Misc. Equipment/Structure	X-611D	Industrial	674	25.0
Slab/Below Grade Concrete	X-611D	Industrial	240	8.9
Fluorescent Light Bulbs	X-611E	Universal	64	2.4
ACM Pipe Insulation	X-611E	Sanitary-ACM	518	19.2
Misc. Equipment/Structure	X-611E	Industrial	1,828	67.7
Slab/Below Grade Concrete	X-611E	Industrial	655	24.3
Tanks	X-612	Industrial	244	9.0
Misc. Equipment/Structure	X-612	Industrial	450	16.7
Junk Removal	X-614A	Industrial	17	0.6
Misc. Equipment/Structure	X-614A	Industrial	696	25.8
Slab/Below Grade Concrete	X-614A	Industrial	150	5.6
Junk Removal	X-614B	Industrial	32	1.2
Misc. Equipment/Structure	X-614B	Industrial	1,070	39.6
Slab/Below Grade Concrete	X-614B	Industrial	276	10.2
Junk Removal	X-617	Industrial	11	0.4
Misc. Equipment/Structure	X-617	Industrial	996	36.9
Slab/Below Grade Concrete	X-617	Industrial	200	7.4
Junk Removal	X-618	Industrial	13	0.5
Fluorescent Light Bulbs	X-618	Universal	32	1.2
Misc. Equipment/Structure	X-618	Industrial	924	34.2
Slab/Below Grade Concrete	X-618	Industrial	225	8.3
Misc. Equipment/Structure	X-621	Industrial	2,430	90.0
Slab/Below Grade Concrete	X-621	Industrial	905	33.5
Junk Removal	X-640-1	Industrial	94	3.5
Misc. Equipment/Structure	X-640-1	Industrial	2,622	97.1
Slab/Below Grade Concrete	X-640-1	Industrial	986	36.5
Transformers	X-640-2	Recycle	48	1.8
Tanks	X-640-2	Industrial	281	10.4
Misc. Equipment/Structure	X-640-2	Industrial	550	20.4
Junk Removal	X-700	LLW	7,373	273.1
TSCA Waste	X-700	TSCA	3,840	142.2
RCRA Waste	X-700	MLLW	2,560	94.8
10 ton Lead-bored Polyethylene door	X-700	MLLW	28	1.0
Building Exterior - Transite	X-700	LLW-ACM	2,302	85.3
ACM Floor Tile	X-700	LLW-ACM	201	7.4
ACM Pipe Insulation	X-700	LLW-ACM	5,743	212.7
Building Exterior - Transite	X-700	LLW-ACM	115	4.3
Concrete	X-700	LLW	5,798	214.7
Misc. Equipment/Structure	X-700	LLW	179,542	6,649.7
Slab/Below Grade Concrete	X-700	LLW	133,022	4,926.7
Junk Removal	X-700A	Industrial	137	5.1
Fluorescent Light Bulbs	X-700A	Universal	64	2.4
Misc. Equipment/Structure	X-700A	LLW	125	4.6
Lube Oil	X-700A	TSCA	12	0.4
Building Exterior - Transite	X-700A	Sanitary-ACM	103	3.8
ACM Pipe Insulation	X-700A	Sanitary-ACM	784	29.0
Misc. Equipment Structure	X-700A	Industrial	3,909	144.8
Concrete	X-700A	Industrial	108	4.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Slab/Below Grade Concrete	X-700A	Industrial	1,796	66.5
Junk Removal	X-705	LLW	5,767	213.6
Fluorescent Light Bulbs	X-705	Universal	64	2.4
Transformers	X-705	Recycle	240	8.9
Building Exterior - Transite	X-705	Sanitary-ACM	1,885	69.8
ACM Pipe Insulation	X-705	LLW-ACM	5,079	188.1
Building Exterior - Transite	X-705	LLW-ACM	94	3.5
Concrete	X-705	LLW	13,605	503.9
Misc. Equipment/Structure	X-705	LLW	440,164	16,302.4
Slab/Below Grade Concrete	X-705	LLW	222,986	8,258.7
Junk Removal	X-705D	LLW	42	1.6
Fluorescent Light Bulbs	X-705D	Universal	64	2.4
Misc. Equipment/Structure	X-705D	LLW	1,241	46.0
Slab/Below Grade Concrete	X-705D	LLW	444	16.4
Junk Removal	X-710	LLW	8,199	303.7
Fluorescent Light Bulbs	X-710	Universal	64	2.4
Misc. Equipment/Structure	X-710	LLW	1,220	45.2
Building Exterior - Transite	X-710	LLW-ACM	1,791	66.3
ACM Pipe Insulation	X-710	LLW-ACM	4,283	158.6
Concrete	X-710	LLW	19,343	716.4
Misc. Equipment/Structure	X-710	LLW	189,808	7,029.9
Slab/Below Grade Concrete	X-710	LLW	38,353	1,420.5
Fluorescent Light Bulbs	X-710A	Universal	64	2.4
Misc. Equipment/Structure	X-710A	Industrial	490	18.1
Slab/Below Grade Concrete	X-710A	Industrial	398	14.7
Fluorescent Light Bulbs	X-710B	Universal	64	2.4
Misc. Equipment/Structure	X-710B	Industrial	558	20.7
Slab/Below Grade Concrete	X-710B	Industrial	308	11.4
Junk Removal	X-720	LLW	17,855	661.3
Fluorescent Light Bulbs	X-720	Universal	64	2.4
Gasoline Storage Tank	X-720	Industrial	1,715	63.5
Transformers	X-720	Recycle	48	1.8
Misc. Equipment/Structure	X-720	Industrial	4,000	148.1
TCA Tank	X-720	TSCA	429	15.9
Building Exterior - Transite	X-720	Sanitary-ACM	1,047	38.8
ACM Floor Tile	X-720	Sanitary-ACM	1,463	54.2
ACM Pipe Insulation	X-720	Sanitary-ACM	8,938	331.0
Concrete	X-720	Industrial	14,042	520.1
Misc. Equipment/Structure	X-720	Industrial	792,465	29,350.6
Slab/Below Grade Concrete	X-720	Industrial	320,637	11,875.4
Junk Removal	X-720B	Industrial	44	1.6
Fluorescent Light Bulbs	X-720B	Universal	64	2.4
ACM Pipe Insulation	X-720B	Sanitary-ACM	443	16.4
Misc. Equipment/Structure	X-720B	Industrial	1,544	57.2
Slab/Below Grade Concrete	X-720B	Industrial	623	23.1
Junk Removal	X-720C	Industrial	240	8.9
Fluorescent Light Bulbs	X-720C	Universal	64	2.4
Concrete	X-720C	Industrial	189	7.0
Misc. Equipment/Structure	X-720C	Industrial	5,496	203.6

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Slab/Below Grade Concrete	X-720C	Industrial	2,800	103.7
Junk Removal	X-721	Industrial	229	8.5
Fluorescent Light Bulbs	X-721	Universal	64	2.4
Building Exterior - Transite	X-721	Sanitary-ACM	95	3.5
Misc. Equipment/Structure	X-721	Industrial	5,682	210.4
Slab/Below Grade Concrete	X-721	Industrial	4,000	148.1
Building Exterior - Transite	X-741	Sanitary-ACM	21	0.8
Misc. Equipment/Structure	X-741	Industrial	969	35.9
Slab/Below Grade Concrete	X-741	Industrial	625	23.1
Building Exterior - Transite	X-742	Sanitary-ACM	69	2.6
Misc. Equipment/Structure	X-742	Industrial	641	23.7
Slab/Below Grade Concrete	X-742	Industrial	7,286	269.9
Building Exterior - Transite	X-743	Sanitary-ACM	41	1.5
Misc. Equipment/Structure	X-743	Industrial	2,628	97.3
Slab/Below Grade Concrete	X-743	Industrial	3,914	145.0
Misc. Equipment/Structure	X-744B	Industrial	208	7.7
Slab/Below Grade Concrete	X-744B	Industrial	600	22.2
Misc. Equipment/Structure	X-744H	Industrial	640	23.7
Transformers	X-744H	Recycle	48	1.8
ACM Pipe Insulation	X-744H	Sanitary-ACM	50	1.9
Misc. Equipment/Structure	X-744H	Industrial	43,723	1,619.4
Slab/Below Grade Concrete	X-744H	Industrial	31,521	1,167.4
Misc. Equipment/Structure	X-744J	Industrial	1,280	47.4
Transformers	X-744J	Recycle	48	1.8
Misc. Equipment/Structure	X-744J	Industrial	43,723	1,619.4
Slab/Below Grade Concrete	X-744J	Industrial	31,521	1,167.4
Concrete	X-744L	LLW-PCB	4	0.1
Transformers	X-744L	Recycle	48	1.8
Misc. Equipment/Structure	X-744L	Industrial	1,280	47.4
Misc. Equipment/Structure	X-744L	Industrial	43,723	1,619.4
Slab/Below Grade Concrete	X-744L	Industrial	31,521	1,167.4
Batteries	X-744W	Universal	8	0.3
Transformers	X-744W	Recycle	48	1.8
Misc. Equipment/Structure	X-744W	Industrial	19,342	716.4
Slab/Below Grade Concrete	X-744W	Industrial	26,915	996.9
Junk Removal	X-750	Industrial	887	32.9
Fluorescent Light Bulbs	X-750	Universal	64	2.4
Batteries	X-750	Universal	28	1.0
Tanks	X-750	Industrial	29,151	1,079.7
Building Exterior - Transite	X-750	Sanitary-ACM	276	10.2
ACM Pipe Insulation	X-750	Sanitary-ACM	1,992	73.8
Concrete	X-750	Industrial	1,395	51.7
Misc. Equipment/Structure	X-750	Industrial	17,342	642.3
Slab/Below Grade Concrete	X-750	Industrial	8,564	317.2
Junk Removal	X-750A	Industrial	27	1.0
Fluorescent Light Bulbs	X-750A	Universal	64	2.4
Misc. Equipment/Structure	X-750A	Industrial	130	4.8
Slab/Below Grade Concrete	X-750A	Industrial	323	12.0
Slab/Below Grade Concrete	X-120	LLW	1,350	50.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Fluorescent Light Bulbs	X-540	Universal	32	1.2
Batteries, Lead, Silver Circuit Boards	X-540	Universal	50	1.9
80 gal Halon Fire Extinguisher System	X-540	Industrial	3	0.1
ACM Pipe Insulation	X-540	Sanitary-ACM	824	30.5
Junk Removal	X-540	Industrial	152	5.6
Concrete	X-540	Industrial	269	10.0
Misc. Equipment/Structure	X-540	Industrial	4,557	168.8
Slab/Below Grade Concrete	X-540	Industrial	2,858	105.9
Demolition Debris	X-1007	Industrial	51,200	1,896.3
Demolition Debris	X-1020	Industrial	0	0.0
Demolition Debris	X-103	Industrial	0	0.0
Demolition Debris	X-114A	Industrial	5,600	207.4
Hazardous Material	X-114A	RCRA	120	4.4
Demolition Debris	X-206A	Industrial	286,925	10,626.9
Demolition Debris	X-206B	Industrial	181,697	6,729.5
Demolition Debris	X-206E	Industrial	65,483	2,425.3
Demolition Debris	X-206H	Industrial	71,886	2,662.4
Demolition Debris	X-206J	Industrial	0	0.0
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Demolition Debris	X-208	Industrial	13,327.9	493.6
Slab/Below Grade Concrete	X-215D	Industrial	142,425	5,275.0
Slab/Below Grade Concrete	X-220A	Industrial	602,050	22,298.1
Demolition Debris	X-230A10	Industrial	0	0.0
Demolition Debris	X-230A12	Industrial	0	0.0
Demolition Debris	X-230A15	Industrial	0	0.0
Demolition Debris	X-230A23	Industrial	0	0.0
Demolition Debris	X-230A24	Industrial	0	0.0
Demolition Debris	X-230A28	Industrial	0	0.0
Demolition Debris	X-230A29	Industrial	0	0.0
Demolition Debris	X-230A3	Industrial	0	0.0
Demolition Debris	X-230A36	Industrial	0	0.0
Demolition Debris	X-230A37	Industrial	0	0.0
Demolition Debris	X-230A40	Industrial	0	0.0
Demolition Debris	X-230A41	Industrial	0	0.0
Demolition Debris	X-230A6	Industrial	0	0.0
Demolition Debris	X-230A8	Industrial	0	0.0
Demolition Debris	X-230A9	Industrial	0	0.0
Demolition Debris	X-230J1	Industrial	189	7.0
Demolition Debris	X-232D	Industrial	30,000	1,111.1

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Demolition Debris	X-334	LLW	0	0.0
Demolition Debris	X-344C	Industrial	0	0.0
Demolition Debris	X-344E	Industrial	2,253	83.4
Demolition Debris	X-344F	Industrial	0	0.0
Demolition Debris	X-344D	Industrial	2,072	76.7
Demolition Debris	X-501	Industrial	252	9.3
Demolition Debris	X-501A	Industrial	378	14.0
Demolition Debris	X-502	Industrial	1,689	62.6
Tanks	X-530E	Industrial	1,607	59.5
Tanks	X-530F	Industrial	1,607	59.5
Demolition Debris	X-533	Industrial	6,960	257.8
ACM Pipe Insulation and Cable Tray	X-533B	Sanitary-ACM	10,812	400.4
ACM Floor Tile	X-533B	Sanitary-ACM	0	0.0
Building Exterior - Transite	X-533B	Sanitary-ACM	0	0.0
Haz Material (Waste)	X-533B	RCRA	0	0.0
Junk Removal	X-533B	Industrial	0	0.0
Concrete	X-533B	Industrial	0	0.0
Demolition Debris	X-533B	Industrial	0	0.0
Slab/Below Grade Concrete	X-533B	Industrial	108,533	4,019.7
Building Exterior - Transite	X-533C	Sanitary-ACM	0	0.0
Junk Removal	X-533C	Industrial	0	0.0
Concrete	X-533C	Industrial	0	0.0
Demolition Debris	X-533C	Industrial	0	0.0
Slab/Below Grade Concrete	X-533C	Industrial	921	34.1
Junk Removal	X-533D	Industrial	0	0.0
Demolition Debris	X-533D	Industrial	0	0.0
Slab/Below Grade Concrete	X-533D	Industrial	179	6.6
Haz Material (Waste)	X-533E	RCRA	0	0.0
Demolition Debris	X-533E	Industrial	0	0.0
Slab/Below Grade Concrete	X-533E	Industrial	512	19.0
Tanks	X-533E	Sanitary-ACM	0	0.0
Demolition Debris	X-533F	Industrial	0	0.0
Slab/Below Grade Concrete	X-533F	Industrial	512	19.0
Tanks	X-533F	Sanitary-ACM	0	0.0
Haz Material (Waste)	X-533F	RCRA	0	0.0
Demolition Debris	X-533H	Industrial	900	33.3
Demolition Debris	X-600	Industrial	6,880	254.8
Demolition Debris	X-605H	Industrial	0	0.0
Demolition Debris	X-605I	Industrial	0	0.0
Demolition Debris	X-605J	Industrial	0	0.0
Demolition Debris	X-611B1	Industrial	675	25.0
Demolition Debris	X-611B3	Industrial	675	25.0
Demolition Debris	X-614D	Industrial	0	0.0
Demolition Debris	X-614P	Industrial	1,000	37.0
Slab/Below Grade Concrete	X-745B	Industrial	0	0.0
Slab/Below Grade Concrete	X-745D	Industrial	51,802	1,918.6
Slab/Below Grade Concrete	X-745F	Industrial	0	0.0
Slab/Below Grade Concrete	X-745G-2	Industrial	0	0.0

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Demolition Debris	X-748	Industrial	10,800	400.0
Demolition Debris	X-760	LLW	0	0.0
Demolition Debris	XT-800	Industrial	4,188	155.1
ACM Pipe Insulation	X-232D	Sanitary-ACM	13,200	488.9
Hazardous Material	X-104A	RCRA	120	4.4
Misc. Equipment/Structure	XT-104B	Industrial	3,360	124.4
ACM Floor Tile	XT-104B	Sanitary-ACM	48	1.8
Fluorescent Light Bulbs	XT-104B	Universal	64	2.4
Junk Removal	XT-104B	Industrial	88	3.3
Misc. Equipment/Structure	XT-104C	Industrial	3,360	124.4
ACM Floor Tile	XT-104C	Sanitary-ACM	48	1.8
Fluorescent Light Bulbs	XT-104C	Universal	64	2.4
Junk Removal	XT-104C	Industrial	88	3.3
Lube Oil	X-300A	TSCA	10	0.4
Slab/Below Grade Concrete	X-342C	LLW	280	10.4
Lube Oil	X-342C	TSCA	64	2.4
Lube Oil	X-530C	TSCA	32	1.2
Lube Oil	X-530D	TSCA	10	0.4
Misc. Equipment/Structure	X-530T1	Industrial	1,680	62.2
ACM Floor Tile	X-530T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-530T1	Universal	32	1.2
Junk Removal	X-530T1	Industrial	44	1.6
Misc. Equipment/Structure	X-533T1	Industrial	1,680	62.2
ACM Floor Tile	X-533T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-533T1	Universal	32	1.2
Junk Removal	X-533T1	Industrial	44	1.6
Misc. Equipment/Structure	X-533T2	Industrial	1,680	62.2
ACM Floor Tile	X-533T2	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-533T2	Universal	32	1.2
Junk Removal	X-533T2	Industrial	44	1.6
Misc. Equipment/Structure	X-533T3	Industrial	1,680	62.2
ACM Floor Tile	X-533T3	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-533T3	Universal	32	1.2
Junk Removal	X-533T3	Industrial	44	1.6
Misc. Equipment/Structure	X-533T4	Industrial	1,680	62.2
ACM Floor Tile	X-533T4	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-533T4	Universal	32	1.2
Junk Removal	X-533T4	Industrial	44	1.6
Misc. Equipment/Structure	X-533H1	Industrial	840	31.1
ACM Floor Tile	X-533H1	Sanitary-ACM	12	0.4
Fluorescent Light Bulbs	X-533H1	Universal	16	0.6
Junk Removal	X-533H1	Industrial	22	0.8
Misc. Equipment/Structure	X-600D	Industrial	1,680	62.2
ACM Floor Tile	X-600D	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-600D	Universal	32	1.2
Junk Removal	X-600D	Industrial	44	1.6
Lube Oil	X-605	TSCA	10	0.4
Slab/Below Grade Concrete	X-611B2	Industrial	675	25.0
Misc. Equipment/Structure	x-614Q	Industrial	1,070	39.6

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Slab/Below Grade Concrete	x-614Q	Industrial	276	10.2
Junk Removal	x-614Q	Industrial	32	1.2
Misc. Equipment/Structure	X-633T1	Industrial	1,680	62.2
ACM Floor Tile	X-633T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-633T1	Universal	32	1.2
Junk Removal	X-633T1	Industrial	44	1.6
Misc. Equipment/Structure	X-633T2	Industrial	1,680	62.2
ACM Floor Tile	X-633T2	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-633T2	Universal	32	1.2
Junk Removal	X-633T2	Industrial	44	1.6
Misc. Equipment/Structure	X-633T3	Industrial	1,680	62.2
ACM Floor Tile	X-633T3	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-633T3	Universal	32	1.2
Junk Removal	X-633T3	Industrial	44	1.6
Misc. Equipment/Structure	X-640-1A	Industrial	300	11.1
Slab/Below Grade Concrete	X-640-1A	Industrial	300	11.1
Misc. Equipment/Structure	X-640-2A	Industrial	60	2.2
Slab/Below Grade Concrete	X-640-2A	Industrial	36	1.3
Misc. Equipment/Structure	X-670	Industrial	49,578	1,836.2
Slab/Below Grade Concrete	X-670	Industrial	15,255	565.0
Fluorescent Light Bulbs	X-670	Universal	60	2.2
Misc. Equipment/Structure	X-670A	Industrial	1,230	45.6
Slab/Below Grade Concrete	X-670A	Industrial	1,230	45.6
Misc. Equipment/Structure	X-675	Industrial	576	21.3
Slab/Below Grade Concrete	X-675	Industrial	576	21.3
Slab/Below Grade Concrete	X-701D	Industrial	761	28.2
Slab/Below Grade Concrete	X-720A	Industrial	386	14.3
Misc. Equipment/Structure	X-701T1	Industrial	1,680	62.2
ACM Floor Tile	X-701T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-701T1	Universal	32	1.2
Junk Removal	X-701T1	Industrial	44	1.6
Misc. Equipment/Structure	X-720T01	Industrial	1,680	62.2
ACM Floor Tile	X-720T01	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-720T01	Universal	32	1.2
Junk Removal	X-720T01	Industrial	44	1.6
Misc. Equipment/Structure	X-735A	Industrial	2,902	107.5
Junk Removal	X-735A	Industrial	162	6.0
Fluorescent Light Bulbs	X-735A	Universal	64	2.4
Slab/Below Grade Concrete	X-735A	Industrial	1,626	60.2
Misc. Equipment/Structure	X-744N	Industrial	11,162	413.4
Slab/Below Grade Concrete	X-744N	Industrial	8,028	297.3
Misc. Equipment/Structure	X-744P	Industrial	11,162	413.4
Slab/Below Grade Concrete	X-744P	Industrial	8,028	297.3
Misc. Equipment/Structure	X-744Q	Industrial	11,162	413.4
Slab/Below Grade Concrete	X-744Q	Industrial	8,028	297.3
Misc. Equipment/Structure	X-744YT1	Industrial	1,680	62.2
ACM Floor Tile	X-744YT1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT1	Universal	32	1.2
Junk Removal	X-744YT1	Industrial	44	1.6

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Misc. Equipment/Structure	X-744YT2	Industrial	1,680	62.2
ACM Floor Tile	X-744YT2	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT2	Universal	32	1.2
Junk Removal	X-744YT2	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT3	Industrial	1,680	62.2
ACM Floor Tile	X-744YT3	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT3	Universal	32	1.2
Junk Removal	X-744YT3	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT4	Industrial	1,680	62.2
ACM Floor Tile	X-744YT4	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT4	Universal	32	1.2
Junk Removal	X-744YT4	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT5	Industrial	1,680	62.2
ACM Floor Tile	X-744YT5	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT5	Universal	32	1.2
Junk Removal	X-744YT5	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT6	Industrial	1,680	62.2
ACM Floor Tile	X-744YT6	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT6	Universal	32	1.2
Junk Removal	X-744YT6	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT7	Industrial	1,680	62.2
ACM Floor Tile	X-744YT7	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT7	Universal	32	1.2
Junk Removal	X-744YT7	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT8	Industrial	1,680	62.2
ACM Floor Tile	X-744YT8	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT8	Universal	32	1.2
Junk Removal	X-744YT8	Industrial	44	1.6
Misc. Equipment/Structure	X-744YT9	Industrial	1,680	62.2
ACM Floor Tile	X-744YT9	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-744YT9	Universal	32	1.2
Junk Removal	X-744YT9	Industrial	44	1.6
Misc. Equipment/Structure	X-752AT-1	Industrial	1,125	41.7
ACM Floor Tile	X-752AT-1	Sanitary-ACM	24	0.9
Junk Removal	X-752AT-1	Industrial	100	3.7
Misc. Equipment/Structure	X-752AT-2	Industrial	1,125	41.7
ACM Floor Tile	X-752AT-2	Sanitary-ACM	24	0.9
Junk Removal	X-752AT-2	Industrial	100	3.7
Misc. Equipment/Structure	X-752AT-3	Industrial	1,125	41.7
ACM Floor Tile	X-752AT-3	Sanitary-ACM	24	0.9
Junk Removal	X-752AT-3	Industrial	100	3.7
Misc. Equipment/Structure	X-752AT-4	Industrial	1,125	41.7
ACM Floor Tile	X-752AT-4	Sanitary-ACM	24	0.9
Junk Removal	X-752AT-4	Industrial	100	3.7
Misc. Equipment/Structure	X-760T1	Industrial	1,680	62.2
ACM Floor Tile	X-760T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-760T1	Universal	32	1.2
Junk Removal	X-760T1	Industrial	44	1.6
Misc. Equipment/Structure	X-760T2	Industrial	1,680	62.2

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
ACM Floor Tile	X-760T2	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-760T2	Universal	32	1.2
Junk Removal	X-760T2	Industrial	44	1.6
Misc. Equipment/Structure	X-1000	Industrial	88,500	3,277.8
Slab/Below Grade Concrete	X-1000	Industrial	29,700	1,100.0
Fluorescent Light Bulbs	X-1000	Universal	64	2.4
Junk Removal	X-1000	Industrial	8,250	305.6
Misc. Equipment/Structure	X-1000T1	Industrial	1,680	62.2
ACM Floor Tile	X-1000T1	Sanitary-ACM	24	0.9
Fluorescent Light Bulbs	X-1000T1	Universal	32	1.2
Junk Removal	X-1000T1	Industrial	44	1.6
Misc. Equipment/Structure	X-1007	Industrial	46,464	1,720.9
Junk Removal	X-1007	Industrial	4,736	175.4
Misc. Equipment/Structure	X-1107BV	Industrial	1,325	49.1
Slab/Below Grade Concrete	X-1107BV	Industrial	1,012	37.5
Fluorescent Light Bulbs	X-1107BV	Universal	32	1.2
Misc. Equipment/Structure	I-Peter_Kiewit_ Powder_Magazine	Industrial	192	7.1
Slab/Below Grade Concrete	I-Peter_Kiewit_ Powder_Magazine	Industrial	35	1.3
Misc. Equipment/Structure	JX-1000_Pavilion	Industrial	300	11.1
Slab/Below Grade Concrete	JX-1000_Pavilion	Industrial	300	11.1
Slab/Below Grade Concrete	B_Pad	Industrial	1,570	58.1
Misc. Equipment/Structure	X-151_Trl_Complex	Industrial	13,440	497.8
Fluorescent Light Bulbs	X-151_Trl_Complex	Universal	256	9.5
Junk Removal	X-151_Trl_Complex	Industrial	352	13.0
Misc. Equipment/Structure	X-152_Trl_Complex	Industrial	107,520	3,982.2
Fluorescent Light Bulbs	X-152_Trl_Complex	Universal	2,048	75.9
Junk Removal	X-152_Trl_Complex	Industrial	2,816	104.3
Misc. Equipment/Structure	X-157_Trl_Complex	Industrial	50,400	1,866.7
Fluorescent Light Bulbs	X-157_Trl_Complex	Universal	960	35.6
Junk Removal	X-157_Trl_Complex	Industrial	2,816	104.3
Slab/Below Grade Concrete	X-326_Fuel_Tank_1	Industrial	300	11.1
Piping/Tank	X-326_Fuel_Tank_1	Industrial	43.78	1.6
Fuel/Sludge	X-326_Fuel_Tank_1	Industrial	6.7	0.2
Slab/Below Grade Concrete	X-326_Fuel_Tank_2	Industrial	176	6.5
Piping/tank	X-326_Fuel_Tank_2	Industrial	759.27	28.1
Fuel/Sludge	X-326_Fuel_Tank_2	Industrial	66.8	2.5
Slab/Below Grade Concrete	X-300A_Fuel_Tank	Industrial	92	3.4
Piping/Tank	X-300A_Fuel_Tank	Industrial	391.7	14.5
Fuel/Sludge	X-300A_Fuel_Tank	Industrial	33.4	1.2
Slab/Below Grade Concrete	X-720_Fuel_Tank	Industrial	134	5.0
Piping/Tank	X-720_Fuel_Tank	Industrial	598.11	22.2
Fuel/Sludge	X-720_Fuel_Tank	Industrial	53.4	2.0
Slab/Below Grade Concrete	X-750_Fuel_Tank	Industrial	632	23.4
Piping/Tank	X-750_Fuel_Tank	Industrial	2,979	110.3
Fuel/Sludge	X-750_Fuel_Tank	Industrial	534.7	19.8
Misc. Equipment/Structure	X-344J	Industrial	18,720	693.3
Slab/Below Grade Concrete	X-344J	Industrial	5,280	195.6

Balance of Plant Building Volumes (Continued)

Commodity	Building	Characterization	In Place Volume (cf)	In Place Volume (cy)
Fluorescent Light Bulbs	X-344J	Universal	64	2.4
Junk Removal	X-344J	Industrial	370	13.7
ACM Pipe Insulation	X-6619	Sanitary-ACM	102	3.8
Concrete	X-6619	Industrial	450	16.7
Junk Removal	X-6619	Industrial	229	8.5
Misc. Equipment/Structure	X-6619	Industrial	15,078	558.4
Piping	X-6619	LLW	22,500	833.3
Slab/Below Grade Concrete	X-6619	Industrial	1,713	63.4
		Total Cubic Yardage		**344,262**

ATTACHMENT E.5: D&D RESIDUAL SOIL VOLUMES (RC-1, EC-1)

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D&D Residual Soil Volumes

Commodity	Building	Characterization	In-place Volume (cf)	In-place Volume (cy)
Soil-Utilities	QI – RA A	MLLW	30,248.33	1,120.3
Soil-Utilities	QI – RA C	MLLW	24,502.5	907.5
Soil-Utilities	QI – RA D	MLLW	53,976.67	1,999.1
Soil-Utilities	QI – RA E	MLLW	379,530.83	14,056.7
Soil-Utilities	QII– RA A	MLLW	1,220	45.2
Soil-Utilities	QII – RA B	MLLW	222,071.67	8,224.9
Soil-Utilities	QII – RA C	MLLW	99,675.83	3,691.7
Soil-Utilities	QIII – RA A	MLLW	25,069.17	928.5
Soil-Utilities	QIII – RA B	MLLW	39,685	1,469.8
Soil-Utilities	QIII – RA C	MLLW	161,600	5,985.2
Soil-Utilities	QIV – RA A	MLLW	48,422.5	1,793.4
Soil-Utilities	QIV – RA B	MLLW	73,725	2,730.6
Soil-Utilities	QIV – RA C	MLLW	7,907.5	292.9
Soil-Utilities	QIV – RA D	MLLW	115,515.83	4,278.4
Soil-Utilities	QIV – RA E	MLLW	28,896.67	1,070.2
Soil-Utilities	QIV – RA F	MLLW	127,124.17	4,708.3
			Total Cubic Yardage	**53,303**

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ATTACHMENT E.6: OHIO CONSENT DECREE SOIL VOLUMES (RC-2)

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Ohio Consent Decree Soil Volumes

Commodity	Building	Characterization	In-place Volume (cf)	In-place Volume (cy)
Contaminated Soil	X-326	LLW	972,290.25	36,010.8
Contaminated Soil	X-326	LLW	972,290.25	36,010.8
Contaminated Soil	X-326	LLW	972,290.25	36,010.8
Contaminated Soil	X-326	LLW	972,290.25	36,010.8
Contaminated Soil	X-330	LLW	1,075,700.25	39,840.8
Contaminated Soil	X-330	LLW	1,075,700.25	39,840.8
Contaminated Soil	X-330	LLW	1,075,700.25	39,840.8
Contaminated Soil	X-330	LLW	1,075,700.25	39,840.8
Contaminated Soil	X-333	LLW	2,167,452	80,276.0
Contaminated Soil	X-333	LLW	2,167,452	80,276.0
Berea Wells CF FY13	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	62.5	2.3
Gallia Wells CF FY13	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	75	2.8
Berea Wells CF FY15	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	62.5	2.3
Gallia Wells CF FY15	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	75	2.8
Gallia Wells CF FY16	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	18.75	0.7
Gallia Wells Abandon CF FY16	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	93.75	3.5
Gallia Wells CF FY17	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	18.75	0.7
Gallia Wells Abandon CF FY17	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	93.75	3.5
Berea Wells CF FY18	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	62.5	2.3
Gallia Wells CF FY18	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	75	2.8
Gallia Wells Abandon CF FY18	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY19	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY20	Q-I X-749 / X-120 / PK Landfill Monitoring Area	LLW	93.75	3.5
Berea Wells CF FY14	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5
Gallia Wells CF FY14	Q-I Groundwater Investigative Area / X-749A	LLW	75	2.8
Gallia Wells CF FY15	Q-I Groundwater Investigative Area / X-749A	LLW	18.75	0.7
Gallia Wells Abandon CF FY16	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5
Gallia Wells Abandon CF FY17	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5
Gallia Wells Abandon CF FY18	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5
Gallia Wells Abandon CF FY19	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5

Ohio Consent Decree Soil Volumes (Continued)

Commodity	Building	Characterization	In-place Volume (cf)	In-place Volume (cy)
Gallia Wells Abandon CF FY20	Q-I Groundwater Investigative Area / X-749A	LLW	93.75	3.5
Berea Wells CF FY14	Q-II (7-Unit) Groundwater Investigative Area	LLW	250	9.3
Gallia Wells CF FY14	Q-II (7-Unit) Groundwater Investigative Area	LLW	281.25	10.4
Gallia Wells CF FY15	Q-II (7-Unit) Groundwater Investigative Area	LLW	75	2.8
Gallia Wells Abandon CF FY16	Q-II (7-Unit) Groundwater Investigative Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY17	Q-II (7-Unit) Groundwater Investigative Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY18	Q-II (7-Unit) Groundwater Investigative Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY19	Q-II (7-Unit) Groundwater Investigative Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY20	Q-II (7-Unit) Groundwater Investigative Area	LLW	112.5	4.2
Berea Wells CF FY14	Q-II X-701B Holding Pond Monitoring Area	LLW	62.5	2.3
Gallia Wells CF FY14	Q-II X-701B Holding Pond Monitoring Area	LLW	37.5	1.4
Gallia Wells Abandon CF FY16	Q-II X-701B Holding Pond Monitoring Area	LLW	187.5	6.9
Gallia Wells Abandon CF FY17	Q-II X-701B Holding Pond Monitoring Area	LLW	187.5	6.9
Gallia Wells Abandon CF FY18	Q-II X-701B Holding Pond Monitoring Area	LLW	187.5	6.9
Gallia Wells Abandon CF FY19	Q-II X-701B Holding Pond Monitoring Area	LLW	187.5	6.9
Gallia Wells Abandon CF FY20	Q-II X-701B Holding Pond Monitoring Area	LLW	187.5	6.9
Gallia Wells Abandon CF FY16	Q-II X-633 Pumphouse Cooling Towers Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY17	Q-II X-633 Pumphouse Cooling Towers Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY18	Q-II X-633 Pumphouse Cooling Towers Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY19	Q-II X-633 Pumphouse Cooling Towers Area	LLW	93.75	3.5
Gallia Wells Abandon CF FY20	Q-II X-633 Pumphouse Cooling Towers Area	LLW	93.75	3.5
Berea Wells CF FY14	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	125	4.6
Gallia Wells CF FY14	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	56.25	2.1
Gallia Wells Abandon CF FY16	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY17	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	112.5	4.2

Ohio Consent Decree Soil Volumes (Continued)

Commodity	Building	Characterization	In-place Volume (cf)	In-place Volume (cy)
Gallia Wells Abandon CF FY18	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY19	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	112.5	4.2
Gallia Wells Abandon CF FY20	Q-III X-740 Waste Oil Handling Facility Monitoring Area	LLW	112.5	4.2
Soil	X-326_Fuel_Tank_1	Industrial	120	4.4
Soil	X-326_Fuel_Tank_2	Industrial	123	4.6
Soil	X-300A_Fuel_Tank	Industrial	90	3.3
Soil	X-720_Fuel_Tank	Industrial	111	4.1
Soil	X-750_Fuel_Tank	Industrial	336	12.4
Soil	X-2230M	MLLW	15,033.33	556.8
Soil	X-600	MLLW	53,184.17	1,969.8
Soil	X-230K	MLLW	176,907.5	6,552.1
Soil	X-600	MLLW	9,281.67	343.8
Soil	X-626-1,2	MLLW	38,248.33	1,416.6
Soil	Big Run Creek	MLLW	44,480.83	1,647.4
Soil	East Drainage Ditch	MLLW	72,058.33	2,668.8
Soil	Little Beaver Creek	MLLW	397,673.33	14,728.6
Soil	West Drainage Ditch	MLLW	93,716.67	3,471.0
Soil	North Drainage Ditch	MLLW	98,555	3,650.2
Soil	X-700	MLLW	116,180.83	4,303.0
Soil	X-701C	MLLW	66,130.83	2,449.3
Soil	X-705	MLLW	466,710	17,285.6
Soil	X-705A,B	MLLW	31,834.17	1,179.0
Soil	X-720	MLLW	568,687.5	21,062.5
Soil	X-720-NP	MLLW	43,523.33	1,612.0
Soil	X-230J7	MLLW	69,972.5	2,591.6
Soil	X-633-1,2A,2B,2C,2D	MLLW	247,295.83	9,159.1
Soil	X-230J5	MLLW	21,547.5	798.1
Soil	X-2230N	MLLW	11,399.17	422.2
Soil	X-744N,P,Q OCH	MLLW	1,166,111.67	43,189.3
Soil	X-230J3	MLLW	38,930	1,441.9
Soil	X-530A,B,C,D,E,F,G	MLLW	739,811.67	27,400.4
Soil	X-230J6	MLLW	11,662.5	431.9
Soil	X-230L	MLLW	826,425	30,608.3
Soil	X-747H	MLLW	245,801.67	9,103.8
Soil	Z-SWMU-QUAD-IV	MLLW	6,820.83	252.6
Soil	X-533	MLLW	38,108.33	1,411.4
Soil	X-533A,B,C,D,E,F,H	MLLW	684,281.67	25,343.8
Soil	X-342A	MLLW	10,879.17	402.9
Soil	X-342B	MLLW	1,640.83	60.8

Ohio Consent Decree Soil Volumes (Continued)

Commodity	Building	Characterization	In-place Volume (cf)	In-place Volume (cy)
Soil	X-342C	MLLW	2,682.5	99.4
Soil	X-630-1,2A,2B	MLLW	133,957.5	4,961.4
Soil	X-630-3	MLLW	1,530	56.7
Soil	X-745B	MLLW	68,710.83	2,544.8
Soil (Secondary Waste from Pre-design Soil Sampling)	QI RA A	MLLW	106.67	4.0
Soil (Secondary Waste from Pre-design Soil Sampling)	QI RA B	MLLW	205	7.6
Soil (Secondary Waste from Pre-design Soil Sampling)	QI RA C	MLLW	205	7.6
Soil (Secondary Waste from Pre-design Soil Sampling)	QI RA D	MLLW	140	5.2
Soil (Secondary Waste from Pre-design Soil Sampling)	QI RA E	MLLW	676.67	25.1
Soil (Secondary Waste from Pre-design Soil Sampling)	QII RA A	MLLW	2,243.33	83.1
Soil (Secondary Waste from Pre-design Soil Sampling)	QII RA B	MLLW	468.33	17.3
Soil (Secondary Waste from Pre-design Soil Sampling)	QII RA C	MLLW	323.33	12.0
Soil (Secondary Waste from Pre-design Soil Sampling)	QIII RA A	MLLW	218.33	8.1
Soil (Secondary Waste from Pre-design Soil Sampling)	QIII RA B	MLLW	1,373.33	50.9
Soil (Secondary Waste from Pre-design Soil Sampling)	QIII RA C	MLLW	561.67	20.8
Soil (Secondary Waste from Pre-design Soil Sampling)	QIII RA D	MLLW	205	7.6
Soil (Secondary Waste from Pre-design Soil Sampling)	QIII RA E	MLLW	205	7.6
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA A	MLLW	190	7.0
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA B	MLLW	803.33	29.8
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA C	MLLW	35	1.3
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA D	MLLW	751.67	27.8
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA E	MLLW	431.67	16.0
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA F	MLLW	343.33	12.7
Soil (Secondary Waste from Pre-design Soil Sampling)	QIV RA G	MLLW	205	7.6
		Total Cubic Yardage		**709,708**

APPENDIX F: ARARS

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TABLES

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F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio F-129

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CAA	Clean Air Act of 1970
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LMES	Lockheed Martin Energy Systems, Inc.
LPP	LATA/Parallax Portsmouth, LLC
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHPA	National Historic Preservation Act of 1966
OAC	*Ohio Administrative Code*
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSDC	on-Site disposal cell
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RI/FS	Remedial Investigation/Feasibility Study
TBC	to-be-considered (guidance)
TSCA	Toxic Substances Control Act of 1976

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F.1. INTRODUCTION

In accordance with the requirements of *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) and pursuant to Ohio's laws and regulations, and utilizing 40 *Code of Federal Regulations* (*CFR*) 300.430(f)(1)(ii)(B) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as a framework, entirely on-site remedial actions are required to attain applicable or relevant and appropriate requirements (ARARs), unless waived in accordance with the DFF&O and consistent with 40 *CFR* 300.430(f)(1)(ii)(C). The ARARs include only federal and state environmental or facility siting laws/regulations; they do not include occupational safety or worker radiation protection requirements.

Paragraph 9.a of the DFF&O provides that portions of response actions conducted entirely on Site pursuant to work plans or plans concurred with or approved by Ohio Environmental Protection Agency (Ohio EPA) under the Order can be conducted pursuant to Section 121(e)(1) of CERCLA, 42 *United States Code* Section 9621. Section 121(e)(1) specifically provides that no federal, state, or local permit shall be required for the portion of any removal or remedial action conducted entirely as an on-site response action. In addition to "permits," the U.S. Environmental Protection Agency (EPA) has interpreted this section broadly to cover: "all administrative provisions from other laws, such as recordkeeping, consultation, and reporting requirements. In other words, administrative requirements do not apply to on-site response actions." (EPA 1998). Those portions of the remedial action that are taken off Site are subject to both the substantive and administrative requirements of applicable laws.

ARARs are typically divided into three groups: (1) chemical-specific, (2) location-specific, and (3) action-specific. Tables F.1 and F.2 group the ARARs/to-be-considered (guidance) (TBCs) for the on-Site and off-Site disposal alternatives, respectively. Both location- and action-specific ARARs/TBCs are included in Table F.1 (on-Site disposal). Only action-specific ARARs/TBCs are included in Table F.2 (off-Site disposal) because the scope of the action includes only the coordination of the preparation (treatment, as necessary, and packaging) and transport (shipping) of wastes to appropriate off-Site disposal facilities. No chemical-specific ARARs were identified for either alternative. In some cases, the conditions associated with the prerequisite requirements have not been confirmed to be present; if the subject condition is encountered during implementation of the action, then the specified ARAR would be triggered. A brief description of key ARAR/TBC topics follows.

Development of ARARs is an iterative process. This list of ARARs and TBCs will be further evaluated and refined (with further revisions, additions, and deletions potentially occurring) as more information becomes known about proposed remedies and a detailed design is developed for a preferred remedy concurrent with the Proposed Plan stage. The final list of enforceable ARARs and TBCs will be set when the Record of Decision is finalized.

F.2. CHEMICAL-SPECIFIC ARARS/TBCS

Chemical-specific ARARs provide health- or risk-based concentration limits or discharge limitations in various environmental media (i.e., surface water, groundwater, soil, and air) for specific hazardous substances, pollutants, or contaminants. Because this Site-wide Waste Disposition Evaluation Remedial Investigation/Feasibility Study (RI/FS) is not addressing cleanup decisions for contaminated environmental media, chemical-specific ARARs and TBCs are not identified at this stage.

F.3. LOCATION-SPECIFIC ARARS/TBCS

Location-specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (e.g., wetlands, floodplains, critical habitats, streams). Sensitive resources identified at candidate on-Site disposal cell (OSDC) locations under the on-Site disposal alternative will be protected in accordance with the location-specific ARARs and TBCs listed in Table F.1, as appropriate.

F.3.1 FLOODPLAINS AND WETLANDS

Wetlands, floodplains, and aquatic resources are present on the Portsmouth Gaseous Diffusion Plant (PORTS) Facility. None of the candidate OSDC locations are located within a 100- or 500-year floodplain, and none of the planned activities are expected to impact floodplain areas. Several jurisdictional wetlands have been identified at candidate Site D; the acreages for these wetlands are given in Table D.5 in Appendix D. Site C includes three very small ponds with acreages of 0.093, 0.066, and 0.037 (total area of 0.196 acres). These resources will be appropriately protected in accordance with the location-specific ARARs and TBCs identified in Table F.1. Activities will be designed to avoid or minimize impacts to wetlands. In the event wetlands would be impacted, mitigation activities would be incorporated into design where such impacts occur.

F.3.2 THREATENED AND ENDANGERED SPECIES

A PORTS-wide threatened and endangered species survey, which was completed in 1996, identified a number of potentially suitable habitats at PORTS for federal- and State of Ohio-listed threatened and endangered species, although only one state-listed plant species was actually observed (Lockheed Martin Energy Systems, Inc. [LMES] 1997). None of the identified habitats or species are located within the proposed candidate OSDC locations, and proposed activities are not expected to impact such species or habitats. Therefore, ARARs for protection of these resources are not included in Table F.1.

F.3.3 CULTURAL RESOURCES

Cultural resources include any prehistoric or historic district, site, building, structure, or object resulting from, or modified by, human activity. Under federal regulations (36 *CFR* 800), federal agencies must assess the impacts their actions have on historic properties and, if appropriate, avoid, minimize, or mitigate adverse effects. Historic properties are cultural resources listed in, or eligible for listing in, the NRHP because of their significance and integrity.

The National Historic Preservation Act of 1966 (NHPA), Section 106 requires that a proposed activity be assessed for impacts to buildings/historic structures that are considered historic properties (see Table F.1). The U.S. Department of Energy (DOE) plans and, in certain instances, is already implementing a variety of activities to execute the NHPA ARARs. Because both above- and below-ground activities will occur under the RI/FS and its follow-up implementation of measures to address risks and hazards, DOE will be implementing a planned approach to take into account the potential effect the actions may have on cultural resources. DOE's approach and proposed mitigation measures are described in detail in Section 7.2.2.3.

F.4. ACTION-SPECIFIC ARARS/TBCS

Action-specific ARARs include operation, performance, and design requirements or limitations based on the waste types, media, and removal/remedial activities.

F.4.1 NO ACTION ALTERNATIVE

Pursuant to EPA guidance, there are no ARARs for a No Action alternative (EPA 1991).

F.4.2 ON-SITE DISPOSAL ALTERNATIVE

The action-specific ARARs and TBCs identified in Table F.1 address design, construction, operation, capping, and post-operations care for the preliminary on-Site disposal alternative. These include landfill design and operation requirements under the Toxic Substances Control Act of 1976 (TSCA) and Subtitle C of the Resource Conservation and Recovery Act of 1976, as amended (RCRA), DOE Order 435.1-1 requirements for low-level (radioactive) waste disposal facilities, state requirements under *Ohio Administrative Code (OAC)* 3745-27 for solid waste landfills, and Clean Air Act of 1970 (CAA) requirements for asbestos-containing materials disposal facilities.

The action-specific ARARs and TBCs also include landfill siting requirements for siting waste disposal facilities. The siting requirements and considerations, detailed in Table F.1, can be grouped generally as floodplains, wetlands, seismic considerations, hydrologic considerations, suitable terrain, land use, buffers, and ecological and cultural considerations. Table F.1 also includes location-specific ARARs and TBCs that include siting considerations to protect sensitive resources (e.g., wetlands, floodplains, critical habitats, streams). The Ohio siting criterion under *OAC* 3745-27-07(H)(4)(d) that requires a setback of 200 ft for solid waste placement of solid waste from a stream, lake, or wetland would need to be waived, in accordance with the DFF&O and consistent with 40 *CFR* 300.430(f)(1)(ii)(C), for this alternative. The need for this "greater risk to human health and environment" ARAR waiver is discussed in detail in Section 9.2.2.1.2 of the main text of this document.

In 1993, EPA promulgated rules establishing special units under RCRA, called Corrective Action Management Units (CAMUs), to facilitate treatment, storage, and disposal of hazardous wastes managed for implementing cleanup. CAMUs were also established to remove the disincentives to cleanup that the application of stringent RCRA land disposal restrictions and treatment standards to these wastes (called "remediation wastes") can sometimes impose. The amendments established minimum design and operating standards for CAMUs and minimum treatment standards for wastes placed in CAMUs ("CAMU-eligible wastes"). The rule also amended the regulations for staging piles to expressly allow for mixing, blending, and similar physical operations intended to prepare waste for subsequent management and treatment, and added a provision allowing off-site placement of CAMU-eligible waste in hazardous waste landfills. ARARs for both CAMU and land disposal regulations are included in the Table F.1 while design and waste acceptance criteria for a potential OSDC are being developed and reviewed for protectiveness. Both sets of regulations are being carried forward until protectiveness of a potential OSDC is demonstrated and agreement is reached about what wastes may be CAMU-eligible. Land disposal related ARARs will apply to non CAMU-eligible hazardous wastes. The appropriate set of regulations will be evaluated during remedial design based on the outcome of these decisions.

All primary wastes (e.g., wastes sent to the facility for disposal) and secondary wastes (e.g., contaminated personal protective equipment, decontamination wastes) generated during facility construction and operational activities must be characterized and managed appropriately in accordance with State of Ohio laws and regulations, including but not limited to those for hazardous, solid, and radioactive waste, as well as federal TSCA, DOE Order, and CAA requirements (and the other requirements as specified in the table). Long-term storage of waste would not be anticipated, although provisions for temporary storage are included. Hazardous waste determinations will be based on available process knowledge and sampling/analysis results.

Wastewater, including leachate and contaminated storm water, would be treated on Site for radioactive and nonradioactive constituents, including volatile organic compounds. This treatment would be done at a newly constructed on-Site wastewater treatment unit. Treated effluent would be discharged to surface water via a newly established outfall(s) and in compliance with appropriate outfall limits established in consultation with Ohio EPA to ensure surface water quality standards are not exceeded. Water treatment ARARs are included in Table F.1 to address this potential new unit and outfall(s). It is assumed that the wastewater treatment system would emit less than 10 lb/day of air contaminants in compliance with the de minimis emission limits of *OAC* 3745-15-05(B). This would be evaluated further as the remedial design progresses.

It is anticipated that a potential OSDC would have some capability to treat waste to meet physical or analytical waste acceptance criteria, as deemed necessary. A potential OSDC would be responsible for any necessary treatment and/or off-Site transport of its own facility-generated wastes that cannot meet the waste acceptance criteria for on-Site disposal.

The requirements for a TSCA chemical waste landfill in 40 *CFR* 761.75 would be potential ARARs for disposal of such wastes in an on-Site disposal facility. The TSCA chemical waste landfill design requirements generally follow the RCRA landfill design requirements. TSCA, however, specifies that if a synthetic liner is used, it must have a minimum thickness of 30 mil. In addition, TSCA specifies that the bottom of the liner must be located 50 ft above the historical high groundwater mark and must prohibit any hydrologic connection between the disposal location and any surface water (40 *CFR* 761.75[b][3]). In accordance with the DFF&O, however, the RI/FS will evaluate at least one alternative or subalternative that is fully ARARs-compliant with no ARARs waived.

F.4.3 OFF-SITE DISPOSAL ALTERNATIVE

The off-Site disposal alternative consists of treating (as necessary), packaging, shipping, and disposing all anticipated D&D generated waste to appropriately licensed and permitted off-Site disposal facilities. Coordination of the preparation and transport of wastes to appropriate off-Site disposal facilities would be the responsibility of the Site-wide Waste Disposition Evaluation Project.

As noted in the DFF&O, Paragraph 9.a, the NCP at 40 *CFR* 300.400(e)(1) defines "on-site" as meaning "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for the implementation of the response action." Off-Site disposal, by definition, is not an on-Site response action and is subject to all substantive, procedural, and administrative requirements of all legally applicable laws, but not to any requirements that might normally be labeled relevant and appropriate under the ARARs process.

Any wastes transferred off Site or transported in commerce along public rights-of-way must meet the requirements summarized on Table F.2, depending on the type of waste (e.g., hazardous, low-level, mixed, or solid waste). These requirements include packaging, labeling, marking, manifesting, and placarding for hazardous materials in accordance with 49 *CFR* 170-180 *et seq.* Transport of D&D wastes along roads within the PORTS Facility must meet the requirements in the *Transportation Safety Document for the On-site Transfer of Hazardous Material at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (LATA/Parallax Portsmouth, LLC [LPP] 2008).

In addition, in 40 *CFR* 300.440, EPA requires that the off-site transfer of any hazardous substance, pollutant, or contaminant generated during response actions be to a treatment, storage, or disposal facility that complies with applicable federal and state laws. This facility must also have prior EPA approval for acceptance of waste (see also the "Off-Site Rule" at 40 *CFR* 300.440 *et seq.*). Accordingly, before

transport, DOE will verify with the appropriate EPA regional contact that any needed off-Site facility is acceptable for receipt of these D&D wastes.

F.5. REFERENCES

EPA 1998, *RCRA, Superfund & EPCRA Hotline Training Module: Introduction to Applicable or Relevant and Appropriate Requirements*, EPA/540-R-98-020 (Updated February 1998), OSWER Directive 9205.5-10A, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., June.

EPA 1991, *ARARs Q's and A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers*, OSWER Directive 9234.2-01FS-A, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., June.

LMES 1997, *Final Threatened and Endangered Species Report*, DOE/OR/11-1668&D0 and POEF-LMES-166, Lockheed Martin Energy Systems, Inc., Piketon, OH.

LPP 2008, *Transportation Safety Document for the On-site Transfer of Hazardous Material at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, LPP-0021/R3, LATA/Parallax Portsmouth, LLC.

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Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Location-specific ARARs		
	Wetlands		
Presence of wetlands as defined in 10 *CFR* 1022.4	Avoid, to the extent possible, the long- and short-term adverse effects associated with destruction, occupancy, and modification of wetlands.	DOE actions that involve potential impacts to, or take place within, wetlands—**applicable**	10 *CFR* 1022.3(c)
	Take action, to extent practicable, to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.		10 *CFR* 1022.3(a)(7) and (8)
	Undertake a careful evaluation of potential effects of any new construction in wetlands. Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse impacts on wetlands.		10 *CFR* 1022.3(b) and (d)
	Measures to take to mitigate the adverse effects of actions in wetlands include, but are not limited to, minimum grading requirements, runoff controls, design and construction constraints, and protection of ecology-sensitive areas.		10 *CFR* 1022.13(a)(3)
	If no practicable alternative to locating or conducting the action in the wetland is available, then before taking action, design or modify the action in order to minimize potential harm to or within the wetland, consistent with the policies set forth in Executive Order 11990.		10 *CFR* 1022.14(a)

[a]Definitions of terms used in the Ohio solid waste regulations are given in *OAC* 3745-27-01. All *OAC* Chapter 3745-27 rules that refer to the term "aquifer" or "aquifer system" are utilizing those terms as they are defined in *OAC* Rule 3745-27-01(A)(7) and (8). Likewise, the *OAC* Chapter 3745-50 rules that refer to the term "aquifer" are utilizing the term as it is defined in *OAC* Rule 3745-50-10(A)(7)
[b]The requirements portion of the ARARs table is intended to provide a summary of the cited ARAR. The omission of any particular requirement does not limit the scope of the cited ARARs.

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Presence of jurisdictional wetlands	Except as provided under the CWA Section 404(b)(2), no discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem or if it will cause or contribute to significant degradation of the waters of the U.S.	Actions that involve the discharge of dredged or fill material into waters of the U.S., including jurisdictional (adjacent) wetlands—**applicable**	40 *CFR* 230.10(a) and (c)
	Except as provided under the CWA Section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with 40 *CFR* 230.70 *et seq*. are taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem.		40 *CFR* 230.10(d)
Water pollution and sludge management violations prohibited.	No entity shall cause pollution or place or cause to be placed any sewage, sludge, sludge materials, industrial waste, or other wastes in a location where they cause pollution of any waters of the state.		*ORC* 6111.04(A)
Presence of wetlands as defined under *OAC* 3745-1-02(B)(90)	Wetlands designated uses, as assigned in accordance with *OAC* 3745-1-54(B)(2), shall be maintained and protected such that degradation of surface waters through direct, indirect, or cumulative impacts does not result in the net loss of wetland acreage or functions in accordance with the substantive wetland avoidance, minimization, and compensatory mitigation requirements of the paragraphs (D) and (E) of *OAC* 3745-1-54.	Activity that would cause loss of wetlands as defined under *OAC* 3745-1-02(B)(90)—**applicable**	*OAC* 3745-1-54(B)(1) *OAC* 3745-1-51 through -54
	Wetland narrative criteria in *OAC* 3745-1-51(A) shall be protected to prevent significant adverse impacts on the hydrology necessary to support the biological and physical characteristics naturally present in wetlands		
	Wetland narrative criteria in *OAC* 3745-1-51(B) shall be protected to prevent significant adverse impacts on water quality necessary to support existing habitat and populations of wetland flora and fauna and to prevent conditions conducive to the establishment or proliferation of nuisance organisms		

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Presence of "isolated" wetlands as defined under *ORC* 6111.02	No person shall engage in the filling of an isolated wetland unless authorized to do so pursuant to the substantive requirements of a general or individual state isolated wetland permit.	Actions that involve the discharge of dredged or fill material into "isolated wetlands"— **applicable**	*ORC* 6111.021 – 6111.028
	Must comply with the following substantive requirements and conditions of this permit: • Only suitable material free of toxic contaminants in other than trace quantities shall be used as fill material. • Use of asphalt and rubber tires as fill is prohibited. • Wetland narrative and chemical criteria in *OAC* 3745-1-51 and 3745-1-52 shall be maintained in isolated wetlands wholly or partially avoided. • Visible signage, as detailed in the general permit, shall be placed around the delineated boundary of the avoided wetlands.	Category 1 or 2 "isolated wetlands" of a total of ½ acre or less— **applicable**	Ohio General Permit for Filling Category 1 and Category 2 Isolated Wetlands (effective April 10, 2012)
	Mitigation is required either on or off site, or at a mitigation bank within the same U.S. Army COE district as the project location. Mitigation must be conducted in accordance with the ratios established in the general permit depending on the wetland category designation. The mitigation site shall be protected in perpetuity, and appropriate practicable management measures including vegetative buffers shall be implemented to restrict harmful activities that jeopardize the mitigation.	Actions that involve the discharge of dredged or fill material into Category 1 or 2 "isolated wetlands" of a total of ½ acre or less— **applicable**	Ohio General Permit for Filling Category 1 and Category 2 Isolated Wetlands (effective April 10, 2012)
	Aquatic resources		
Location encompassing aquatic ecosystem as defined in 40 *CFR* 230.3(c)	Except as provided under Section 404(b)(2), no discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact on the aquatic ecosystem or if it will cause or contribute to significant degradation of the waters of the U.S.	Action that involves discharge of dredged or fill material into waters of the U.S.— **applicable**	40 *CFR* 230.10(a) and (c) *OAC* 3745-32-05

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Location encompassing aquatic ecosystem as defined in 40 *CFR* 230.3(c) (continued)	Except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with the substantive provisions of 40 *CFR* 230.70 *et seq*. are taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem.		40 *CFR* 230.10(d) *OAC* 3745-32-05
	Consideration of mitigation will occur throughout the activity and includes avoiding, minimizing, rectifying, reducing, or compensating for resource losses. Losses will be avoided to the extent practicable. Compensation may occur on-site or at an off-site location. Mitigation requirements generally fall into three categories:	Action that involves discharge of dredged or fill material into waters of the U.S.—**applicable**	33 *CFR* 320.4(r)(1)
	• Minor project modifications considered feasible (cost, constructability, etc.) and that, if adopted, result in a project that generally meets the purpose and need.		33 *CFR* 320.4(r)(1)(i)
	• Further mitigation measures required to satisfy legal requirements. For CWA 404 applications, mitigation shall be required to ensure project complies with CWA 404(b)(1) Guidelines.		33 *CFR* 320.4(r)(1)(ii)
	• Mitigation measures that may be required as a result of the public interest review process. Such should be developed and incorporated within the public interest review process to the extent that it is found to be reasonable and justified.		33 *CFR* 320.4(r)(1)(iii)
	All compensatory mitigation will be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. All mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable.		33 *CFR* 320.4(r)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Location encompassing stream ecosystem – stream antidegradation review requirements	Activities may be approved that lower water quality only if there has been an examination of non-degradation, minimal degradation and mitigative technique alternatives, a review of the social and economic issues related to the activity, a public participation process and appropriate intergovernmental coordination, and it is determined that the lower water quality is necessary to accommodate important social or economic development in the area in which the water body is located. The director may require the applicant to implement a non-degradation alternative, a minimal degradation alternative or a mitigative technique alternative to offset all or part of the proposed lowering of water quality if the director determines that the alternative is technically feasible and economically justifiable. Any lowering of water quality shall not exceed the limitations specified in *OAC* 3745-1-05(C)(6). When making determinations regarding proposed activities that lower water quality the director shall consider the factors listed in *OAC* 3745-1-05(C)(5)(a) through (m).	Action that involves aquatic habitat alterations caused by an activity and associated construction disturbances that would result in the loss of an existing or designated stream use—**applicable**	*OAC* 3745-1-05(C)(5)
Criteria for decision by director	The directors shall evaluate the criteria in *OAC* 3745-32-05 and shall not issue a section 401 water quality certification unless he determines that the applicant has demonstrated that the discharge of dredged or fill material to waters of the state or the creation of any obstruction or alteration in waters of the state will not prevent or interfere with the attainment or maintenance of applicable water quality standards or not result in a violation of any applicable provision of sections of the Federal Water Pollution Control Act listed in *OAC* 3745-32-05(2).	Action that involves aquatic habitat alterations caused by an activity and associated construction disturbances that would result in the loss of an existing or designated stream use—**applicable**	*OAC* 3745-32-05
Criteria applicable to all waters	Water quality criteria in *OAC* 3745-1-04 shall be applied to all surface waters of the state including mixing zones to every extent practical and possible as determined by the director.	Actions that that may result in the lowering of water quality	*OAC* 3745-1-04

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Cultural resources		
Presence of archaeological resources	Must provide for the preservation of significant historical and archeological data which might otherwise be irreparably lost or destroyed as a result of any alteration of terrain caused as a result of any federal construction project.	Federal construction projects that would cause the irreparable loss or destruction of significant historical or archeological resources or data—**applicable**	16 *USC* 469
Presence of human remains, funerary objects, sacred objects, or objects of cultural patrimony for Native Americans	Must stop activities in the area of the discovery and take reasonable effort to secure and protect the objects discovered before resuming activity.	Federal agency construction activities that inadvertently discover Native American cultural items on federal lands—**applicable**	25 *USC* 3002(d) 43 *CFR* 10.4(c) and (d)(2)
Presence of historic resources	Federal agencies must take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.	Federal agency undertaking that may impact historic properties listed or eligible for inclusion on the National Register of Historic Places—**applicable**	16 *USC* 470f 36 *CFR* 800.1(a)
	Federal agencies must initiate measures to assure that where, as a result of Federal action, a historic property is to be substantially altered or demolished, timely steps are taken to make or have made appropriate records.	Substantial alterations or demolition of a historic property—**applicable**	16 *USC* 470h-2(b)
	Action-specific ARARs		
HAZARDOUS WASTE			
	Design, construction, operation and closure of a hazardous waste landfill		
Siting of RCRA hazardous waste landfill	Portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted shall not be located within 61 m (approximately 200 ft) of a fault that had displacement in Holocene time.	Construction of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.18 *OAC* 3745-54-18(A)(1)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Siting Criteria Document Requirements	A hazardous waste facility installation and operation permit cannot be approved unless it is proven that the facility:	Construction of a RCRA hazardous waste landfill—**applicable**	*OAC* 3745-50-38(A)
	• Complies with the hazardous waste standards		*OAC* 3745-50-38(A)(2)
	• Represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of various alternatives		*OAC* 3745-50-38(A)(3)
	• Represents the minimum risk of all of the following: (i) fires or explosions from TSD methods; (ii) release of hazardous waste during transportation to or from facility; (iii) adverse impact on the public health and safety		*OAC* 3745-50-38(A)(4)(a) – (c)
	• Must not be located within the boundaries of a state park or state park purchase area or national park or recreation area or national park candidate area.		*OAC* 3745-50-38(A)(7)
Design of a RCRA hazardous waste facility	Facilities must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment.	Construction of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.31 *OAC* 3745-54-31
	The operation of a hazardous waste facility shall not cause, permit or allow the emission of any particulate matter, dust, fumes, gas, mist, smoke, or vapor or odorous substance that unreasonably interferes with the comfortable enjoyment of life and property by persons living or working in the vicinity of the facility or that is injurious to public health.	Site where hazardous waste will be managed such that air emissions may occur—**applicable**	*ORC* 3734.02(I)
Liner and leachate collection design for a RCRA landfill	Must install two or more liners and a leachate collection and removal system above and between such liners.	Construction of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.301(c) *OAC* 3745-57-03(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Liner and leachate collection design for a RCRA landfill (continued)	The liner system must include a:		40 *CFR* 264.301(c)(1)(i) *OAC* 3745-57-03(C)(1)(a)
Liner			
	Top liner, designed and constructed of materials (e.g., geomembrane) to prevent the migration of hazardous constituents into the liner during active life and the post-closure period; and a		40 *CFR* 264.301(c)(1)(i)(A) *OAC* 3745-57-03(C)(1)(a)(i)
	Composite bottom liner consisting of at least two components: • Upper component must be designed and constructed of materials to prevent migration of hazardous constituents into component during active life and post-closure period. • Lower component constructed of at least 3 ft of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/s.		40 *CFR* 264.301(c)(1)(i)(B) *OAC* 3745-57-03(C)(1)(a)(ii)
	Liners must comply with Paragraphs (a)(1)(i), (ii), and (iii) of this section, which states that the liner must be:		40 *CFR* 264.301(c)(1)(ii) *OAC* 3745-57-03(C)(1)(b)
	• Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste or leachate to which they are exposed, climatic conditions, or stress from installation or daily operation		40 *CFR* 264.301(a)(1)(i) *OAC* 3745-57-03(A)(1)(a)
	• Placed on a foundation or base capable of supporting the liner and resistance to the pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression or uplift		40 *CFR* 264.301(a)(1)(ii) *OAC* 3745-57-03(A)(1)(b)
	• Installed to cover all areas likely to be in contact with the waste or leachate.		40 *CFR* 264.301(a)(1)(iii) *OAC* 3745-57-03(A)(1)(c)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Liner and leachate collection design for a RCRA landfill (continued)	Must be designed, constructed, operated, and maintained to collect and remove leachate from the landfill during the active life and post-closure period and ensure that the leachate depth over the liner does not exceed 30 cm, and comply with Paragraphs (c)(3)(iii) and (iv) of this section.	Construction of a RCRA hazardous waste landfill**—applicable**	40 *CFR* 264.301(c)(2) *OAC* 3745-57-03(C)(2)
Top leachate collection and removal system	Leachate collection and removal system must be constructed of materials that are: • Chemically resistant to waste managed in landfill and leachate generated. • Of sufficient strength and thickness to prevent collapse under pressures exerted by overlying wastes, waste cover materials, and any equipment used.		40 *CFR* 264.301(c)(3)(iii) *OAC* 3745-57-03(C)(3)(c)
	Must be designed and operated to minimize clogging during the active life of the facility and post-closure care period of the landfill.		40 *CFR* 264.301(c)(3)(iv) *OAC* 3745-57-03(C)(3)(d)
Bottom leachate collection and removal system/leak detection system	Leachate collection and removal system must be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. Requirements for a leak detection system are satisfied by installation of a system that is:	Construction of a RCRA hazardous waste landfill**—applicable**	40 *CFR* 264.301(c)(3) *OAC* 3745-57-03(C)(3)
	• Constructed with a bottom slope of 1% or more		40 *CFR* 264.301(c)(3)(i) *OAC* 3745-57-03(C)(3)(a)
	• Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-2} cm/s and a thickness of 12 in. or more or synthetic or geonet drainage materials with a transmissivity of 3×10^{-5} m^2/s		40 *CFR* 264.301(c)(3)(ii) *OAC* 3745-57-03(C)(3)(b)
	• Constructed of materials that are chemically resistant to waste managed and expected leachate to be generated, and structurally sufficient to resist pressures exerted by waste, cover, and equipment used at the landfill		40 *CFR* 264.301(c)(3)(iii) *OAC* 3745-57-03(C)(3)(c)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Liner and leachate collection design for a RCRA landfill (continued)	• Designed and operated to minimize clogging during the active life of the facility and post-closure care period		40 *CFR* 264.301(c)(3)(iv) *OAC* 3745-57-03(C)(3)(d)
Bottom leachate collection and removal system/leak detection system (continued)	• Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up. Each unit must have its own sump(s). The design of each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.		40 *CFR* 264.301(c)(3)(v) *OAC* 3745-57-03(C)(3)(e)
	Must collect and remove liquids in the leak detection system sumps to minimize the head on the bottom liner.		40 *CFR* 264.301(c)(4) *OAC* 3745-57-03(C)(4)
	If the leak detection system is not located completely above the seasonal high water table, a demonstration must be made that the operation of the system will not be adversely affected by groundwater.		40 *CFR* 264.301(c)(5) *OAC* 3745-57-03(C)(5)
Action leakage rate testing for the RCRA leachate detection system	The action leakage rate (maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding 1 ft) must include an adequate safety margin to allow for uncertainties in the design, construction, operation, and location of the leak detection system, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the leak detection system, and proposed response actions (e.g., the action leakage rate must consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover, and creep of synthetic components of the system, overburden pressures, etc.).	Construction and operation of a RCRA hazardous waste landfill**—applicable**	40 *CFR* 264.302(a) *OAC* 3745-57-04(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Action leakage rate testing for the RCRA leachate detection system (continued)	To determine if the action leakage rate has been exceeded, must convert the weekly or monthly flow rate from the monitoring data obtained under 40 *CFR* 264.303(c) to an average daily flow rate (gal/acre/day) for each sump. The average daily flow rate for each sump must be calculated weekly during the active life and closure period, and monthly during the post-closure period when monthly monitoring is required under 40 *CFR* 264.303(c).		40 *CFR* 264.302(b) *OAC* 3745-57-04(B)
Monitoring of liners and cover systems during and after construction and installation	During construction or installation, liners and cover systems must be checked for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, etc.).	Construction and operation of a RCRA landfill**—applicable**	40 *CFR* 264.303(a) *OAC* 3745-57-05(A)
	Immediately after construction or installations, synthetic liners must be checked to ensure tight seams and joints and the absence of tears, punctures, or blisters; soil based and mixed liners and covers must be checked for imperfections, including lenses, cracks, channels, or other structural nonuniformities.		40 *CFR* 264.303(a)(1) - (2) *OAC* 3745-57-05(A)(1) – (2)
	Must record the amount of liquids removed from the leak detection system sumps at least weekly during the active life and closure period.		40 *CFR* 264.303(c)(1)
Response actions for RCRA leachate detection system	Must develop actions to be taken if action leakage rate has been exceeded.	Operation of a RCRA landfill leak detection system**—applicable**	40 *CFR* 264.304(a) *OAC* 3745-57-06(A)
	If the flow rate into the leak detection system exceeds the action leakage rate for any sump, must determine:	Flow rate into the leak detection system exceeds action leakage rate for any sump**—applicable**	40 *CFR* 264.304 (b) *OAC* 3745-57-06(B)
	• To the extent practicable, the location, size, and cause of any leak		40 *CFR* 264.304 (b)(3) *OAC* 3745-57-06(B)(3)
	• Whether waste receipt should cease or be curtailed, whether any waste should be removed from the unit for inspection, repairs, or controls, and whether or not the unit should be closed		40 *CFR* 264.304 (b)(4) *OAC* 3745-57-06(B)(4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Response actions for RCRA leachate detection system (continued)	• Any other short-term and longer-term actions to be taken to mitigate or stop any leaks.		40 *CFR* 264.304 (b)(5) *OAC* 3745-57-06(B)(5)
	Must assess the source of liquids and amounts of liquids by source; conduct a fingerprint, hazardous constituent, or other analyses of the liquids in the leak detection system to identify the source of liquids and possible location of any leaks, and the hazard and mobility of the liquid; and assess the seriousness of any leaks in terms of potential for escaping into the environment; or document why such assessments are not needed.	Leak and/or remediation determinations required—**applicable**	40 *CFR* 264.304(c)(1) and (2) *OAC* 3745-57-06(C)(1) and (2)
Security system for a RCRA landfill	Must prevent the unknowing entry, and minimize the possibility for the unauthorized entry, of persons or livestock onto the active portion of his facility, unless:	Construction and operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.14 *OAC* 3745-54-14(A)
	• Physical contact with the waste, structures, or equipment within the active portion of the facility will not injure unknowing or unauthorized persons or livestock which may enter the active portion of a facility		40 *CFR* 264.14(1) *OAC* 3745-54-14(A)(1)
	• Disturbance of the waste or equipment, by the unknowing or unauthorized entry of persons or livestock onto the active portion of a facility, will not cause a violation of the requirements of this part.		40 *CFR* 264.14(2) *OAC* 3745-54-14(A)(2)
	Must have a 24-hour surveillance system which continuously monitors and controls entry onto the active portion of the facility; or an artificial or natural barrier which completely surrounds the active portion of the facility; and a means to control entry, at all times, through the gates or other entrances to the active portion of the facility.		40 *CFR* 264.14(b) *OAC* 3745-54-14(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Security system for a RCRA landfill (continued)	Must post a sign with the legend "Danger – Unauthorized Personnel Keep Out" at each entrance to the active portion of a facility and at other locations in sufficient numbers to be seen from any approach in the active portion. Legend must be written in English and be legible from a distance of at least 25 ft.		40 *CFR* 264.14(c) *OAC* 3745-54-14(C)
Run-on/runoff control systems	A run-on control system must be designed, constructed, operated, and maintained that is capable of preventing flow onto the active portion of the landfill during peak discharge from at least a 25-year storm.	Construction and operation of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.301(g) *OAC* 3745-57-03(G)
	Runoff management system must be able to collect and control the water volume from a runoff resulting from a 24-hour, 25-year storm event.		40 *CFR* 264.301(h) *OAC* 3745-57-03(H)
	Collection and holding facilities must be emptied or otherwise expeditiously managed after storm events to maintain design capacity of the system.		40 *CFR* 264.301(i) *OAC* 3745-57-03(I)
Wind dispersal control system	If the landfill contains any particulate matter which may be subject to wind dispersal, must cover or manage the landfill to control wind dispersal of particulate matter.	Operation of a RCRA hazardous waste landfill**—applicable**	40 *CFR* 264.301(j) *OAC* 3745-57-03(J)
Construction Quality Assurance (CQA) program	A CQA program is required for all surface impoundment, waste pile, and landfill units that are required to comply with paragraphs (C) or (D) of *OAC* 3745-56-21, 3745-56-51, and 3745-57-03. The program must ensure that the constructed unit meets or exceeds all design criteria and specifications, must be developed and implemented under the direction of a CQA officer who is a registered engineer, and must address the physical components listed in *OAC* 3745-54-19(A)(2) where applicable.		40 *CFR* 264.19(a) *OAC* 3745-54-19(A)
	Must develop and implement a written CQA plan as detailed in *OAC* 3745-54-19(B).		40 *CFR* 264.19(b) *OAC* 3745-54-19(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Construction Quality Assurance (CQA) program (continued)	The CQA program must include the observations, inspections, tests and measurements sufficient to meet the assurances listed in *OAC* 3745-54-19(C)(1)(a) to (c) and must include the test fill requirements detailed in *OAC* 3745-54-19(C)(2).		40 *CFR* 264.19(c) *OAC* 3745-54-19(C)
	Waste must not be received in a unit until the owner or operator has submitted to the Director by certified mail or hand delivery a certification signed by the CQA officer that the approved CQA plan has been successfully carried out and that the unit meets the requirements of paragraphs (C) or (D) of *OAC* 3745-56-21, 3745-56-51, or 3745-57-03; and the procedure in *OAC* 3745-50-58(L)(2)(b) has been completed. Documentation supporting the CQA officer's certification must be furnished to the Director upon request.		40 *CFR* 264.19(d) *OAC* 3745-54-19(D)
Post-construction monitoring of liners, leak detection, run-on/runoff systems during active life of facility	Must inspect landfill weekly and after storm events to ensure proper functioning of the run-on and runoff control system, wind dispersal control systems, and the leachate collection and removal systems.	Operation of a RCRA hazardous waste landfill**—applicable**	40 *CFR* 264.303(b) *OAC* 3745-57-05(B)
Facility and equipment inspection, testing and maintenance	Must inspect facility for malfunctions and deterioration, operator errors, and discharges to identify any problems and remedy any deterioration or malfunction of equipment or structures on a schedule and in a manner that ensures that the problem does not lead to an environmental or human health hazard, as detailed in 40 *CFR* 264.15 [*OAC* 3745-54-15].	Operation of a RCRA hazardous waste facility**—applicable**	40 *CFR* 264.15(a) – (d) *OAC* 3745-54-15(A) – (D)
	All facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, shall be tested and maintained as necessary to assure its proper operation in time of emergency.		40 *CFR* 264.33 *OAC* 3745-54-33

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Required emergency equipment	All facilities shall be equipped with the following:		40 *CFR* 264.32 *OAC* 3745-54-32
	• An internal communications or alarm system capable of providing immediate emergency instruction to facility personnel		40 *CFR* 264.32(A) *OAC* 3745-54-32(A)
	• A device capable of summoning emergency assistance from local police departments, fire departments, or Ohio EPA or local emergency response teams		40 *CFR* 264.32(B) *OAC* 3745-54-32(B)
	• Portable fire extinguishers, fire control equipment, including but not limited to, special extinguishing equipment, such as that using foam, inert gas, or dry chemicals, spill control equipment, and decontamination equipment		40 *CFR* 264.32(C) *OAC* 3745-54-32(C)
	• Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.		40 *CFR* 264.32(D) *OAC* 3745-54-32(D)
Access to communications or alarm system	Whenever hazardous waste is being poured, mixed, spread, or otherwise handled, all personnel involved in the operation shall have immediate access to an internal alarm or emergency communication device, either directly or through visual or voice contact with another employee, unless such a device is not required under 40 *CFR* 264.32 [*OAC* 3745-54-32].	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.34(a) *OAC* 3745-54-34(A)
	If there is only one employee on the premises while the facility is operating, such employee shall have immediate access to a device capable of summoning external emergency assistance, unless such a device is not required under 40 *CFR* 264.32 [*OAC* 3745-54-32].		40 *CFR* 264.34(b) *OAC* 3745-54-34(B)
Required aisle space	Shall maintain aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency, unless it can be satisfactorily demonstrated that aisle space is not needed for any of these purposes.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.35 *OAC* 3745-54-35

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Purpose and implementation of a contingency plan	Substantive requirements will be met to minimize hazards to human health or the environment from fires, explosions or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.51(a) *OAC* 3745-54-51(A)
	Substantive requirements shall be implemented immediately whenever there is a fire, explosion or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.		40 *CFR* 264.51(b) *OAC* 3745-54-51(B)
Content of contingency plan	Comply with the substantive requirements of §§264.51 and 264.56 [rules 3745-54-51 and 3745-54-56 of the Administrative Code] in response to fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility. 40 *CFR* 264.52(a) through (f) [*OAC* 3745-54-52(A) through (F)] describes what must be included in the Plan.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.52 *OAC* 3745-54-52
Emergency coordinator	At all times, there shall be at least one employee either on the facility premises or on call with responsibility for coordinating all internal emergency response measures. This coordinator shall be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the locations and characteristics of waste handled, the location of all records within the facility, and the facility layout. In addition, this person shall have the authority to commit the resources needed to implement the contingency plan.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.55 *OAC* 3745-54-55
Emergency procedures	Whenever there is an imminent or actual emergency situation, the emergency coordinator, or his designee when the emergency coordinator is on call, must immediately implement the substantive requirements detailed in 40 *CFR* 264.56 [*OAC* 3745-54-56].	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.56 *OAC* 3745-54-56

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Training requirements	Facility personnel must successfully complete a program of classroom instruction or on-the-job training in accordance with the program outlined in 40 *CFR* 264.16 [*OAC* 3745-54-16] and take part in an annual review of this initial training.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.16 *OAC* 3745-54-16
Inventory requirements	Record on a map the exact location, and dimensions, including depth, of each cell in reference to permanently surveyed benchmarks and document the contents of each cell and the approximate location of each hazardous waste type within each cell.	Operation of a RCRA hazardous waste facility—**applicable**	40 *CFR* 264.309 *OAC* 3745-57-09
	Groundwater monitoring at a hazardous waste landfill		
Construction of groundwater monitoring wells	All RCRA monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of groundwater and samples.	Construction of RCRA groundwater monitoring well—**applicable**	40 *CFR* 264.97(c) *OAC* 3745-54-97(C)
Groundwater monitoring program at a RCRA landfill	Must implement a groundwater monitoring program capable of determining the facility's impact on the quality of groundwater in the uppermost aquifer underlying the facility. Must comply with the substantive requirements of Subpart F 40 *CFR* 264.90 through 264.100 [*OAC* 3745-54-90 through 3745-54-100] for the purposes of detecting, characterizing and responding to releases during the active life of the regulated unit, including the closure and post-closure periods.	Operation of a RCRA hazardous waste unit—**applicable**	40 *CFR* 264.90(a) and (c) *OAC* 3745-54-90(A) and (C)
Groundwater protection standard	Must ensure that hazardous constituents detected in the groundwater from a regulated unit do not exceed the concentration limits for MCLs in the uppermost aquifer underlying the waste management area beyond the point of compliance during the compliance period. Must comply with the substantive requirements for detection, compliance and corrective action monitoring, as appropriate.	Operation of a RCRA groundwater monitoring program—**applicable**	40 *CFR* 264.92 through 264.100 *OAC* 3745-54-92 through 54-100

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
General groundwater monitoring requirements for a RCRA landfill	The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield samples from the uppermost aquifer that: • Represent the quality of background groundwater • Represent the quality of groundwater passing the point of compliance • Allows for the detection of contamination when the hazardous waste or constituents have migrated from the waste management area to the uppermost aquifer.	Operation of a RCRA detection monitoring program under 40 *CFR* 264.98—**applicable**	40 *CFR* 264.97(a) *OAC* 3745-54-97(A)
Groundwater monitoring program for a RCRA landfill	Groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area.	Operation of a RCRA detection monitoring program under 40 *CFR* 264.98—**applicable**	40 *CFR* 264.97(d) *OAC* 3745-54-97(D)
	Groundwater monitoring program must include sampling and analytical methods that are appropriate and accurately measure hazardous constituents in groundwater samples.		40 *CFR* 264.97(e) *OAC* 3745-54-97(E)
	Groundwater monitoring program must include a determination of the groundwater surface elevation each time groundwater is sampled.		40 *CFR* 264.97(f) *OAC* 3745-54-97(F)
Groundwater sample collection	The number and size of samples collected to establish background and measure groundwater quality at the point-of-compliance shall be appropriate for the form of statistical test employed following generally accepted statistical principles.	Operation of a RCRA detection monitoring program under 40 *CFR* 264.98—**applicable**	40 *CFR* 264.97(g) *OAC* 3745-54-97(G)
	Shall specify the statistical method, in conformance with 40 *CFR* 264.97(h) [*OAC* 3745-54-97(H)], to be used in evaluating groundwater monitoring data for each hazardous constituent. Statistical method used must be protective of human health and the environment and must comply with performance standards outlined in 40 *CFR* 264.97(i) [*OAC* 3745-54-97(I)].		40 *CFR* 264.97(h) *OAC* 3745-54-97(H) 40 *CFR* 264.97(i) *OAC* 3745-54-97(I)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Groundwater sample collection (continued)	Groundwater monitoring data collected in accordance with 40 *CFR* 264.97(g) [*OAC* 3745-54-97(G)], including actual levels of constituents, must be maintained in the facility operating records.		40 *CFR* 264.97(j) *OAC* 3745-54-97(J)
Detection monitoring for a RCRA landfill	Must monitor for EPA-specified indicator parameters, waste constituents or reaction products that provide a reliable indication of the presence of hazardous constituents in groundwater.	Operation of a RCRA detection monitoring program under 40 *CFR* 264.98—**applicable**	40 *CFR* 264.98(a) *OAC* 3745-54-98(A)
	Must install a groundwater monitoring system at the compliance point as specified under 40 *CFR* 264.95 [*OAC* 3745-54-95] that complies with 264.97(a)(2), (b), and (c) [*OAC* 3745-54-97(A)].		40 *CFR* 264.98(b) *OAC* 3745-54-98(B)
	Must conduct a monitoring program for each EPA-specified chemical parameter and hazardous constituent in accordance with 40 *CFR* 264.97(g) [*OAC* 3745-54-97(G)].		40 *CFR* 264.98(c) *OAC* 3745-54-98(C)
	Sampling frequency shall be sufficient to determine whether there is statistically significant evidence of contamination.		40 *CFR* 264.98(d) *OAC* 3745-54-98(D)
	Must determine the groundwater flow rate and direction in the uppermost aquifer at least annually.		40 *CFR* 264.98(e) *OAC* 3745-54-98(E)
	Must determine whether there is statistically significant evidence of contamination of any EPA-specified chemical parameter or hazardous constituent at a specified frequency.		40 *CFR* 264.98(f) *OAC* 3745-54-98(F)
	If there is statistically significant evidence of contamination at any monitoring well at the compliance point, must follow the substantive provisions of this subsection.		40 *CFR* 264.98(g) *OAC* 3745-54-98(G)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Closure of a hazardous waste landfill		
Closure performance standard for RCRA hazardous waste management units	Must close the facility in a manner that: • Minimizes the need for further maintenance; and	Closure of a RCRA hazardous waste management unit—**applicable**	40 *CFR* 264.111(a) *OAC* 3745-55-11(A)
	• Controls, minimizes, or eliminates, to the extent necessary to protect human health and environment, post-closure escape of hazardous waste, hazardous constituents, contaminated runoff, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and		40 *CFR* 264.111(b) *OAC* 3745-55-11(B)
	• Complies with the substantive closure requirements of 40 *CFR* 264 [*OAC* 3745-54 to 3745-57 and 3745-205] for particular type of facility including, but not limited to, requirements of Sections 264.178 (container storage area) [*OAC* 3745-55-78], 264.197 (tanks) [*OAC* 3745-55-97], 264.310 (landfills) [*OAC* 3745-57-10], and 264.554 (remediation waste piles) [*OAC* 3745-56-58].		40 *CFR* 264.111(c) *OAC* 3745-55-11(C)
	Must have a closure plan identifying the steps necessary to perform partial and/or final closure of the facility at any point during its active life and must amend the plan as necessary.		40 *CFR* 264.112 *OAC* 3745-55-12
	During the partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed or decontaminated.		40 *CFR* 264.114 *OAC* 3745-55-14
Closure of RCRA landfill	Must cover the landfill or cell with a final cover designed and constructed to:	Closure of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.310 *OAC* 3745-57-10
	• Provide long-term minimization of migration of liquids through the closed landfill		40 *CFR* 264.310(a)(1) *OAC* 3745-57-10(A)(1)
	• Function with minimum maintenance		40 *CFR* 264.310(a)(2) *OAC* 3745-57-10(A)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Closure of RCRA landfill (continued)	• Promote drainage and minimize erosion or abrasion of the cover		40 *CFR* 264.310(a)(3) *OAC* 3745-57-10(A)(3)
	• Accommodate settling and subsidence so that integrity of the cover is maintained		40 *CFR* 264.310(a)(4) *OAC* 3745-57-10(A)(4)
	• Have a permeability less than or equal to the permeability any bottom liner system or natural subsoils present.		40 *CFR* 264.310(a)(5) *OAC* 3745-57-10(A)(5)
	Post-closure care of a landfill		
Duration of post-closure care	Post-closure care must begin after closure and continue for at least 30 years after that date. The Director may shorten or extend the post-closure period.	Closure of a RCRA hazardous waste disposal unit— **applicable**	40 *CFR* 264.117(a) *OAC* 3745-55-17(A)
Continuation of security requirements	Continuation of the security requirements of 40 *CFR* 264.14 may be required during part or all of the post-closure period when hazardous wastes may remain exposed after completion of partial or final closure or access by the public or domestic livestock may pose a hazard to human health.	Closure of a RCRA hazardous waste disposal unit— **applicable**	40 *CFR* 264.117(b) *OAC* 3745-55-17(B)
Protection of disposal facility	Post-closure use of property must never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the facility's monitoring system unless the disturbance is necessary to the proposed use of the property and will not increase the potential hazard to human health or the environment or it is necessary to reduce a threat to human health or the environment.	Closure of a RCRA hazardous waste disposal unit— **applicable**	40 *CFR* 264.117(c) *OAC* 3745-55-17(C)
Post-closure plan	Must have a post-closure plan identifying the activities that will be carried on after closure of each disposal unit and the frequency of these activities, and must amend the plan as necessary. All post-closure care activities must be in accordance with the approved post-closure care plan.	Closure of a RCRA hazardous waste disposal unit— **applicable**	40 *CFR* 264.117(d) *OAC* 3745-55-17(D) 40 *CFR* 264.118 *OAC* 3745-55-18

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Post-closure plan (continued)	Within 90 days after receiving the final volume of hazardous wastes, must treat, remove from the unit or facility, or dispose of on site, all hazardous wastes in accordance with approved closure plan. The Director may approve a longer period in accordance with 40 *CFR* 264.113(a)(1) and (2) and 264.113(c) [*OAC* 3745-55-13(A)(1) and (2) and 3745-55-13(C)].		40 *CFR* 264.113(a) and (c) *OAC* 3745-55-13(A) and (C)
	Must complete partial and final closure activities in accordance with the approved closure plan within 180 days after receiving the final volume of hazardous wastes at the hazardous waste management unit or facility. The Director may approve a longer closure period in accordance with 40 *CFR* 264.113(b)(1) and (2) and 264.113(c) [*OAC* 3745-55-13(B)(1) and (2) and 3745-55-13(C)].		40 *CFR* 264.113(b) and (c) *OAC* 3745-55-13(B) and (C)
General post-closure care	After final closure, owner or operator must:	Closure of a RCRA hazardous waste landfill—**applicable**	40 *CFR* 264.310(b) *OAC* 3745-57-10(B)
	• Maintain the effectiveness and integrity of the final cover including making repairs to the cap as necessary to correct effects of settling, erosion, subsidence or other events		40 *CFR* 264.310(b)(1) *OAC* 3745-57-10(B)(1)
	• Continue to operate the leachate collection and removal system until leachate is no longer detected		40 *CFR* 264.310(b)(2) *OAC* 3745-57-10(B)(2)
	• Maintain and monitor the leachate detection system in accordance with the substantive requirements in 40 *CFR* 264.301(a)(3)(iv) and (4) and 40 *CFR* 264.303(c)		40 *CFR* 264.310(b)(3) *OAC* 3745-57-10(B)(3)
	• Maintain and monitor a ground water monitoring system and comply with all other applicable provisions 40 *CFR* 264, Subpart F		40 *CFR* 264.310(b)(4) *OAC* 3745-57-10(B)(4)
	• Prevent run-on and runoff from eroding or otherwise damaging final cover		40 *CFR* 264.310(b)(5) *OAC* 3745-57-10(B)(5)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
General post-closure care (continued)	• Protect and maintain surveyed benchmarks used to locate waste cells.		40 *CFR* 264.310(b)(6) *OAC* 3745-57-10(B)(6)
Monitoring of the leachate collection system post-closure	Must record the amount of liquids removed from the leak detection system at least monthly after the final cover is installed and thereafter as specified in 40 *CFR* 264.303(c)(2) [*OAC* 3745-57-05(C)(2)].	Closure of a RCRA landfill**—applicable**	40 *CFR* 264.303(c)(2) *OAC* 3745-57-05(C)(1) to (3)
	Management of wastes in a CAMU		
Designation and management of CAMUs	CAMUs may be designated at a facility. CAMUs are areas within a facility that are used only for managing CAMU-eligible wastes for implementing corrective action or cleanup at the facility. A CAMU must be located within the contiguous property under the control of the owner or operator where the wastes to be managed in the CAMU originated. One or more CAMUs may be designated at a facility.	Management of CAMU-eligible wastes within a CAMU located within the contiguous property under the control of the owner or operator where the wastes to be managed in the CAMU originated—**applicable**	40 *CFR* 264.552(a) *OAC* 3745-57-72(A)
	CAMU-eligible waste means all non-hazardous and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris that are managed for implementing cleanup. As-generated wastes from ongoing industrial operations at a site are not CAMU-eligible wastes.		40 *CFR* 264.552(a)(1)(i) *OAC* 3745-57-72(A)(1)(a)
	Wastes that would otherwise meet the description in paragraph (A)(1)(a) of this rule are not "CAMU-Eligible Wastes" where: (i) The wastes are hazardous wastes found during cleanup in intact or substantially intact containers, tanks, or other non-land-based units found above ground, unless the wastes are first placed in these units as part of cleanup, or the units are excavated during the course of cleanup; or (ii) The director exercises the discretion in paragraph (A)(2) of this rule to prohibit the wastes from management in a CAMU.		40 *CFR* 264.552(a)(1)(ii) *OAC* 3745-57-72(A)(1)(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Designation and management of CAMUs (continued)	Notwithstanding paragraph (A)(1)(a) of this rule, where appropriate, as-generated non-hazardous waste may be placed in a CAMU where such waste is being used to facilitate treatment or the performance of the CAMU.		40 *CFR* 264.552(a)(1)(iii) *OAC* 3745-57-72(A)(1)(c)
	Director may prohibit placement of waste in a CAMU where he has information that such wastes have not been managed in compliance with land disposal treatment or unit design standards or that noncompliance with other applicable standards likely contributed to release of the waste.		40 *CFR* 264.552(a)(2) *OAC* 3745-57-72(A)(2)
	The placement of bulk or noncontainerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not sorbents have been added) in any CAMU is prohibited except where placement of such wastes facilitates the remedy selected for the waste. Certain provisions of 40 *CFR* 264.314 [*OAC* 3745-57-14] regarding liquids, as given in 40 *CFR* 264.552(a)(3) [*OAC* 3745-57-72-(A)(3)] also apply.		40 *CFR* 264.552(a)(3) *OAC* 3745-57-72(A)(3)
	Placement of CAMU-eligible wastes into or within a CAMU does not constitute land disposal of hazardous wastes.		40 *CFR* 264.552(a)(4) *OAC* 3745-57-72(A)(4)
	Consolidation or placement of CAMU-eligible wastes into or within a CAMU does not constitute creation of a unit subject to minimum technology requirements.		40 *CFR* 264.552(a)(5) *OAC* 3745-57-72(A)(5)
	May designate a regulated unit as a CAMU, or may incorporate a regulated unit into a CAMU, if the regulated unit is closed or closing and inclusion of the unit will enhance implementation of effective, protective, and reliable remedial actions for the facility.		40 *CFR* 264.552(b)(1) *OAC* 3745-57-72(B)(1)
	The hazardous waste rules that applied to the regulated unit will continue to apply to that portion of the CAMU after incorporation into the CAMU.		40 *CFR* 264.552(b)(2) *OAC* 3745-57-72(B)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Designation and management of CAMUs (continued)	A CAMU may used for the management of CAMU-eligible waste in accordance with the following requirements of 40 *CFR* 264.552 (*OAC* 3745-57-72):		40 *CFR* 264.552(c)(1) *OAC* 3745-57-72(C)(1)
	• CAMU shall facilitate implementation of reliable, effective, protective and cost-effective remedies.		
	• Waste management activities shall not create unacceptable risks or to the environment resulting from exposure to hazardous wastes or hazardous constituents.		40 *CFR* 264.552(c)(2) *OAC* 3745-57-72(C)(2)
	• CAMU shall include uncontaminated areas of the facility, only if including such areas for the purpose of managing CAMU-eligible waste is more protective than management of such wastes at contaminated areas of the facility.		40 *CFR* 264.552(c)(3) *OAC* 3745-57-72(C)(3)
	• Areas within the CAMU, where wastes remain in place after closure of the CAMU, shall be managed and contained so as to minimize future releases, to the extent practicable.		40 *CFR* 264.552(c)(4) *OAC* 3745-57-72(C)(4)
	• CAMU shall expedite the timing of remedial activity implementation, when appropriate and practicable.		40 *CFR* 264.552(c)(5) *OAC* 3745-57-72(C)(5)
	• CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU and		40 *CFR* 264.552(c)(6) *OAC* 3745-57-72(C)(6)
	• CAMU shall, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the CAMU.		40 *CFR* 264.552(c)(7) *OAC* 3745-57-72(C)(7)
	To designate a CAMU in accordance with the criteria in 40 *CFR* 264.552 (*OAC* 3745-57-72), knowledge of the waste must include		40 *CFR* 264.552(d) *OAC* 3745-57-72(D)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Designation and management of CAMUs (continued)	• The origin of the waste and how it was subsequently managed (including a description of the timing and circumstances surrounding the disposal and/or release);		40 *CFR* 264.552(d)(1) *OAC* 3745-57-72(D)(1)
	• Whether the waste was listed or identified as hazardous at the time of disposal and/or release; and		40 *CFR* 264.552(d)(2) *OAC* 3745-57-72(D)(2)
	• Whether disposal and/or release of the waste occurred before or after the land disposal requirements of 40 *CFR* 268 (*OAC* 3745-270) were in effect for the waste listing or characteristic.		40 *CFR* 264.552(d)(3) *OAC* 3745-57-72(D)(3)
Design, operation, and closure of a CAMU	Director will-designate the requirements for a CAMU, to include the following:	Management of CAMU-eligible wastes within a CAMU located within the contiguous property under the control of the owner or operator where the wastes to be managed in the CAMU originated—**applicable**	40 *CFR* 264.552(e) *OAC* 3745-57-72(E)
	• Areal configuration of the CAMU		40 *CFR* 264.552(e)(1) *OAC* 3745-57-72(E)(1)
	• Specification of applicable design, operation, treatment and closure requirements in the hazardous waste rules.		40 *CFR* 264.552(e)(2) *OAC* 3745-57-72(E)(2)
	Shall comply with the designated substantive minimum design, operation, treatment, and closure standards for a CAMU, including the following:		40 *CFR* 264.552(e)(3) *OAC* 3745-57-72(E)(3)
	• Liners and leachate collection		40 *CFR* 264.552(e)(3)(i) *OAC* 3745-57-72(E)(3)(a)
	• Treatment of principal hazardous constituents		40 *CFR* 264.552(e)(4) *OAC* 3745-57-72(E)(4)
	• Ground water monitoring		40 *CFR* 264.552(e)(5) *OAC* 3745-57-72(E)(5)
	• Capping requirements		40 *CFR* 264.552(e)(6)(iv) *OAC* 3745-57-72(E)(6)(d)
	• Closure and post-closure care.		40 *CFR* 264.552(e)(6) *OAC* 3745-57-72(E)(6)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Design, operation, and closure of a CAMU (continued)	CAMUs into which wastes are placed where all wastes have constituent levels at or below remedial levels or goals applicable to the site do not have to comply with the liner requirements at 40 *CFR* 264.552(e)(3)(i) [*OAC* 3745-57-72(E)(3)(a)], the capping requirements at 40 *CFR* 264.552 (e)(6)(iv) [*OAC* 3745-57-72(E)(6)(d)], or the ground water monitoring requirements at 40 *CFR* 264.552 (e)(5) [*OAC* 3745-57-72(E)(5)].		40 *CFR* 264.552(g) *OAC* 3745-57-72(G)
Designation, design, operation, and closure of a CAMU used for storage and/or treatment only	CAMUs used for storage and/or treatment only are CAMUs in which wastes will not remain after closure. Such CAMUs must be designated in accordance with all of the requirements 40 *CFR* 264.552 [*OAC* 3745-57-72], except as follows:	Management of CAMU-eligible wastes within a CAMU used for storage and/or treatment only—**applicable**	40 *CFR* 264.552(f) *OAC* 3745-57-72(F)
	• Such CAMUs that operate in accordance with time limits established for hazardous waste staging piles are subject to requirements for staging piles in lieu of performance standards and requirements for CAMUs.		40 *CFR* 264.552(f)(1) *OAC* 3745-57-72(F)(1)
	• Such CAMUs that do not operate in accordance with time limits established for hazardous waste staging piles are subject to a time limit, as established by the Director, that is no longer than necessary to achieve a timely remedy selected for the waste, and are subject to requirements for staging piles in lieu of performance standards and requirements for CAMUs.		40 *CFR* 264.552(f)(2) *OAC* 3745-57-72(F)(2)
	The designation of a CAMU does not change Ohio EPA's existing authority to address clean-up levels, media-specific points of compliance to be applied to remediation at a facility, or other remedy selection decisions.		*OAC* 3745-57-72(K)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Hazardous waste generation, characterization, and segregation		
Characterization of solid waste (*all primary and secondary wastes*)	Must determine if solid waste is hazardous or is excluded under 40 *CFR* 261.4 [*OAC* 3745-51-04]; and	Generation of solid waste as defined in 40 *CFR* 261.2—**applicable**	40 *CFR* 262.11(a) *OAC* 3745-52-11(A)
	Must determine if waste is listed as a hazardous waste in 40 *CFR* 261 [*OAC* 3745-51-30 to 3745-51-35], or	Generation of solid waste, which is not excluded under 40 *CFR* 261.4—**applicable**	40 *CFR* 262.11(b) *OAC* 3745-52-11(B)
	Must determine whether the waste is identified in Subpart C of 40 *CFR* 261 [*OAC* 3745-51-20 through 3745-51-24], characterizing the waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in Subpart D of 40 *CFR* 261 and not excluded under 40 *CFR* 261.4—**applicable**	40 *CFR* 262.11(c) *OAC* 3745-52-11(C)
	Must refer to 40 *CFR* 261, 262, 264, 265, 266, 268, and 273 [*OAC* 3745-51, 3745-54 to 3745-57, 3745-65 to 3745-69, 3745-205, 3745-256, 3745-266, 3745-270, and 3745-273] for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous—**applicable**	40 *CFR* 262.11(d) *OAC* 3745-52-11(D)
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) that, at a minimum, contains all the information which must be known to treat, store, or dispose of the waste in accordance with 40 *CFR* 264 and 268 [*OAC* 3745-54 to3745-57, 3745-205, and 3745-270].	Generation of RCRA hazardous waste for storage, treatment, or disposal**—applicable**	40 *CFR* 264.13(a)(1) and (2) *OAC* 3745-54-13(A)(1) and (2)
Determinations for land disposal of hazardous waste	Must determine if the waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 [*OAC* 3745-270-40, 3745-270-45, and 3745-270-49] by testing in accordance with prescribed methods or use of generator knowledge of waste.	Generation of RCRA hazardous waste for storage, treatment, or disposal**—applicable**	40 *CFR* 268.7(a) *OAC* 3745-270-07(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Determinations for land disposal of hazardous waste (continued)	Treatment facilities must test their wastes according to the frequency specified in their waste analysis plans to determine if the waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 [*OAC* 3745-270-40, 3745-270-45, and 3745-270-49] prior to disposal.	Treatment of RCRA hazardous waste prior to disposal—**applicable**	40 *CFR* 268.7(b) *OAC* 3745-270-07(B)
	Must determine each EPA Hazardous Waste Number (waste code) to determine the applicable treatment standards under 40 *CFR* 268.40 et seq. [*OAC* 3745-270-40 et seq.].	Generation of RCRA hazardous waste for storage, treatment, or disposal—**applicable**	40 *CFR* 268.9(a) *OAC* 3745-270-09(A)
	Must determine the underlying hazardous constituents [as defined in 40 *CFR* 268.2(i) and *OAC* 3745-270-02] in the waste.	Generation of RCRA characteristically hazardous waste (and is not D001 nonwastewaters treated by CMBST, RORGS, or POLYM of Section 268.42, Table 1) for storage, treatment, or disposal—**applicable**	40 *CFR* 268.9(a) *OAC* 3745-270-09(A)
	Must determine whether the waste meets other applicable treatment standards under 40 *CFR* 268.9 [*OAC* 3745-270-09] for characteristic wastes.	Generation of RCRA characteristically hazardous waste—**applicable**	40 *CFR* 268.9(b) to (d) *OAC* 3745-270-09(B) to (C)
Characterization and management of wastewater (e.g., decon water)	On-site wastewater treatment units (including tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to the wastewater treatment facility) are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment units subject to regulation under Section 402 or Section 307(b) of the CWA—**applicable**	40 *CFR* 264.1(g)(6) *OAC* 3745-54-01(G)(6)
Characterization and management of industrial wastewater	Industrial wastewater discharges that are point source discharges subject to regulation under Section 402 of the CWA, as amended, are not solid wastes for the purpose of hazardous waste management.	Generation of industrial wastewater for discharge—**applicable**	40 *CFR* 261.4(a)(2) *OAC* 3745-51-04(A)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Segregation of scrap metal for recycle	Material is not subject to RCRA requirements for generators, transporters, and storage facilities under 40 *CFR* Parts 262 through 266, 268, 270, or 124 [*OAC* 3745-50-40 to 3745-50-235 or 3745-52, -53, -54 to -57, -65 to -69, -205, -256, -266, and -270].	Scrap metal, as defined in 40 *CFR* 261.1(c)(6) intended for recycle—**applicable**	40 *CFR* 261.6(a)(3)(ii) *OAC* 3745-51-06(A)(3)(b)
Management of recyclable materials for precious metal recovery	Recyclable materials being collected, transported or stored that are being reclaimed to recover economically significant amounts of gold, silver, platinum, palladium, iridium, osmium, rhodium, ruthenium, or any combination of these must be managed in accordance with the substantive requirements of 40 *CFR* 266.70 [*OAC* 3745-266-70].	Management of recyclable materials for precious metal recovery—**applicable**	40 *CFR* 266.70 *OAC* 3745-266-70
Management of spent lead acid batteries being reclaimed	Spent lead acid batteries being collected, transported and stored prior to regeneration must be managed in accordance with particular hazardous waste requirements depending on permit status and whether they are being reclaimed through regeneration or in other ways. Management options are detailed in 40 *CFR* 266.80 [*OAC* 3745-266-80]. Spent lead acid batteries can also be managed as universal wastes under 40 *CFR* 273 [*OAC* 3745-273].	Management of spent lead acid batteries being reclaimed—**applicable**	40 *CFR* 266.80 *OAC* 3745-266-80
	Hazardous waste storage		
Storage of hazardous wastes restricted from land disposal	Prohibits storage of hazardous waste restricted from land disposal unless the generator stores such waste in tanks, containers, or containment buildings on site solely for the purpose of accumulating such quantities as necessary to facilitate proper recovery, treatment, or disposal.	Accumulation of hazardous wastes restricted from land disposal solely for purpose of accumulation of quantities as necessary to facilitate proper recovery, treatment, or disposal—**applicable**	40 *CFR* 268.50 *OAC* 3745-270-50

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage and accumulation of hazardous waste in containers on site	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on site as defined in 40 *CFR* 260.10—**applicable**	40 *CFR* 262.34(a)(1)(i) *OAC* 3745-52-34(A)(1)(a)
	• The waste is placed in containers that comply with 40 *CFR* 265.171-173 (Subpart I) [*OAC* 3745-66-70 to -73]		
	• Container is marked with the date upon which each period of accumulation begins		40 *CFR* 262.34(a)(2) *OAC* 3745-52-34(A)(2)
	• Container is marked with the words “hazardous waste”		40 *CFR* 262.34(a)(3) *OAC* 3745-52-34(A)(3)
	The generator complies with the requirements in Subparts C and D in 40 *CFR* Part 265, with §265.16, and with 40 *CFR* 268.7(a)(5) [*OAC* 3745-270-07(A)(5); *OAC* 3745-65-16; *OAC* 3745-65-30 to *OAC* 3745-65-37; and *OAC* 3745-65-50 to *OAC* 3745-65-56].	Accumulation of RCRA hazardous waste on site as defined in 40 *CFR* 260.10—**applicable**	40 *CFR* 262.34(a)(4) *OAC* 3745-52-34(A)(4)
	Generator is exempt from all requirements in Subparts G and H of 40 *CFR* Part 265, except for §§ 265.111 and 265.114 [*OAC* 3745- 66-10 to *OAC* 3745-66-21 and *OAC* 3745-66-40 to *OAC* 3745-66-48 except for paragraphs (A) and (B) of *OAC* 3745-66-11 and *OAC* 3745-66-14].		40 *CFR* 262.34(a)(1) *OAC* 3745-52-34(A)(1)(e)
	Container must be marked with either the words “Hazardous Wastes” or with other words that identify the contents.	Accumulation of 55 gal or less of RCRA hazardous waste or 1 qt or less of acutely hazardous waste at or near any point of generation—**applicable**	40 *CFR* 262.34(c)(1)(ii) *OAC* 3745-52-34(C)(1)(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage and accumulation of hazardous waste in containers on site (continued)	For the excess waste, must comply within 3 days with the requirements of *OAC* 3745-52-34(A) or other applicable provisions of Chapter 3745-52 of the Administrative Code. During the 3-day period, comply with *OAC* 3745-52-34(C)(1)(a) and (b). Must mark container holding excess accumulation with the date the excess accumulation began.	Accumulation of more than 55 gal of hazardous waste or more than 1 qt of acutely hazardous waste at or near any point of generation—**applicable**	40 *CFR* 262.34(c)(2) *OAC* 3745-52-34(C)(2)
Accumulation of rejected shipments of hazardous waste	A generator who receives a shipment of hazardous waste back as a rejected load or residue from a facility in accordance with a manifest discrepancy may accumulate the waste on site in accordance with paragraphs (a) and (b) or (d), (e) and (f) of 40 *CFR* 262.34 [(A) and (B) or (D), (E), and (F) of *OAC* 3745-52-34] depending on the amount of hazardous waste on site in that calendar month.	Accumulation of RCRA hazardous waste on site as defined in 40 *CFR* 260.10—**applicable**	40 *CFR* 262.34(m) *OAC* 3745-52-34(M)
Management of hazardous waste stored in containers	If container is not in good condition (e.g., severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers**—applicable**	40 *CFR* 264.171 *OAC* 3745-55-71
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 *CFR* 264.172 *OAC* 3745-55-72
	Keep containers closed during storage, except to add/remove waste.		40 *CFR* 264.173(a) *OAC* 3745-55-73(A)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak.		40 *CFR* 264.173(b) *OAC* 3745-55-73(B)
Inspection of RCRA container storage area	At least weekly, must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors.	Storage of RCRA hazardous waste in containers—**applicable**	40 *CFR* 264.174 *OAC* 3745-55-74
Operation of a RCRA container storage area	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage in containers of RCRA hazardous waste that do not contain free liquids—**applicable**	40 *CFR* 264.175(c) *OAC* 3745-55-75(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Storage of RCRA hazardous waste with free liquids in containers	Area must have a containment system designed and operated in accordance with 40 *CFR* 264.175(b) [*OAC* 3745-55-75(B)] as follows:	Storage of RCRA hazardous waste with free liquids or F020 to F023, F026, and F027 in containers—**applicable**	40 *CFR* 264.175(a) and (d) *OAC* 3745-55-75(A) and (D)
	• A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.		40 *CFR* 264.175(b)(1) *OAC* 3745-55-75(B)(1)
	• A base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids.		40 *CFR* 264.175(b)(2) *OAC* 3745-55-75(B)(2)
	• The system must have sufficient capacity to contain 10% of the volume of containers or volume of largest container, whichever is greater.		40 *CFR* 264.175(b)(3) *OAC* 3745-55-75(B)(3)
	• Run-on into the system must be prevented unless the collection system has sufficient capacity to contain along with volume required for containers.		40 *CFR* 264.175(b)(4) *OAC* 3745-55-75(B)(4)
	• Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow.		40 *CFR* 264.175(b)(5) *OAC* 3745-55-75(B)(5)
Storage of incompatible waste in containers	Containers holding ignitable or reactive waste must be located at least 15 m (50 ft) from the facility's property line.	Storage of ignitable or reactive RCRA hazardous waste in containers—**applicable**	40 *CFR* 264.176 *OAC* 3745-55-76
	Must not place incompatible wastes in same container unless comply with 40 *CFR* 264.17(b) [*OAC* 3745-54-17(B)].	Storage of "incompatible" RCRA hazardous wastes in containers—**applicable**	40 *CFR* 264.177(a) *OAC* 3745-55-77(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Storage of incompatible waste in containers (continued)	Waste shall not be placed in an unwashed container that previously held an incompatible waste or material.		40 *CFR* 264.177(b) *OAC* 3745-55-77(B)
	A container holding incompatible wastes must be separated from any waste or nearby materials or must protect them from one another by using a dike, berm, wall, or other device.		40 *CFR* 264.177(c) *OAC* 3745-55-77(C)
Temporary storage or treatment of hazardous waste in tanks	Assess tank systems integrity as detailed in 40 *CFR* 264.191 [*OAC* 3745-55-91] and ensure that existing and new tanks have sufficient structural strength that is compatible with the waste to prevent collapse or rupture.	Storage of RCRA hazardous waste in a tank (any portable device in which a material is stored, transported, or disposed of or handled) for a period greater than 90 days before treatment, disposal, or storage elsewhere—**applicable**	40 *CFR* 264.191 *OAC* 3745-55-91
	Design and install tanks and tank systems in accordance with specifications detailed in 40 *CFR* 264.192 [*OAC* 3745-55-92].		40 *CFR* 264.192 *OAC* 3745-55-92
	Provide tanks with secondary containment leak detection system controls in accordance with 40 *CFR* 264.193 [*OAC* 3745-55-93].		40 *CFR* 264.193 *OAC* 3745-55-93
	Operate tanks and tank systems in accordance with the general operating requirements detailed in 40 *CFR* 264.194 [*OAC* 3745-55-94].		40 *CFR* 264.194 *OAC* 3745-55-94
	Must inspect tanks and tank systems in accordance with the schedules detailed in 40 *CFR* 264.195 [*OAC* 3745-55-95].		40 *CFR* 264.195 *OAC* 3745-55-95
	Respond to any leaks or spills from tanks systems in accordance with the response actions detailed in 40 *CFR* 264.196 [*OAC* 3745-55-96] and remove unfit tanks from further use.		40 *CFR* 264.196 *OAC* 3745-55-96
	Presents general precautions to be taken to prevent accidental ignition or reaction of ignitable or reactive wastes that are treated or stored in tanks.	Storage of ignitable or reactive hazardous wastes in tanks—**applicable**	40 *CFR* 264.198 *OAC* 3745-55-98
	Presents general precautions to be taken when dealing with incompatible wastes treated or stored in tanks.	Storage of incompatible hazardous wastes in tanks—**applicable**	40 *CFR* 264.199 *OAC* 3745-55-99

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in tanks (continued)	Less stringent minimum technology requirements may be applied to tanks designated as TUs. Protection of human health and the environment must be ensured.	Management of RCRA or CERCLA remediation wastes in tanks designated as TUs—**applicable**	40 *CFR* 264.553 *OAC* 3745-57-73
Temporary storage of RCRA remediation waste in a staging pile	May be temporarily stored (including mixing, sizing, blending, or other similar physical operations intended to prepare the wastes for subsequent management or treatment) at a facility provided that the staging pile:	Accumulation of nonflowing hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 *CFR* 260.10 (*OAC* 3745-50-10)—**applicable**	40 *CFR* 264.554 *OAC* 3745-57-74
	• Is located within the contiguous property under the control of the owner/operator where the wastes to be managed in the staging pile originated. Staging piles must be designated by the director.		40 *CFR* 264.554(a) *OAC* 3745-57-74(A)
	• Staging piles may be used to store hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) if the standards and design criteria are followed that the director has designated for that staging pile.		40 *CFR* 264.554(b) *OAC* 3745-57-74(B)
	• Knowledge of the waste pile must be sufficient to establish the required standards		40 *CFR* 264.554(c) *OAC* 3745-57-74(C)
	Staging pile must be designed to:		40 *CFR* 264.554(d)(1)(i) *OAC* 3745-57-74(D)(1)(a)
	• Facilitate a reliable, effective, and protective remedy		
	• Prevent or minimize releases of hazardous wastes and constituents into the environment and minimize or adequately control cross-media transfer, as necessary, to protect human health and the environment (e.g., through the use of liners, covers, run-on/runoff controls, as appropriate).		40 *CFR* 264.554(d)(1)(ii) *OAC* 3745-57-74(D)(1)(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage of RCRA remediation waste in a staging pile (continued)	• The staging pile must not operate for more than 2 years, except when the director grants an operating term extension. The 2-year limit, or other operating term specified by the director in the permit, closure plan, or order, is measured from the first time remediation waste is placed into a staging pile. Must maintain a record of the date when remediation waste is first placed into the staging pile for the life of the permit, closure plan, or order, or for 3 years, whichever is longer.		40 *CFR* 264.554(d)(1)(iii) *OAC* 3745-57-74(D)(1)(c)
	In setting the design standards for staging piles, the director will consider the following factors: • Length of time the pile will be in operation • Volumes of wastes you intend to store in the pile • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.		40 *CFR* 264.554(d)(2) *OAC* 3745-57-74(D)(2)
Storage of ignitable or reactive waste in a staging pile	Must not place ignitable or reactive remediation waste in a staging pile unless:	Storage of ignitable or reactive remediation waste in staging pile—**applicable**	40 *CFR* 264.554(e) *OAC* 3745-57-74(E)
	• Waste has been treated, rendered, or mixed before it was placed in the staging pile so that the waste is no longer ignitable or reactive under §261.21 or §261.31 (*OAC* 3745-52-21 or 52-31), and 40 *CFR* 264.17(b) [*OAC* 3745-54-17(B)] has been complied with; or		40 *CFR* 264.554(e)(i) *OAC* 3745-57-74(E)(1)
	• Remediation waste is managed to protect it from exposure to any material or condition that may cause it to ignite or react.		40 *CFR* 264.554(e)(ii) *OAC* 3745-57-74(E)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Storage of incompatible waste in a staging pile	Must not place incompatible wastes in same pile unless comply with 40 *CFR* 264.17(b) [*OAC* 3745-54-17(B)].	Storage of "incompatible" remediation waste in staging pile—**applicable**	40 *CFR* 264.554(f)(1) *OAC* 3745-57-74(F)(1)
	Incompatible wastes must be separated from any waste or nearby materials or must protect them from one another by using a dike, berm, wall, or other device.		40 *CFR* 264.554(f)(2) *OAC* 3745-57-74(F)(2)
	Must not pile remediation waste on the same base where incompatible wastes or materials were previously piled, unless the base has been decontaminated sufficiently to comply with 40 *CFR* 274.17(b) [*OAC* 3745-54-17(B)].		40 *CFR* 264.554(f)(3) *OAC* 3745-57-74(F)(3)
	Placing hazardous remediation wastes into a staging pile does not constitute land disposal of hazardous waste or create a unit that is subject to the minimum technological requirements of Section 3004(o) of RCRA.	Placement of hazardous remediation wastes into a staging pile—**applicable**	40 *CFR* 264.554(g) *OAC* 3745-57-74(G)
	A staging pile may operate for up to 2 years after hazardous remediation waste is first placed into the pile.		40 *CFR* 264.554(h) *OAC* 3745-57-74(H)
	The director may grant one operating term extension of up to 180 days beyond the operating term limit allowed under 40 *CFR* 264.554(h) [*OAC* 3745-57-74(H)] if he determines that continued operation of the staging pile will not pose a threat to human health and the environment; and that it is necessary to ensure timely and efficient implementation of remedial actions at the facility. The director may, as a condition of the extension, specify further standards and design criteria, as necessary, to ensure protection of human health and the environment.		40 *CFR* 264.554(i) *OAC* 3745-57-74(I)
	To modify a closure plan to incorporate a staging pile or staging pile operating term extension, must follow the applicable requirements under §264.112(c) or §265.112(c) [*OAC* 3745-55-12(C) or *OAC* 3745-66-12(C)]. To modify an order to incorporate a staging pile or staging pile operating term extension, must follow the terms of the order.		40 *CFR* 264.554(l)(3) and (4) *OAC* 3745-57-74(L)(3) and (4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles - applicability	*OAC* 3745-56-50 to 3745-56-59 applies to owners and operators of facilities that store or treat hazardous waste in piles, except as *OAC* 3745-54-01 provides otherwise.	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.250(a) *OAC* 3745-56-50(A)
	OAC 3745-56-50 to 3745-56-59 does not apply to owners or operators of waste piles that are closed with wastes left in place. Such waste piles are subject to regulation as landfills under *OAC* 3745-57-02 to 3745-57-17.		40 *CFR* 264.250(b) *OAC* 3745-56-50(B)
	Owner or operator of any waste pile that is inside or under a structure that provides protection from precipitation so that neither run-off nor leachate is generated is not subject to regulation under *OAC* 3745-56-51 or *OAC* 3745-54-90 to 3745-54-101, provided that: • Liquids or materials containing free liquids are not placed in the pile; and • Pile is protected from surface water run-on by the structure or in some other manner; and • Pile is designed and operated to control dispersal of the waste by wind, where necessary, by means other than wetting; and • Pile will not generate leachate through decomposition or other reactions.		40 *CFR* 264.250(c) *OAC* 3745-56-50(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – design and operating requirements	A waste pile (except for an existing portion of a waste pile) must have:	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.251(a) *OAC* 3745-56-51(A)
	(1) A liner that is designed, constructed, and installed to prevent any migration of wastes out of the pile into the adjacent subsurface soil or ground water or surface water at any time during the active life (including the closure period) of the waste pile. The liner may be constructed of materials that may allow waste to migrate into the liner itself (but not into the adjacent subsurface soil or ground water or surface water) during the active life of the facility. The liner must be:		40 *CFR* 264.251(a)(1) *OAC* 3745-56-51(A)(1)
	• Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climate conditions, the stress of installation, and the stress of daily operation; and		40 *CFR* 264.251(a)(1)(i) *OAC* 3745-56-51(A)(1)(a)
	• Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of liner due to settlement, compression, or uplift; and		40 *CFR* 264.251(a)(1)(ii) *OAC* 3745-56-51(A)(1)(b)
	• Installed to cover all surrounding earth likely to be in contact with the waste or leachate; and		40 *CFR* 264.251(a)(1)(iii) *OAC* 3745-56-51(A)(1)(c)
	(2) A leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the pile. Design and operating conditions will be specified to ensure that the leachate depth over the liner does not exceed 30 cm (1 ft). The leachate collection and removal system must be:		40 *CFR* 264.251(a)(2) *OAC* 3745-56-51(A)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – design and operating requirements (continued)	• Constructed of materials that are: (i) chemically resistant to waste managed in the pile and the leachate expected to be generated; and (ii) of sufficient strength and thickness to prevent collapse under the pressures exerted by overlaying wastes, waste cover materials, and by any equipment used at the pile; and		40 *CFR* 264.251(a)(2)(i) *OAC* 3745-56-51(A)(2)(a)
	• Designed and operated to function without clogging through the scheduled closure of the waste pile.		40 *CFR* 264.251(a)(2)(ii) *OAC* 3745-56-51(A)(2)(b)
	The owner or operator will be exempted from the requirements of *OAC* 3745-56-51(A) if the Director finds, based on a demonstration by the owner or operator, that alternate design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Director will consider the factors listed in *OAC* 3745-56-51(B)(1) through (4).		40 *CFR* 264.251(b) *OAC* 3745-56-51(B)
	The owner or operator of each new waste pile unit, each lateral expansion of a waste pile unit, and each replacement of an existing waste pile unit must install two or more liners and a leachate collection and removal system above and between such liners.		40 *CFR* 264.251(c) *OAC* 3745-56-51(C)
	The liner system must include: • A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and		40 *CFR* 264.251(c)(1)(i)(A) *OAC* 3745-56-51(C)(1)(a)(i)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – design and operating requirements (continued)	• A composite bottom liner consisting of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component must be designed and constructed of materials to minimize migration of hazardous constituents if a breach in the upper component were to occur. Lower component must be constructed of at least 3 ft (91.0 cm) of compacted soil material with a hydraulic conductivity of no more than 1 x 10-7 cm/s.		40 *CFR* 264.251(c)(1)(i)(B) *OAC* 3745-56-51(C)(1)(a)(ii)
	The liners must comply with paragraphs (A)(1)(a), (A)(1)(b), and (A)(1)(c) of *OAC* 3745-56-51.		40 *CFR* 264.251(c)(1)(ii) *OAC* 3745-56-51(C)(1)(b)
	The leachate collection and removal system immediately above the top liner must be designed, constructed, operated, and maintained to collect and remove leachate from the waste pile during the active life and post-closure care period. Design and operating conditions will be specified to ensure that the leachate depth over the liner does not exceed 30 cm (1 ft). The leachate collection and removal system must comply with *OAC* 3745-56-51(C)(3)(c) and (C)(3)(d).		40 *CFR* 264.251(c)(2) *OAC* 3745-56-51(C)(2)
	The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system. This leak detection system must be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this paragraph are satisfied by installation of a system that is, at a minimum:		40 *CFR* 264.251(c)(3) *OAC* 3745-56-51(C)(3)
	• Constructed with a bottom slope of 1 percent or more;		40 *CFR* 264.251(c)(3)(i) *OAC* 3745-56-51(C)(3)(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – design and operating requirements (continued)	• Constructed of granular drainage materials with a hydraulic conductivity of 1×10^{-2} cm/s or more and a thickness of 12 in. (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3×10^{-5} m^2/s or more;		40 *CFR* 264.251(c)(3)(ii) *OAC* 3745-56-51(C)(3)(b)
	• Constructed of materials that are chemically resistant to the waste managed in the waste pile and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and equipment used at the waste pile;		40 *CFR* 264.251(c)(3)(iii) *OAC* 3745-56-51(C)(3)(c)
	• Designed and operated to minimize clogging during the active life and post-closure period; and		40 *CFR* 264.251(c)(3)(iv) *OAC* 3745-56-51(C)(3)(d)
	• Constructed with sumps and liquid removal methods of sufficient size to collect and remove liquids from sump and prevent liquids from backing up into drainage layer. Each unit must have its own sump(s). Design of each sump and removal system must provide a method for measuring and recording volume of liquids present in sump and of liquids removed.		40 *CFR* 264.251(c)(3)(v) *OAC* 3745-56-51(C)(3)(e)
	The owner or operator must collect and remove pumpable liquids in the leak detection system sumps to minimize the head on the bottom liner.		40 *CFR* 264.251(c)(4) *OAC* 3745-56-51(C)(4)
	The owner or operator of a leak detection system that is not located completely above the seasonal high water table must demonstrate that the operation of the leak detection system will not be adversely affected by the presence of ground water.		40 *CFR* 264.251(c)(5) *OAC* 3745-56-51(C)(5)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – design and operating requirements (continued)	The Director may approve alternative design or operating practices if the owner or operator demonstrates that such design and operating practices, together with location characteristics: (1) will prevent the migration of any hazardous constituent into the ground water or surface water at least as effectively as the liners and leachate collection and removal systems specified in this rule; and (2) will allow detection of leaks of hazardous constituents through the top liner at least as effectively.		40 *CFR* 264.251(d) *OAC* 3745-56-51(D)
	The owner or operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the pile during peak discharge from at least a 25-year storm.		40 *CFR* 264.251(g) *OAC* 3745-56-51(G)
	The owner or operator must design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 25-year storm.		40 *CFR* 264.251(h) *OAC* 3745-56-51(H)
	Collection and holding facilities (e.g., tanks or basins) associated with run-on and run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.		40 *CFR* 264.251(i) *OAC* 3745-56-51(I)
	If the pile contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the pile to control wind dispersal.		40 *CFR* 264.251(j) *OAC* 3745-56-51(J)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – action leakage rate	The Director will approve an action leakage rate for waste piles subject to *OAC* 3745-56-51(C) or (D). The action leakage rate is the maximum design flow rate that the leak detection system can remove without the fluid head on the bottom liner exceeding 1 ft. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the leak detection system, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the leak detection system, and proposed response actions (e.g., the action leakage rate must consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.).	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.252(a) *OAC* 3745-56-52(A)
	To determine if the action leakage rate has been exceeded, the owner or operator must convert the weekly flow rate from the monitoring data obtained under paragraph (C) of *OAC* 3745-56-54 to an average daily flow rate (gal/acre/day) for each sump. Unless the Director approves a different calculation, the average daily flow rate for each sump must be calculated weekly during the active life and closure period.		40 *CFR* 264.252(b) *OAC* 3745-56-52(B)
Temporary storage or treatment of hazardous waste in waste piles – response actions	The owner or operator of waste pile units subject to paragraph (C) or (D) of *OAC* 3745-56-51 must have an approved response action plan before receipt of waste. The response action plan must set forth the actions to be taken if the action leakage rate has been exceeded. At a minimum, the response action plan must describe the actions specified in *OAC* 3745-56-53(B).	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.253(a) *OAC* 3745-56-53(A)
	If the flow rate into the leak detection system exceeds the action leakage rate for any sump, owner or operator must: • Notify the director in writing of the exceedance within 7 days of the determination;		40 *CFR* 264.253(b)(1) – (6) *OAC* 3745-56-53(B)(1) – (6)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – response actions (continued)	• Submit a preliminary written assessment to the Director within 14 days of the determination, as to the amount of liquids, likely sources of liquids, possible location, size, and cause of any leaks, and short-term actions taken and planned; • Determine to the extent practicable the location, size, and cause of any leak; • Determine whether waste receipt should cease or be curtailed, whether any waste should be removed from the unit for inspection, repairs, or controls, and whether or not the unit should be closed; • Determine any other short-term and long-term actions to be taken to mitigate or stop any leaks; and • Within 30 days after notification that the action leakage rate has been exceeded, submit to the Director the results of the analyses specified in paragraphs (B)(3), (B)(4), and (B)(5) of this rule, the results of actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the leak detection system exceeds the action leakage rate, the owner or operator must submit a report summarizing the results of any remedial actions taken and actions planned.		
	To make the leak and/or remediation determinations in *OAC* 3745-56-53(B)(3), (B)(4), and (B)(5), the owner or operator must: • Assess the source of liquids and amounts of liquids by source; • Conduct fingerprint, hazardous constituent, or other analyses of liquids in the leak detection system to identify the source of liquids and possible location of any leaks, and the hazard and mobility of the liquid; and		40 *CFR* 264.253(c)(1)(i) – (iii) *OAC* 3745-56-53(C)(1)(a) – (c)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – response actions (continued)	• Assess the seriousness of any leaks in terms of potential for escaping into the environment; or		
	Document why such assessments are not needed.		40 *CFR* 264.253(c)(2) *OAC* 3745-56-53(C)(2)
Temporary storage or treatment of hazardous waste in waste piles – monitoring and inspections	During construction or installation, liners and cover systems (e.g., membranes, sheets, or coatings) must be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.254(a) *OAC* 3745-56-54(A)
	• Synthetic liners and covers must be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and		40 *CFR* 264.254(a)(1) *OAC* 3745-56-54(A)(1)
	• Soil-based and admixed liners and covers must be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.		40 *CFR* 264.254(a)(2) *OAC* 3745-56-54(A)(2)
	While a waste pile is in operation, it must be inspected weekly and after storms to detect evidence of any of the following:		40 *CFR* 264.254(b) *OAC* 3745-56-54(B)
	• Deterioration, malfunctions, or improper operation of run-on and run-off control systems; and		40 *CFR* 264.254(b)(1) *OAC* 3745-56-54(B)(1)
	• Proper functioning of wind dispersal control systems, where present; and		40 *CFR* 264.254(b)(2) *OAC* 3745-56-54(B)(2)
	• The presence of leachate in and proper functioning of leachate collection and removal systems, where present.		40 *CFR* 264.254(b)(3) *OAC* 3745-56-54(B)(3)
	An owner or operator required to have a leak detection system under *OAC* 3745-56-51(C) must record the amount of liquids removed from each leak detection system sump at least once each week during the active life and closure period.		40 *CFR* 264.254(c) *OAC* 3745-56-54(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – special requirements for ignitable or reactive waste	Ignitable or reactive waste shall not be placed in a waste pile unless the waste and the waste pile satisfy all applicable requirements of *OAC* 3745-270, and:	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.256 *OAC* 3745-56-56
	• Addition of the waste to an existing pile results in waste or mixture no longer meeting the definition of ignitable or reactive waste under *OAC* 3745-51-21 or 3745-51-23 and complies with *OAC* 3745-54-17(B); or		40 *CFR* 264.256(a) *OAC* 3745-56-56(A)
	• The waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react.		40 *CFR* 264.256(b) *OAC* 3745-56-56(B)
Temporary storage or treatment of hazardous waste in waste piles – special requirements for incompatible waste	Incompatible wastes, or incompatible wastes and materials (see the appendix to *OAC* 3745-55-99 for examples), shall not be placed in the same pile, unless *OAC* 3745-54-17(B) is complied with.	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.257(a) *OAC* 3745-56-57(A)
	A pile of hazardous waste that is incompatible with any waste or other material stored nearby in other containers, piles, open tanks, or surface impoundments shall be separated from the other materials, or protected from them by means of a dike, berm, wall or other device.		40 *CFR* 264.257(b) *OAC* 3745-56-57(B)
	Hazardous waste shall not be piled on the same base where incompatible wastes or materials were previously piled unless the base has been decontaminated sufficiently to ensure compliance with *OAC* 3745-54-17(B).		40 *CFR* 264.257(c) *OAC* 3745-56-57(C)
Temporary storage or treatment of hazardous waste in waste piles – closure and post-closure care	At closure, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless *OAC* 3745-51-03(D) applies.	Storage of RCRA hazardous waste in a waste pile—**applicable**	40 *CFR* 264.258(a) *OAC* 3745-56-58(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage or treatment of hazardous waste in waste piles – closure and post-closure care (continued)	If, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment as required in paragraph (A) of this rule, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance *OAC* 3745-57-10.		40 *CFR* 264.258(b) *OAC* 3745-56-58(B)
	The owner or operator of a waste pile that does not comply with the liner requirements of *OAC* 3745-56-51(A)(1) and is not exempt from them in accordance with *OAC* 3745-56-50(C) or *OAC* 3745-56-51(B) must:		40 *CFR* 264.258(c)(1) *OAC* 3745-56-58(C)(1)
	Include in the closure plan for the pile in accordance with *OAC* 3745-55-12 both a plan for complying with paragraph (A) of this rule and a contingent plan for complying with paragraph (B) of this rule in case not all contaminated subsoils can be practicably removed at closure; and		40 *CFR* 264.258(c)(1)(i) *OAC* 3745-56-58(C)(1)(a)
	Prepare a contingent post-closure plan in accordance with *OAC* 3745-55-18 for complying with paragraph (B) of this rule in case not all contaminated subsoils can be practicably removed at closure.		40 *CFR* 264.258(c)(1)(ii) *OAC* 3745-56-58(C)(1)(b)
	Cost estimates calculated in accordance with *OAC* 3745-55-42 and 3745-55-44 for closure and post-closure care of a pile subject to this paragraph must include the cost of complying with the contingent closure plan and the contingent post-closure plan but are not required to include the cost of expected closure under paragraph (A) of this rule.		40 *CFR* 264.258(c)(2) *OAC* 3745-56-58(C)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Hazardous waste treatment/disposal		
Disposal of RCRA-prohibited hazardous waste in a land-based unit	May be land disposed only if it meets the applicable requirements in the table "Treatment Standards for Hazardous Waste" at 40 *CFR* 268.40 (*OAC* 3745-270-40) before land disposal. The table lists either "total waste" standards, "waste-extract" standards, or "technology-specific" standards [as detailed further in 40 *CFR* 268.42 (*OAC* 3745-270-42)].	Land disposal, as defined in 40 *CFR* 268.2, of RCRA prohibited waste [as listed in 40 *CFR* 268.20 to .39 (*OAC* 3745-270-20 to -39)]— **applicable**	40 *CFR* 268.40(a) *OAC* 3745-270-40(A) 40 *CFR* 268.30 to 268.40 *OAC* 3745-270-30 to -40 40 *CFR* 268.42 *OAC* 3745-270-42
	For characteristic wastes (D001 – D043) that are subject to the treatment standards, all underlying hazardous constituents must meet the UTSs specified in 40 *CFR* 268.48 (*OAC* 3745-270-48).	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment unit that is regulated under the CWA or is CWA equivalent, or that are injected into a Class I nonhazardous injection well— **applicable**	40 *CFR* 268.40(e) *OAC* 3745-270-40(E) 40 *CFR* 268.48 *OAC* 3745-270-48
	May be land disposed if the wastes no longer exhibit a characteristic at the point of land disposal, unless the wastes are subject to a specified method of treatment other than DEACT in 40 *CFR* 628.40 (*OAC* 3745-270-48), or are D003 reactive cyanide.	Land disposal of RCRA-restricted characteristic wastes— **applicable**	40 *CFR* 268.1(c)(4)(iv) *OAC* 3745-270-01 (C)(4)
Debris	May be land disposed if treated prior to disposal as provided under the "Alternative Treatment Standards for Hazardous Debris" in 40 *CFR* 268.45(a)(1)-(5) [*OAC* 3745-270-45(A) (1)-(5)] unless it is determined under 40 *CFR* 261.3(f)(2) [*OAC* 3745-51-03(F)(2)] that the debris is no longer contaminated with hazardous waste or the debris is treated to the waste specific treatment standard provided in 40 *CFR* 268.40 (*OAC* 3745-270-40) for the waste contaminating the debris.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous debris— **applicable**	40 *CFR* 268.45(a) *OAC* 3745-270-45(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of RCRA-prohibited hazardous waste in a land-based unit (continued)	The hazardous debris must be treated for each "contaminant subject to treatment," which must be determined in accordance with 40 *CFR* 268.45(b) [*OAC* 3745-270-45(B)].		40 *CFR* 268.45(b) *OAC* 3745-270-45(B)
Soils	May be land disposed if treated prior to disposal according to the alternative treatment standards of 40 *CFR* 268.49(c) [*OAC* 3745-270-49(C)] or according to the UTSs specified in 40 *CFR* 268.48 (*OAC* 3745-270-48) applicable to the listed hazardous waste and/or applicable characteristic of hazardous waste if the soil is characteristic.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous waste and soils —**applicabl**e	40 *CFR* 268.49(b) and (c) *OAC* 3745-270-49(B) and (C)
Variance from a treatment standard for RCRA restricted hazardous wastes	A variance from a treatment standard may be used if it is: • Not physically possible to treat the waste to the level specified in the treatment standard, or by the method specified as the treatment standard, or • Inappropriate to require the waste to be treated to the level specified in the treatment standard or by the method specified as the treatment standard even though such treatment is technically possible. *NOTE:* Variance approval will be granted through the DFF&O document approval process and included in the appropriate DFF&O document.	Generation of a RCRA hazardous waste requiring treatment prior to land disposal—**applicable**	40 *CFR* 268.44 *OAC* 3745-270-44
Disposal of treated hazardous debris	Debris treated by one of the specified extraction or destruction technologies on Table 1 of this section and which no longer exhibits a characteristic is not a hazardous waste and need not be managed in RCRA Subtitle C facility. Hazardous debris contaminated with listed waste that is treated by an immobilization technology must be managed in a RCRA Subtitle C facility.	Treated debris contaminated with RCRA-listed or characteristic waste—**applicable**	40 *CFR* 268.45(c) *OAC* 3745-270-45(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of hazardous debris treatment residues	Except as provided in 40 *CFR* 268.45(d)(2) and (d)(4) [*OAC* 3745-270-45(D)(2) and (D)(4)], treatment residues must be separated from the treated debris using simple physical or mechanical means, and such residues are subject to the waste-specific treatment standards for the waste contaminating the debris. Layers of debris removed by spalling are hazardous debris that remain subject to the treatment standards.	Residues from the treatment of hazardous debris—**applicable**	40 *CFR* 268.45(d)(1) – (5) *OAC* 3745-270-45(D)(1) – (5)
Prohibition of dilution to meet LDRs	Except as provided under 40 *CFR* 268.3(b) [*OAC* 3745-270-03(B)], must not in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with land disposal restriction levels.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous waste—**applicable**	40 *CFR* 268.3(a) *OAC* 3745-270-03(A)
	It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead.		*OAC* 3745-270-03(D)
Disposal requirements for particular RCRA waste forms and types	Must not be placed in a landfill unless the waste and the landfill meet applicable provisions of 40 *CFR* 268 and: • The resulting waste, mixture, or dissolution of material no longer is reactive or ignitable. • 40 *CFR* 264.17(b) [*OAC* 3745-54-17(B)] is complied with.	Disposal of ignitable or reactive RCRA waste—**applicable**	40 *CFR* 264.312(a) *OAC* 3745-57-12(A)
	May be landfilled without meeting 40 *CFR* 264.312(a) [*OAC* 3745-57-12(A)], provided wastes are disposed of in such a way that they are protected from any materials or conditions which may cause them to ignite; Must be disposed of in nonleaking containers which are carefully handled and placed to avoid heat, sparks, rupture, or any other condition that might cause ignition of the wastes;	Disposal of ignitable or reactive RCRA waste [except for prohibited wastes which remain subject to treatment standards in 40 *CFR* 268.40 *et seq.*]—**applicable**	40 *CFR* 264.312(b) *OAC* 3745-57-12(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal requirements for particular RCRA waste forms and types (continued)	Must be covered daily with soil or other noncombustible material to minimize the potential of ignition;		
	Must not be disposed of in cells that contain or will contain other wastes which may generate heat sufficient to cause ignition of the waste and		
	Must not be placed into a cell unless 40 *CFR* 264.17(b) [*OAC* 3745-54-17(B)] is complied with.	Disposal of incompatible wastes in a RCRA landfill— **applicable**	40 *CFR* 264.313 *OAC* 3745-57-13
Disposal of bulk or containerized hazardous liquids	The placement of bulk or noncontainerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents have been added) in any landfill is prohibited.	Placement of bulk or containerized hazardous waste liquids in a landfill— **applicable**	40 *CFR* 264.314(a) *OAC* 3745-57-14(A)
	Must use the Paint Filter Liquids Test to demonstrate the absence or presence of free liquids in either a containerized or a bulk waste.		40 *CFR* 264.314(b) *OAC* 3745-57-14(B)
	Containers holding free liquids must not be placed in a landfill, unless:		40 *CFR* 264.314(c) *OAC* 3745-57-14(C)
	• All free-standing liquid has been removed by decanting, or other methods; or has been mixed with sorbent or solidified so that free-standing liquid is no longer observed; or has been otherwise eliminated; or		40 *CFR* 264.314(c)(1) *OAC* 3745-57-14(C)(1)
	• Container is very small, such as an ampule; or		40 *CFR* 264.314(c)(2) *OAC* 3745-57-14(C)(2)
	• Container is designed to hold free liquids for use other than storage, such as a battery or capacitor or		40 *CFR* 264.314(c)(3) *OAC* 3745-57-14(C)(3)
	• Container is a lab pack as defined in 40 *CFR* 264.316 [*OAC* 3745-57-16] and is disposed of in accordance with 40 *CFR* 264.316 [*OAC* 3745-57-16].		40 *CFR* 264.314(c)(4) *OAC* 3745-57-14(C)(4)
	Sorbents used to treat free liquids to be disposed of in landfills must be nonbiodegradable as described in 40 *CFR* 264.314(d)(1) [*OAC* 3745-57-14(D)(1)].		40 *CFR* 264.314(d) *OAC* 3745-57-14(D)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of bulk or containerized hazardous liquids (continued)	The placement of any liquid which is not a hazardous waste in a landfill is prohibited unless it is demonstrated that the only reasonably available alternative is placement in a landfill or unlined surface impoundment which contains or may contain hazardous waste and such placement will not present a risk of contamination of any underground source of drinking water.		40 *CFR* 264.314(e) *OAC* 3745-57-14(E)
	Unless they are very small, containers must be either at least 90% full when placed in the landfill, or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.		40 *CFR* 264.315 *OAC* 3745-57-15
	Small containers of hazardous waste in overpacked drums (lab packs) may be placed in a landfill if the requirements of this section are met.		40 *CFR* 264.316 *OAC* 3745-57-16
Disposal of hazardous wastes F020, F021, F022, F023, F026, and F027 listed wastes	Disposal of F020, F021, F022, F023, F026, and F027 wastes in a hazardous waste landfill is not permitted unless comply with the substantive requirements for waste management of 40 *CFR* 264.317 [*OAC* 3745-57-17].	Disposal of hazardous wastes F020, F021, F022, F023, F026, and F027—**applicable**	40 *CFR* 264.317 *OAC* 3745-57-17
Treatment and disposal of ignitable, reactive, or incompatible RCRA wastes	Must take precautions to prevent accidental ignition or reaction of waste, and waste must be separated and protected from sources of ignition or reaction.	Operation of a RCRA facility that treats, stores, or disposes of ignitable, reactive, or incompatible wastes—**applicable**	40 *CFR* 264.17(a) *OAC* 3745-54-17(A)
	Must take precautions to prevent reactions that: • Generate extreme heat, pressure, fire or explosion, or violent reactions • Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment • Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions • Damage the structural integrity of the device or facility • Through other like means threaten human health or the environment.		40 *CFR* 264.17(b) *OAC* 3745-54-17(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Closure of treatment or storage units		
Closure performance standard for RCRA hazardous waste management units	Must close the facility in a manner that: • Minimizes the need for further maintenance and	Closure of a RCRA hazardous waste management unit—**applicable**	40 *CFR* 264.111(a) *OAC* 3745-55-11(A)
	• Controls, minimizes, or eliminates, to the extent necessary to protect human health and environment, post-closure escape of hazardous waste, hazardous constituents, contaminated runoff, or hazardous waste decomposition products to ground or surface waters or to the atmosphere		40 *CFR* 264.111(b) *OAC* 3745-55-11(B)
	• Complies with the substantive closure requirements of 40 *CFR* 264 [*OAC* 3745-54 to 3745-57 and 3745-205] for particular type of facility including, but not limited to, requirements of Sections 264.178 (container storage area) [*OAC* 3745-55-78], 264.197 (tanks) [*OAC* 3745-55-97], and 264.554 (remediation waste piles) [*OAC* 3745-56-58].		40 *CFR* 264.111(c) *OAC* 3745-55-11(C)
	Must have a closure plan identifying the steps necessary to perform partial and/or final closure of the facility at any point during its active life and must amend the plan as necessary.		40 *CFR* 264.112 *OAC* 3745-55-12
	During the partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed or decontaminated.	Closure of a RCRA hazardous waste management unit—**applicable**	40 *CFR* 264.114 *OAC* 3745-55-14
Post-closure care of RCRA hazardous waste management unit	Post-closure care in accordance with the substantive requirements of *OAC* 3745-55-17 (A)(1) must begin after closure and continue for at least 30 years after that date. The Director may shorten or extend the post-closure period as indicated to protect human health and the environment.	Closure of a RCRA hazardous waste disposal unit—**applicable**	40 *CFR* 264.117(a)(1) and (2) *OAC* 3745-55-17(A)(1) and (2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Closure of a RCRA container storage unit	Must remove all hazardous waste and residues from containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or residues must be decontaminated or removed.	Closure of a RCRA hazardous waste container storage area—**applicable**	40 *CFR* 264.178 *OAC* 3745-55-78
Closure of RCRA hazardous waste tanks	At closure, remove all hazardous waste and hazardous waste residues from tanks, discharge control equipment, and discharge confinement structures.	Management of RCRA hazardous waste in tanks—**applicable**	40 *CFR* 264.197(a) *OAC* 3745-55-97(A)
	If all contaminated contents cannot be removed, must consider the tank system a landfill and close the facility and perform post-closure care in accordance with the landfill closure requirements of 40 *CFR* 264.310 [*OAC* 3745-57-10].		40 *CFR* 264.197(b) *OAC* 3745-55-97(B)
	If a tank system does not have secondary containment, such a system is considered a landfill and closure and post-closure plans must reflect this.		40 *CFR* 264.197(c) *OAC* 3745-55-97(C)
Closure of a RCRA remediation waste staging pile	Must be closed by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate.	Storage of remediation waste in staging pile located in previously contaminated area—**applicable**	40 *CFR* 264.554(j)(1) *OAC* 3745-57-74(J)(1)
	Must decontaminate contaminated subsoils in a manner that will protect human health and the environment.		40 *CFR* 264.554(j)(2) *OAC* 3745-57-74(J)(2)
	Must be closed according to substantive requirements in 40 *CFR* 264.258(a) and 264.111 or 265.258(a) and 265.111 [*OAC* 3745-56-58(A) and 3745-55-11 or 3745-67-58 and 3745-66-11] by removing or decontaminating all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and managing them as hazardous waste.	Storage of remediation waste in staging pile located in an uncontaminated area—**applicable**	40 *CFR* 264.554(k) *OAC* 3745-57-74(K)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Transportation[c]		
Transportation of hazardous waste on site	The generator manifesting requirements of 40 *CFR* 262.20 to 262.32(b) [*OAC* 3745-52-20 to 3745-52-23 and 3745-52-32(B)] do not apply. Generator or transporter must comply with the requirements set forth in 40 *CFR* 263.30 and 263.31 [*OAC* 3745-53-30 and 3745-53-31] in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way—**applicable**	40 *CFR* 262.20(f) *OAC* 3745-52-20(F)
Transportation of hazardous waste off site	Must comply with the generator requirements of 40 *CFR* 262.20 to 262.23 [*OAC* 3745-52-20 to 3745-52-23] for manifesting, Section 262.30 [*OAC* 3745-52-30] for packaging, Section 262.31 [*OAC* 3745-52-31] for labeling, Sect. 262.32 [*OAC* 3745-52-32] for marking, Section 262.33 [*OAC* 3745-52-33] for placarding, Sections 262.40 and 262.41(a) [*OAC* 3745-52-40 and 3745-52-41] for record keeping requirements, and Section 262.12 [*OAC* 3745-52-12] to obtain EPA ID number.	Preparation of RCRA hazardous waste for off-site transport—**applicable**	40 *CFR* 262.10(h) *OAC* 3745-52-10(H) 40 *CFR* 262.20 to .23 *OAC* 3745-52-20 to -23 40 *CFR* 262.30 to .33 *OAC* 3745-52-30 to -33
Transportation of hazardous materials on site	Must meet the substantive requirements of 49 *CFR* Parts 171–174, 177, and 178 or the site- or facility-specific Transportation Safety Document (i.e., *Transportation Safety Document for the On-Site Transfer of Hazardous Material at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* [LPP 2008]).	Transport of hazardous materials on the PORTS facility—**TBC**	DOE Order 460.1C(4)(b)

[c] As noted in the DFF&O, Paragraph 9.a, the NCP at 40 *CFR* 300.400(e)(1) defines "on-site" as meaning "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for the implementation of the response action." Off-site transportation, by definition, is not an on-site response action and is subject to all substantive, procedural, and administrative requirements of all legally applicable laws, but not to any requirements that might normally be labeled relevant and appropriate under the ARARs process.

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Transportation of hazardous materials off site	Any person who, under contract with a department or agency of the Federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material, shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 *CFR* 171 – 180 related to marking, labeling, placarding, etc.	Preparation for transport or shipment "in commerce" of a hazardous material—**applicable**	49 *CFR* 171.1(c)
SOLID WASTE			
	Design, construction, operation, and closure of a solid waste landfill		
Siting of a solid waste landfill	The limits of solid waste placement of the landfill cannot be:	Construction of a sanitary landfill (defined in *OAC* 3745-27-01 as including solid waste landfills)—**applicable**	*OAC* 3745-27-07(H) *OAC* 3745-27-07(H)(1)
	• Within 1,000 ft of or within a national park or recreation area or candidate area for potential inclusion in the national park system; or a state park or state park purchase area; or any property that lies within the boundaries of a national park or recreation area but that has not been acquired or is not administered by the secretary of the DOI (1,000-ft setback does not apply if obtain written authorization from the owner to locate within 1,000 ft)		
	• In a sand or gravel pit, or		*OAC* 3745-27-07(H)(2)(a)
	• In a limestone or sandstone quarry		*OAC* 3745-27-07(H)(2)(b)
	• Above a federally-designated sole source aquifer, unless granted an exemption by Ohio EPA		*OAC* 3745-27-07(H)(2)(c)
	• Above an unconsolidated aquifer system capable of sustaining a yield of 100 gpm for a 24-hr period to a well located within 1,000 ft of where solid waste is placed, unless deemed acceptable by Ohio EPA.		*OAC* 3745-27-07(H)(2)(d)
	The isolation distance between the uppermost aquifer system and the bottom of the recompacted soil liner of the landfill must be not less than 15 ft of in situ or added geologic material deemed acceptable by Ohio EPA.		*OAC* 3745-27-07(H)(2)(e)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Siting of a solid waste landfill (continued)	The limits of solid waste placement of the landfill and any leachate ponds or lagoons cannot be located within the surface and subsurface areas of either of the following:	Construction of a sanitary landfill (defined as including solid waste landfills)—**applicable**	*OAC* 3745-27-07(H)(3)(a)
	• Surrounding a public water supply well through which contaminants may move toward and may reach the well through underground geologic or man-made pathways within a period of 5 years		*OAC* 3745-27-07(H)(3)(a)(i)
	• A wellhead protection area or a drinking water source protection area for a public water system using groundwater		*OAC* 3745-27-07(H)(3)(a)(ii)
	Landfill cannot be located within an area of potential subsidence due to an underground mine or within the angle of draw of an underground mine unless the potential impact to the facility due to subsidence is minimized.		*OAC* 3745-27-07(H)(3)(b)
	The limits of solid waste placement of the landfill cannot be within 1,000 ft of a water supply well or a developed spring unless one or more of the conditions listed in *OAC* 3745-27-07(H)(3)(c)(i) – (iv) is met.		*OAC* 3745-27-07(H)(3)(c)
	Solid waste cannot be placed within 1,000 ft of the following natural areas:		*OAC* 3745-27-07(H)(4)(a)
	• National or state nature/wildlife refuge or preserve		
	• National or state wild, scenic or recreational river		
	• Special interest or research area, or		
	• Stream area designated by Ohio EPA as a coldwater or exceptional warm water habitat.		
	Solid waste cannot be placed:		*OAC* 3745-27-07(H)(4)
	• Within 300 ft of the landfill facility's property line, unless deemed acceptable by Ohio EPA		*OAC* 3745-27-07(H)(4)(b)
	• Within 1,000 ft of a residence whose owner has not consented in writing to its location		*OAC* 3745-27-07(H)(4)(c)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Siting of a solid waste landfill (continued)	• Within 200 ft of a stream, lake, or wetland		*OAC* 3745-27-07(H)(4)(d)
	• In a regulatory floodplain (as defined in *OAC* 3745-27-01) unless demonstrated that unit(s) will not restrict flow of the 100-yr flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health and the environment.	Construction of a sanitary landfill (defined as including solid waste landfills)—**applicable**	*OAC* 3745-27-20(C)(2)
	• Within 200 ft of a fault that has had displacement in Holocene time unless it is demonstrated that a distance of less than 200 ft will prevent damage to the structural integrity of the facility and will be protective of human health and the environment.		*OAC* 3745-27-20(C)(3)
	• In a "seismic impact zone" (as defined in *OAC* 3745-27-01) unless demonstrated that all containment structures, including liners, leachate collection systems, sedimentation ponds, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.		*OAC* 3745-27-20(C)(4)
	• In an "unstable area" (as defined in *OAC* 3745-27-01) unless demonstrated that engineering measures have been incorporated into the design of the facility to ensure that the integrity of the structural components will not be disrupted.		*OAC* 3745-27-20(C)(5)
Design of a solid waste disposal facility	Detail engineering plans, specifications, and information for all unit(s) of a sanitary landfill facility shall be submitted, shown by means of drawings and narrative descriptions where appropriate. The information to be included on the drawings shall be as listed in *OAC* 3745-27-06(B)(2) through (7).	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-06(B) *OAC* 3745-27-06(B)(2) – (7)
	The following information shall be presented in narrative form in a report:		*OAC* 3745-27-06(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Design of a solid waste disposal facility (continued)	• Summary of the facility environs and a demonstration that the sanitary landfill facility will meet the siting criteria; shall include a discussion of the facility's compliance with the facility's limits of waste placement, the location restriction demonstrations, and operational criteria		*OAC* 3745-27-06(C)(1)
	• A hydrogeologic and geotechnical site investigation report(s), which shall at a minimum include the information listed in *OAC* 3745-27-06(C)(3)(a) through (g)	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-06(C)(3)
	• Analyses, as listed in *OAC* 3745-27-06(C)(4)(a) – (e) and (g), establishing stability of the facility and the subsurface.		*OAC* 3745-27-06(C)(4)(a) – (e) and (g)
	• Design calculations with references to equations used, showing site-specific input and assumptions that demonstrate compliance with the design requirements of *OAC* 3745-27-08		*OAC* 3745-27-06(C)(5)(a), (c) and (e) – (g), and (j) – (m)
	• For proposed new unit(s), the location restriction demonstrations in accordance with *OAC* 3745-27-20		*OAC* 3745-27-06(C)(6)
	• Demonstration of physical and chemical resistance, as required in *OAC* 3745-27-08(D)(10) and (D)(13), and compaction equipment slope limitations.		*OAC* 3745-27-06(C)(7)(b) and (c)
	• The QA/QC plan for the engineered components		*OAC* 3745-27-06(C)(9)(c)
	• Wetland demonstration to authorize discharge of dredge or fill material into wetlands, if facility will be sited in wetlands; and proof of property ownership or lease agreement to use the property as a sanitary landfill facility		*OAC* 3745-27-06(C)(10)(c) and (d)
Liner design criteria for a composite liner system	Composite liner system shall be designed to:	Construction of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(C)(1)
	• Serve as a barrier to prevent the discharge of any leachate to ground or surface waters.		*OAC* 3745-27-08(C)(1)(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Leachate collection and management system	• Have at least a 2.0% slope in all areas, except along flow lines augmented by leachate collection pipes, after accounting for 100% of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the landfill which includes, as applicable, in-situ soil, added geologic material, structural fill material, and re-compacted soil liner.		*OAC* 3745-27-08(C)(1)(b)
	• Have a maximum slope based on the compaction equipment limitations and the slope stability		*OAC* 3745-27-08(C)(1)(e)
	The leachate collection and management system shall be designed to do the following:	Construction of a sanitary waste landfill**—applicable**	*OAC* 3745-27-08(C)(3)
	• Any components located outside of the limits of solid waste placement shall be no less protective of the environment than the sanitary landfill by complying with this paragraph.		*OAC* 3745-27-08(C)(3)(a)
	• The selection and specifications for the materials that will make up the leachate collection layer shall be protective of the flexible membrane liner or the design must include a liner cushion layer meeting the specifications for liner cushions at *OAC* 3745-27-08(D)(11).		*OAC* 3745-27-08(C)(3)(b) *OAC* 3745-27-08(D)(11)
	• Limit the level of leachate in areas other than sumps to a maximum of 1 ft throughout the operation and post closure of the landfill.		*OAC* 3745-27-08(C)(3)(c)
	• Have at least a 0.5% grade for the leachate collection pipes after accounting for 100% of the primary consolidation settlement and the secondary consolidation settlement of the compressible materials beneath the landfill which includes, as applicable, in-situ soil, added geologic material, structural fill material, and re-compacted soil liner.		*OAC* 3745-27-08(C)(3)(d)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Composite cap system for closure	Composite cap system shall be designed to do the following: • Minimize infiltration of surface water • Serve as a barrier to prevent leachate outbreaks • Have at least a 5.0% grade in all areas except where surface water control structures are located • Have a maximum slope based on compaction and maintenance equipment limitations and on slope stability	Closure of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(C)(4) *OAC* 3745-27-08(C)(4)(a) *OAC* 3745-27-08(C)(4)(b) *OAC* 3745-27-08(C)(4)(c) *OAC* 3745-27-08(C)(4)(d)
Design for explosive gas control system	The design of the explosive gas control system may utilize a passive venting system or an active extraction system to satisfy air pollution control requirements and shall be designed to maintain explosive gas concentrations below the explosive gas threshold limits in *OAC* 3745-27-12(E)(5)(a).	Construction of a sanitary waste landfill—**applicable** if landfill design includes an explosive gas control system	*OAC* 3745-27-08(C)(5)
Design for geosynthetic materials	The design of all geosynthetic materials specified in the engineered components, including but not limited to, flexible membrane liners, geosynthetic clay liners, and geosynthetic drainage nets, shall not rely on any of the tensile qualities of these geosynthetic components.	Construction of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(C)(6)
Design for engineered components and waste mass	The design for the stability of all engineered components and the waste mass shall address any configuration throughout the applicable developmental and post closure periods. Potential failures associated with internal, interim and final slopes, as these slopes are defined in *OAC* 3745-27-06, shall be used to define the minimum construction specification and materials that, at a minimum, will meet the requirements listed in *OAC* 3745-27-08(C)(7)(a) through (f).	Construction of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(C)(7)(a) through (f)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Run-on/runoff control structures	Surface water run-on and run-off control structures shall comply with the following: • Accommodate peak flow from 25-year/24-hour storm event • Minimize silting and scouring. • Use non-mechanical means for all permanent structures.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-08(D)(2)
Sedimentation ponds	Sedimentation ponds must comply with the standards in *OAC* 3745-27-08(D)(3)(a) through (e).	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-08(D)(3)
Groundwater control structures	Permanent ground water control structures shall adequately control ground water infiltration through the use of non-mechanical means such as impermeable barriers or permeable drainage structures. However, no permanent ground water control structures may be used to dewater an aquifer system, except if the recharge and discharge zone of the aquifer system are located entirely within the boundary of the sanitary landfill facility.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-08(D)(4)
Liner and leachate collection design for a composite liner system	The unconsolidated or consolidated stratigraphic units that make up the in-situ foundation shall meet the design standards listed in *OAC* 3745-27-08(D)(5)(a) through (f).	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-08(D)(5)
	Rock fills or soil fills for a structural berm or subbase shall comply with the design standards listed in *OAC* 3745-27-08(D)(6)(a) through (f).		*OAC* 3745-27-08(D)(6)
	Added geologic material shall comply with the design standards listed in *OAC* 3745-27-08(D)(7)(a) through (h).		*OAC* 3745-27-08(D)(7)
Liners	Recompacted soil liner shall comply with the design standards listed in *OAC* 3745-27-08(D)(8)(b) through (j).		*OAC* 3745-27-08(D)(8)
	A geosynthetic clay liner used in lieu of part of the recompacted soil liner or in lieu of the recompacted soil barrier layer, shall comply with the design standards listed in *OAC* 3745-27-08(D)(9)(a) through (d).		*OAC* 3745-27-08(D)(9)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Liner and leachate collection design for a composite liner system (continued) *Leachate collection layer*	A flexible membrane liner shall comply with the design standards listed in *OAC* 3745-27-08(D)(10)(a) through (f).		*OAC* 3745-27-08(D)(10)
	The liner cushion layer shall be placed above the flexible membrane liner and protect it from damage that may be caused by construction materials and activities and have pre-construction interface testing performed.		*OAC* 3745-27-08(D)(11)
	The leachate collection layer shall be placed above the composite liner system which may be protected by the cushion layer and shall comply with the standards in *OAC* 3745-27-08(D)(12)(a) and (b).		*OAC* 3745-27-08(D)(12)
	Leachate collection pipes shall comply with the design standards listed in *OAC* 3745-27-08(D)(13)(a) through (g).		*OAC* 3745-27-08(D)(13)
	The filter layer of the leachate collection and management system shall be placed above the leachate collection layer and leachate collection pipes and be designed to minimize clogging of the leachate collection layer, leachate collection pipes, and sumps.		*OAC* 3745-27-08(D)(14)
	Leachate collection and management system shall incorporate an adequate number of sumps that shall be protected from adverse effects from leachate and differential settling and be equipped with automatic high level alarms located no greater than 1 ft above the top elevation of sump.		*OAC* 3745-27-08(D)(15)
	Leachate collection and management system shall incorporate adequate measures that will automatically remove leachate from the landfill to leachate storage tank(s), a permitted discharge to a public sewer, or a permitted WWTU to facilitate the transfer of leachate from the storage tank(s) for the purpose of disposal.		*OAC* 3745-27-08(D)(16)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Liner and leachate collection design for a composite liner system (continued)	Any leachate conveyance apparatus located outside the limits of solid waste placement shall be monitored, be double cased with a witness zone, and be protected from the effects of freezing temperatures, crushing, or excess deflection.		*OAC* 3745-27-08(D)(16)(a) – (c)
Leachate storage tanks	Leachate storage tanks shall have adequate storage capacity to receive the anticipated amount of leachate removed during normal operations from the leachate sumps to maintain a maximum 1 ft of head and at a minimum have at least 1 week of storage capacity using design assumptions simulating final closure.		*OAC* 3745-27-08(D)(17)
	Any leachate storage tanks located outside of the limits of solid waste placement shall be monitored and include one of the following: • For leachate ASTs, be provided with spill containment no less than 110% of tank volume. • For leachate USTs, be double cased with a witness zone.		*OAC* 3745-27-08(D)(17)(a) and (b)
Support facilities for a sanitary landfill	All access roads used for waste hauling that are constructed within the horizontal limits of waste placement shall not have grades in excess of 12% and be designed to be stable and to prevent damage to the liner or cap systems caused by the effects of traffic loading and braking or any other action.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-08(D)(18)
Closure of a solid waste landfill with a composite cap system	Design and construction of a recompacted soil barrier layer in the composite cap system shall comply with *OAC* 3745-27-08(D)(21)(b) through (g) as follows:	Closure of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(D)(21)(a)
	• Be free of debris, foreign material, and deleterious material.		*OAC* 3745-27-08(D)(21)(b)
	• Not be comprised of solid waste.		*OAC* 3745-27-08(D)(21)(c)
	• Be placed above all areas of waste placement.		*OAC* 3745-27-08(D)(21)(d)
	• Not have any abrupt changes in grade that may result in damage to the geosynthetics		*OAC* 3745-27-08(D)(21)(e)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Closure of a solid waste landfill with a composite cap system (continued)	• Have pre-construction testing of the borrow soils performed on representative samples and the results submitted to Ohio EPA no later than 7 days prior to intended use of the material in construction of the cap soil barrier layer. Pre-construction testing shall determine the maximum dry density and optimum moisture content, grain size distribution, and recompacted laboratory permeability.		*OAC* 3745-27-08(D)(21)(f)
	• Be constructed in lifts to achieve uniform compaction, in accordance with the substantive requirements of *OAC* 3745-27-08(D)(21)(g)(i)(a) through (e), (ii), and (iii).		*OAC* 3745-27-08(D)(21)(g)
	• Be adequately protected from damage due to desiccation, freeze/thaw cycles, wet/dry cycles, and the intrusion of objects during construction of the cap system		*OAC* 3745-27-08(D)(21)(h)
	• Have QC control testing of the constructed lifts performed to determine the density and moisture content according to ASTM D2922-01 and ASTM D3017-01 (nuclear methods), ASTM D1556-00 (sand cone), ASTM D2167-94 (rubber balloon) or other methods acceptable to the director or his authorized representative at a frequency of no less than five tests per acre per lift. The locations of the individual tests shall be adequately spaced to represent the constructed area. Any penetrations shall be repaired using bentonite.		*OAC* 3745-27-08(D)(21)(i)
	If a geosynthetic clay liner is used in the composite cap system in accordance with paragraph (D)(21) of this rule, it shall be placed above an engineered subbase designed and constructed in accordance *OAC* 3745-27-08(D)(22).		*OAC* 3745-27-08(D)(22)
	A cap geosynthetic clay liner meeting the requirements of paragraph (D)(9) of this rule shall be placed above the engineered subgrade in the composite cap system.		*OAC* 3745-27-08(D)(23)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Closure of a solid waste landfill with a composite cap system (continued)	A cap flexible membrane liner meeting the requirements of paragraph (D)(10) of this rule shall be placed above the recompacted soil barrier layer or the geosynthetic clay liner in the composite cap system.		*OAC* 3745-27-08(D)(24)
	The cap drainage layer for the composite cap system shall comply with *OAC* 3745-27-08(D)(25).		*OAC* 3745-27-08(D)(25)
	For cap protection layers: a cap protection layer shall comply with *OAC* 3745-27-08(D)(26).		*OAC* 3745-27-08(D)(26)
Explosive gas control system design criteria	Explosive gas control system shall not compromise the integrity of the cap system, the leachate management system, or the composite liner system, and shall comply with the following:	Construction of a sanitary waste landfill—**applicable** if design includes explosive gas control system	*OAC* 3745-27-08(D)(27)
	• Accommodate waste settlement		*OAC* 3745-27-08(D)(27)(a)
	• Provide for the removal of condensate		*OAC* 3745-27-08(D)(27)(b)
	• Prevent lateral movement of explosive gas from the sanitary landfill facility		*OAC* 3745-27-08(D)(27)(c)
	• Prevent fires within the limits of solid waste placement		*OAC* 3745-27-08(D)(27)(d)
Liner design criteria for a recompacted soil liner	The construction of the recompacted soil liner shall be modeled by an approved test pad in accordance with *OAC* 3745-27-08(E).	Construction of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(E)
Pre-construction interface testing and reporting	The specific soils and representative samples of the geosynthetic materials that will be used at the site shall be tested, in accordance with the substantive requirements of *OAC* 3745-27-08(G), for interface shear strength over the entire range of normal stresses that will develop at the facility.	Construction of a sanitary waste landfill—**applicable**	*OAC* 3745-27-08(G)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Explosive gas migration monitoring	Shall prepare an explosive gas monitoring plan in compliance with the substantive requirements of *OAC* 3745-27-12(D) and (E).	Operation of a sanitary landfill**—relevant and appropriate** if calculated explosive gas emissions exceed calculated threshold limits of *OAC* 3745-27-12(E)(5)(a)	*OAC* 3745-27-12
	Shall implement explosive gas monitoring, sampling, and reporting, and appropriate contingency plans if required, in accordance with the approved monitoring plan and with the substantive requirements of *OAC* 3745-27-12(F) through (K).		
Post-closure restrictions	No person shall fill in, grade, excavate, build, drill, or mine on land where a hazardous or solid waste facility was operated without authorization from Ohio EPA.	Closure of a hazardous or solid waste disposal facility**—applicable**	*OAC* 3745-27-13(A), (C) and (H)
	If a person engages in filling, grading, excavating, building, drilling, or mining on land where a hazardous or solid waste facility was operated, must comply with the substantive best management provisions of *OAC* 3745-27-13.		*OAC* 3745-27-13
Activities causing release of pollutants, nuisances, or health hazards	Shall operate the facility in such a manner that operation does not create a nuisance or a health hazard or cause water pollution.	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(B)(5)
Placement of waste in first layer ("select waste layer")	Shall place select waste as the first layer of waste in all areas within the limits of waste placement adjacent to or in contact with the leachate collection system to protect the composite liner from the intrusion of objects during operation of the facility. The select waste layer shall:	Operation of a sanitary landfill**—applicable**	*OAC* 3745-27-19(D)(1)
	• Not contain items over 2 ft in length that are capable of puncturing the liner.		*OAC* 3745-27-19(D)(1)(b)
	• Not restrict the flow of liquid to the leachate collection and management system.		*OAC* 3745-27-19(D)(1)(c)
	• Not contain fines or small particles which can clog the leachate collection system.		*OAC* 3745-27-19(D)(1)(d)
Site preparation	Shall clear naturally occurring vegetation to the extent necessary for proper operation of the facility	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(1)(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Site preparation (continued)	Any oil or gas wells within proposed limits of solid waste placement shall be properly plugged and abandoned in accordance with Chapter 1509 of the Revised Code.	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(1)(b)
Facility maintenance and repair	Maintain integrity of the engineered components of the facility and repair any damage to or failure of the components.	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(1)(c)
Chemical compatibility testing	Perform chemical compatibility testing if the director determines that such testing is necessary to demonstrate that the solid waste to be received at facility will not compromise the integrity of any material used to construct the facility.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(1)(d)
Support facilities for a sanitary landfill	Construct and maintain all-weather access roads within facility boundary in such a manner as to withstand the anticipated degree of use and allow passage of loaded refuse vehicles at all times, with minimum of erosion and dust generation.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(2)(a)
Security system for a sanitary landfill	Limit access to the facility by non-employees except during operating hours when operating personnel are present. Exclude live domestic and farm animals from the operating areas of the facility except for animals used for security purposes.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(2)(a), (b) and (d)
Content of contingency plan	Shall ensure that operable equipment of adequate size and quantity for facility operations are available at all times, or that an appropriate contingency plan is prepared to properly handle and dispose of waste materials in the event of equipment failure.	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(E)(3)(a),(b)
Inspections	Inspect facility at least daily for ponding, erosion, and leachate outbreaks and record results on daily log forms.	Operation of a sanitary landfill**—applicable**	*OAC* 3745-27-19(E)(11)(a)
	Inspect sedimentation ponds and pond discharge structures, includes pipes, ditches, and culverts at least weekly for erosion, clogging, or failure and take prompt correction, if necessary and record results on daily log forms.		*OAC* 3745-27-19(E)(11)(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Run-on/runoff control systems	Ensure surface water is diverted from areas where solid waste is being, or has been, deposited. Ensure facility is designed, constructed, maintained, and provided with surface water control structures that control run-on and runoff of surface water. Structures shall ensure minimal erosion and infiltration of water through the cover material and cap system and shall be designed in accordance with *OAC* 3745-27-08. If ponding or erosion occurs where waste is being or has been deposited, shall undertake actions as necessary to correct conditions causing it. If substantial threat of surface water pollution exists, may be required to monitor the surface water.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(J)(1) – (4)
Leachate management at a solid waste landfill	If a leachate outbreak occurs at the facility, must repair all outbreaks and contain, properly manage, collect, and dispose of the leachate in accordance with *OAC* 3745-27-19(K)(5) and (K)(6) and take action to minimize, control, or eliminate the conditions which contribute to the production of leachate.	Construction and operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(K)(1)
	Maintain at least one lift station back-up pump at facility at all times.		*OAC* 3745-27-19(K)(2)
	Visually or physically inspect collection pipe network of leachate management system after placement of initial lift of waste to ensure that crushing has not occurred and inspect network annually thereafter to ensure that clogging has not occurred.		*OAC* 3745-27-19(K)(3)
	If approved, may temporarily store leachate within limits of waste placement until the leachate can be treated and disposed as outlined in the leachate contingency plan under *OAC* 3745-27-19(K)(6).		*OAC* 3745-27-19(K)(4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Leachate management at a solid waste landfill (continued)	Treat and dispose of collected leachate in accordance with *ORC* Chapter 6111 and with one of the following: • Treat and dispose of collected leachate on site at the disposal facility • Pretreat collected leachate on site and dispose of off-site of facility • Treat and dispose of collected leachate off-site of facility	Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(K)(5)
	Must plan for storage and disposal of leachate to address immediate and long-term steps, including the setting aside of land for the construction and operation of an on-site treatment facility, to be taken for leachate management in the event that leachate cannot be managed in accordance with *OAC* 3745-27-19(K)(5).	Operation of a sanitary landfill—**applicable** Operation of a sanitary landfill—**applicable**	*OAC* 3745-27-19(K)(6)
	If a substantial threat of water pollution exists from the leachate entering surface waters, the director or health commissioner may require the owner or operator to monitor the surface water.		*OAC* 3745-27-19(K)(7)
	Solid waste disposal		
Disposal of solid wastes	Except as provided in paragraph (D) of *OAC* 3745-27-02, no person shall establish or modify a solid waste disposal facility without meeting the substantive criteria as follows:	Management and disposal of solid waste**—applicable**	*OAC* 3745-27-02(A)
	Disposal of solid wastes shall only be by the following methods or combination thereof:		*OAC* 3745-27-05(A)
	• Disposal at a licensed sanitary landfill facility		*OAC* 3745-27-05(A)(1)
	• Incinerating at a licensed incinerator		*OAC* 3745-27-05(A)(2)
	• Composting at a licensed composting facility		*OAC* 3745-27-05(A)(3)
	• Alternative disposal methods either as engineered fill or land application, provided use will not create a nuisance or harm human health or the environment and is capable of complying with other applicable laws.		*OAC* 3745-27-05(A)(4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Prohibition on open dumping of solid wastes	Temporary storage of putrescible solid wastes in excess of 7 days, or temporary storage of any solid wastes where such storage causes a nuisance or health hazard shall be considered open dumping.	Temporary storage of solid waste prior to collection for disposal or transfer—**applicable**	*OAC* 3745-27-03(A)(2)
	No person shall conduct, permit, or allow open dumping. In the event that open dumping is or has occurred, person(s) responsible shall promptly remove and dispose or otherwise manage the solid waste and shall submit verification that the waste has been properly managed.	Management and disposal of solid waste**—applicable**	*OAC* 3745-27-05(C)
Disposal of whole or shredded scrap tires	Whole or shredded scrap tires cannot be disposed at a sanitary landfill with the exception of the following:		*OAC* 3745-27-19(E)(8)(g)
	• Burned or partially burned scrap tires, pyrolytic oil, and contaminated soils provided those materials meet the definition of solid waste in *OAC* 3745-27-01.		*OAC* 3745-27-19(E)(8)(g)(i)
	• Scrap tire pieces from a scrap tire recovery facility that are the byproduct of scrap tire processing.		*OAC* 3745-27-19(E)(8)(g)(ii)
	• Authorized beneficial uses of scrap tires pursuant to *OAC* 3745-27-78.		*OAC* 3745-27-19(E)(8)(g)(iii)
	• Whole scrap tires which could not be processed by a scrap tire recovery facility. The owner or operator of the scrap tire recovery facility shall complete a scrap tire shipping paper and record on the shipping paper why the scrap tires are not processable at the scrap tire recovery facility. This includes but is not limited to aircraft tires and forklift tires that are not processable due to their construction or scrap tires contaminated with mud or other materials that render the tires unsuitable for processing.		*OAC* 3745-27-19(E)(8)(g)(iv)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
TSCA/PCB WASTES			
	Design, construction, operation and closure of a TSCA chemical waste landfill		
Siting and liner design requirements for a TSCA landfill	Shall be located in thick, relatively impermeable formations such as large area clay pans. Where this is not possible, the soil shall have a high clay and silt content with the following parameters:	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(1)
	• In place soil thickness, 4 ft or compacted soil liner thickness, 3 ft		40 *CFR* 761.75(b)(1)(i)
	• Permeability (cm/sec), equal to or less than 1×10^{-7}		40 *CFR* 761.75(b)(1)(ii)
	• Percent soil passing No. 200 sieve > 30		40 *CFR* 761.75(b)(1)(iii)
	• Liquid limit, > 30		40 *CFR* 761.75(b)(1)(iv)
	• Plasticity index > 15.		40 *CFR* 761.75(b)(1)(v)
	Synthetic membrane liners shall be used when the hydrologic or geologic conditions at the landfill require such a liner in order to provide at least a permeability equivalent to that of the soils. A synthetic liner should be chemically compatible with PCBs.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(2)
	Adequate soil underlining and cover shall be provided to prevent excessive stress or rupture of the liner. The liner must have a minimum thickness of 30 mil.		
	The landfill must be located above the historical high groundwater table. The bottom of the landfill liner shall be at least 50 ft above the historical high water table. Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(3)
	Shall provide diversion structures capable of diverting all surface water runoff from a 24-hour, 25-year storm.	Construction of a TSCA chemical waste landfill above the 100-year floodwater elevation—**applicable**	40 *CFR* 761.75(b)(4)(ii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Siting and liner design requirements for a TSCA landfill (continued)	The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(5)
	The landfill will not present an unreasonable risk of injury to health or the environment from PCBs when one or more of the requirements of 40 *CFR* 761.75(b) are not met, these requirements may be waived.		40 *CFR* 761.75(c)(4)
Monitoring at a TSCA chemical waste landfill	The groundwater and surface water from the disposal site area must be sampled prior to commencing operation for use as baseline data.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(6)(i)(A)
Placement and construction of groundwater monitoring wells at a TSCA chemical waste landfill	If underlying earth materials are homogenous, impermeable, and uniformly sloping in one direction, only three sampling points shall be necessary.	Operation of TSCA chemical waste landfill groundwater monitoring program—**applicable**	40 *CFR* 761.75(b)(6)(ii)(A)
	The points shall be equally spaced on a line through center of disposal area and extending from the area of highest water table elevation to the area of the lowest water table elevation.		
	All TSCA monitoring wells shall be cased and the annular space between the monitor zone (zone of saturation) and the surface shall be completely backfilled with Portland cement or an equivalent material and plugged with Portland cement to effectively prevent percolation of surface water into the well bore. The well opening at the surface shall have a removable cap to provide access and to prevent entrance of rainfall or stormwater runoff.	Construction of a TSCA groundwater monitoring well—**applicable**	40 *CFR* 761.75(b)(6)(ii)(B)
Groundwater monitoring at a TSCA chemical waste landfill	The groundwater monitoring well shall be pumped to remove the volume of liquid initially contained in the well before obtaining a sample for analysis.	Operation of TSCA groundwater monitoring wells—**applicable**	40 *CFR* 761.75(b)(6)(ii)(B)
Monitoring (surface or groundwater) at a TSCA chemical waste landfill	At a minimum, all samples shall be analyzed for PCBs, pH, specific conductance, and chlorinated organics. Sampling methods and analytical procedures for these parameters shall comply with those specified in 40 *CFR* 136 as amended in 41 FR 52779 on December 1, 1976.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(6)(iii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Monitoring (surface or groundwater) at a TSCA chemical waste landfill (continued)	The discharge shall be treated to meet applicable State or Federal standards or recycled to the chemical waste landfill.		
Leachate collection system for TSCA landfill	A leachate collection monitoring system shall be installed above the chemical waste landfill. An acceptable system includes a compound leachate collection.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(7)
	Compound leachate collection system consists of a gravity flow drainfield installed above the waste disposal facility liner and above a secondary installed liner.		40 *CFR* 761.75(b)(7)(ii)
Leachate collection system monitoring and handling	Leachate collection systems shall be monitored monthly for quantity and physicochemical characteristics of leachate produced. The leachate should be either treated to acceptable limits for discharge in accordance with legally applicable discharge limits or disposed of by another legally appropriate method. Water analysis shall be conducted as provided in Paragraph (b)(6)(iii) of 40 *CFR* 761.75.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(7)
Inventory requirements	Disposal records shall include information on the PCB concentration in the liquid wastes and the three dimensional burial coordinates for PCBs and PCB Items.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(8)(iv)
Security and support facilities for TSCA chemical waste landfill	A 6-ft woven mesh fence, wall, or similar device shall be placed around the site to prevent unauthorized persons and animals from entering.	Construction of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(9)(i)
	Roads shall be maintained to and within the site that are adequate to support the operation and maintenance of the site without causing safety or nuisance problems or hazardous conditions.		40 *CFR* 761.75(b)(9)(ii)
Operation of a TSCA chemical waste landfill	Site shall be operated and maintained to prevent hazardous conditions resulting from spilled liquids and windblown materials.	Operation of a TSCA chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(9)(iii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
PCB waste generation, characterization, and segregation			
Torch-cutting of metal coated with paint that may contain PCBs	No person may openly burn PCBs. Combustion of PCBs by incineration as approved under Section 761.60 (a) or (e), or otherwise allowed under 40 *CFR* 761, is not open burning.	Management of PCB waste for storage or disposal—**applicable**	40 *CFR* 761.50(a)(1)
Management of PCB waste	Any person storing or disposing of PCB waste must do so in accordance with 40 *CFR* 761, Subpart D.	Storage or disposal of waste containing PCBs at concentrations ≥ 50 ppm—**applicable**	40 *CFR* 761.50(a)
	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Cleanup or disposal of PCB remediation waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.61
Cleanup of new PCB spills	Spills shall be cleaned up in accordance with 40 *CFR* 761, Subpart G, "PCB Spill Cleanup Policy." This policy does not apply to existing spills (old spills which occurred prior to May 4, 1987).	Release into the environment of materials containing PCBs at ≥ 50 ppm, which occurs after May 4, 1987—**applicable**	40 *CFR* 761.125
	There may be exceptional spill situations that require less stringent cleanup or a different approach to cleanup because of factors associated with the particular spill. These factors may mitigate expected exposures and risks or make cleanup to these requirements impracticable.		40 *CFR* 761.120(a)(4)
Decontamination of PCB contaminated materials prior to use, reuse, distribution in commerce, or disposal as a non-TSCA waste	Chopping (including wire chopping), distilling, filtering, oil/water separation, spraying, soaking, wiping, stripping of insulation, scraping, scarification or the use of abrasives or solvents may be used to remove or separate PCBs to the decontamination standards for liquids, concrete, or nonporous surfaces, as listed in 40 *CFR* 761.79(b).	Generation of PCB wastes, including water, organic liquids, nonporous surfaces (scrap metal from disassembled electrical equipment), concrete, and nonporous surfaces covered with porous surfaces, such as paint or coating on metal—**applicable**	40 *CFR* 761.79(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Decontamination of water containing PCBs to levels acceptable for discharge	For water discharged to a treatment works or to navigable waters, decontaminate to < 3 µg/L (approximately < 3 ppb) or a PCB discharge limit included in a permit issued under Section 304(b) or 402 of the CWA; or	Discharge of water containing PCBs to a treatment works or navigable waters—**applicable**	40 *CFR* 761.79(b)(1)(ii)
Decontamination of water containing PCBs to levels acceptable for unrestricted use	Decontaminate to ≤ 0.5 µg/L (approximately ≤ 0.5 ppb) for unrestricted use.	Release of water containing PCBs for unrestricted use—**applicable**	40 *CFR* 761.79(b)(1)(iii)
Decontamination of organic liquids or nonaqueous inorganic liquids containing PCBs	For organic liquids or nonaqueous inorganic liquids containing PCBs, decontamination standard is < 2 mg/kg (i.e., < 2 ppm) PCBs.	Release of organic liquids or nonaqueous liquid containing PCBs—**applicable**	40 *CFR* 761.79(b)(2)
Decontamination of nonporous surfaces in contact with liquid PCBs to levels acceptable for unrestricted use	For nonporous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, ≤ 10 µg PCBs per 100 sq cm (≤ 10 µg/100 cm^2) as measured by a standard wipe test (40 *CFR* 761.123) at locations selected in accordance with Subpart P of 40 *CFR* 761.	Release of nonporous surfaces in contact with liquid PCBs at any concentration for unrestricted use—**applicable**	40 *CFR* 761.79(b)(3)(i)(A)
Decontamination of nonporous surfaces in contact with nonliquid PCBs to levels acceptable for unrestricted use	For nonporous surfaces in contact with nonliquid PCBs (including nonporous surfaces covered with a porous surface, such as paint or coating on metal), clean to Visual Standard No. 2, Near-White Blast Cleaned Surface Finish of the NACE. A person shall verify compliance with standard No. 2 by visually inspecting all cleaned areas.	Release of nonporous surfaces in contact with nonliquid PCBs for unrestricted use—**applicable**	40 *CFR* 761.79(b)(3)(i)(B)
Decontamination of nonporous surfaces in contact with liquid PCBs to levels acceptable for disposal in a TSCA smelter	For nonporous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, decontaminate to < 100 µg/100 cm^2 as measured by a standard wipe test (Section 761.123) at locations selected in accordance with Subpart P of 40 *CFR* 761.	Disposal of nonporous surfaces previously in contact with liquid PCBs at any concentration into a smelter operating in accordance with Section 761.72(b) —**applicable**	40 *CFR* 761.79(b)(3)(ii)(A)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Decontamination of nonporous surfaces in contact with nonliquid PCBs to levels acceptable for disposal in a TSCA smelter	For nonporous surfaces in contact with nonliquid PCBs (including nonporous surfaces covered with a porous surface, such as paint or coating on metal) clean to Visual Standard No. 3, Commercial Blast Cleaned Surface Finish, of the NACE. A person shall verify compliance with Standard No. 3 by visually inspecting all cleaned areas.	Disposal of nonporous surfaces in contact with nonliquid PCBs into a smelter operating in accordance with Section 761.72(b) — **applicable**	40 *CFR* 761.79(b)(3)(ii)(B)
Decontamination of concrete recently contaminated with PCBs	Decontamination standard for concrete is < 10 µg/100 cm^2 as measured by a standard wipe test (Section 761.123) if the decontamination procedure is commenced within 72 hours of the initial spill of PCBs to the concrete or portion thereof being decontaminated.	Decontamination of concrete within 72 hours of the initial spill of PCBs to the concrete—**applicable**	40 *CFR* 761.79(b)(4)
Disposal of materials previously contaminated with PCBs as non-TSCA waste	Materials from which PCBs have been removed by decontamination in accordance with 40 *CFR* 761.79, not including decontamination wastes and residuals under 40 *CFR* 761.79(g), are considered unregulated for disposal under Subpart D of TSCA (40 *CFR* 761).	Disposal of materials from which PCBs have been removed— **applicable**	40 *CFR* 761.79(a)(4)
Risk-based decontamination of PCB-containing materials	May decontaminate to an alternate risk-based decontamination standard under 40 *CFR* 761.79(h) if the standard does not pose an unreasonable risk of injury to health or the environment.	Decontamination of materials contaminated with PCBs – **applicable**	40 *CFR* 761.79(h)
Management of PCB/radioactive waste	Any person storing such waste ≥ 50 ppm PCBs must do so taking into account both its PCB concentration and radioactive properties, except as provided in 40 *CFR* 761.65(a)(1), (b)(1)(ii), and (c)(6)(i).	Generation of PCB/radioactive waste for disposal— **applicable**	40 *CFR* 761.50(b)(7)(i)
	Any person disposing of such waste must do so taking into account both its PCB concentration and its radioactive properties.		40 *CFR* 761.50(b)(7)(ii)
	If, after taking into account only the PCB properties in the waste, the waste meets the requirements for disposal in a facility permitted, licensed, or registered by a State as a municipal or nonmunicipal nonhazardous waste landfill, then the person may dispose of such waste without regard to the PCBs, based on its radioactive properties alone.		40 *CFR* 761.50(b)(7)(ii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	PCB waste storage		
Temporary storage of PCB waste in a non-RCRA-regulated area	Except as provided in 40 *CFR* 761.65 (b)(2), (c)(1), (c)(7), (c)(9), and (c)(10), after July 1, 1978, facilities used for the storage of PCBs and PCB Items designated for disposal shall comply with the storage unit requirements in 40 *CFR* 761.65(b)(1).	Storage of PCBs and PCB items at concentrations ≥ 50 ppm for disposal—**applicable**	40 *CFR* 761.65(b)
	The facilities shall meet the following criteria:		40 *CFR* 761.65(b)(1)
	• Adequate roof and walls to prevent rain water from reaching the stored PCBs and PCB Items		40 *CFR* 761.65(b)(1)(i)
	• Adequate floor that has continuous curbing with a minimum 6-in.-high curb. Floor and curb must provide a containment volume equal to at least two times the internal volume of the largest PCB article or container or 25% of the internal volume of all articles or containers stored there, whichever is greater. *Note*: 6-in. minimum curbing not required for area storing PCB/radioactive waste		40 *CFR* 761.65(b)(1)(ii)
	• No drain valves, floor drains, expansion joints, sewer lines, or openings that permit liquids to flow from curbed area		40 *CFR* 761.65(b)(1)(iii)
	• Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, nonporous surface as defined at Section 761.3, which prevents or minimizes penetration of PCBs and		40 *CFR* 761.65(b)(1)(iv)
	• Not located at site below 100-year flood water elevation.		40 *CFR* 761.65(b)(1)(v)
Temporary storage of PCB waste in a RCRA-regulated area	Does not have to meet storage unit requirements in 40 *CFR* 761.65(b)(1) provided unit is stored in compliance with RCRA and PCB spills are cleaned up in accordance with Subpart G of 40 *CFR* 761.	Storage of PCBs and PCB items at concentrations ≥ 50 ppm for disposal—**applicable**	40 *CFR* 761.65(b)(2)(i) thru (iv)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Temporary storage of PCB waste in containers	Container(s) shall be marked as illustrated in 40 *CFR* 761.45(a).	Storage of PCBs and PCB Items at concentrations ≥ 50 ppm for disposal—**applicable**	40 *CFR* 761.40(a)(1)
	Storage area must be properly marked as required by 40 *CFR* 761.40(a)(10).		40 *CFR* 761.65(c)(3)
	Any leaking PCB Items and their contents shall be transferred immediately to a properly marked nonleaking container(s).		40 *CFR* 761.65(c)(5)
	Except as provided in 40 *CFR* 761.65(c)(6)(i) and (ii), container(s) shall be in accordance with requirements set forth in DOT HMR at 49 *CFR* 171-180.		40 *CFR* 761.65(c)(6)
	Items shall be dated when they are removed from service and the storage shall be managed so that PCB items can be located by this date. (Note: Date should be marked on the container.)	PCB Items (includes PCB wastes) removed from service for disposal—**applicable**	40 *CFR* 761.65(c)(8)
Temporary storage of PCB remediation waste or PCB bulk product waste in a TSCA waste pile	Waste must be placed and managed in accordance with the design and operation standards, including liner and cover requirements and runoff control systems, in 40 *CFR* 761.65(c)(9).	Storage of PCB remediation waste or PCB bulk product waste at cleanup site or site of generation—**applicable**	40 *CFR* 761.65(c)(9)(i)
	Requirements of 40 *CFR* 761.65(c)(9) of this part may be modified under the risk-based disposal option of Section 761.61(c).		40 *CFR* 761.65(c)(9)(iv)
Risk-based storage of PCB remediation waste or bulk product waste prior to disposal	May store in a manner other than prescribed in 40 *CFR* 761.65 if the method will not pose an unreasonable risk of injury to health or the environment.	Storage of PCB remediation waste or bulk product waste prior to disposal—**applicable**	40 *CFR* 761.61(c) 40 *CFR* 761.62(c)
Storage of PCB/radioactive waste in containers	For liquid wastes, containers must be nonleaking.	Storage of PCB/radioactive waste in containers other than those meeting DOT HMR performance standards—**applicable**	40 *CFR* 761.65(c)(6)(i)(A)
	For nonliquid wastes, containers must be designed to prevent buildup of liquids if such containers are stored in an area meeting the containment requirements of 40 *CFR* 761.65(b)(1)(ii); and		40 *CFR* 761.65(c)(6(i)(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Storage of PCB/radioactive waste in containers (continued)	For both liquid and nonliquid wastes, containers must meet all regulations and requirements pertaining to nuclear criticality safety.		40 *CFR* 761.65(c)(6)(i)(C)
Closure of TSCA storage facility	Must close in a manner that eliminates the potential for post-closure releases of PCBs which may present an unreasonable risk to human health or the environment.	Closure of a TSCA storage facility—**applicable**	40 *CFR* 761.65(e)(1)
	Must remove or decontaminate PCB waste residues and contaminated containment system components, equipment, structures, and soils during closure in accordance with levels specified in the PCB Spills Cleanup Policy in Subpart G of 40 *CFR* 761.		40 *CFR* 761.65(e)(1)(iv)
	A TSCA/RCRA storage facility closed under RCRA is exempt from the TSCA closure requirements of 40 *CFR* 761.65(e).	Closure of a TSCA/RCRA storage facility—**applicable**	40 *CFR* 761.65(e)(3)
	PCB waste treatment/disposal		
Disposal of TSCA PCB waste in a chemical waste landfill	Must be placed in manner that will prevent damage to containers or articles. Other wastes that are not chemically compatible with PCBs shall be segregated from the PCBs throughout the handling and disposal process.	Disposal of PCBs or PCB Items in chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(8)(i)
	May be disposed of provided such waste is pretreated and/or stabilized (e.g., chemically fixed, evaporated, mixed with dry inert absorbent) to reduce its liquid content or increase its solid content so that a nonflowing consistency is achieved to eliminate the presence of free liquids prior to final disposal.	Disposal of PCB bulk liquids not exceeding 500 ppm—**applicable**	40 *CFR* 761.75(b)(8)(ii)
	May be disposed of if each container is surrounded by an amount of inert sorbent material capable of absorbing all of the liquid contents of the container.	Disposal of PCB container with liquid PCB between 50 and 500 ppm—**applicable**	40 *CFR* 761.75(b)(8)(ii)
	Ignitable wastes shall not be disposed of in chemical waste landfills.	Disposal of PCBs in a chemical waste landfill—**applicable**	40 *CFR* 761.75(b)(8)(iii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Performance-based disposal of PCB remediation waste	Shall be disposed according to 40 *CFR* 761.60(a) or (e), or decontaminated in accordance with 40 *CFR* 761.79.	Disposal of liquid PCB remediation waste—**applicable**	40 *CFR* 761.61(b)(1)
	May dispose by one of the following methods: • In a high-temperature incinerator approved under 40 *CFR* 761.70(b) • By an alternate disposal method under 40 *CFR* 761.60(e) • In a chemical waste landfill under 40 *CFR* 761.75 • In a facility under 40 *CFR* 761.77, or	Disposal of nonliquid PCB remediation waste (as defined in 40 *CFR* 761.3)—**applicable**	40 *CFR* 761.61(b)(2) 40 *CFR* 761.61(b)(2)(i)
	• Through decontamination in accordance with 40 *CFR* 761.79.		40 *CFR* 761.61(b)(2)(ii)
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 *CFR* 761.61(a) or (b) if the method will not pose an unreasonable risk of injury to health or the environment.	Disposal of PCB remediation waste—**applicable**	40 *CFR* 761.61(c)
Disposal of PCB decontamination waste and residues	Shall be disposed at their existing PCB concentration unless otherwise specified in 40 *CFR* 761.79(g).	PCB decontamination waste and residues for disposal—**applicable**	40 *CFR* 761.79(g)
Disposal of PCB liquids (e.g., from drained electrical equipment)	Must be disposed of in an incinerator which complies with 40 *CFR* 761.70, except:	PCB liquids at concentrations ≥ 50 ppm—**applicable**	40 *CFR* 761.60(a)
	For mineral oil dielectric fluid, may be disposed in a high efficiency boiler according to 40 *CFR* 761.71(a).	PCB liquids at concentrations ≥ 50 ppm and < 500 ppm—**applicable**	40 *CFR* 761.60(a)(1)
	For liquids other than mineral oil dielectric fluid, may be disposed in a high efficiency boiler according to 40 *CFR* 761.71(b).		40 *CFR* 761.60(a)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of PCB-contaminated precipitation, condensation, or leachate	May be disposed in a chemical waste landfill which complies with 40 *CFR* 761.75 if:	PCB liquids at concentrations ≥ 50 ppm from incidental sources and associated with PCB Articles or nonliquid PCB wastes— **applicable**	40 *CFR* 761.60(a)(3)
	• Disposal does not violate 40 *CFR* 268.32(a) or 268.42(a)(1) and		40 *CFR* 761.60(a)(3)(i)
	• Liquids do not exceed 500 ppm and are not ignitable waste as described in 40 *CFR* 761.75(b)(8)(iii).		40 *CFR* 761.60(a)(3)(ii)
Disposal of PCB transformers	Shall be disposed of in one of the following:	Disposal of PCB transformers that contain PCBs at concentrations of ≥ 500 ppm in the contaminating fluid as defined in 40 *CFR* 761.3— **applicable**	40 *CFR* 761.60(b)(1)
	• An incinerator that complies with 40 *CFR* 761.70		40 *CFR* 761.60(b)(1)(i)(A)
	• A chemical waste landfill that is compliant with 40 *CFR* 761.75 provided all free-flowing liquid is removed from the transformer, the transformer is filled with a solvent, the transformer is allowed to stand for at least 18-continuous hours, and then the solvent is thoroughly removed.		40 *CFR* 761.60(b)(1)(i)(B)
Performance-based disposal of PCB bulk product waste	May dispose of by one of the following:	Disposal of PCB bulk product waste as defined in 40 *CFR* 761.3— **applicable**	40 *CFR* 761.62(a)
	• In an incinerator under 40 *CFR* 761.70		40 *CFR* 761.62(a)(1)
	• In a chemical waste landfill under 40 *CFR* 761.75		40 *CFR* 761.62(a)(2)
	• In a hazardous waste landfill under Section 3004 or Section 3006 of RCRA		40 *CFR* 761.62(a)(3)
	• Under alternate disposal under 40 *CFR* 761.60(e)		40 *CFR* 761.62(a)(4)
	• In accordance with decontamination provisions of 40 *CFR* 761.79		40 *CFR* 761.62(a)(5)
	• In accordance with the thermal decontamination provisions of 40 *CFR* 761.79(e)(6) for metal surfaces in contact with PCBs.		40 *CFR* 761.62(a)(6)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Risk-based disposal of PCB bulk product waste	May dispose of in a manner other than that prescribed in 40 *CFR* 761.62(a) if approved in writing by EPA and method will not pose an unreasonable risk of injury to health or the environment.	Disposal of PCB bulk product waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.62(c)
Disposal of PCB bulk product waste in solid waste landfill	May dispose of the following in a municipal or nonmunicipal nonhazardous waste landfill:	Disposal of nonliquid PCB bulk product waste listed in 40 *CFR* 761.62(b)(1)—**applicable**	40 *CFR* 761.62(b)(1)
	• Plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos; nonliquid building demolition debris; or nonliquid PCB bulk product waste from the shredding of automobiles or household appliances from which PCB small capacitors have been removed (shredder fluff)		40 *CFR* 761.62(b)(1)(i)
	• Other PCB bulk product waste, sampled in accordance with the protocols set out in subpart R of 40 *CFR* Part 761 that leaches PCBs at < 10 µg/L of water measured using a procedure used to simulate leachate generation.		40 *CFR* 761.62(b)(1)(ii)
	May dispose of in a municipal or nonmunicipal nonhazardous waste landfill if:	PCB bulk product waste not meeting conditions of 40 *CFR* 761.62(b)(1) (e.g., paper/felt gaskets contaminated by liquid PCBs)—**applicable**	40 *CFR* 761.62(b)(2)
	• The PCB bulk product waste is segregated from organic liquids disposed of in the landfill and		40 *CFR* 761.62(b)(2)(i)
	• Leachate is collected from the landfill and monitored for PCBs.		40 *CFR* 761.62(b)(2)(ii)
Disposal of fluorescent light ballasts	Must be disposed of in a TSCA disposal facility as bulk product waste under 40 *CFR* 761.62 or in accordance with the decontamination provisions of 40 *CFR* 761.79.	Generation for disposal of fluorescent light ballasts containing PCBs in the potting material—**applicable**	40 *CFR* 761.60(b)(6)(iii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of PCB-contaminated electrical equipment (except capacitors)	Must remove all free-flowing liquid from the electrical equipment and dispose of the removed liquid in accordance with 40 *CFR* 761.60(a) and	Generation of PCB-contaminated electrical equipment (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(4)
	Dispose of by one of the following methods: • In a facility managed as a municipal solid waste or nonmunicipal nonhazardous waste facility • In an industrial furnace operating in compliance with 40 *CFR* 761.72, or • In a disposal facility under 40 *CFR* 761.60.	Drained PCB-contaminated electrical equipment including any residual liquids—**applicable**	40 *CFR* 761.60(b)(4)(i)
Disposal of PCB capacitor(s)	Any person must assume that a capacitor manufactured prior to July 2, 1979, whose PCB concentration is not established, contains ≥ 500 ppm PCBs. If the date of manufacture is unknown, any person must assume the capacitor contains ≥ 500 ppm PCBs.	Generation of PCB capacitors with ≥ 500 ppm PCBs for disposal—**applicable**	40 *CFR* 761.2(a)(4)
	Shall comply with all requirements of 40 *CFR* 761.60 unless it is known from label or nameplate information, manufacturer's literature, or chemical analysis that capacitor does not contain PCBs.		40 *CFR* 761.60(b)(2)(i)
	Shall dispose of in accordance with either of the following: • Disposal in an incinerator that complies with 40 *CFR* 761.70 • Disposal in a chemical waste landfill that complies with 40 *CFR* 761.75.	Generation of PCB capacitors with ≥ 500 ppm PCBs for disposal—**applicable**	40 *CFR* 761.60(b)(2)(iii)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of PCB capacitor(s) (continued)	Shall dispose of in one of the following disposal facilities approved under 40 *CFR* 761.60: • Incinerator under 40 *CFR* 761.70 • Chemical waste landfill under 40 *CFR* 761.75 • High efficiency boiler under 40 *CFR* 761.71 • Scrap metal recovery oven or smelter under 40 *CFR* 761.72	Disposal of large capacitors that contain ≥ 50 ppm but < 500 ppm PCBs**—applicable**	40 *CFR* 761.60(b)(4)(ii)
	May dispose of in municipal solid waste landfill.	Generation of PCB small capacitors (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(2)(ii)
Disposal of PCB-contaminated articles	Must remove all free-flowing liquid from the Article, disposing of the liquid in compliance with the requirements of 40 *CFR* 761.60(a)(2) or (a)(3) and	Generation of PCB-contaminated Articles (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(6)(ii)
	Dispose by one of the following methods: • In accordance with the decontamination provisions at 40 *CFR* 761.79 • In a facility managed as a municipal solid waste or nonmunicipal nonhazardous waste facility • In an industrial furnace operating in compliance with 40 *CFR* 761.72, or • In a disposal facility under 40 *CFR* 761.60.	Disposal of PCB-contaminated articles with no free-flowing liquid—**applicable**	40 *CFR* 761.60(b)(6)(ii)(A) thru (D)
Transportation of PCB wastes off site for disposal	Must comply with the manifesting provisions at 40 *CFR* 761.207 through 218.	Preparation for relinquishment of control over PCB wastes by transporting or offering for transport—**applicable**	40 *CFR* 761.207(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
RADIOACTIVE WASTE			
Design, construction, operation and closure of a low-level radioactive waste landfill			
Radiation protection of the public and the environment	Except as provided in 458.1(4)(c), exposure to individual members of the public from radiation shall not exceed a total EDE of 0.1 rem/year (100 mrem/year), an equivalent dose to the lens of the eye exceeding 1500 mrem/year, or an equivalent dose to the skin or extremities exceeding 5,000 mrem/year, exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs.	Release of radionuclides to the environment from all sources of ionizing radiation and exposure pathways at a DOE facility that could contribute significantly to the total dose—**TBC**	DOE Order 458.1(4)(b) and (c)
	Shall use, to the extent practicable, procedures and engineering controls based on sound radiation protection principles to achieve doses to members of the public that are ALARA.		DOE Order 458.1(4)(d)
	Must not exceed 3 pCi/L annual average radon-220 and radon-222 concentration, not including background, at the site boundary if DOE activities release radon-220 and radon-222 or their decay products.	DOE activities that release radon-220 and radon-222 or their decay products—**TBC**	DOE Order 458.1(4)(f)(5)
	Except as provided in *OAC* 3701:1-38-13(C), exposure to individual members of the public from radiation shall not exceed 1 millisievert (0.1 rem) in a year, exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs.	Licensee or registrant conducting operations that release radioactivity—**relevant and appropriate**	*OAC* 3701:1-38-13(A)(1)
	The dose in any unrestricted area from external sources, exclusive of the dose contribution from patients administered radioactive material and released in accordance with *OAC* 3701:1-58-30 or equivalent U.S. nuclear regulatory agency or agreement state regulations, shall not exceed 0.02 millisievert (0.002 rem) in any 1 hour.		*OAC* 3701:1-38-13(A)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Management, storage and disposal of LLW	Management, storage, and disposal must be conducted in a manner such that exposure to members of the public to radiation from radioactive waste complies with ALARA process requirements and does not exceed a TED of 25 mrem in a year from all exposure pathways and radiation sources associated with the waste, except for transportation and radon and its decay products.	Management, storage, and disposal of low-level radioactive waste—**TBC**	DOE Order 458.1(h)(1)(c)
Siting of a LLW disposal facility	Proposed locations for low-level waste facilities shall be evaluated considering environmental characteristics, geotechnical characteristics, and human activities, including whether it is located in a floodplain, a tectonically active area, or in a zone of water table fluctuation.	Construction of a LLW disposal facility—**TBC**	DOE M 435.1-1(IV)(M)(1)(a)(2)
	Proposed locations with environmental and geotechnical characteristics, and human activities for which adequate protection cannot be provided through the facility design shall be deemed unsuitable for location of the facility.		DOE M 435.1-1(IV)(M)(1)(b)
Siting, design, and operation of a DOE LLW disposal facility	LLW disposal facilities shall be sited, designed, operated, maintained, and closed so that a reasonable expectation exists that the following performance objectives will be met:	Siting, design, operation, maintenance, and closure of DOE LLW disposal facility—**TBC**	DOE M 435.1-1(IV)(P)(1)
	Dose to representative members of the public shall not exceed 25 mrem in a year total effective dose equivalent from all exposure pathways, excluding the dose from radon and its progeny in air.		DOE M 435.1-1(IV)(P)(1)(a)
	Dose to representative members of the public via air pathway shall not exceed 10 mrem in a year total EDE, excluding the dose from radon and its progeny.		DOE M 435.1-1(IV)(P)(1)(b)
	Release of radon shall be less than an average flux of 20 pCi/m2/s (0.74 Bq/m^2/s) at the surface of the disposal facility. Alternatively, a limit of 0.5 pCi/L (0.0185 Bq/L) of air may be applied at the boundary of the facility.	Operation of a LLW disposal facility at a DOE site—**TBC**	DOE M 435.1-1(IV)(P)(1)(c)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Siting, design, and operation of a DOE LLW disposal facility (continued)	Operating procedures must protect the public, workers, and the environment, ensure the security of the facility, minimize subsidence during and after waste placement, achieve long-term stability and minimize the need for long-term active maintenance, and meet the requirements of the closure/post-closure plan.		DOE M 435.1-1 (IV)(P)(6)(a)
	Permanent identification marks for disposal excavations and monitoring wells shall be emplaced.		DOE M 435.1-1 (IV)(P)(6)(b)
	Operations shall be conducted so that disposal operations do not have adverse effects on any other disposal unit low-level wastes.		DOE M 435.1-1 (IV)(P)(6)(d)
	Operations shall include a process for tracking and documenting low-level waste placement in the facility by generator source.		DOE M 435.1-1 (IV)(P)(6)(e)
Environmental monitoring at a LLW disposal facility	The environmental monitoring program shall be designed and operated to include measuring and evaluating releases, migration of radionuclides, disposal unit subsidence, and changes in disposal facility and disposal site parameters which may affect long term performance.	Operation of a LLW disposal facility at a DOE site**—TBC**	DOE M 435.1-1(IV)(R)(3)(b)
Control and stabilization of uranium-bearing wastes at a DOE site	Control and stabilization features shall be designed to: • Provide to the extent reasonably achievable an effective life of 1,000 years with a minimum of at least 200 years	Long-term management of uranium and its decay products**—TBC**	DOE Order 458.1(4)(h)(1)(d)(1)(a)
	• Limit radon-222 emanation to the atmosphere from the wastes to less than an annual average release rate of 20 pCi/m^2/s and prevent increase in the annual average radon-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L.		DOE Order 458.1(4)(h)(1)(d)(1)(b)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Facility requirements for land disposal of radioactive waste – performance objectives	Land disposal facilities shall be sited, designed, operated, closed, and controlled after closure to provide reasonable assurance that the following performance objectives will be met:	Siting, design, operation and closure of a licensed radioactive waste land disposal facility— **relevant and appropriate**	*OAC* 3701:1-54-08(B)
	• Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding the equivalent of 0.25 millisievert (25 millirem) to the whole body, 0.75 millisievert (75 millirem) to the thyroid, or 0.25 millisievert (25 millirem) to any other organ to any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.		*OAC* 3701:1-54-08(B)(1)
	• Disposal facility shall be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate, to the extent practical, the need for ongoing active maintenance of the disposal site after closure so that only surveillance, monitoring, or minor custodial care are required.		*OAC* 3701:1-54-08(B)(4)
	• Shall develop and implement security measures to protect against and to detect unauthorized access to radioactive material or safety and security systems from external as well as internal threats. Shall perform periodic inspections to ensure all radioactive material is accounted for and that safety and security systems are operating as designed. Shall report any deficiency involving the radioactive material inventory or a safety and security system.		*OAC* 3701:1-54-08(B)(5)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Facility requirements for land disposal of radioactive waste – performance objectives (continued)	• Radioactive waste and its containers shall be protected from adverse environmental conditions including, but not limited to, temperature changes that could compromise the isolation of the waste from the biosphere.		*OAC* 3701:1-54-08(B)(6)
	• Shall use standard engineering designs and procedural practices to maintain doses to people, and radionuclide releases to environment, as low as reasonably achievable.		*OAC* 3701:1-54-08(B)(7)
Facility requirements for land disposal of radioactive waste – operational requirements	The operation of the disposal facility shall incorporate the following items:	Operation of a licensed radioactive waste land disposal facility— **relevant and appropriate**	*OAC* 3701:1-54-08(C)
	• Waste shall be packaged in appropriate containers for disposal when applicable. Wastes shall be emplaced in a manner that maintains the package integrity during emplacement, minimizes void spaces between packages, and permits the void spaces to be filled.		*OAC* 3701:1-54-08(C)(4)
	• Void spaces between packages shall be filled as needed to reduce future subsidence within the fill.		*OAC* 3701:1-54-08(C)(5)
	• Boundaries and locations of each disposal unit shall be accurately located and mapped by means of a land survey. Disposal units shall be marked in such a way that boundaries of each unit can be easily defined. Three permanent survey marker control points shall be established on the site to facilitate surveys.		*OAC* 3701:1-54-08(C)(7)
	• A buffer zone of land shall be maintained between any disposed waste and the disposal site boundary and beneath the disposed waste. Buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in *OAC* 3701:1-54-09(E) and to take mitigative measures if needed.		*OAC* 3701:1-54-08(C)(8)
	• Closure and stabilization measures as set forth in the approved site closure plan shall be carried out as each disposal unit is filled and covered.		*OAC* 3701:1-54-08(C)(9)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Facility requirements for land disposal of radioactive waste – operational requirements (continued)	• Active waste disposal operations shall not have an adverse effect on completed closure and stabilization measures.		*OAC* 3701:1-54-08(C)(10)
Land disposal of radioactive waste – site selection, design, and environmental assessment	The primary emphasis in disposal site suitability is given to isolation of wastes and to disposal site features that ensure that the long-term performance objectives are met. Suitable disposal site features shall include:	Siting and design of a licensed radioactive waste land disposal facility**—relevant and appropriate**	*OAC* 3701:1-54-09(A)(1)
	• Shall be capable of being characterized, modeled, analyzed and monitored.		*OAC* 3701:1-54-09(A)(1)(a)
	• Areas shall be avoided having known natural resources that, if exploited, could result in failure to meet the performance objectives.		*OAC* 3701:1-54-09(A)(1)(c)
	• Site shall be generally well drained and free of areas of flooding or frequent ponding; shall not be located in a 100-year flood plain, coastal high-hazard area, or wetland, as defined in Federal Executive Order 11988, "Floodplain Management Guidelines," and shall be designed and constructed to be outside the 500-year floodplain.		*OAC* 3701:1-54-09(A)(1)(d)
	• Upstream drainage areas shall be minimized to decrease the amount of runoff that could erode or inundate waste disposal units.		*OAC* 3701:1-54-09(A)(1)(e)
	• Site shall provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur.		*OAC* 3701:1-54-09(A)(1)(f)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Land disposal of radioactive waste – site selection, design, and environmental assessment (continued)	• The hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site. The soil or rock layers immediately beneath the facility, but above the water table shall have good vertical drainage or be engineered to have good drainage to prevent water from ponding around the base of the facility. The shallowest hydrogeologic unit beneath the facility shall not discharge perennially to the site.		*OAC* 3701:1-54-09(A)(1)(g)
	• Areas shall be avoided where tectonic processes such as faulting, folding, seismic activity, or vulcanization may occur with such frequency and extent that it may significantly affect the ability of the disposal site to meet the performance objectives of this rule or may preclude defensible modeling and prediction of long-term impacts.		*OAC* 3701:1-54-09(A)(1)(h)
	• Areas should be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent that it may significantly affect the ability of the disposal site to meet the performance objectives of this rule, or may preclude defensible modeling and prediction of long-term impacts.		*OAC* 3701:1-54-09(A)(1)(i)
	• Site must not be located where nearby facilities or activities could affect the ability of the site to meet the performance objectives or mask the environmental monitoring program.		*OAC* 3701:1-54-09(A)(1)(j)
Radioactive generation, characterization, and segregation			
Characterization of LLW	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage or disposal at a DOE facility—**TBC**	DOE M 435.1-1(IV)(I)
	Characterization data shall, at a minimum, include the following information relevant to the management of the waste:		DOE M 435.1-1(IV)(I)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Characterization of LLW (continued)	• Physical and chemical characteristics		DOE M 435.1-1(IV)(2)(a)
	• Volume, including the waste and any stabilization or absorbent media		DOE M 435.1-1(IV)(I)(2)(b)
	• Weight of the container and contents		DOE M 435.1-1(IV)(I)(2)(c)
	• Identities, activities, and concentrations of major radionuclides		DOE M 435.1-1(IV)(I)(2)(d)
	• Characterization date		DOE M 435.1-1(IV)(I)(2)(e)
	• Generating source		DOE M 435.1-1(IV)(I)(2)(f)
	• Any other information which may be needed to prepare and maintain the disposal facility performance assessment, or demonstrate compliance with performance objectives.		DOE M 435.1-1(IV)(I)(2)(g)
Decontamination of radioactively contaminated equipment and building structures	Property potentially containing residual radioactive material must not be released or cleared from DOE control unless it is either demonstrated not to contain residual radioactive material based on process and historical knowledge, radiological monitoring or surveys, or a combination of these; or the property is evaluated and appropriately monitored or surveyed in accordance with DOE Order 458.1(4)(k)(3)(b).	Residual radioactive material on equipment and building structures for unrestricted use—**TBC**	DOE Order 458.1(4)(k)(3)
Release of radiological materials or scrap metal for recycle or reuse	Before being released, property shall be monitored or surveyed to determine the types and quantities of residual radioactive material within the property; the quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material on or under any coating); and that contamination within or on the property is in compliance with applicable DOE Authorized Limits of DOE Order 458.1(4)(k)(6).	Radionuclide-contaminated materials and equipment intended for recycle or reuse—**TBC**	DOE Order 458.1(4)(k)(3)(b)(1)–(2) and (4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Release of radiological materials or scrap metal for recycle or reuse (continued)	Where potentially contaminated surfaces are difficult to access for measurement (as in some pipes, drains, and ductwork), such property may be released after case-by-case evaluation and documentation based on both the history of its use and available measurements sufficient to demonstrate that the unsurveyable surfaces are likely to meet DOE Authorized Limits.		DOE Order 458.1(4)(k)(3)(b)(3)
	Radioactive storage		
Preparation of solid LLW for storage	Shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until waste has been removed from container.	Management and storage of LLW in containers at a DOE facility—**TBC**	DOE M 435.1-1 IV.L(1)(a)
	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container. Containers shall be marked such that their contents can be identified.		DOE M 435.1-1 IV.L(1)(b) and (c)
Temporary staging and storage of LLW	Ensure radioactive waste is stored in a manner that protects the public, workers, and the environment and that the integrity of waste storage is maintained for expected time of storage.	Management and storage of LLW at a DOE facility—**TBC**	DOE M 435.1-1 I.F(13) DOE M 435.1-1 IV.N(1)
	Shall not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water.		
	Shall be stored in a location and manner that protects the integrity of waste for the expected time of storage.		DOE M 435.1-1 IV.N(3)
	Shall be managed to identify and segregate LLW from mixed waste.		DOE M 435.1-1 IV.N(6)
	Staging of LLW shall be for the purpose of accumulation of such quantities of waste as necessary to facilitate transportation, treatment, and disposal.		DOE M 435.1-1 IV.N(7)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Radioactive waste treatment/disposal		
Treatment of LLW	Waste treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary to meet performance objectives of the disposal facility.	Generation of LLW for disposal at a DOE LLW facility—**TBC**	DOE M 435.1-1 IV.O
Treatment of uranium-bearing LLW	Such wastes shall be properly conditioned so that the generation and escape of biogenic gases will not cause the emission or dose limits in paragraph 4.h.(1) of DOE Order 458.1 to be exceeded and that biodegradation within the facility will not result in premature structural failure.	Placement of potentially biodegradable contaminated wastes in a long-term management facility—**TBC**	DOE Order 458.1(h)(1)(d)(3)
Disposal of LLW in a landfill	Waste placement into disposal units shall minimize voids between containers with the voids filled to the extent practicable. Uncontainerized bulk waste shall be placed to minimize voids and subsidence.	Operation of a LLW disposal facility at a DOE site—**TBC**	DOE M 435.1-1 (IV)(P)(6)(c)
	Void spaces within the waste and, if containers are used, between the waste and its container shall be reduced to the extent practical.		DOE M 435.1-1 (IV)(G)(1)(d)(1)
Land disposal of radioactive waste – waste classification and characteristics	The following waste characteristics are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.	Land disposal of radioactive waste in a licensed radioactive waste landfill—**relevant and appropriate**	*OAC* 3701:1-54-10(B)
	Waste must not be packaged for disposal in cardboard or fiberboard boxes.		*OAC* 3701:1-54-10(B)(1)
	Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.		*OAC* 3701:1-54-10(B)(2)
	Solid waste containing liquid shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.		*OAC* 3701:1-54-10(B)(3)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Land disposal of radioactive waste – waste classification and characteristics (continued)	Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.		*OAC* 3701:1-54-10(B)(4)
	Waste must not contain or be capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with paragraph (B)(7) of this rule.		*OAC* 3701:1-54-10(B)(5)
	Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.		*OAC* 3701:1-54-10(B)(6)
	The requirements in this rule are intended to provide stability of the waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.		*OAC* 3701:1-54-10(B)(9)
	• Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.		*OAC* 3701:1-54-10(B)(9)(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Land disposal of radioactive waste – waste classification and characteristics (continued)	• Notwithstanding provisions in *OAC* 3701:1-54-10 (B)(2) and (3), liquid wastes, or wastes containing liquid, must be converted into a form that contains as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.		*OAC* 3701:1-54-10(B)(9)(b)
Disposal of solid LLW at DOE facilities	Shall meet waste acceptance requirements before it is transferred to the receiving facility.	Generation of LLW for disposal at a DOE facility—**TBC**	DOE M 435.1-1 (IV)(J)(2)
Transportation of radioactive waste off site for disposal	Shall be packed and transported in accordance with the substantive requirements of DOE Order 460.1C (*Packaging and Transportation Safety*) and DOE Order 460.2A (*Departmental Materials Transportation and Packaging Management*).	Preparation of shipment of radioactive waste—**TBC**	DOE M 435.1-1(I)(1)(E)(11)
	To the extent practicable, the volume of waste and number of shipments shall be minimized.		DOE M 435.1-1(III)(L)(2) DOE M 435.1-1(IV)(L)(2)
ASBESTOS-CONTAINING WASTE			
	Operation and closure of an asbestos-containing waste disposal site		
Operation of an active ACM waste disposal site	Shall cause or permit no visible emissions to the outside air; or shall comply with the requirements of *OAC* 3745-20-06(B) [as noted below].	Operation of an active waste disposal site that receives ACM—**applicable**	*OAC* 3745-20-06(A)
	Shall be no visible emissions to the outside air from ACM during the on-site transportation, transfer, deposition, or compacting operations.		*OAC* 3745-20-06(B)(1)
	Deposition and burial operations shall be conducted in a manner which prevents handling by equipment or persons that causes asbestos-containing waste materials to be broken up or dispersed before the materials are buried.		*OAC* 3745-20-06(B)(2)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Operation of an active ACM waste disposal site (continued)	As soon as practicable after deposition of the ACM but no later than at the end of each operating day, the ACM deposited during the operating day shall be covered with at least 12 in. of compacted nonasbestos-containing material. Alternatively, may apply for approval to utilize alternative control methods to bind dust, control wind erosion or convert asbestos to nonfriable forms.		*OAC* 3745-20-06(B)(3)
	During the unloading, deposition, burial, and initial compaction of ACM, must establish a restricted area adequate to deter the unauthorized entry of the general public and any unauthorized personnel from any location within 100 ft of the operations; and		*OAC* 3745-20-06(B)(4)
	Shall display a sign not less than 20 ×14 in. so that it is visible at all entrances and at intervals of 300 ft or less along the property line or the fencing immediately surrounding the restricted area using wording, letter sizes, and styles in accordance with specifications listed in *OAC* 3745-20-06(B)(5).		*OAC* 3745-20-06(B)(5)
Inventory requirements	Maintain until closure records of the location, depth and area, and quantity in cubic yards of asbestos-containing waste material within the disposal site on a map or diagram.	Operation of an active waste disposal site that receives ACM—**applicable**	40 *CFR* 61.154(f) *OAC* 3745-20-06(C)(2)
Closure of an asbestos-containing waste disposal site	Upon closure, meet the following requirements:	Closure of an active asbestos-containing waste disposal site—**applicable**	40 *CFR* 61.154(g) – (h) *OAC* 3745-20-06(E)
	• Either discharge no visible emissions to the outside air or		40 *CFR* 61.151(a)(1) *OAC* 3745-20-07(A)(1)
	• Cover the waste material with at least 15 cm (6 in.) of compacted nonasbestos-containing material and grow and maintain a vegetative cover on the area adequate to prevent exposure of ACM or		40 *CFR* 61.151(a)(2) *OAC* 3745-20-07(A)(2)
	• Cover the waste material with at least 60 cm (2 ft) of compacted nonasbestos-containing material, and maintain it to prevent exposure of the asbestos-containing waste		40 *CFR* 61.151(a)(3) *OAC* 3745-20-07(A)(3)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Closure of an asbestos-containing waste disposal site (continued)	• Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing as detailed in 40 *CFR* 61.151(b)(1) – (3)		40 *CFR* 61.151(b) *OAC* 3745-20-07(B)
	• Owner may use an alternative method of controlling the asbestos that has received prior approval of the Administrator rather than comply with the requirements of 40 *CFR* 61.151(a) or (b). *NOTE:* Approval would be granted through the DFF&O document approval process and included in the appropriate DFF&O document.		40 *CFR* 61.151(c) *OAC* 3745-20-07(C).
	Asbestos-containing waste treatment and disposal		
Management of ACM prior to disposal	Discharge no visible emissions to the outside air, or use one of the emission control and waste treatment methods specified in Paragraphs (a)(1) through (a)(4) of 40 *CFR* 61.150 [Paragraphs (B)(1) through (B)(4) of *OAC* 3745-20-05].	Generation, collection, processing, packaging, and transporting of any ACM that is not Category I or II nonfriable ACM waste that did not become crumbled, pulverized, or reduced to powder [40 *CFR* 61.150(a)(5)]—**applicable**	40 *CFR* 61.150(a) *OAC* 3745-20-05(B)
Disposal of asbestos-containing waste material (e.g., transite siding, pipe lagging, insulation, ceiling tiles)	All asbestos-containing waste material must be adequately wetted, collected, sealed in leak-proof containers, and deposited as soon as practicable at an approved waste disposal site operated in accordance with Section 61.154 [*OAC* 3745-20-06] or a site that converts RACM and asbestos-containing waste material into nonasbestos (asbestos-free) material according to provisions of 40 *CFR* 61.155 [*OAC* 3745-20-13].	Removal and disposal of RACM, except Category I nonfriable asbestos-containing material**—applicable**	40 *CFR* 61.150(b)(1) - (2) *OAC* 3745-20-05(A)
	The requirements of 40 *CFR* 61.150(b)(1) and (2) [*OAC* 3745-20-05(A)] do not apply to Category I nonfriable ACM that is not RACM.		40 *CFR* 61.150(b)(3) *OAC* 3745-20-05(A)(4)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of asbestos-containing waste material (e.g., transite siding, pipe lagging, insulation, ceiling tiles) (continued)	May use an alternative emission control and waste treatment method that will control asbestos emissions equivalent to currently required methods, if the alternative method is suitable for the intended application, and the alternative method will not violate other regulations and will not result in increased water or land pollution or occupational hazards.		40 *CFR* 61.150(a)(4) *OAC* 3745-20-05(B)(4)
Transportation of asbestos-containing waste materials off site for disposal	For asbestos-containing waste material to be transported off the facility site, label containers or wrapped materials with the name of the waste generator and location at which the waste was generated.	Preparation of asbestos-containing waste materials for off-site transport—**applicable**	40 *CFR* 61.150(a)(1)(v) *OAC* 3745-20-05(C)(1)
	Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of waste so that the signs are visible. The markings must conform to the requirements of 40 *CFR* 61.149(d)(1)(i), (ii), and (iii).		40 *CFR* 61.150(c) *OAC* 3745-20-05(E)
UNIVERSAL WASTES			
	Characterization and management		
Characterization and management of universal waste	Must manage universal waste in accordance with 40 *CFR* 273 [*OAC* 3745-273-33] in a way that prevents releases of any universal waste or component of a universal waste to the environment.	Generation of universal waste [as defined in 40 *CFR* 273 and *OAC* 3745-273] for disposal—**applicable**	40 *CFR* 273.33 *OAC* 3745-273-33(A)
	Must label or mark the universal waste to identify the type of universal waste.		40 *CFR* 273.34 *OAC* 3745-273-34
	May accumulate waste for no longer than 1 year from the date the waste is generated or received from another handler unless the requirements of 40 *CFR* 273.35(b) [*OAC* 3745-273-35(B)] are met.		40 *CFR* 273.35(a) *OAC* 3745-273-35(A)
	May accumulate universal waste for longer than 1 year from the date the waste is generated or received from another handler if such activity is solely for the purpose of accumulation of such quantities of universal waste as necessary to facilitate proper recovery, treatment, or disposal. However, the handler bears the burden of proving that such activity was solely for this purpose.		40 *CFR* 273.35(b) *OAC* 3745-273-35(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Characterization and management of universal waste (continued)	Shall ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures relative to their responsibilities during normal facility operations and emergencies.		40 *CFR* 273.36 *OAC* 3745-273-36
	Must immediately contain all releases of universal wastes and other residues from universal wastes, and must determine whether any material resulting from the release is hazardous waste, and if so, must manage the hazardous waste in compliance with all applicable requirements.		40 *CFR* 273.37 *OAC* 3745-273-37
	Transportation		
Transportation of universal waste off site	Off-site shipments of universal waste by a large quantity handler of universal waste shall be made in accordance with 40 *CFR* 273.38 [*OAC* 3745-273-38].	Preparation of universal waste for off-site transport—**applicable**	40 *CFR* 273.38(c) *OAC* 3745-273-38(C)
	Must keep a record of each shipment of universal waste received and sent from the facility and retain record for at least 3 years. Record must include waste handler, shipper, or destination facility name and address, quantity and type of waste, and date shipment left or was received at facility.		40 *CFR* 273.39 *OAC* 3745-273.39
	Off-site shipments to a foreign destination must comply with requirements applicable to a primary exporter in *OAC* 3745-52-10, 3745-52-53, 3745-52-56 and 3745-52-57 and export waste only upon consent of the receiving country and in conformance with the EPA "Acknowledgement of Consent" as defined in *OAC* 3745-52-50 to 3745-52-57. A copy of the consent must be provided to the transporter.		40 *CFR* 273.40 *OAC* 3745-273.40

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Batteries		
Management of universal waste batteries	A large quantity handler of universal waste must contain any universal waste battery that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container.	Generation of universal waste batteries [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-02]—**applicable**	40 *CFR* 273.33(a)(1) *OAC* 3745-273-33(A)(1)
	Container must be closed, structurally sound, compatible with the contents of the battery, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions.		
	Batteries, or container or tank in which the batteries are contained, must be labeled or marked clearly with any one of the following phrases: "Universal Waste – Battery(ies)" or "Waste Batter(ies)" or "Used Battery(ies)."		40 *CFR* 273.34(a) *OAC* 3745-273-34(A)
	Pesticides		
Management of universal waste pesticides	A large quantity handler of universal waste pesticide must contain the pesticide in a container that remains closed, structurally sound, compatible with the pesticide, and that lacks evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions. A leaking pesticide container must be put into an overpack container, tank, or transport container, as detailed in 40 *CFR* 273.33(b) [*OAC* 3745-273-33(B)].	Generation of universal waste pesticides [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-03]—**applicable**	40 *CFR* 273.33(b) *OAC* 3745-273-33(B)(1) – (4)
	A container, tank, transport vehicle or vessel in which recalled or unused pesticides are contained must be labeled or marked clearly with the label that was on or accompanied the product and the word "Universal Waste – Pesticide(s)" or "Waste – Pesticide(s)."		40 *CFR* 273.34(b) and (c) *OAC* 3745-273-34(B) and (C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Thermostats and other mercury-containing equipment		
Management of universal waste thermostats or other mercury-containing equipment	A large quantity handler of universal waste must contain any mercury-containing equipment that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container.	Generation of universal waste mercury-containing equipment [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-04]—**applicable**	40 *CFR* 273.33(c)(1) *OAC* 3745-273-33(C)(1)
	Container must be closed, structurally sound, compatible with the contents of the thermostat, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions, and be reasonably designed to prevent the escape of mercury into the environment by volatilization or any other means.		
	May remove the mercury-containing ampule or the open original housing holding the mercury from mercury-containing equipment and manage and dispose of it in accordance with regulations.		40 *CFR* 273.33(c)(2) – (4) *OAC* 3745-273-33(C)(2) – (4)
	Mercury-containing equipment or a container in which the equipment is contained must be labeled or marked clearly with any of the following phrases: "Universal Waste – Mercury-Containing Equipment" or Waste Mercury-Containing Equipment" or "Used Mercury-Containing Equipment."		40 *CFR* 273.34(d)(1) *OAC* 3745-273-34(D)(1)
	Mercury-containing thermostats or containers containing only these thermostats must be labeled or marked clearly with any of the following phrases: "Universal Waste – Mercury Thermostat(s)" or "Waste Mercury Thermostat(s)" or "Used Mercury Thermostat(s)."		40 *CFR* 273.34(d)(2) *OAC* 3745-273-34(D)(2)
	Fluorescent and mercury vapor lamps		
Management of universal waste lamps (fluorescent, mercury vapor)	A large quantity handler of universal waste lamps must contain any lamp in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps.	Generation of universal waste lamps [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-05]—**applicable**	40 *CFR* 273.33(d)(1) *OAC* 3745-273-33(D)(1)
	Such containers and packages must remain closed and must lack evidence of leakage, spillage, or damage that could cause leakage of hazardous constituents under reasonably foreseeable conditions.		

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Management of universal waste lamps (fluorescent, mercury vapor) (continued)	A large quantity handler of universal waste lamps must immediately clean up and place in a container any lamp that is broken and must place in a container any lamp that shows evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous constituents to the environment.		40 *CFR* 273.33(d)(2) *OAC* 3745-273-33(D)(2)
	Each lamp or container or package in which such lamps are contained must be labeled or marked clearly with one of the following phrases: "Universal Waste-Lamp(s)," or "Waste Lamps," or "Used Lamps."		40 *CFR* 273.34(e) *OAC* 3745-273-34(E)
	Mark or label the individual item with the date the lamp(s) became a waste, or mark or label the container or package with the date the wastes were received.		40 *CFR* 273.35(c) *OAC* 3745-273-35(C)
MISCELLANEOUS WASTES			
	State of Ohio Construction-Demolition Debris		
Exclusions for disposal or reuse of construction and demolition debris, or "clean hard fill" [as defined in *OAC* 3745-400-01(E)]	Construction and demolition debris facility requirements do not apply to construction and demolition debris or clean hard fill used in one or more of the following ways:	Use of construction and demolition debris or clean hard fill at a site**—applicable**	*OAC* 3745-400-03
	• Any construction site where construction debris and trees and brush removed in clearing the construction site are used as fill material on the site where the materials are generated or removed		*OAC* 3745-400-03(A)
	• Any site where clean hard fill is used, either alone or in conjunction with clean soil, sand, gravel, or other clean aggregates, in legitimate fill operations		*OAC* 3745-400-03(B)
	• Any site where debris is not disposed, such as where debris is reused or recycled in a beneficial manner, or stored for a temporary period remaining unchanged and retrievable.		*OAC* 3745-400-03(C)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of construction and demolition debris	Shall be disposed of only in an authorized construction and demolition debris facility or solid waste disposal facility; by means of open burning if permitted as provided in *OAC* 3745-19; or by other methods provided such methods are demonstrated to be capable of disposing without creating a nuisance or health hazard, without causing water pollution, and without violating any regulations under Chapters 3745, 3704 or 3734.	Disposal of construction and demolition debris—**applicable**	*OAC* 3745-400-04(A) and (B)
Disposal of construction and demolition debris as "clean hard fill"	Clean hard fill (does not include materials contaminated with hazardous, solid, or infectious waste) consisting of reinforced or nonreinforced concrete, asphalt concrete, brick (includes but is not limited to refractory brick and mortar), block, tile, or stone shall be managed in one or more of the following ways: • Recycled into usable construction material • Disposed in licensed construction and demolition debris or other waste facilities • Used in legitimate fill operations for construction purposes or to bring the site up to consistent grade, on the site of generation, or on a site other than the site of generation, pursuant to Paragraph (C) of *OAC* 3745-400-05.	Use of clean hard fill to bring a construction site up to consistent grade**—applicable**	*OAC* 3745-400-05(A)
	Clean hard fill may be stored for a period of less than 2 years. "Stored" means held in a manner remaining retrievable and substantially unchanged. Clean hard fill piled adjacent to a construction materials processing facility shall not be considered stored for more than 2 years if the pile is active, i.e., if clean hard fill material is added to and removed from the pile within a 2-year period.		*OAC* 3745-400-05(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
	Beryllium wastes		
Release of beryllium-contaminated equipment or other items	Must clean beryllium-contaminated equipment or other items to the lowest contamination level practicable, not to exceed the levels established in 10 *CFR* 850.31(b) and (c) and label them before release.	Release of beryllium-contaminated equipment or other items to general public or another DOE facility—**applicable**	10 *CFR* 850.31(a)
	Before being released to the general public or another DOE facility, ensure that the removable contamination level of equipment and item surfaces does not exceed the higher of 0.2 µg/100 cm^2 or the concentration level of beryllium in soil at the point or release, whichever is greater;		10 *CFR* 850.31(b)(1)
	Ensure equipment or item is labeled in accordance with 10 *CFR* 850.38(b); and		10 *CFR* 850.31(b)(2)
	Release is conditioned on the recipient's commitment to implement controls that will prevent foreseeable beryllium exposure.		10 *CFR* 850.31(b)(3)
	Before being released to another facility performing work with beryllium, must ensure that removal contamination level of equipment and other item surfaces does not exceed 3 µg/100 cm^2;	Release of beryllium-contaminated equipment or other items to another facility performing work with beryllium—**applicable**	10 *CFR* 850.31(c)(1)
	Ensure equipment or item is labeled in accordance with 10 *CFR* 850.38(b); and		10 *CFR* 850.31(c)(2)
	Enclose or place in sealed, impermeable bags or containers to prevent the release of beryllium dust during handling or transportation.		10 *CFR* 850.31(c)(3)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Disposal of beryllium-containing waste or beryllium-contaminated equipment and other items	Must control the generation of beryllium-containing waste or beryllium-contaminated equipment and other items through the application of waste minimization principles.	Generation of beryllium-containing waste or beryllium-contaminated equipment and other items—**applicable**	10 *CFR* 850.32(a)
	Dispose of in sealed, impermeable bags, containers, or enclosures to prevent the release of beryllium dust during handling and transportation. Bags, containers, and enclosures must be labeled according to 10 *CFR* 850.38.		10 *CFR* 850.32(b)
	Used oil		
Management of used oil	Used oil shall not be stored in a unit other than a tank, container, or RCRA regulated unit.	Generation and storage of used oil, as defined in 40 *CFR* 279.1 [*OAC* 3745-279-01(A)(12)], that meets the applicability requirements of 40 *CFR* 279.10—**applicable**	40 *CFR* 279.22(a) *OAC* 3745-279-22(A)
	Containers and aboveground tanks used to store used oil must be in good condition (no severe rusting, apparent structural defects, or deterioration); and not leaking (no visible leaks).		40 *CFR* 279.22(b)(1) and (2) *OAC* 3745-279-22(B)(1) and (2)
	Containers and aboveground tanks used to store used oil and fill pipes used to transfer used oil into USTs must be labeled or marked clearly with the words "Used Oil."		40 *CFR* 279.22(c)(1) and (2) *OAC* 3745-279-22(C)(1)
	Upon detection of a release of used oil to the environment, a generator must stop the release; contain, clean up, and properly manage the released used oil; and, if necessary, repair or replace any leaking used oil storage containers or tanks prior to returning them to service.	Release of used oil to the environment—**applicable**	40 *CFR* 279.22(d) *OAC* 3745-279-22(D)
Disposal of hazardous used oil	Used oils that are identified as a hazardous waste and cannot be recycled in accordance with *OAC* 3745-279 must be managed in accordance with the hazardous waste management requirements of *OAC* 3745-50 to 3745-69, 3745-205, 3745-256, 3745-266, and 3745-270.	Generation of used oil—**applicable**	40 *CFR* 279.81(a) *OAC* 3745-279-81(A)
Disposal of nonhazardous used oils	Used oils that are not hazardous wastes and cannot be recycled under *OAC* 3745-279 must be disposed in accordance with the applicable requirements of *OAC* 3745-27, 3745-28, 3745-29, and 3745-30.		40 *CFR* 279.81(b) *OAC* 3745-279-81(B)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Transportation of used oil off site	Except as provided in paragraphs (a) to (c) of 40 *CFR* 279.24 [*OAC* 3745-279-24(A) to (C)], generators must ensure that their used oil is transported by transporters who have obtained EPA ID numbers.	Preparation of used oil for off-site transport—**applicable**	40 *CFR* 279.24 *OAC* 3745-279-24
	Refrigeration equipment		
Disposal of refrigeration equipment	With the exception of the substitutes in the end uses listed in 40 *CFR* 82.154(a)(1)(i) – (vi), no person maintaining, servicing, repairing, or disposing of appliances may knowingly vent or otherwise release into the environment any refrigerant or substitute from such appliances.	Appliances that contain Class I or II substances used as a refrigerant—**applicable**	40 *CFR* 82.154(a)(1)
Disposal of refrigeration equipment (continued)	*De minimis* releases associated with good faith attempts to recycle or recover refrigerants are not subject to this prohibition.		40 *CFR* 82.154(a)(2)
	No person may dispose of such appliances, except for small appliances, MVACs, and MVAC-like appliances, without: • Observing the required practices set forth in 40 *CFR* 82.156 and • Using equipment that is certified for that type of appliance pursuant to 40 *CFR* 82.158.		40 *CFR* 82.154(b)
WATER DISCHARGES			
	Water treatment and discharges (e.g., leachate, stormwater, decon water)		
Activities causing storm water runoff	Dischargers must utilize best management practices to control pollutants in storm water discharges during and after construction, which may include, as appropriate, soil stabilization practices (e.g., seeding); perimeter structural practices (e.g., gabions, silt fences, sediment traps); and storm water management devices as detailed in Part III.G.2 (“Controls”) of NPDES OHC000003.	Storm water runoff discharges from land disturbed by construction activity—disturbance of ≥ 1 acre total, except where otherwise exempt as specified in 40 *CFR* 122.26(b)(15)—**applicable**	Authorization for Storm Water Discharges Associated with Construction Activity under NPDES OHC000003, Part III.G.2

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Release of wastewater from a new hazardous waste landfill through a new point source	Except as provided in 40 *CFR* 445.1, discharges of wastewater from a new RCRA hazardous waste landfill must comply with the performance standards for new sources, which are the same as the maximum daily and maximum monthly average effluent limitations listed in 40 *CFR* 445.11.	Release of water from a new hazardous waste landfill through a new discharge point source—**applicable**	40 *CFR* 445.14
Disposal of wastewaters containing RCRA hazardous constituents in a CWA WWTU	Disposal is not prohibited if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. under the CWA unless the wastes are subject to a specified method of treatment other than DEACT in 40 *CFR* 268.40 (*OAC* 3745-270-40) or are D003 reactive cyanide.	Disposal of RCRA restricted hazardous wastes that are hazardous only because they exhibit a hazardous characteristic and are not otherwise prohibited under 40 *CFR* Part 268—**applicable**	40 *CFR* 268.1(c)(4)(i) *OAC* 3745-01(C)(4)
General duty to mitigate for discharge of wastewater from water treatment system	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters—**applicable**	40 *CFR* 122.41(d) *ORC* 6111.04(C)
Operation and maintenance of treatment system	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters—**applicable**	40 *CFR* 122.41(e) *OAC* 3745-33-08(A)(8)
Criteria for discharge of wastewater with radionuclides into surface water	Except for tritium and sanitary sewers, apply BAT if at the point of discharge: • The annual average concentration of a given radionuclide is greater than the DCS value for water or, for multiple radionuclides, the composite DCS must be the sum of the fractional DCS values derived from DOE-approved DCS values.	Discharge or release of liquids containing radionuclides from DOE activities—**TBC**	DOE Order 458.1(g)(5)(a)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Criteria for discharge of wastewater with radionuclides into surface water (continued)	• The discharge contributes greater than 10 mrem (0.1 mSv) annual TED to members of the public or		DOE Order 458.1(g)(5)(b)
	• The collective dose from all DOE sources is greater than 100 person-rem (1 person-Sv) and the liquid discharge contributes 50% or more of this collective dose.		DOE Order 458.1(g)(5)(c)
	Conduct activities to ensure that liquid discharges containing radionuclides from DOE activities do not exceed an average (at the point of discharge) of either of the following:	Release of liquids containing radionuclides from DOE activities—**TBC**	DOE Order 458.1(g)(4)
	• 5 pCi (0.2 Bq) per gram above background level of settleable solids for alpha-emitting radionuclides or		
	• 50 pCi (2 Bq) per gram above background level of settleable solids for beta-emitting radionuclides.		
	Ensure that liquid releases are managed in a manner that protects ground water resources now and in the future, based on use and value considerations.		DOE Order 458.1(g)(3)
	Ensure that radionuclides contained in liquid effluents do not cause private or public drinking water systems to exceed the drinking water MCLs in 40 *CFR* 141.		DOE Order 458.1(g)(7)
Technology-based treatment requirements for wastewater discharge	To the extent that EPA promulgated effluent limitations are inapplicable, shall develop on a case-by-case BPJ basis under §402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in 40 *CFR* §125.3(d) and shall consider:	Discharge of pollutants to surface waters from other than a POTW—**applicable**	40 *CFR* 125.3(c)(2) *ORC* 6111.042
	• The appropriate technology for this category or class of point sources, based upon all available information; and		
	• Any unique factors relating to the discharger.		

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Water quality-based effluent limits for wastewater discharge	Must develop water quality based effluent limits that ensure that: • The level of water quality to be achieved by limits on point source(s) established under this paragraph is derived from, and complies with all applicable water quality standards and • Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 *CFR* §130.7.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard established under §303 of the CWA—**applicable**	40 *CFR* 122.44(d)(1)(vii) *OAC* 3745-33-05(A)(1)
	Must attain or maintain a specified water quality through water quality related effluent limits established under §302 of the CWA.		40 *CFR* 122.44(d)(2)
	No entity shall cause pollution or place or cause to be placed any sewage, sludge, sludge materials, industrial waste, or other wastes in a location where they cause pollution of any waters of the state.		*ORC* 6111.04
	No person shall violate or fail to perform any duty imposed by sections 6111.01 to 6111.08 of the Revised Code or violate any order, rule, or term or condition of a permit issued or adopted by the director of environmental protection pursuant to those sections.		*ORC* 6111.07
	Stream use designations are given for Little Beaver Creek drainage basin and Scioto River drainage basin and *OAC* 3745-1-07 is referenced for applicable water quality standards.		*OAC* 3745-1-09 *OAC* 3745-1-15
	OAC 3745-1-07 provides allowable instream concentrations of pollutants that may be found in surface waters or discharged into surface waters, depending on use designation, and are applied as “outside mixing zone” or “inside mixing zone maximum” averages.		*OAC* 3745-1-07

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Water quality-based effluent limits for wastewater discharge (continued)	The general water quality criteria listed in *OAC* 3745-1-04 (which address suspended solids, floating debris, oil, scum, color, odor, toxic substances, nuisance growth of algae and weeds, and sewage) apply to all surface waters of the state including mixing zones.		*OAC* 3745-1-04
Monitoring requirements for water treatment system discharges	In addition to 40 *CFR* §122.48(a) and (b) and to assure compliance with effluent limitations, one must monitor, as provided in subsections (i) thru (iv) of §122.44(i)(1).	Discharge of pollutants to surface waters—**applicable**	40 *CFR* 122.44(i)(1) *OAC* 3745-33-08(A)(6)
	NOTE: Monitoring parameters, including frequency of sampling, will be developed as part of the DFF&O process and included in a Remedial Design, RAWP, or other appropriate DFF&O document.		
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under §122.44(k).		40 *CFR* 122.45(a) *OAC* 3745-33-06(A)
	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as maximum daily and average monthly discharge limitations for all discharges.	Continuous discharge of pollutants to surface waters—**applicable**	40 *CFR* 122.45(d)(1)
AIR EMISSIONS			
	Fugitive air emissions		
Activities causing fugitive dust (particulate) emissions	Shall take reasonable achievable control measures to prevent particulate matter from becoming airborne. Reasonable achievable control measures shall include, but are not limited to, the following:	Fugitive emissions from transportation, land-disturbing, or building alteration activities located in areas identified in Appendix A to *OAC* 3745-17-08, except as exempted under *OAC* 3745-17-08(A)(3)—**relevant and appropriate**	*OAC* 3745-17-08(B)
	• Use, where possible, of water or chemicals for control of dust and in demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land		*OAC* 3745-17-08(B)(1)

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Activities causing fugitive dust (particulate) emissions (continued)	• Periodic application of asphalt, oil (excluding used oil), water, or other suitable chemicals on dirt or gravel roads and parking lots, materials stock piles, and other surfaces which can create airborne dusts, or the use of canvas or other suitable coverings for all materials stockpiles and stockpiling operations except temporary stockpiles		*OAC* 3745-17-08(B)(2) and (6)
	• Install and use hoods, fans, and other equipment to adequately enclose, contain, capture, vent, and control fugitive dust at the point of capture to extent possible with good engineering design. Equipment must meet efficiency requirements of *OAC* 3745-17-08(B)(3)(a) and (b).		*OAC* 3745-17-08(B)(3)
	• Use of adequate containment methods during sandblasting or similar operations		*OAC* 3745-17-08(B)(5)
	• Cover, at all times, open-bodied vehicles when transporting materials likely to become airborne		*OAC* 3745-17-08(B)(7)
	• Pave and maintain roadways in a clean condition		*OAC* 3745-17-08(B)(8)
	• Promptly remove, in such a manner as to minimize or prevent resuspension, earth or other material from paved streets onto which this material has been deposited by trucking or earth moving equipment or erosion by water or other means.		*OAC* 3745-17-08(B)(9)
	Air emissions from a stationary source		
Activities causing release of air pollutants	Shall not cause the emission or escape into the open air from any source or sources whatsoever, of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, or any other substances or combinations of substances, in such manner or in such amounts as to endanger the health, safety, or welfare of the public, or cause unreasonable injury or damage to property.	Activities causing the release of air pollution nuisances as defined in *OAC* 3745-15-07(A)—**applicable**	*OAC* 3745-15-07

Table F.1. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project On-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Media/Location/Action[a]	Requirements[b]	Prerequisite	Citation
Activities causing radionuclide air emissions	Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an EDE of 10 mrem per year.	Radionuclide air emissions from DOE facilities—**applicable**	40 *CFR* 61.92
Air emissions from process vents in treatment of VOC contaminated water	Except as provided in paragraphs (C), (D) and (H) of *OAC* 3745-15-05 and division (B) of section 3704.011 of the Revised Code, any air contaminant source is exempt from Chapter 3704 of the Revised Code and rules adopted thereunder, unless the potential emissions of any one of the following exceeds 10 lb/day: particulate matter, sulfur dioxide, nitrogen oxides, organic compounds, carbon monoxide, lead or any other air contaminant.	Air emissions from an air contaminant source—**applicable**	*OAC* 3745-15-05(B)

ACM = asbestos-containing material
ALARA = as low as reasonably achievable
ARAR = applicable or relevant and appropriate requirement
AST = aboveground storage tank
ASTM = American Society for Testing and Materials
BAT = best available technology
BPJ = best professional judgment
CAMU = corrective action management unit
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
CMBST = combustion
COE = Corps of Engineers
CQA = Construction Quality Assurance
CWA = Clean Water Act
DCS = Derived Concentration Technical Standard
DEACT = deactivation
DFF&O = *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE = U.S. Department of Energy
DOE M = U.S. Department of Energy Radioactive Waste Management Manual
DOI = U.S. Department of Interior
DOT = U.S. Department of Transportation
EDE = effective dose equivalent
EPA = U.S. Environmental Protection Agency
FR = Federal Register
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act of 1975 (Amendments of 1976)
ID = identification number
LDR = land disposal restriction
LPP = LATA/Parallax Portsmouth, LLC
LLW = low-level (radioactive) waste
MCL = maximum contaminant level
MVAC = motor vehicle air conditioning
NACE = National Association of Corrosion Engineers
NCP = National Oil and Hazardous Substances Pollution Contingency Plan
NPDES = National Pollutant Discharge Elimination System
OAC = Ohio Administrative Code
Ohio EPA = Ohio Environmental Protection Agency
ORC = Ohio Revised Code
PCB = polychlorinated biphenyl
POLYM = polymerization
PORTS = Portsmouth Gaseous Diffusion Plant
POTW = publicly owned treatment works
QA = quality assurance
QC = quality control
RACM = regulated asbestos-containing material
RAWP = remedial action work plan
RCRA = Resource Conservation and Recovery Act of 1976, as amended
RORGS = recovery of organics
TBC = to-be-considered
TED = total effective dose
TSCA = Toxic Substances Control Act of 1976
TSD = treatment, storage, and disposal
TU = temporary unit
USC = United States Code
UST = underground storage tank
UTS = universal treatment standard
VOC = volatile organic compound
WAC = waste acceptance criteria
WWTU = wastewater treatment unit

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Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio

Action	Requirements[a]	Prerequisite	Citation
HAZARDOUS WASTE			
	Waste generation, characterization, and segregation		
Characterization of solid waste	Must determine if solid waste is hazardous or is excluded under 40 *CFR* 261.4 [*OAC* 3745 51-04]; and	Generation of solid waste as defined in 40 *CFR* 261.2—**applicable**	40 *CFR* 262.11(a) *OAC* 3745-52-11(A)
	Must determine if waste is listed as a hazardous waste in 40 *CFR* Part 261 [*OAC* 3745-51-30 to 3745-51-35], or	Generation of solid waste that is not excluded under 40 *CFR* 261.4—**applicable**	40 *CFR* 262.11(b) *OAC* 3745-52-11(B)
	Must determine whether the waste is identified in subpart C of 40 *CFR* 261[*OAC* 3745-51-20 through 3745-51-24], characterizing the waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in subpart D of 40 *CFR* 261 and not excluded under 40 *CFR* 261.4—**applicable**	40 *CFR* 262.11(c) *OAC* 3745-52-11(C)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 [*OAC* 3745-51, 3745-54 to 3745-57, 3745-65 to 3745-69, 3745-205, 3745-256, 3745-266, 3745-270, and 3745-273] for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous—**applicable**	40 *CFR* 262.11(d) *OAC* 3745-52-11(D)
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) that, at a minimum, contains all the information that must be known to treat, store, or dispose of the waste in accordance with 40 *CFR* 264 and 268 [*OAC* 3745-54 to 3745-57, 3745-205, and 3745-270].	Generation of RCRA hazardous waste for storage, treatment or disposal—**applicable**	40 *CFR* 264.13(a)(1) and (2) *OAC* 3745-54-13(A)(1) and (2)
Determinations for land disposal of hazardous waste	Must determine if the waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 [*OAC* 3745-270-40, 3745-270-45, and 3745-270-49] by testing in accordance with prescribed methods or use of generator knowledge of waste.	Generation of RCRA hazardous waste for storage, treatment or disposal—**applicable**	40 *CFR* 268.7(a) *OAC* 3745-270-07(A)

[a]The requirements portion of the ARARs table is intended to provide a summary of the cited ARAR. The omission of any particular requirement does not limit the scope of the cited ARARs.

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Determinations for land disposal of hazardous waste (continued)	Treatment facilities must test their wastes according to the frequency specified in their waste analysis plans to determine if the waste meets the treatment standards in 40 *CFR* 268.40, 268.45, or 268.49 [*OAC* 3745-270-40, 3745-270-45, and 3745-270-49] prior to disposal.	Treatment of RCRA hazardous waste prior to disposal—**applicable**	40 *CFR* 268.7(b) *OAC* 3745-270-07(B)
	Must determine each EPA Hazardous Waste Number (Waste Code) to determine the applicable treatment standards under 40 *CFR* 268.40 et seq. (*OAC* 3745-270-40 et seq.).	Generation of RCRA hazardous waste for storage, treatment or disposal—**applicable**	40 *CFR* 268.9(a) *OAC* 3745-270-09(A)
	Must determine the underlying hazardous constituents [as defined in 40 *CFR* 268.2(i) and *OAC* 3745-270-02] in the waste.	Generation of RCRA characteristically hazardous waste (and is not D001 nonwastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal—**applicable**	40 *CFR* 268.9(a) *OAC* 3745-270-09(A)
	Must determine whether the waste meets other applicable treatment standards under 40 *CFR* 268.9 (*OAC* 3745-270-09) for characteristic wastes.	Generation of RCRA characteristically hazardous waste—**applicable**	40 *CFR* 268.9(b) to (d) *OAC* 3745-270-09(B) to (D)
Characterization and management of wastewater (e.g., decon water)	On-site wastewater treatment units (including tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to the wastewater treatment facility) are exempt from the requirements of RCRA Subtitle C standards.	On-site wastewater treatment units subject to regulation under Section 402 or Section 307(b) of the CWA—**applicable**	40 *CFR* 264.1(g)(6) *OAC* 3745-54-01(G)(6)
Characterization and management of industrial wastewater	Industrial wastewater discharges that are point source discharges under Section 402 of the CWA, as amended, are not solid wastes for purpose of hazardous waste management.	Generation of industrial wastewater for discharge—**applicable**	40 *CFR* 261.4(a)(2) *OAC* 3745-51-04(A)(2)
	No entity shall cause pollution or place or cause to be placed any sewage, sludge, sludge materials, industrial waste, or other wastes in a location where they cause pollution of any waters of the state.		*ORC* 6111.04
	No person shall violate or fail to perform any duty imposed by sections 6111.01 to 6111.08 of the Revised Code or violate any order, rule, or term or condition of a permit issued or adopted by the director of environmental protection pursuant to those sections.		*ORC* 6111.07

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Segregation of scrap metal for recycle	Material is not subject to RCRA requirements for generators, transporters, and storage facilities under 40 *CFR* Parts 262 through 266, 268, 270, or 124 [*OAC* 3745-50-40 to 3745-50-235 or 3745-52, 3745-53, 3745-54 to 3745-57, 3745-65 to 3745-69, 3745-205, 3745-256, 3745-266, and 3745-270].	Scrap metal, as defined in 40 *CFR* 261.1(c)(6) intended for recycle—**applicable**	40 *CFR* 261.6(a)(3)(ii) *OAC* 3745-51-06(A)(3)(b)
Management of recyclable materials for precious metal recovery	Recyclable materials being collected, transported or stored that are being reclaimed to recover economically significant amounts of gold, silver, platinum, palladium, iridium, osmium, rhodium, ruthenium, or any combination of these must be managed in accordance with the substantive requirements of 40 *CFR* 266.70 (*OAC* 3745-266-70).	Management of recyclable materials for precious metal recovery—**applicable**	40 *CFR* 266.70 *OAC* 3745-266-70
Management of spent lead acid batteries being reclaimed	Spent lead acid batteries being collected, transported and stored prior to regeneration must be managed in accordance with particular hazardous waste requirements depending on permit status and whether they are being reclaimed through regeneration or in other ways. Management options are detailed in 40 *CFR* 266.80 (*OAC* 3745-266-80). Spent lead acid batteries can also be managed as universal wastes under 40 *CFR* 273 (*OAC* 3745-273).	Management of spent lead acid batteries being reclaimed—**applicable**	40 *CFR* 266.80 *OAC* 3745-266-80
	Hazardous waste treatment/disposal		
Disposal of RCRA-prohibited hazardous waste in a land-based unit	May be land disposed only if it meets the applicable requirements in the table "Treatment Standards for Hazardous Waste" at 40 *CFR* 268.40 (*OAC* 3745-270-40) before land disposal. The table lists either "total waste" standards, "waste-extract" standards, or "technology-specific" standards (as detailed further in 40 *CFR* 268.42 [*OAC* 3745-270-42]).	Land disposal, as defined in 40 *CFR* 268.2, of RCRA prohibited waste [as listed in 40 *CFR* 268.20 to .39 (*OAC* 3745-270-20 to -39)]—**applicable**	40 *CFR* 268.40(a) *OAC* 3745-270-40(A) 40 *CFR* 268.20 to .40 *OAC* 3745-270-20 to -40 40 *CFR* 268.42 *OAC* 3745-270-42
	For characteristic wastes (D001 – D043) that are subject to the treatment standards, all underlying hazardous constituents must meet the UTSs specified in 40 *CFR* 268.48 (*OAC* 3745-270-48).	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment unit that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well—**applicable**	40 *CFR* 268.40(e) *OAC* 3745-270-40(E) 40 *CFR* 268.48 *OAC* 3745-270-48

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of RCRA-prohibited hazardous waste in a land-based unit (continued)	May be land disposed if the wastes no longer exhibit a characteristic at the point of land disposal, unless the wastes are subject to a specified method of treatment other than DEACT in 40 *CFR* 628.40 (*OAC* 3745-270-48), or are D003 reactive cyanide.	Land disposal of RCRA-restricted characteristic wastes—**applicable**	40 *CFR* 268.1(c)(4)(iv) *OAC* 3745-270-01(C)(4)
Debris	May be land disposed if treated prior to disposal as provided under the "Alternative Treatment Standards for Hazardous Debris" in 40 *CFR* 268.45(a)(1)-(5) [*OAC* 3745-270-45(A)(1)-(5)] unless it is determined under 40 *CFR* 261.3(f)(2) [*OAC* 3745-51-03(F)(2)] that the debris is no longer contaminated with hazardous waste or the debris is treated to the waste specific treatment standard provided in 40 *CFR* 268.40 (*OAC* 3745-270-40) for the waste contaminating the debris.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous debris—**applicable**	40 *CFR* 268.45(a) *OAC* 3745-270-45(A)
	The hazardous debris must be treated for each "contaminant subject to treatment," which must be determined in accordance with 40 *CFR* 268.45(b) [*OAC* 3745-270-45(B)].		40 *CFR* 268.45(b) *OAC* 3745-270-45(B)
Soils	May be land disposed if treated prior to disposal according to the alternative treatment standards of 40 *CFR* 268.49(c) [*OAC* 3745-270-49(C)] or according to the UTSs specified in 40 *CFR* 268.48 (*OAC* 3745-270-48) applicable to the listed hazardous waste and/or applicable characteristic of hazardous waste if the soil is characteristic.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous soils—**applicable**	40 *CFR* 268.49(b) and (c) *OAC* 3745-270-49(B) and (C)
Variance from a treatment standard for RCRA restricted hazardous wastes	A variance from a treatment standard may be used if it is: • Not physically possible to treat the waste to the level specified in the treatment standard, or by the method specified as the treatment standard, or • Inappropriate to require the waste to be treated to the level specified in the treatment standard or by the method specified as the treatment standard even though such treatment is technically possible.	Generation of a RCRA hazardous waste requiring treatment prior to land disposal—**applicable**	40 *CFR* 268.44 *OAC* 3745-270-44
Disposal of treated hazardous debris	Debris treated by one of the specified extraction or destruction technologies on Table 1 of this section and which no longer exhibits a characteristic is not a hazardous waste and need not be managed in RCRA subtitle C facility.	Treated debris contaminated with RCRA-listed or characteristic waste—**applicable**	40 *CFR* 268.45(c) *OAC* 3745-270-45(C)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of treated hazardous debris (continued)	Hazardous debris contaminated with listed waste that is treated by an immobilization technology must be managed in a RCRA subtitle C facility.		
Disposal of hazardous debris treatment residues	Except as provided in 268.45(d)(2) and (d)(4) [*OAC* 3745-270-45(D)(2) and (D)(4)], treatment residues must be separated from the treated debris using simple physical or mechanical means, and such residues are subject to the waste-specific treatment standards for the waste contaminating the debris. Layers of debris removed by spalling are hazardous debris that remain subject to treatment standards.	Residues from the treatment of hazardous debris—**applicable**	40 *CFR* 268.45(d)(1) – (5) *OAC* 3745-270-45(D)(1) – (5)
Prohibition of dilution to meet LDRs	Except as provided under 40 *CFR* 268.3(b) [*OAC* 3745-270-03(B)], must not in any way dilute a restricted waste or the residual from treatment of a restricted waste as a substitute for adequate treatment to achieve compliance with land disposal restriction levels.	Land disposal, as defined in 40 *CFR* 268.2 (*OAC* 3745-270-02), of RCRA-restricted hazardous waste—**applicable**	40 *CFR* 268.3(a) *OAC* 3745-270-03(A)
	It is a form of impermissible dilution, and therefore prohibited, to add iron filings or other metallic forms of iron to lead-containing hazardous wastes in order to achieve any land disposal restriction treatment standard for lead.		*OAC* 3745-270-03(D)
Pretreatment standards for discharges to a permitted wastewater treatment unit	Pollutants introduced to POTWs shall not pass through POTWs or interfere with the operation or performance of the POTW. Substances listed in *OAC* 3745-3-04(B) shall not be introduced into a POTW.	Discharge of wastewater containing pollutants to a POTW—**relevant and appropriate**	*OAC* 3745-3-04
	Must notify POTW immediately of all discharges that could cause problems to the POTW, including any slug loading, in accordance with *OAC* 3745-3-05.		*OAC* 3745-3-05
	Industrial users are subject to national categorical pretreatment standards under 40 *CFR* 403.6 and to the general requirements listed in *OAC* 3745-3-09 regarding the interpretation and application of pretreatment standards.		*OAC* 3745-3-09

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of wastewaters containing RCRA hazardous constituents in a CWA wastewater treatment unit	Disposal is not prohibited if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. under the CWA unless the wastes are subject to a specified method of treatment other than DEACT in 40 *CFR* 268.40 (*OAC* 3745-270-40) or are D003 reactive cyanide.	Disposal of RCRA restricted hazardous wastes that are hazardous only because they exhibit a hazardous characteristic and are not otherwise prohibited under 40 *CFR* Part 268—**applicable**	40 *CFR* 268.1(c)(4)(i) *OAC* 3745-270-01(C)(4)
Disposal of wastewaters in a CWA wastewater treatment unit	No entity shall cause pollution or place or cause to be placed any sewage, sludge, sludge materials, industrial waste, or other wastes in a location where they cause pollution of any waters of the state.	Discharge of contaminants to waters of the state—**applicable**	*ORC* 6111.04
	No person shall violate or fail to perform any duty imposed by sections 6111.01 to 6111.08 to the Revised Code or violate any order, rule, or term or condition of a permit issued or adopted by the director of environmental protection pursuant to those sections.		*ORC* 6111.07
Treatment and disposal of ignitable, reactive, or incompatible RCRA wastes	Must take precautions to prevent accidental ignition or reaction of waste, and waste must be separated and protected from sources of ignition or reaction.	Operation of a RCRA facility that treats or stores ignitable, reactive, or incompatible wastes**—applicable**	40 *CFR* 264.17(a) *OAC* 3745-54-17(A)
	Must take precautions to prevent reactions that: • Generate extreme heat, pressure, fire or explosion, or violent reactions • Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment • Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions • Damage the structural integrity of the device or facility • Through other like means threaten human health or the environment.		40 *CFR* 264.17(b) *OAC* 3745-54-17(B)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
	Transportation of hazardous wastes and materials[b]		
Transportation of hazardous waste on site	The generator manifesting requirements of 40 *CFR* 262.20 to 262.32(b) [*OAC* 3745-52-20 to 3745-52-23 and 3745-52-32(B)] do not apply. Generator or transporter must comply with the requirements set forth in 40 *CFR* 263.30 and 263.31 [*OAC* 3745-53-30 and 3745-53-31] in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way—**applicable**	40 *CFR* 262.20(f) *OAC* 3745-52-20(F)
Transportation of hazardous materials on site	Must meet the substantive requirements of 49 *CFR* Parts 171-174, 177, and 178 or the site or facility specific Transportation Safety Document (i.e., *Transportation Safety Document for the On-Site Transfer of Hazardous Material at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* [LPP 2008]).	Transport of hazardous materials on the PORTS facility – **TBC**	DOE Order 460.1C(4)(b)
Transportation of hazardous waste off site	Must comply with the generator requirements of 40 *CFR* 262.20 to 262.23 [*OAC* 3745-52-20 to 3745-52-23] for manifesting, Section 262.30 [*OAC* 3745-52-30] for packaging, Section 262.31 [*OAC* 3745-52-31] for labeling, Section 262.32 [*OAC* 3745-52-32] for marking, Section 262.33 [*OAC* 3745-52-33] for placarding, Sections 262.40 and 262.41(a) [*OAC* 3745-52-40 and 3745-52-41] for record keeping requirements, and Section 262.12 [*OAC* 3745-52-12] to obtain EPA ID number.	Preparation of RCRA hazardous waste for transport off site—**applicable**	40 *CFR* 262.10(h) *OAC* 3745-52-10(H) 40 *CFR* 262.20 to .23 *OAC* 3745-52-20 to -23 40 *CFR* 262.30 to .33 *OAC* 3745-52-30 to -33
Transportation of hazardous materials off site	Any person who, under contract with a department or agency of the Federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material, shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 *CFR* 171 – 180 related to marking, labeling, placarding, etc.	Preparation for transport or shipment "in commerce" of a hazardous material—**applicable**	49 *CFR* 171.1(c)

[b]As noted in the DFF&O, Paragraph 9.a, the NCP at 40 *CFR* 300.400(e)(1) defines "on-site" as meaning "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for the implementation of the response action." Off-site transportation, by definition, is not an on-site response action and is subject to all substantive, procedural, and administrative requirements of all legally applicable laws, but not to any requirements that might be relevant and appropriate under the ARARs process.

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
SOLID WASTE			
Disposal of solid wastes	Except as provided in paragraph (D) of *OAC* 3745-27-02, no person shall establish or modify a solid waste disposal facility without meeting the substantive criteria as follows:	Management and disposal of solid waste, as defined in *OAC* 3745-27-01[c] **—applicable**	*OAC* 3745-27-02(A)
	Disposal of solid wastes shall only be by the following methods or combination thereof:		*OAC* 3745-27-05(A)
	• Disposal at a licensed sanitary landfill facility		*OAC* 3745-27-05(A)(1)
	• Incinerating at a licensed incinerator		*OAC* 3745-27-05(A)(2)
	• Composting at a licensed composting facility		*OAC* 3745-27-05(A)(3)
	• Alternative disposal methods either as engineered fill or land application, provided use will not create a nuisance or harm human health or the environment and is capable of complying with other applicable laws.		*OAC* 3745-27-05(A)(4)
Prohibition on open dumping of solid wastes	Temporary storage of putrescible solid wastes in excess of 7 days, or temporary storage of any solid wastes where such storage causes a nuisance or health hazard shall be considered open dumping.	Temporary storage of solid waste prior to collection for disposal or transfer—**applicable**	*OAC* 3745-27-03(A)(2)
	No person shall conduct, permit, or allow open dumping. In the event that open dumping is or has occurred, person(s) responsible shall promptly remove and dispose or otherwise manage the solid waste and shall submit verification that the waste has been properly managed.	Management and disposal of solid waste**—applicable**	*OAC* 3745-27-05(C)
TSCA/PCB WASTES			
	PCB waste generation, characterization, and segregation		
Management of PCB Items	Any person removing from use a PCB item containing an intact and nonleaking PCB article must dispose of it in accordance with Section 761.60(b), or decontaminate it in accordance with Section 761.79. PCB items where the PCB articles are no longer intact and nonleaking are regulated for disposal as PCB bulk product waste under Section 761.62(a) or (c).	Management of PCB waste for storage or disposal—**applicable**	40 *CFR* 761.50(b)(2)

[c]Definitions of terms used in the Ohio solid waste regulations are given in *OAC* 3745-27-01.

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Management of PCB waste	Any person storing or disposing of PCB waste must do so in accordance with 40 *CFR* 761, Subpart D.	Storage or disposal of waste containing PCBs at concentrations ≥ 50 ppm—**applicable**	40 *CFR* 761.50(a)
	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Cleanup or disposal of PCB remediation waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.61
Decontamination of PCB contaminated materials prior to use, re-use, distribution, in commerce or disposal as a non-TSCA waste	Chopping (including wire chopping), distilling, filtering, oil/water separation, spraying, soaking, wiping, stripping of insulation, scraping, scarification or the use of abrasives or solvents may be used to remove or separate PCBs to the decontamination standards for liquids, concrete, or nonporous surfaces, as listed in 40 *CFR* 761.79(b).	Generation of PCB wastes, including water, organic liquids, nonporous surfaces (scrap metal from disassembled electrical equipment), concrete, and nonporous surfaces covered with porous surfaces, such as paint or coating on metal—**applicable**	40 *CFR* 761.79(b)
Decontamination of water containing PCBs to levels acceptable for discharge	For water discharged to a treatment works or to navigable waters, decontaminate to < 3 µg/L (approximately < 3 ppb) or a PCB discharge limit included in a permit issued under Section 304(b) or 402 of the CWA.	Discharge of water containing PCBs to a treatment works or navigable waters—**applicable**	40 *CFR* 761.79(b)(1)(ii)
Decontamination of water containing PCBs to levels acceptable for unrestricted use	Decontaminate to ≤ 0.5 µg/L (approximately ≤ 0.5 ppb) for unrestricted use.	Release of water containing PCBs for unrestricted use—**applicable**	40 *CFR* 761.79(b)(1)(iii)
Decontamination of organic liquids or nonaqueous inorganic liquids containing PCBs	For organic liquids or nonaqueous inorganic liquids containing PCBs, decontamination standard is < 2 mg/kg (i.e., < 2 ppm) PCBs.	Release of organic liquids or nonaqueous liquid containing PCBs—**applicable**	40 *CFR* 761.79(b)(2)
Decontamination of nonporous surfaces in contact with liquid PCBs to levels acceptable for unrestricted use	For nonporous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, ≤ 10 µg PCBs per 100 sq cm (≤ 10 µg/ 100 cm^2) as measured by a standard wipe test (40 *CFR* 761.123) at locations selected in accordance with Subpart P of 40 *CFR* 761.	Release of nonporous surfaces in contact with liquid PCBs at any concentration for unrestricted use—**applicable**	40 *CFR* 761.79(b)(3)(i)(A)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Decontamination of nonporous surfaces in contact with nonliquid PCBs to levels acceptable for unrestricted use	For nonporous surfaces in contact with nonliquid PCBs (including nonporous surfaces covered with a porous surface, such as paint or coating on metal), clean to Visual Standard No. 2, Near-White Blast Cleaned Surface Finish of the NACE. A person shall verify compliance with standard No. 2 by visually inspecting all cleaned areas.	Release of nonporous surfaces in contact with nonliquid PCBs for unrestricted use—**applicable**	40 *CFR* 761.79(b)(3)(i)(B)
Decontamination of nonporous surfaces in contact with liquid PCBs to levels acceptable for disposal in a TSCA smelter	For nonporous surfaces previously in contact with liquid PCBs at any concentration, where no free-flowing liquids are currently present, decontaminate to < 100 µg/100 cm^2 as measured by a standard wipe test (Section 761.123) at locations selected in accordance with Subpart P of 40 *CFR* 761.	Disposal of nonporous surfaces previously in contact with liquid PCBs at any concentration into a smelter operating in accordance with Section 761.72(b)—**applicable**	40 *CFR* 761.79(b)(3)(ii)(A)
	For nonporous surfaces in contact with nonliquid PCBs (including nonporous surfaces covered with a porous surface, such as paint or coating on metal) clean to Visual Standard No. 3, Commercial Blast Cleaned Surface Finish, of the NACE A person shall verify compliance with Standard No. 3 by visually inspecting all cleaned areas.		40 *CFR* 761.79(b)(3)(ii)(B)
Decontamination of concrete recently contaminated with PCBs	Decontamination standard for concrete is < 10 µg/100 cm^2 as measured by a standard wipe test (Section 761.123) if the decontamination procedure is commenced within 72 hours of the initial spill of PCBs to the concrete or portion thereof being decontaminated.	Decontamination of concrete within 72 hours of the initial spill of PCBs to the concrete—**applicable**	40 *CFR* 761.79(b)(4)
Risk-based decontamination of PCB-containing materials	May decontaminate to an alternate risk-based decontamination standard under 40 *CFR* 761.79(h) if the standard does not pose an unreasonable risk of injury to health or the environment.	Decontamination of materials contaminated with PCBs—**applicable**	40 *CFR* 761.79(h)
Management of PCB/radioactive waste	Any person storing such waste ≥ 50 ppm PCBs must do so taking into account both its PCB concentration and radioactive properties, except as provided in 40 *CFR* 761.65(a)(1), (b)(1)(ii) and (c)(6)(i).	Generation of PCB/radioactive waste for disposal—**applicable**	40 *CFR* 761.50(b)(7)(i)
	Any person disposing of such waste must do so taking into account both its PCB concentration and its radioactive properties.		40 *CFR* 761.50(b)(7)(ii)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Management of PCB/radioactive waste (continued)	If, after taking into account only the PCB properties in the waste, the waste meets the requirements for disposal in a facility permitted, licensed, or registered by a state as a municipal or nonmunicipal nonhazardous waste landfill, then the person may dispose of such waste without regard to the PCBs, based on its radioactive properties alone.		40 *CFR* 761.50(b)(7)(ii)
	PCB waste treatment/disposal		
Performance-based disposal of PCB remediation waste	Shall be disposed according to 40 *CFR* 761.60(a) or (e), or decontaminated in accordance with 40 *CFR* 761.79.	Disposal of liquid PCB remediation waste—**applicable**	40 *CFR* 761.61(b)(1)
	May dispose by one of the following methods:	Disposal of nonliquid PCB remediation waste (as defined in 40 *CFR* 761.3) —**applicable**	40 *CFR* 761.61(b)(2)
	• In a high-temperature incinerator under 40 *CFR* 761.70(b)		40 *CFR* 761.61(b)(2)(i)
	• By an alternate disposal method under 40 *CFR* 761.60(e)		
	• In a chemical waste landfill under 40 *CFR* 761.75		
	• In a facility under 40 *CFR* 761.77 or		
	• Through decontamination in accordance with 40 *CFR* 761.79.		40 *CFR* 761.61(b)(2)(ii)
Disposal of materials previously contaminated with PCBs as non-TSCA waste	Materials from which PCBs have been removed by decontamination in accordance with 40 *CFR* 761.79, not including decontamination wastes and residuals under 40 *CFR* 761.79(g), are considered unregulated for disposal under Subpart D of TSCA (40 *CFR* 761).	Disposal of materials from which PCBs have been removed—**applicable**	40 *CFR* 761.79(a)(4)
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 *CFR* 761.61(a) or (b) if the method will not pose an unreasonable risk of injury to health or the environment.	Disposal of PCB remediation waste—**applicable**	40 *CFR* 761.61(c)
Disposal of PCB decontamination waste and residues	Shall be disposed of at their existing PCB concentration unless otherwise specified in 40 *CFR* 761.79(g).	PCB decontamination waste and residues for disposal—**applicable**	40 *CFR* 761.79(g)
Disposal of PCB liquids (e.g., from drained electrical equipment)	Must be disposed of in an incinerator that complies with 40 *CFR* 761.70, except:	PCB liquids at concentrations $\geq$ 50 ppm—**applicable**	40 *CFR* 761.60(a)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of PCB liquids (e.g., from drained electrical equipment) (continued)	For mineral oil dielectric fluid, may be disposed in a high efficiency boiler according to 40 *CFR* 761.71(a).		40 *CFR* 761.60(a)(1)
	For liquids other than mineral oil dielectric fluid, may be disposed in a high efficiency boiler according to 40 *CFR* 761.71(b).		40 *CFR* 761.60(a)(2)
Disposal of PCB-contaminated precipitation, condensation, or leachate	May be disposed in a chemical waste landfill that complies with 40 *CFR* 761.75 if:	PCB liquids at concentrations ≥ 50 ppm from incidental sources and associated with PCB articles or nonliquid PCB wastes—**applicable**	40 *CFR* 761.60(a)(3)
	• Disposal does not violate 40 *CFR* 268.32(a) or 268.42(a)(1) and		40 *CFR* 761.60(a)(3)(i)
	• Liquids do not exceed 500 ppm and are not ignitable waste as described in 40 *CFR* 761.75(b)(8)(iii).		40 *CFR* 761.60(a) (3)(ii)
Disposal of PCB transformers	Shall be disposed of in either:	PCB-contaminated electrical equipment (including transformers that contain PCBs at concentrations of ≥ 50 ppm and < 500 ppm in the contaminating fluid) as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.60(b)(1)
	• An incinerator that complies with 40 *CFR* 761.70 or		40 *CFR* 761.60(b)(1) (i)(A)
	• A chemical waste landfill that is compliant with 40 *CFR* 761.75 provided all free flowing liquid is removed from the transformer, the transformer is filled with a solvent, the transformer is allowed to stand for at least 18-continuous hours, and then the solvent is thoroughly removed.		40 *CFR* 761.60(b)(1) (i)(B)
Performance-based disposal of PCB bulk product waste	May dispose of by one of the following:	Disposal of PCB bulk product waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.62(a)
	• In an incinerator under Section 761.70		40 *CFR* 761.62(a)(1)
	• In a chemical waste landfill under Section 761.75		40 *CFR* 761.62(a)(2)
	• In a hazardous waste landfill under Section 3004 or Section 3006 of RCRA		40 *CFR* 761.62(a)(3)
	• Under alternate disposal under Section 761.60(e)		40 *CFR* 761.62(a)(4)
	• In accordance with decontamination provisions of Section 761.79		40 *CFR* 761.62(a)(5)
	• In accordance with the thermal decontamination provisions of Section 761.79(e)(6) for metal surfaces in contact with PCBs.		40 *CFR* 761.62(a)(6)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Risk-based disposal of PCB bulk product waste	May dispose of in a manner other than that prescribed in 40 *CFR* 761.62(a) if the method will not pose an unreasonable risk of injury to health or the environment.	Disposal of PCB bulk product waste as defined in 40 *CFR* 761.3—**applicable**	40 *CFR* 761.62(c)
Disposal of PCB bulk product waste in solid waste landfill	May dispose of the following in a municipal or nonmunicipal nonhazardous waste landfill.	Disposal of nonliquid PCB bulk product waste listed in 40 *CFR* 761.62(b)(1)—**applicable**	40 *CFR* 761.62(b)(1)
	• Plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos; nonliquid building demolition debris; or nonliquid PCB bulk product waste from the shredding of automobiles or household appliances from which PCB small capacitors have been removed (shredder fluff)		40 *CFR* 761.62(b)(1)(i)
	• Other PCB bulk product waste, sampled in accordance with the protocols set out in subpart R of 40 *CFR* Part 761, that leaches PCBs at < 10 µg/L of water measured using a procedure used to simulate leachate generation.		40 *CFR* 761.62(b)(1)(ii)
	May dispose of in a municipal or nonmunicipal nonhazardous waste landfill if:	PCB bulk product waste not meeting conditions of 40 *CFR* 761.62(b)(1) (e.g., paper/felt gaskets contaminated by liquid PCBs)—**applicable**	40 *CFR* 761.62(b)(2)
	• The PCB bulk product waste is segregated from organic liquids disposed of in the landfill and		40 *CFR* 761.62(b)(2)(i)
	• Leachate is collected from the landfill and monitored for PCBs.		40 *CFR* 761.62(b)(2)(ii)
Disposal of fluorescent light ballasts	Must be disposed of in a TSCA disposal facility as bulk product waste under 40 *CFR* 761.62 or in accordance with the decontamination provisions of 40 *CFR* 761.79.	Generation for disposal of fluorescent light ballasts containing PCBs in the potting material—**applicable**	40 *CFR* 761.60(b)(6)(iii)
Disposal of PCB-contaminated electrical equipment (except capacitors)	Must remove all free-flowing liquid from the electrical equipment and dispose of the removed liquid in accordance with 40 *CFR* 761.60(a) and	Generation of PCB-contaminated electrical equipment (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(4)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of PCB-contaminated electrical equipment (except capacitors) (continued)	Dispose of by one of the following methods: • In a facility managed as a municipal solid waste or nonmunicipal nonhazardous waste • In an industrial furnace operating in compliance with 40 *CFR* 761.72 or • In a disposal facility under 40 *CFR* 761.60.	Drained PCB-contaminated electrical equipment, including any residual liquids—**applicable**	40 *CFR* 761.60(b)(4)(i)
Disposal of PCB capacitors	Any person must assume that a capacitor manufactured prior to July 2, 1979, whose PCB concentration is not established, contains ≥ 500 ppm PCBs. If the date of manufacture is unknown, any person must assume the capacitor contains ≥ 500 ppm PCBs.	Generation of PCB capacitors with ≥ 500 ppm PCBs for disposal—**applicable**	40 *CFR* 761.2(a)(4)
	Shall comply with all requirements of 40 *CFR* 761.60 unless it is known from label or nameplate information, manufacturer's literature, or chemical analysis that capacitor does not contain PCBs.		40 *CFR* 761.60(b)(2)(i)
	Shall dispose of in accordance with either of the following: • Disposal in an incinerator that complies with 40 *CFR* 761.70 or • Disposal in a chemical waste landfill that complies with 40 *CFR* 761.75.	Generation of PCB capacitors with ≥ 500 ppm PCBs for disposal—**applicable**	40 *CFR* 761.60(b)(2)(iii)
	Shall dispose of in one of the following disposal facilities approved under 40 *CFR* 761.60: • Incinerator under 40 *CFR* 761.70 • Chemical waste landfill under 40 *CFR* 761.75 • High-efficiency boiler under 40 *CFR* 761.71 • Scrap metal recovery oven or smelter under 40 *CFR* 761.72.	Disposal of large capacitors that contain ≥ 50 ppm but < 500 ppm PCBs**—applicable**	40 *CFR* 761.60(b)(4)(ii)
	May dispose of in municipal solid waste landfill.	Generation of PCB small capacitors (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(2)(ii)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of PCB-contaminated articles	Must remove all free-flowing liquid from the article, disposing of the liquid in compliance with the requirements of 40 *CFR* 761.60(a)(2) or (a)(3), and	Generation of PCB-contaminated articles (as defined in 40 *CFR* 761.3) for disposal—**applicable**	40 *CFR* 761.60(b)(6)(ii)
	Dispose by one of the following methods: • In accordance with the decontamination provisions at 40 *CFR* 761.79 • In a facility managed as a municipal solid waste or nonmunicipal nonhazardous waste • In an industrial furnace operating in compliance with 40 *CFR* 761.72, or • In a disposal facility under 40 *CFR* 761.60.	Disposal of PCB-contaminated articles with no free-flowing liquid—**applicable**	40 *CFR* 761.60(b)(6)(ii)(A) thru (D)
Transportation of PCB wastes off site for disposal	Must comply with the manifesting provisions at 40 *CFR* 761.207 through 218.	Preparation for relinquishment of control over PCB wastes by transporting or offering for transport—**applicable**	40 *CFR* 761.207(a)
RADIOACTIVE WASTE			
Radiation protection of the public and the environment	Except as provided in 458.1(4)(c), exposure to individual members of the public from radiation shall not exceed a total EDE of 0.1 rem/year (100 mrem/year), an equivalent dose to the lens of the eye exceeding 1,500 mrem/year, or an equivalent dose to the skin or extremities exceeding 5,000 mrem/year, exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs.	Release of radionuclides to the environment from all sources of ionizing radiation and exposure pathways at a DOE facility that could contribute significantly to the total dose—**TBC**	DOE Order 458.1(4)(b) and (c)
	Shall use, to the extent practicable, procedures and engineering controls based on sound radiation protection principles to achieve doses to members of the public that are ALARA.		DOE Order 458.1(4)(d)
	Except as provided in *OAC* 3701:1-38-13(C), exposure to individual members of the public from radiation shall not exceed 1 millisievert (0.1 rem) in a year, exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs.	Licensee or registrant conducting operations that release radioactivity—**relevant and appropriate**	*OAC* 3701:1-38-13(A)(1)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Radiation protection of the public and the environment (continued)	The dose in any unrestricted area from external sources, exclusive of the dose contribution from patients administered radioactive material and released in accordance with *OAC* 3701:1-58-30 or equivalent U.S. nuclear regulatory agency or agreement state regulations, shall not exceed 0.02 millisievert (0.002 rem) in any 1 hour.		*OAC* 3701:1-38-13(A)(2)
Management, storage and disposal of LLW waste	Management, storage, and disposal must be conducted in a manner such that exposure to members of the public to radiation from radioactive waste complies with ALARA process requirements and does not exceed a TED of 25 mrem in a year from all exposure pathways and radiation sources associated with the waste, except for transportation and radon and its decay products.	Management, storage, and disposal of LLW—**TBC**	DOE Order 458.1(h)(1)(c)
Characterization of LLW	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage or disposal at a DOE facility—**TBC**	DOE M 435.1-1(IV)(I)
	Characterization data shall, at a minimum, include the following information relevant to the management of the waste:		DOE M 435.1-1(IV)(I)(2)
	• Physical and chemical characteristics		DOE M 435.1-1(IV)(2)(a)
	• Volume, including the waste and any stabilization or absorbent media		DOE M 435.1-1 (IV)(I)(2)(b)
	• Weight of the container and contents		DOE M 435.1-1 (IV)(I)(2)(c)
	• Identities, activities, and concentrations of major radionuclides		DOE M 435.1-1 (IV)(I)(2)(d)
	• Characterization date		DOE M 435.1-1 (IV)(I)(2)(e)
	• Generating source, and		DOE M 435.1-1 (IV)(I)(2)(f)
	• Any other information that may be needed to prepare and maintain the disposal facility performance assessment, or demonstrate compliance with performance objectives.		DOE M 435.1-1 (IV)(I)(2)(g)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Packaging of solid LLW	Shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.	Storage of LLW in containers at a DOE facility—**TBC**	DOE M 435.1-1 (IV)(L)(1)(a)
	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container. Containers shall be marked such that their contents can be identified.		DOE M 435.1-1 (IV)(L)(1)(b) and (c)
Release of radiological materials or scrap metal for reuse	Before being released, property shall be monitored or surveyed to determine the types and quantities of residual radioactive material within the property; the quantities of removable and total residual radioactive material on property surfaces (including residual radioactive material on or under any coating); and that contamination within or on the property is in compliance with applicable DOE Authorized Limits of DOE Order 458.1(4)(k)(6).	Radionuclide-contaminated materials and equipment intended for unrestricted use—**TBC**	DOE Order 458.1(4)(k)(3)(b)(1)–(2) and (4)
	Where potentially contaminated surfaces are difficult to access for measurement (as in some pipes, drains, and ductwork), such property may be released after case-by-case evaluation and documentation based on both the history of its use and available measurements sufficient to demonstrate that the unsurveyable surfaces are likely to meet DOE Authorized Limits.		DOE Order 458.1(4)(k)(3)(b)(3)
Treatment of LLW	Waste treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary to meet performance objectives of the disposal facility.	Generation of LLW for disposal at a DOE LLW disposal facility—**TBC**	DOE M 435.1-1(IV)(O)
Disposal of solid LLW at DOE facilities	Shall meet waste acceptance requirements before it is transferred to the receiving facility.	Generation of LLW for disposal at a DOE facility—**TBC**	DOE M 435.1-1(IV)(J)(2)
Transportation of radioactive waste	Shall be packaged and transported in accordance with the substantive requirements of DOE Order 460.1C (*Packaging and Transportation Safety*) and DOE Order 460.2A (*Departmental Materials Transportation and Packaging Management*).	Preparation of shipment of radioactive waste—**TBC**	DOE M 435.1-1 (I)(1)(E)(11)
	To the extent practicable, the volume of waste and number of shipments shall be minimized.		DOE M 435.1-1 (III)(L)(2) DOE M 435.1-1 (IV)(L)(2)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
ASBESTOS-CONTAINING WASTES			
Management of ACM prior to disposal	Discharge no visible emissions to the outside air or use one of the emission control and waste treatment methods specified in paragraphs (a)(1) through (a)(4) of 40 *CFR* 61.150 [paragraphs (B)(1) through (B)(4) of *OAC* 3745-20-05].	Generation, collection, processing, packaging, and transportation of any asbestos-containing waste material that is not Category I or II nonfriable ACM waste that did not become crumbled, pulverized, or reduced to powder [40 *CFR* 61.150(a) (5)]—**applicable**	40 *CFR* 61.150(a) *OAC* 3745-20-05(B)
	All asbestos-containing waste material shall be deposited as soon as practicable at a waste disposal site operated in accordance with the provisions of 40 *CFR* 61.154 [*OAC* 3745-20-06] or an appropriate site that coverts RACM and asbestos-containing waste materials into nonasbestos (asbestos-free) materials according to the provisions of 40 *CFR* 61.155 [*OAC* 3745-20-13].		40 *CFR* 61.150(b)(1) - (2) *OAC* 3745-20-05(A)
	The requirements of 40 *CFR* 61.150(b)(1) and (2) [*OAC* 3745-20-05(A)]do not apply to Category I nonfriable ACM that is not RACM.		40 *CFR* 61.150(b)(3) *OAC* 3745-20-05(A)(4)
Disposal of asbestos-containing waste material (e.g., transite siding, pipe lagging, insulation, ceiling tiles)	All asbestos-containing waste material must be deposited as soon as practicable at a waste disposal site operated in accordance with Section 61.154 [*OAC* 3745-20-06] or a site that converts RACM and asbestos-containing waste material into nonasbestos (asbestos free) material according to the provisions of 40 *CFR* 61.155 [*OAC* 3745-20-13].	Removal and disposal of RACM except Category I nonfriable asbestos containing material—**applicable**	40 *CFR* 61.150(b)(1) and (2) *OAC* 3745-20-05(A)
	May use an alternative emission control and waste treatment method that will control asbestos emissions equivalent to currently required methods, the alternative method is suitable for the intended application, and the alternative method will not violate other regulations and will not result in increased water or land pollution or occupational hazards.		40 *CFR* 61.150(a)(4) *OAC* 3745-20-05(B)(4)
Transportation of asbestos-containing waste materials off site	For asbestos-containing waste material to be transported off the facility site, label containers or wrapped materials with the name of the waste generator and location at which the waste was generated.	Preparation for transport of asbestos-containing waste materials off site—**applicable**	40 *CFR* 61.150(a)(1)(v) *OAC* 3745-20-05(C)(1)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Transportation of asbestos-containing waste materials off site (continued)	Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of waste so that the signs are visible. The markings must conform to the requirements of 40 *CFR* 61.149(d)(1)(i), (ii), and (iii).		40 *CFR* 61.150(c) *OAC* 3745-20-05(E)
UNIVERSAL WASTES			
Characterization and management of universal waste	A large quantity handler of universal waste is prohibited from disposing, diluting, or treating universal waste except in accordance with 40 *CFR* 273 [*OAC* 3745-273-33 or 3745-273-37].	Generation of universal waste [as defined in 40 *CFR* 273 and *OAC* 3745-273] for disposal—**applicable**	40 *CFR* 273.31 *OAC* 3745-273-31
	A large quantity handler of universal waste must manage universal waste in accordance with 40 *CFR* 273 [*OAC* 3745-273-33] in a way that prevents releases of any universal waste or component of a universal waste to the environment.		40 *CFR* 273.33 *OAC* 3745-273-33(A)
	Must label or mark the universal waste to identify the type of universal waste.		40 *CFR* 273.34 *OAC* 3745-273-34
	May accumulate waste for no longer than 1 year from the date the waste is generated or received from another handler unless the requirements of 40 *CFR* 273.35(b) [*OAC* 3745-273-35(B)] are met		40 *CFR* 273.35(a) *OAC* 3745-273-35(A)
	May accumulate universal waste for longer than 1 year from the date the universal waste is generated or received from another handler if such activity is solely for the purpose of accumulation of such quantities of universal waste as necessary to facilitate proper recovery, treatment, or disposal. However, the handler bears the burden of proving that such activity was solely for this purpose.		40 *CFR* 273.35(b) *OAC* 3745-273-35(B)
	Shall ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures relative to their responsibilities during normal facility operations and emergencies.		40 *CFR* 273.36 *OAC* 3745-273-36

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Characterization and management of universal waste (continued)	A large quantity handler of universal waste must immediately contain all releases of universal wastes and other residues from universal wastes, and must determine whether any material resulting from the release is hazardous waste, and if so, must manage the hazardous waste in compliance with all applicable requirements.		40 *CFR* 273.37 *OAC* 3745- 273.37
Transportation of universal waste off site	Off-site shipments of universal waste by a large quantity handler of universal waste shall be made in accordance with 40 *CFR* 273.38 [*OAC* 3745-273-38].	Preparation of universal waste for transport off site—**applicable**	40 *CFR* 273.38(c) *OAC* 3745-273-38(A), (C), (D), and (E)
	Must keep a record of each shipment of universal waste received and sent from the facility and retain record for at least 3 years. Record must include waste handler, shipper, or destination facility name and address, quantity and type of waste, and date shipment left or was received at facility.		40 *CFR* 273.39 *OAC* 3745-273.39
	Off-site shipments to a foreign destination must comply with requirements applicable to a primary exporter in *OAC* 3745-52-10, 3745-52-53, 3745-52-56 and 3745-52-57 and export waste only upon consent of the receiving country and in conformance with the EPA "Acknowledgement of Consent" as defined in *OAC* 3745-52-50 to 3745-52-57. A copy of the consent must be provided to the transporter.		40 *CFR* 273.40 *OAC* 3745-273.40
Management of universal waste batteries	A large quantity handler of universal waste must contain any universal waste battery that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container.	Generation of universal waste batteries [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-02]—**applicable**	40 *CFR* 273.33(a)(1) *OAC* 3745-273-33(A)(1)
	Container must be closed, structurally sound, compatible with the contents of the battery, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions.		
	Batteries, or container or tank in which the batteries are contained, must be labeled or marked clearly with any one of the following phrases: "Universal Waste – Battery(ies)" or "Waste Batter(ies)" or "Used Battery(ies)."		40 *CFR* 273.34(a) *OAC* 3745-273-34(A)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Management of universal waste pesticides	A large quantity handler of universal waste pesticide must contain the pesticide in a container that remains closed, structurally sound, compatible with the pesticide, and that lacks evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions. A leaking pesticide container must be put into an overpack container, tank, or transport container, as detailed in 40 *CFR* 273.33(b) [*OAC* 3745-273-33(B)].	Generation of universal waste pesticides [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-03]—**applicable**	40 *CFR* 273.33(b) *OAC* 3745-273-33(B)(1) – (4)
	A container, tank, transport vehicle or vessel in which recalled or unused pesticides are contained must be labeled or marked clearly with the label that was on or accompanied the product and the word "Universal Waste – Pesticide(s)" or "Waste – Pesticide(s)."		40 *CFR* 273.34(b) and (c) *OAC* 3745-273-34(B) and (C)
Management of universal waste thermostats or other mercury-containing equipment	A large quantity handler of universal waste must contain any mercury-containing equipment that shows evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions in a container.	Generation of universal waste mercury-containing equipment [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-04]—**applicable**	40 *CFR* 273.33(c)(1) *OAC* 3745-273-33(C)(1)
	Container must be closed, structurally sound, compatible with the contents of the thermostat, and lack evidence of leakage, spillage, or damage that could cause leakage under reasonably foreseeable conditions, and be reasonably designed to prevent the escape of mercury into the environment by volatilization or any other means.		
	May remove the mercury-containing ampule or the open original housing holding the mercury from mercury-containing equipment and manage and dispose of it in accordance with regulations.		40 *CFR* 273.33(c)(2) - (4) *OAC* 3745-273-33(C)(2) - (4)
	Mercury-containing equipment or a container in which the equipment is contained must be labeled or marked clearly with any of the following phrases: "Universal Waste – Mercury-Containing Equipment" or Waste Mercury-Containing Equipment" or "Used Mercury-Containing Equipment."		40 *CFR* 273.34(d)(1) *OAC* 3745-273-34(D)(1)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Management of universal waste thermostats or other mercury-containing equipment (continued)	Mercury-containing thermostats or containers containing only these thermostats must be labeled or marked clearly with any of the following phrases: "Universal Waste – Mercury Thermostat(s)" or "Waste Mercury Thermostat(s)" or "Used Mercury Thermostat(s)."		40 *CFR* 273.34(d)(2) *OAC* 3745-273-34(D)(2)
Management of universal waste lamps (fluorescent, mercury vapor)	A large quantity handler of universal waste must contain any lamp in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps.	Generation of universal waste lamps [as defined in 40 *CFR* 273.9 and *OAC* 3745-273-05] —**applicable**	40 *CFR* 273.33(d)(1) *OAC* 3745-273-33(D)(1)
	Such containers and packages must remain closed and must lack evidence of leakage, spillage, or damage that could cause leakage of hazardous constituents under reasonably foreseeable conditions.		
	A large quantity handler of universal waste lamp must immediately clean up and place in a container any lamp that is broken and must place in a container any lamp that shows evidence of breakage, leakage, or damage that could cause the release of mercury or other hazardous constituents to the environment.		40 *CFR* 273.33(d)(2) *OAC* 3745-273-33 (D)(2)
	Each lamp or container or package in which such lamps are contained must be labeled or marked clearly with one of the following phrases: "Universal Waste-Lamp(s)," or "Waste Lamps," or "Used Lamps."		40 *CFR* 273.34(e) *OAC* 3745-273-34(E)
	Mark or label the individual item with the date the lamp(s) became a waste, or mark or label the container or package with the date the wastes were received.		40 *CFR* 273.35(c) *OAC* 3745-273-35(C)
MISCELLANEOUS WASTES			
	Beryllium-containing wastes		
Release of beryllium-contaminated equipment or other items	Must clean beryllium-contaminated equipment or other items to the lowest contamination level practicable, not to exceed the levels established in 10 *CFR* 850.31(b) and (c) and label them before release.	Release of beryllium-contaminated equipment or other items to general public or another DOE facility—**applicable**	10 *CFR* 850.31(a)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Release of beryllium-contaminated equipment or other items (continued)	Before being released to the general public or another DOE facility, ensure that the removable contamination level of equipment and item surfaces does not exceed the higher of 0.2 µg/100 cm^2 or the concentration level of beryllium in soil at the point or release, whichever is greater;		10 *CFR* 850.31(b)(1)
	Ensure equipment or item is labeled in accordance with 10 *CFR* 850.38(b); and		10 *CFR* 850.31(b)(2)
	Release is conditioned on the recipient's commitment to implement controls that will prevent foreseeable beryllium exposure.		10 *CFR* 850.31(b)(3)
	Before being released to another facility performing work with beryllium, must ensure that removal contamination level of equipment and other item surfaces does not exceed 3 µg/100 cm^2;		10 *CFR* 850.31(c)(1)
	Ensure equipment or item is labeled in accordance with 10 *CFR* 850.38(b); and		10 *CFR* 850.31(c)(2)
	Enclose or place in sealed, impermeable bags or containers to prevent the release of beryllium dust during handling or transportation.		10 *CFR* 850.31(c)(3)
	Used oil		
Management of used oil	Used oil shall not be stored in a unit other than a tank, container, or RCRA regulated unit.	Generation and storage of used oil, as defined in 40 *CFR* 279.1 [*OAC* 3745-279-01(A)(12)], that meets the applicability requirements of 40 *CFR* 279.10—**applicable**	40 *CFR* 279.22(a) *OAC* 3745-279-22(A)
	Containers and aboveground tanks used to store used oil must be in good condition (no severe rusting, apparent structural defects, or deterioration) and not leaking (no visible leaks).		40 *CFR* 279.22(b)(1) and (2) *OAC* 3745-279-22(B)(1) and (2)
	Containers and aboveground tanks used to store used oil and fill pipes used to transfer used oil into USTs must be labeled or marked clearly with the words "Used Oil".		40 *CFR* 279.22(c)(1) and (2) *OAC* 3745-279-22 (C)(1)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Management of used oil (continued)	Upon detection of a release of used oil to the environment, a generator must stop the release; contain, clean up, and properly manage the released used oil; and, if necessary, repair or replace any leaking used oil storage containers or tanks prior to returning to service.	Release of used oil to the environment—**applicable**	40 *CFR* 279.22(d) *OAC* 3745-279-22(D)
Transportation of used oil off site	Except as provided in paragraphs (a) to (c) of 40 *CFR* 279.24 [*OAC* 3745-279-24(A) to (C)], generators must ensure that their used oil is transported by transporters who have obtained EPA ID numbers.	Preparation of used oil for transport off site—**applicable**	40 *CFR* 279.24 *OAC* 3745-279-24
	Refrigeration equipment		
Disposal of refrigeration equipment	With the exception of the substitutes in the end uses listed in 40 *CFR* 82.154(a)(1)(i) – (vi), no person maintaining, servicing, repairing, or disposing of appliances may knowingly vent or otherwise release into the environment any refrigerant or substitute from such appliances.	Appliances that contain Class I or II substances used as a refrigerant—**applicable**	40 *CFR* 82.154(a)(1)
	De minimis releases associated with good faith attempts to recycle or recover refrigerants are not subject to this prohibition.		40 *CFR* 82.154(a)(2)
	No person may dispose of such appliances, except for small appliances, MVACs, and MVAC-like appliances, without: • Observing the required practices set forth in 40 *CFR* 82.156 and • Using equipment that is certified for that type of appliance pursuant to 40 *CFR* 82.158.		40 *CFR* 82.154(b)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
	State of Ohio construction-demolition debris		
Exclusions for disposal or reuse of construction and demolition debris, or "clean hard fill" [as defined in *OAC* 3745-400-01(E)]	Construction and demolition debris facility requirements do not apply to construction and demolition debris or clean hard fill used in one or more of the following ways: • Any construction site where construction debris and trees and brush removed in clearing the construction site are used as fill material on the site where the materials are generated or removed • Any site where clean hard fill is used, either alone or in conjunction with clean soil, sand, gravel, or other clean aggregates, in legitimate fill operations • Any site where debris is not disposed, such as where debris is reused or recycled in a beneficial manner, or stored for a temporary period remaining unchanged and retrievable.	Use of construction and demolition debris or clean hard fill at a site—**applicable**	*OAC* 3745-400-03
Disposal of construction and demolition debris	Shall be disposed of only in an authorized construction and demolition debris facility or solid waste disposal facility; by means of open burning if permitted as provided in *OAC* 3745-19; or by other methods provided such methods are demonstrated to be capable of disposing without creating a nuisance or health hazard, without causing water pollution, and without violating any regulations under Chapters 3745, 3704 or 3734.	Disposal of construction and demolition debris—**applicable**	*OAC* 3745-400-04(A) and (B)
Disposal of construction and demolition debris as "clean hard fill"	Clean hard fill consisting of reinforced or nonreinforced concrete, asphalt concrete, brick (includes but is not limited to refractory brick and mortar), block, tile, or stone shall be managed in one or more of the following ways: • Recycled into usable construction material • Disposed in construction and demolition debris or other waste facilities • Used in legitimate fill operations for construction purposes or to bring the site up to consistent grade, on the site of generation, or on a site other than the site of generation, pursuant to paragraph (C) of *OAC* 3745-400-05.	Use of clean hard fill (does not include materials contaminated with hazardous, solid, or infectious waste) to bring a construction site up to consistent grade—**applicable**	*OAC* 3745-400-05(A)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Disposal of construction and demolition debris as "clean hard fill" (continued)	Clean hard fill may be stored for a period of less than 2years. "Stored" means held in a manner remaining retrievable and substantially unchanged. Clean hard fill piled adjacent to a construction materials processing facility shall not be considered stored for more than 2 years if the pile is active, i.e., if clean hard fill material is added to and removed from the pile within a 2-year period.		*OAC* 3745-400-05(B)
AIR EMISSIONS			
	Fugitive air emissions		
Activities causing fugitive dust (particulate) emissions	Shall take reasonable achievable control measures to prevent particulate matter from becoming airborne. Reasonable achievable control measures shall include, but are not limited to, the following:	Fugitive emissions from transportation, land-disturbing, or building alteration activities located in areas identified in Appendix A to *OAC* 3745-17-08, except as exempted under *OAC* 3745-17-08(A)(3) — **relevant and appropriate**	*OAC* 3745-17-08(B)
	• Use, where possible, of water or chemicals for control of dust and in demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land		*OAC* 3745-17-08(B)(1)
	• Periodic application of asphalt, oil (excluding used oil), water, or other suitable chemicals on dirt or gravel roads and parking lots, materials stock piles, and other surfaces that can create airborne dusts, or the use of canvas or other suitable coverings for all materials stockpiles and stockpiling operations except temporary stockpiles		*OAC* 3745-17-08(B)(2) and (6)
	• Install and use hoods, fans, and other equipment to adequately enclose, contain, capture, vent, and control the fugitive dust at the point(s) of capture to the extent possible with good engineering design. Equipment must meet the efficiency requirements of *OAC* 3745-17-08(B)(3)(a) and (b)		*OAC* 3745-17-08(B)(3)
	• Use of adequate containment methods during sandblasting or similar operations		*OAC* 3745-17-08(B)(5)
	• Cover, at all times, open-bodied vehicles when transporting materials likely to become airborne		*OAC* 3745-17-08(B)(7)

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
Activities causing fugitive dust (particulate) emissions (continued)	• Pave and maintain roadways in a clean condition and • Promptly remove, in such a manner as to minimize or prevent resuspension, earth or other material from paved streets onto which this material has been deposited by trucking or earth moving equipment or erosion by water or other means.		*OAC* 3745-17-08(B)(8) *OAC* 3745-17-08(B)(9)
	Air emissions from a stationary source		
Activities causing release of air pollutants	Shall not cause the emission or escape into the open air from any source or sources whatsoever of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors, or any other substances or combinations of substances in such manner or in such amounts as to endanger the health, safety, or welfare of the public, or cause unreasonable injury or damage to property.	Activities causing the release of air pollution nuisances as defined in *OAC* 3745-15-07(A)—**applicable**	*OAC* 3745-15-07
	The operation of a hazardous waste facility shall not cause, permit, or allow the emission there from of any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substance that unreasonably interferes with the comfortable enjoyment of life or property by persons living or working in the vicinity of the facility or that is injurious to public health.	Site where hazardous waste will be managed such that air emissions may occur—**applicable**	*ORC* 3734.02(I)
Airborne radionuclide emissions	Emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an EDE of 10 mrem per year.	Radionuclide air emissions to the ambient air from DOE facilities—**applicable**	40 *CFR* 61.92

Table F.2. ARARs and TBC Guidance for the Site-wide Waste Disposition Evaluation Project Off-Site Disposal Alternative at PORTS, Piketon, Ohio (Continued)

Action	Requirements[a]	Prerequisite	Citation
WETLANDS			
	Indirect impacts to wetlands		
Activities causing indirect impacts to wetlands	Wetland narrative criteria in *OAC* 3745-1-51(A) shall be protected to prevent significant adverse impacts on the hydrology necessary to support the biological and physical characteristics naturally present in wetlands		*OAC* 3745-1-51(A)
	Wetland narrative criteria in *OAC* 3745-1-51(B) shall be protected to prevent significant adverse impacts on water quality necessary to support existing habitat and populations of wetland flora and fauna and to prevent conditions conducive to the establishment or proliferation of nuisance organisms.		*OAC* 3745-1-51(B)
	Wetland numeric chemical criteria for wastewater discharge to wetlands shall be associated with the "warmwater habitat" use designation shall apply at the "end of pipe".		*OAC* 3745-1-52

ACM = asbestos-containing material
ALARA = as low as reasonably achievable
ARAR = applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
CMBST = combustion
CWA = Clean Water Act
DEACT = deactivation
DOE = U.S. Department of Energy
DOE M = U.S. Department of Energy Radioactive Waste Management Manual
EDE = effective dose equivalent
EPA = U.S. Environmental Protection Agency
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act of 1975 (Amendments of 1976)
ID = identification number
LDR = land disposal restriction
LPP = LATA/Parallax Portsmouth, LLC
LLW = low-level (radioactive) waste
MVAC = motor vehicle air conditioning
NACE = National Association of Corrosion Engineers
NCP = National Oil and Hazardous Substances Pollution Contingency Plan
OAC = *Ohio Administrative Code*
ORC = *Ohio Revised Code*
PCB = polychlorinated biphenyl
POLYM = polymerization
PORTS = Portsmouth Gaseous Diffusion Plant
POTW = publicly owned treatment works
RACM = regulated asbestos-containing material
RCRA = Resource Conservation and Recovery Act of 1976, as amended
RORGS = recovery of organics
TBC = to-be-considered
TED = total effective dose
TSCA = Toxic Substances Control Act of 1976
UST = underground storage tank
UTS = universal treatment standard
WAC = waste acceptance criteria

APPENDIX G: ENGINEERING STUDY OF PROCESS BUILDING EQUIPMENT SUBSIDENCE AVOIDANCE PROCESS OPTIONS

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ACRONYMS

BNFL	British Nuclear Fuel Limited
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
FS	Feasibility Study
FY	fiscal year
HEPA	high efficiency particulate air
LLW	low-level (radioactive) waste
NDA	nondestructive assay
ODOT	Ohio Department of Transportation
OSDC	on-Site disposal cell
PORTS	Portsmouth Gaseous Diffusion Plant
RI	Remedial Investigation
WAC	waste acceptance criteria
WBS	work breakdown structure

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The purpose of this appendix is to evaluate disposal landfill subsidence avoidance process options to support the technology screening phases of the Feasibility Study (FS) for the decontamination and decommissioning (D&D) of the large radiologically contaminated equipment in the process buildings and the FS for the waste disposition decision at the Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. Radiologically contaminated process equipment is expected to represent the highest radiological hazards to PORTS workers and off-PORTS receptors during D&D. However, as a result of their design, they may also represent a significant technical issue for proper design and operation of disposal facilities because of the large void fractions internal to the equipment. This evaluation is conducted in the event that waste acceptance criteria (WAC) require the generating projects to control void spaces in or degradation of their waste to mitigate long-term subsidence. This document addresses subsidence avoidance process options for the process equipment and is primarily oriented toward converters and compressors. Both the waste disposition and process building FSs will use results from this study.

G.1. INTRODUCTION

The U.S. Department of Energy (DOE) is evaluating waste disposition options for up to 1.47 million cy of primarily low-level (radioactive) waste (LLW) anticipated to be generated at the PORTS Facility[1]; 272,000 cy of this volume is process gas equipment. This analysis only addresses the volumes of major equipment from the X-330 and X-333 Buildings that are assumed for on-Site disposal (219,000 cy, of which 154,000 cy are process converters). These converters are assumed in the overall evaluation to be segmented and the nickel removed for future disposition; however, the original in situ volume of 154,000 cy is used for this analysis. Another 53,000 cy (approximately 24 percent) are compressors from the X-330 and X-333 buildings, and 12,000 cy (5.5 percent) are other process gas equipment from these buildings (surge drums and recycle coolers). These three components represent one of the largest, and the most highly contaminated, waste streams requiring disposal under this remedial action.

G.2. SCOPE AND OBJECTIVES

The gaseous diffusion enrichment process equipment is among the largest waste streams expected to be disposed in a potential on-Site disposal cell (OSDC), and the anticipated waste volume for on-Site disposal is approximately 219,000 cy of original equipment. The designs of the process equipment result in significant internal voids. The radioactive contamination inside the equipment and the size of the equipment present a technical challenge, if the disposal facility requires that the disposed waste be controlled in some fashion to control subsidence at the disposal facility. This study evaluates process options to avoid subsidence at a potential OSDC. These options involve eliminating the void space by destructing the equipment, filling the voids in the equipment with a suitable material, or protecting the equipment from corrosion and subsequent degradation. This study does not address options that could be applied to OSDC design or operation to address subsidence concerns.

As remedial decisions, cell design, the WAC, and characterization information matures into a final plan, it is expected that different process options may be selected or not even be needed. This study identifies the representative process options that will be used in the FSs to allow a consideration of the impacts such a requirement may impose.

[1]These waste volumes represent uncontainerized waste with no adjustments for expansion or compaction.

The following addresses the initial scope assumptions for this evaluation. Equipment considered is as follows:

- X-330 converters and compressors-Though the converters will be disassembled and segmented to recover the nickel, the original in situ volume will be included in this analysis for comparison of alternatives.

- X-333 converters and compressors-Though the converters will be disassembled and segmented to recover the nickel, the original in situ volume will be included in this analysis for comparison of alternatives.

- Size reduction of process piping will not be evaluated. It will be demolished with the building and size-reduced with the other building steel.

- Other process equipment (e.g., recycle coolers and surge drums) is similar to the converters and compressors so that subsidence avoidance process options can be extrapolated to them.

If any process gas equipment requires disassembly to remove materials, then the logical process at that point is to continue and segment the equipment into pieces to prevent voids during disposal.

Table G.1 describes the quantities of process equipment being evaluated in this document.

Table G.1. Process Equipment at PORTS

Building	Equipment	Type (Designators)	Quantity[1]
X-333	Converter	X-33 or 000	652
	Compressor	X-33 or 000	655
	Recycle Coolers	000 Trane and Koven	82
	Surge Drums	8 ft × 40 ft and smaller	44
X-330	Converter	X-31 or 00 Sizes 4/5/7	511
	Converter	X-29 or 0 Sizes 0 thru 5	621
	Compressor	X-31 or 00	509
	Compressor	X-29 or 0	600
	Recycle Coolers	000 or 00 York	52
	Recycle Coolers	0 2X	60
	Surge Drums	8 ft × 40 ft (and smaller)	82

[1]Quantities are from Mass Flow Commodity Quantities. Some quantities are uncertain because the specific types for spare equipment are not known.

Table G.2 provides the nominal weight and installed volume of each component.

Converters consist of a nickel-plated steel shell with one inlet process pipe, two outlet process pipes, a finned copper tube cooler with smaller inlet and outlet pipes, and the barrier bundle. The barrier bundle consists of a flow transition (aluminum sheet), tube sheets (nickel-plated steel), a center tube (nickel-plated steel), and thousands of barrier tubes (porous nickel). The readily accessible voids are the inlet and outlet pipes around the outside of the cooler and the outside of the barrier bundle. Inaccessible voids are inside the flow transitions, barrier tubes, cooler tubes, and the cooler inlet and outlet pipes.

Table G.2. Parameters of Process Equipment at PORTS

Building	Equipment	Type (Designators)	Component Weight (lb) Each	Component Volume (cy) Each
X-333	Converter	X-33 or 000	67,514	152.1
	Compressor	X-33 or 000	37,552	57.8
	Recycle Coolers	000 Trane and Koven	8,211 average	19.6
	Surge Drums	8 ft × 40 ft and others	17,347	67.5
X-330	Converter	X-31 or 00 Sizes 4/5/7	21,561	55.0
	Converter	X-29 or 0 Sizes 0 thru 5	16,656	42.7
	Compressor	X-31 or 00	14,152	28.2
	Compressor	X-29 or 0	14,835	28.2
	Recycle Coolers	000 or 00 York	8,403	5.2
	Recycle Coolers	0 2X	2,900	5.2
	Surge Drums	8 ft × 40 ft and others	17,421	67.9

Note:
Parameters are from Mass Flow Commodity Quantities.

The compressors in X-330 and X-333 are axial flow and consist of a nickel-plated steel shell that has an inlet nozzle, a compressor body with a side inlet nozzle, and a discharge nozzle. Inside the shell is a stationary compressor stator (aluminum) with aluminum blades; a rotor (nickel-plated steel) with aluminum blades mounted on a rotating shaft. The rotating shaft penetrates the shell where two compressor seals form a barrier from the outside. The accessible voids in the compressor are the space between the stator and shell, the space between the rotor and stator where the blades are, and all of the nozzles. The inaccessible voids are the interior of the rotor and the ends of the rotor adjacent to the seals.

Recycle coolers are a nickel-plated steel shell with an inlet and outlet process pipe and a copper-finned tube cooler with smaller inlet and outlet pipes. The accessible voids are inside the shell and process inlets. The inaccessible voids are inside the cooler tubes and the cooler inlet and outlet pipes.

Surge drums are nickel-plated steel tanks with inlet and outlet process pipes. The interior is empty and all voids are accessible.

Table G.3 presents a summary of the void spaces in the various process equipment items being evaluated in this study.

The void fractions above are conservative for two reasons. First, some components' volumes are determined here by simple maximum length, width, and height, and do not take into account irregularities and dimension changes that would reduce the volume. Second, some items inside the equipment (e.g., cooler tubes, impellers, bellows) may have the materials of construction (e.g., exterior nickel plating, aluminum, monel) and structural integrity to withstand the disposal facility stresses without collapse, and thus could potentially be exempted from any future potential requirement for void filling in the WAC.

Table G.3. Void Space in Process Equipment at PORTS

Building	Equipment	Type (Designators)	Void Fraction (%)
X-333	Converter	X-33 or 000	96
	Compressor	X-33 or 000	88
	Recycle Coolers	X-33 or 000	97
	Surge Drums	8 ft × 40 ft	98
X-330	Converter	X-31 or 000	95
	Converter	X-29 or 00	96
	Compressor	X-31 or 00	90
	Compressor	X-29 or 0	90
	Recycle Coolers	000, 00, or 0	93
	Surge Drums	8 ft × 40 ft	98

G.3. PROCESS OPTION DESCRIPTIONS

Subsidence avoidance process options are grouped: (1) segmenting the equipment uniquely or prior to a secondary treatment step to make the equipment void disappear (all surfaces available for fill placement), (2) filling the equipment voids with material compatible with potential future WAC of the disposal facility, or (3) protecting the equipment from degradation for the design life of the facility. Segmentation process options before or during demolition include:

- Cutting into pieces/shapes capable of bulk disposal
- Shearing into pieces/shapes capable of bulk disposal
- Cutting or disassembling to fit into a compactor to prevent subsidence
- Cutting or disassembling to fit into a shredder to prevent subsidence
- Cutting or disassembling to fit into a melter to prevent subsidence.

Void-filling process options to prevent subsidence without segmentation include:

- Foaming with an approved dense foam in situ, at a intermediate foaming station, or at the disposal facility
- Sand or other dry solid media fill at the disposal facility
- Low-density grout fill at the disposal facility.

Subsidence avoidance process options to prevent subsidence through corrosion inhibition include:

- Surrounding the equipment with concrete fill
- Applying corrosion resistant external fixatives.

G.3.1 COMMON ELEMENTS

During the evaluation of these various options, there are some common elements that will be part of the cost estimate to give an accurate reflection of program-level cost impacts. In all cases, some equipment cutting is needed prior to removal of hold-up material or to remove the equipment from the buildings. Then a capping process is used to prevent the spread of contamination after cutting. Finally, the

equipment is moved to a shop for further segmentation, a storage area for additional subsidence avoidance efforts, or the disposal facility where some subsidence avoidance efforts may be used. The following process option discussion highlights the common elements that are used in the cost estimate for each subsidence avoidance process option.

Air carbon arc cutting, previously known as air arc cutting, is an arc-cutting process where metal is cut and melted by the heat of a carbon arc. Molten metal is then removed by a blast of air. It employs a consumable carbon or graphite electrode to melt the material, which is then blown away by an air jet. It is the current method used at PORTS to remove equipment that has welded flanges.

Plasma is a process used to cut steel and other metals of different thicknesses (or sometimes other materials) using a plasma torch. In this process, an inert gas (in some units, compressed air) is blown at high speed out of a nozzle; at the same time an electrical arc is formed through that gas from the nozzle to the surface being cut, turning some of that gas to plasma. The plasma is sufficiently hot to melt the metal being cut and moves sufficiently fast to blow molten metal away from the cut. Plasma is currently used at PORTS for cutting pipe and welds where reinstallation preparation will be needed.

Oxy-acetylene is a process that uses a cutting torch to heat metal to kindling temperature. A stream of oxygen is then trained on the metal. The metal burns in that oxygen and then flows out of the cut as an oxide slag. This process requires both fuel and oxygen tanks. It cuts at approximately the same speed as arc air, but tank change outs result in a lower effectiveness. Slag, gases, and fumes are also considerable. Historically, oxy-acetylene cutting has been used extensively in cutting operations at PORTS, although less often on process equipment.

Mechanical cutting is a process where machinery (e.g., circular or reciprocating saws) is used to cut out equipment. Localized heating is much less than with hot cutting. It is much slower than hot cutting, and the in-hand equipment is much heavier for manual cutting (mechanized setup and cutting is generally not feasible for gaseous diffusion equipment). Shards are minimal and gases and fumes are nonexistent. Mechanical cutting was used on the smaller K-25 equipment and piping in Oak Ridge, Tennessee, where limited equipment and piping were removed prior to demolition.

Plastic (3 to 7 mil thickness) and duct tape for capping of openings after cutting are most often used when contamination control is desired. There are minimal security concerns, and no structural strength is required for air or fill pressure on the opening. It is the most common method of capping currently employed at PORTS.

Sheet metal (14- to 18-gauge thickness) and two-part epoxy are used for capping when contamination control is required and some security concerns exist. Oftentimes, duct tape or clamps are used to allow setting of the epoxy. Generally, this process option is not applicable for grout or sand fill pressures on the openings, but it has been successfully used in sealing for foaming operations. This method was used at the K-25 D&D Project in Oak Ridge.

The addition of a plate (1/8 to 1/4-in. thickness) with tack or seam welds is used to provide contamination control, security, and/or fill pressure effectiveness. In some instances, clamps and/or gaskets can be substituted for the welds. Large diameter plates may also require stiffening beams to withstand fill pressures. This method is currently in use at PORTS for sealing of equipment for security requirements or for subsequent pressurization of equipment.

Some segmentation and subsequent mining may occur to comply with a numerical or safety-based WAC. Converters would be removed by cleared workers, capped with plastic and duct tape (sheet metal or plates may be required if uncleared movers are employed), and moved by cart to the decontamination area. In a secure facility, special carts are employed to cut loose and hold the inlet head and outlet head with the cooler assembly. Then the barrier bundle is extracted from the center shell and the transition is removed. The heads and shell are inspected to determine if holdup is present. If holdup is present (not considered likely), then the subassemblies are moved for mechanical or wet decontamination of holdup.

Compressors may have the compressor seals removed in the process buildings before compressor removal by cleared workers, any visible holdup is removed from the seal cavity, and the cavity is sealed with a special bolted plate or sheet metal around the shaft. In situ nondestructive assay (NDA) may then be conducted to determine if further material removal is still required. If necessary, the compressor is then removed from the cell by cleared workers, closed with plastic and duct tape, and removed from the process building onto a cart. Uncleared workers transport the compressor to the decontamination area. The inlet and discharge nozzles are removed, and the rotor and stator are removed from the compressor body. Visible holdup is removed by mechanical scraping or by wet decontamination.

G.3.2 SEGMENTATION SUBSIDENCE AVOIDANCE OPTIONS

The segmentation subsidence avoidance options are as follows:

Segmentation to a Small Size. This process option uses the cutting techniques discussed above to continue disassembly of the equipment to remove material sufficiently to meet the WAC of a disposal facility. In this process option, future potential WAC are met by reducing the size of the residual pieces of the equipment. In general, pieces of waste no larger than 4 ft in length are anticipated.

Shearing In Situ. Shearing is used to significantly avoid subsidence by cutting equipment and piping in the field. It also crushes the equipment together to some extent and achieves some further void reduction in this manner. Special equipment is required to shear process equipment of this size, and this can result in a technology limitation because of the size of tracked equipment that can be effectively used. Shear throat sizes of 18 to 24 in. are achievable, and designs that punch through equipment metal to allow cutting in the throat can be obtained. This process option was successfully used to shear smaller diameter process piping (up to 12-in. diameter), centrifugal compressors, and structural steel during demolition of the K-25 Building in Oak Ridge.

Compaction. Compaction is often coupled with an initial shear or segmentation to facilitate the process. This process option was successfully used by British Nuclear Fuel Limited (BNFL) in the processing and disposition of process equipment from the K-29, K-31, and K-33 buildings in Oak Ridge. Compaction opening size (throat) and high efficiency particulate air (HEPA) filtration are factors affecting cost and operations, as well as the need for separate compactors if classified components are to be processed. Delivery of the subassemblies or sectioned subassemblies to the compactors requires additional movement equipment (carts, conveyors, or wheeled handling equipment). Compacted materials require transfer to conveyances, depending on the requirements of the disposal path, perhaps requiring additional movement equipment. Most of these conveyances become weight-limited rather than volume-limited for transportation. Not all equipment or subassemblies benefit from compaction.

Shredding. Equipment subassemblies could be fed to commercial shredders specially modified to handle radioactive materials by the addition of HEPA filters and ductwork to control airborne contamination. Equipment cost is primarily a factor of shredder opening size (throat) and power (metal types and thicknesses). Larger throat sizes require higher capacity HEPA filtration, so there is a tradeoff between

shredder size and the need to further segment subassemblies, although perhaps not to the extent for waste packaging/void avoidance. Security concerns may also require a minimum of two shredders to process the classified waste separately from the remainder of the process equipment. Delivery of the subassemblies or sectioned subassemblies to the shredders requires additional movement equipment (e.g., carts, conveyors, or wheeled handling equipment). Shredded materials are collected in hoppers and require transfer to conveyances, depending on the requirements of the disposal path. Not all subassemblies benefit from shredding. Curved steel plate may actually result in fewer voids than shredded plate. Cooler and barrier tube shredding would reduce the voids for these subcomponents. Although separated from the equipment, they meet the future potential WAC of the disposal facilities because of their small diameters.

Melting. This process option eliminates voids in the equipment and produces ingots that are volumetrically contaminated. As with the other process options, melters require some additional segmentation of subassemblies so they can be placed in the melter. At the melter, special handling equipment is necessary to load and unload them. Slag (more highly contaminated) is either added to the melted material or segregated as a separate waste stream. After cooling, the ingots are placed into conveyances, depending on the requirements of the disposal path. Most of these conveyances would become weight-limited rather than volume-limited for transportation.

G.3.3 SUBSIDENCE AVOIDANCE WITHOUT SEGMENTATION AND SIZE REDUCTION (VOID FILLING)

Subsidence avoidance without segmentation or size reduction occurs through the introduction of inert materials of sufficient strength to withstand disposal facility waste and cap pressures after the process equipment external shell has degraded (oxidized) to the point that structural integrity is lost. The amount of necessary subsidence avoidance is a function of the design and future WAC at the disposal facility. This is still indeterminate for any potential OSDC. Using the component weights and volumes in Table G.2 and assuming all materials are the density of steel, rough total void fractions are provided in Table G.3. If needed, these void fractions will be refined with more accurate weight and volume determinations, based on materials of construction in the D&D design phase. However, for now, they are conservatively suitable for process option discussions concerning subsidence avoidance.

Three media are considered for void-filling of the PORTS process equipment, low-density grout, dry sand, or high-strength foam. Of the three, only the foam option is considered feasible for all of the equipment at a location remote from the disposal facility because of the weight gains associated with the other process options. Introduction of sand and grout is assumed to occur at a potential OSDC. The three media and their use are described in the following paragraphs:

High-density Foam. High-density foam such as isocyanate foams can be used to fill the voids in the process equipment. These foams are injected as two relatively nonviscous liquids that rapidly react and expand into a hard, solid matrix that has a density of approximately 135 lb/cy. Foaming requires commercial foam injection equipment, and injection occurs in nominally 2-ft lifts to allow the material below to react and harden. The injection equipment is portable, and hoses with mixing guns are used to inject the foam. The liquids are generally supplied in drums or slightly larger totes, which are delivered by truck or forklift. As with the grout (and sand), the same numbers of holes or ports are used for introduction, the viscosity prevents some voids from being reached (although the expansion does assist), the converter security requirements remain, and contamination control with HEPA is likewise needed.

Foaming at the point of generation is a possibility because of the relatively low weight density, the equipment required, and the method of introduction. During the K-25 Building D&D, it was successfully

used in the cell enclosures for void reduction in Size 3 and 4 converters (nominally the size of the X-326 converters). Two sub-options are foaming after cutting and capping the process equipment and foaming before cutting and capping. Because of combustibility, foaming cannot be used where hot cutting techniques are employed. Therefore, if foaming occurs before cutting the equipment, piping is foamed also and mechanical cutting becomes the only alternative for removal. Foaming also has nuclear safety analysis ramifications. If a building fire is a credible nuclear accident scenario, one of the foam components is combustible, and this could cause a limit to the amount of foam inventory allowed in the facility. The operations and equipment may also be subject to nuclear safety controls dictated by the analysis.

Sand. Sand may be used from the top to fill the voids in the process equipment. Dry sand has a nominal density of 2,700 lb/cy and flows into a relatively compact form that does not compress or settle significantly. In order to introduce the sand, all openings in the process equipment must be capped with plates capable of withstanding static pressure from the sand during curing, which can be several hundred pounds per square foot of opening. This generally requires the welding-on of steel plates, or they can be tack-welded or clamped with compressed gaskets. This is assumed to occur during equipment removal from the process buildings. Three types of sand introduction are possible, gravity pour, augered, or pumped. This requires openings or ports on the top (or side near the top) of the equipment at each location where the equipment is sectioned off by the internal components. The sand introduction phase may require some method of contamination control to prevent airborne contamination from exiting the opening and contaminating the equipment or personnel. Generally, this is provided by localized portable HEPA systems. Security controls and cleared workers are also required when accessing a converter for the introduction of sand. Sand may be added at a disposal facility transfer area, at the disposal area face, or inside the disposal area. Each of these options is feasible, but adding sand outside of the disposal area requires heavy duty carts and cranes or other heavy lifting equipment to place the equipment. Sand filling is expected to be slower than grout introduction, and it is not expected to fill as much void space as grout. Dry sand does pose a storage problem prior to use, and silica can be a worker health hazard. An alternative to sand introduction at the potential OSDC could be preparation of the equipment so sand or compact gravel could be placed in its voids after placement of the equipment in the disposal facility. While this is not a viable process option for converters or centrifugal compressors, it could be employed by placing axial compressors with their nozzles in the vertical position, filling around the body, and then filling the nozzles with sand or gravel that will self-compact. A similar technique may be applicable to some models of the recycle coolers.

Low-Density Grout. Grout with a sufficient compressive strength to meet future potential WAC requirements could be introduced into the tops of the process equipment to fill voids. Generally, grout densities of 500 to 3,000 lb/cy can be formulated to provide strengths equal to or greatly exceeding 50 lb/sq ft. Robust opening caps are needed, as with sand, and the security concerns and need for cleared workers remain. The methods of movement or introduction at the disposal facility remain as with the sand. Once again, HEPA ventilation for contamination control may be required. Mixtures with low viscosity can be produced to maximize infiltration of voids. Grout could be mixed at PORTS or purchased for delivery. On-PORTS mixture requires materials storage, expertise in mixing equipment and technology, procedures, and quality assurance programs. Grout filling has been successfully used for some equipment (e.g., centrifuge casings) at the Environmental Management Waste Management Facility in Oak Ridge.

G.3.4 SUBSIDENCE AVOIDANCE THROUGH CORROSION INHIBITION

The design of the process equipment is expected to be able to withstand the soil pressures of the disposal facility without significant deflection or subsidence, although this will have to be technically verified.

The process equipment exterior surfaces are mild steel and will be subject to oxidation corrosion and slow structural degradation, eventually resulting in deflection and subsidence. If this corrosion could be arrested for the life of the disposal facility, then subsidence of the cap could be avoided. Based on highway structure designs and testing, two methods of significantly arresting mild steel corrosion is immersion in concrete rubble or application of noncorrosive protective coverings to the steel. These two process options are described as follows:

Surround with Concrete Fill. This process option can be performed if a supply of concrete fill is available during placement of the process equipment. Depending on how the equipment is placed in the disposal facility, approximately 100,000 to 150,000 cy of concrete fill would be necessary to surround the 219,000 cy of process equipment (assuming all placed without void reduction). Placement would begin with a lift of concrete fill; then placement of the process equipment; then buildup around the equipment with concrete fill, eventually filling up, over, and between the equipment with concrete; and finally a compacted lift of concrete fill above the equipment so another layer of equipment could be placed.

Corrosion-Resistant Exterior Fixatives. Fixatives similar to those used in highway structure designs could be applied to the exterior of the process equipment, forming an impervious barrier to moisture and oxidation of the steel. Application would be by brush or spray, depending on the thickness of application. Normal waste fill or procured fill could then be placed around and between the equipment as with the previously discussed concrete fill.

G.4. PROCESS OPTION EVALUATION DISCUSSION

The following discussion evaluates the effectiveness, implementability, and cost of the various subsidence avoidance process options. Effectiveness evaluates the capability of the process option to reduce disposal facility subsidence through elimination of void from the process equipment, reducing the void in intact equipment by filling it to the extent reasonable with a material that can withstand disposal facility fill pressures, or protecting the equipment from oxidation and subsequent structural degradation. Implementability addresses maturity and acceptability of the processes in comparison to current equipment, facilities, and resource experience. It highlights any significant implementation challenges or schedule impacts. It also addresses the impact of the process option on the size of the disposal facility. Health and safety issues are also discussed under implementability.

The cost evaluation presents capital costs of the entire process equipment removal, treatment, and transportation effort for on-Site disposal, including the cost of the subsidence avoidance process option. Disposal costs assuming on-Site disposition are included. The cost estimates are used only for technology screening and are not used in the detailed analysis of alternatives. More detailed estimates are used at that phase of the project. The first cost estimate on segmentation is considered the baseline case, and it assumes removal and size reduction of the X-330 and X-333 converters and compressors. Estimates from other studies have been used as available, either directly or parametrically, for the changes to each estimate brought about by differing subsidence avoidance process options. If no existing estimates exist, then an estimate has been formulated and the basis of the estimate is documented.

G.4.1 SEGMENTATION TO SMALL SIZE

Segmentation Effectiveness – Good. Disassembly and cutting up of the process equipment renders the equipment very similar to the size reduced steel waste from building demolition (e.g., structural steel, nonprocess piping) and allows it to be dumped and placed in a manner similar to that of the building waste in a potential OSDC. As with building waste, it allows mixing at the disposal point with either soil,

soil-like waste (e.g., rubblized concrete, roofing materials), or fill to meet landfill requirements. Similar to other building waste, there would be short lengths of intact tubing and curved steel surfaces that might cause localized voids (depending upon final orientation), but these would be dispersed through the disposal facility with the other waste. Thus, differential subsidence because of localized large voids would not occur.

Segmentation Implementability – Good. Existing equipment, procedures, and resources have been used to perform very similar work at PORTS in the recent past during pre-D&D activities in the X-705, X-700, and X-720 buildings. These existing buildings, and the existing processes and equipment they contain, are considered viable for executing this process option and likely represent the process option with the least impact to starting work. This process option is planned to be used to remove material from the interior of process equipment to meet the numerical WAC of any disposal facility, or to meet transportation limits for off-Site transport. Thus, this process option is expected to be implemented for some of the process equipment without respect for subsidence avoidance. It does allow segregation and reduction of classified materials, reducing the impact and size of this unique waste stream.

Segmenting the equipment is expected to reduce the total volume of process equipment waste in the cell from approximately 219,000 cy (the equipment volume for X-330 and X-333 converters and compressors) to approximately 60,000 to 70,000 cy, or perhaps less (i.e., about a 12 percent reduction in total waste volume for D&D). The 219,000 cy excludes the intact X-326 converters and compressors.

The major issue with segmenting the process gas equipment is that the removal, moving, and processing of all the equipment (piece-by-piece) is very labor-intensive and slow. It may impact the overall D&D schedule (likely it would be critical path to process building D&D startup). The size of the equipment and a significant contamination exposure potential for workers during removal and size reduction all contribute to potential safety issues for the workers. Processing the equipment requires double handling (movement and lifting) of the equipment and causes significant security concerns in dismantling and handling the classified components in the equipment. Staging areas would be required for classified and unclassified equipment and processed waste containers. Depending on the final sizing of the waste, new fixtures, containment systems, and movement equipment may need to be designed and fabricated.

Segmentation Cost. The costs for this process option are reasonably well understood, given that it has been estimated using the methods used for estimating the FS alternatives. The major costs of the segmentation-to-small-size process option are as follows:

1. Removal (X-330 and X-333 equipment)	$38.0 million
2. Movement (X-330 and X-333 equipment)	$5.7 million
3. Disassembly and segmentation systems (X-330 and X-333 equipment) capital and operating cost	$123.5 million
4. Disposal facility capital and operating cost (including trucking) for 66,000 cy	$59.7 million
Total Capital Costs	**$226.8 million**

G.4.2 SHEARING IN PLACE

Shearing Effectiveness – Good. Shearing is applicable only to compressors after the seals are removed. Converters cannot be sheared at the demolition location because of classification issues, and they must be processed using one of the other process options (assumed for this analysis to be disassembly and segmentation). Shearing with machine-mounted equipment during demolition results in metal waste for

disposal that is similar to the size-reduced structural steel of the buildings. This process option is somewhat superior because curved surfaces can be flattened and metals generally can be bent into more compact or conforming shapes, depending on the amount of processing in the field.

Shearing Implementability – Excellent. Shearing of the compressors involves a much less labor-intensive approach than segmentation and the process options discussed below because of its dependence on heavy equipment. Shearing of the process equipment would use essentially the same mobile heavy equipment and shears used to process structural steel and would let the majority of the size-reduced process equipment be mixed with the building waste for shipment. This process option could reduce the labor and time (perhaps significantly) for cutting and removing the compressors from the field because it could occur during building demolition and use the same equipment. This could result in an earlier start of building demolition because process equipment removal and processing is expected to be the critical schedule driver of process building D&D. Shearing has a significant safety benefit. It removes many workers from the safety risks of cutting, moving, and segmenting the compressors. This process option would not be applicable to converters from X-330 and X-333. Because of security concerns, they would have to be segmented into disposable waste without the benefit of field shearing.

Implementing this process option during demolition would result in compressors being pulled down from the elevated cell floor along with all of the process piping and nonprocess equipment, piping, and structural steel. The primary concern is loss of contamination control and the potential spread of contamination through the storm drain system or dust migration. Commingling of these wastes is not expected to affect waste disposal, as both the process equipment and the structures are currently expected to be treated as LLW. Whether the process equipment is present or not, dust suppression techniques would be employed during demolition. Shearing of process equipment on the demolition location does increase the risk of contaminant migration to storm water. This technique was used during the K-25 Building west wing demolition, but with equipment foamed for contamination control and controlled shearing of process equipment. Also, storm water retention and storm grate filtration were employed for both particulate and contaminant control, although building radioactivity was not detected in either the storm water or the storm grates. No violations of storm water management requirements occurred because of radionuclide transport. There were pH violations resulting from incorrect gravel placement. This is attributed in part to the large amount of concrete from the structure, which tended to immobilize any radioactive contamination flowing from the demolition area in surface waters.

In order to implement this process option, a fixative to immobilize the majority of residual internal contamination in the compressors is conservatively assumed to be necessary. Contamination fixation technologies such as CCFix® or CCWet® could be employed to spray accessible sections of the compressors after cutting from the process piping. Application techniques would have to be developed, but at present, it is assumed that the number of cuts could be reduced from the amount needed during implementation of the segmentation process options. Additional access holes for the compressors would be necessary to allow the maximum feasible coverage inside the equipment.

Shearing of the compressors (with segmentation for the converters) is expected to reduce the total volume of process equipment waste in the cell from approximately 219,000 cy (as is equipment volume) to approximately 60,000 to 70,000 cy, or perhaps less, waste truck volume (i.e., about a 12 percent reduction of total waste volume for D&D). For this analysis, it was assumed that the compressors would be sheared to the same extent that converters are segmented in the segmentation shop (a volume reduction factor of 3.3).

Shearing in place at PORTS is a new process option, at least for the large process equipment D&D, which would require specialty fabrication of shearing fixtures, equipment operations training, readiness evaluation, and new procedures for safety and quality documentation.

Shearing Cost. Costs for this process option are based on shearing efforts implemented with the building structure demolition shearing (with a percentage increase to the average for the heavier work). This process option is considered to be well developed, consisting of techniques used in other contaminated D&D projects throughout the country. The major costs of shearing in place of compressors and using segmentation for removed converters are as follows:

1. Removal (X-330 and X-333 converters) and fixing with CCFix® (X-330 and X-333 compressors)	$41.1 million
2. Movement (X-330 and X-333 converters)	$4.0 million
3. Disassembly and segmentation systems (X-330 and X-333 converters) capital and operating cost	$90.5 million
4. Shearing of X-330 and X-333 compressors in place	$8.5 million
5. Disposal facility capital and operating costs, including trucking for 66,000 cy	$59.7 million
Total Capital Costs	**$203.7 million**

G.4.3 COMPACTION

Compaction Effectiveness – Very Good, Slightly Superior to Segmentation. Compaction starts with the same process of disassembly and segmentation as the baseline process option, but only segments to the point the waste can fit into the compactor(s). This process option is superior because curved surfaces are flattened, tubing is flattened or crushed, and metals are generally bent into more compact or conforming shapes. Compaction was successfully used on the K-31 and K-33 equipment removal project in Oak Ridge.

One uncertainty is the loss of compaction during placement in the disposal facility. Crushed groupings of metal may separate to some extent, depending on the equipment used to place the waste in the disposal facility (e.g., bulldozers). Also, tightly packed groupings may affect the ability to surround them with soil-like waste or fill. This could be exacerbated if bulldozer placement of waste is used, less so with front end loader placement. But if this process option is extensively used, then the suspected subsidence avoidance is expected to be quite uniform and significantly less than placement of whole equipment.

Compaction Implementability – Fair. This process option relies significantly on the disassembly and segmentation process option for implementation. It has one process advantage. Depending on the compactor design, it could somewhat reduce the segmentation effort (although not disassembly). A compactor design with shearing capabilities, similar to the one used in the BNFL process, would reduce hot work cutting. Compaction does introduce an additional handling process to move the disassembled and partially segmented materials to the compaction operation.

This process option would not be applicable to converter bundles from X-330 and X-333. They would have to be segmented to disposable waste without benefit of compaction because of security concerns.

Use of compaction is expected to reduce the total volume of process equipment waste in the cell from approximately 219,000 cy (as is equipment volume) to approximately 40,000 to 50,000 cy, or perhaps less (i.e., about a 13 percent reduction of total waste volume for D&D).

Compaction is a new process option at PORTS, requiring design, fabrication, construction, testing and checkout, training, and readiness evaluation. New procedures, safety documents, and quality documents would have to be written. Safety risks would change and may actually improve, based on the BNFL success with compaction, over complete hot work segmentation of the equipment. There may be significant schedule delays for construction of the compactor and when the compactor is not operational.

Compaction Cost. Costs for compaction are reasonably well understood; components of which have been estimated by DOE in Critical Decision-1 for budgetary as well as regulatory purposes. The major costs of compaction with some segmentation are as follows:

1. Removal (X-330 and X-333 equipment)	$38.0 million
2. Movement (X-330 and X-333 equipment)	$5.7 million
3 Disassembly and segmentation systems (X-330 and X-333 equipment) capital and operating cost, including full size reduction of converter bundles	$120.1 million
4. Compaction capital and operating cost (including movement)	$15.3 million
5. Disposal facility capital and operating costs (including trucking) for 45,000 cy	$40.7 million
Total Capital Costs	**$219.7 million**

G.4.4 SHREDDING

Shredding Effectiveness – Very Good, Slightly Superior to Segmentation and Compaction. This process option is beneficial because large metal components are reduced to shards of metal that can be placed in a landfill, easily mixed with soil-like waste or fill, and compacted. The expected subsidence is expected to be quite uniform and significantly less than for placement of whole equipment.

The only detriment to the effectiveness of this process option is that the large plate steel in the equipment may actually increase in volume from the previous two process options. The significance of this increase is dependent on the shredded shard shape and size. Partial segmentation of the equipment is still needed prior to feeding the waste into the shredder.

Shredding Implementability – Fair. Shredding relies significantly on disassembly and segmentation, but only to the extent required to access the shredder(s). Shredding could, depending on the shredder design, somewhat reduce the segmentation effort (although not disassembly). The shredder throat size would be crucial in determining the extent of segmentation required. This study assumes that some additional segmentation beyond that required for direct disposal is required for shredding.

This process option could be applicable to process converter bundles from X-330 and X-333. A smaller dedicated unit could be employed to shred partially segmented bundles and barrier to disposable waste. The shredding and landfill placement of this waste would require security controls (e.g., controlled processing area, sacrificial containers or supersacks, cleared workers).

As with compaction, shredding is expected to reduce the total volume of process equipment waste in the cell from approximately 219,000 cy (as is equipment volume) to approximately 30,000 to 40,000 cy, or perhaps less (i.e., about a 14 percent reduction of total waste volume for D&D).

Equipment shredding at PORTS is a new process option, requiring design, fabrication, construction, testing and checkout, training, and readiness evaluation. New procedures, safety documents, and quality documents would have to be written. Safety risks would change and are uncertain because of the additional handling and process steps that shredding would add. As with compaction, there is a potential for schedule delays resulting from design and construction of the facility and potential facility or equipment failure.

Shredding Cost. Costs for shredding are reasonably well understood. The capital and operating costs of the shredding operation have been evaluated as a recycling process option. The major costs of the shredding process option are as follows:

1. Removal (X-330 and X-333 equipment)	$38.0 million
2. Movement (X-330 and X-333 equipment)	$5.7 million
3. Disassembly and segmentation systems (X-330 and X-333 equipment) capital and operating cost	$126.9 million
4. Shredding capital and operating cost (including converter bundles)	$24.6 million
5. Disposal facility capital and operating cost (including trucking) for 35,000 cy	$31.6 million
Total Capital Costs	**$226.8 million**

G.4.5 MELTING

Melting Effectiveness – Excellent, Superior to Segmentation, Compaction, and Shredding. This process option is beneficial because large metal components are reduced to ingots that can be placed in a landfill, easily surrounded with soil-like waste or fill, and compacted. The expected subsidence avoidance is the ultimate that is achievable and significantly less than for placement of whole equipment. As with compaction and shredding, partial segmentation is needed prior to waste entering the melter.

Melting Implementability – Fair. Melting relies significantly on disassembly and segmentation and requires a significant new process option never utilized at PORTS. It starts with the same process of disassembly and segmentation as the baseline process option, but stops the segmentation at a point that depends on the size and capabilities of the melter(s) employed. As with the shredding, it is currently assumed that segmentation for melting would result in more cutting than the direct disposal alternative. The melter capacity/entrance size would be crucial in determining the extent of segmentation required.

This process option could be applicable to process converter bundles from X-330 and X-333 with the addition of security controls. A smaller dedicated unit could be employed to melt partially segmented bundles and barrier to disposable waste that has little or no security requirements.

Melting is expected to reduce the total volume of process equipment waste in the cell from approximately 219,000 cy (as is equipment volume) to approximately 10,000 to 20,000 cy (i.e., about a 16 percent reduction of total waste volume for D&D).

Equipment melting at PORTS is a new process option requiring design, fabrication, construction, testing and checkout, training, and readiness evaluation. New procedures, safety documents, and quality documents would be needed. Safety risks would change, but they are uncertain at this time because of the uniqueness of the process option and the additional handling and processing steps that melting would add. Depending on the design and operation of the melter(s), there is a risk of total or partial outages from unforeseen events. The risk of equipment failure is considered highest for this process option. Schedule risks and delays are also the highest for this process option because melter design and construction are anticipated to take several years.

Melting Cost. Costs for this process option are less certain, given the relatively new technology. The capital and operating cost of the melting operation has been evaluated as a recycling process option and has been reviewed. Specifically, the vacuum induction melting process option was used as a basis for a cost estimate. The major costs of the melting process option are as follows:

1. Removal (X-330 and X-333 equipment)	$38.0 million
2. Movement (X-330 and X-333 equipment)	$5.7 million
3. Disassembly and segmentation systems (X-330 and X-333 equipment) capital and operating cost	$130.4 million
4. Melting capital and operating cost (including converter bundles)	$325.1 million
5. Disposal facility capital and operating cost (including trucking) for 15,000 cy	$13.6 million
Total Capital Costs	**$512.7 million**

G.4.6 FOAMING

Foaming Effectiveness – Good. This process has the same effectiveness as grouting and is more effective than sand because of flowability. Foam is used by the K-25 D&D Project in Oak Ridge. Historically, it has effectively filled most of the void spaces in their process equipment, at least to the level required to meet a future potential WAC of the disposal facility. The foam does not appreciably enter the barrier and cooler tubes, and it does not reduce the process equipment volume in the disposal facility.

Foaming Implementability – Good. Foam is introduced after hot cutting of the process equipment to remove it from the building. Introducing foam before cutting would require mechanical cutting of the large process equipment to avoid a fire, but this is not considered to be feasible for the large equipment.

This process option has one advantage. It could allow compressor (but not converter) shearing during demolition, providing contamination control and allowing loading and movement with the other sheared building waste. Foam can also be introduced at the process buildings, which would avoid filling at the disposal facility. Lighter plates (or even sheet metal) could be used to seal the equipment after foaming, thus avoiding the heavier plates and attachment methods used with grouting and sand.

Foaming does not reduce the total in situ process equipment volume (219,000 cy) destined for the disposal facility.

Foaming Cost. Foam has some very significant material costs, although the capital cost of application equipment is considerably less than those for other process options. Costing for this process option

assumes hot cutting of the equipment first. The costs also assume movement of the equipment to the disposal facility for burial without any further processing. The costs are as follows:

1. Cutting and removal and installation of plates, and foam injection and vent ports	$51.5 million
2. Foam in situ capital and operating cost	$145.2 million
3. Disposal facility capital and operating cost (including trucking) for 219,000 cy	$200.0 million
Total Capital Costs	**$396.7 million**

G.4.7 SAND

Sand Effectiveness – Good. The introduction of dry, pourable, sand-like materials of sufficient structural strength into the equipment at the disposal cell would lessen subsidence upon equipment degradation and steel collapse. This process option, however, does nothing to reduce the overall process equipment volume placed in the disposal facility.

Sand Implementability – Good. The introduction of sand can occur during normal disposal facility operations, avoiding or minimizing additional moves for processing. The sand would be introduced at the disposal location because the weight of a sand-filled piece of equipment would make transport difficult. Sand filling is not as labor-intensive as the segmentation process options. It is applicable for both converters and compressors.

This process option has not been implemented during any DOE D&D activities, mainly because grouting process options have been considered to be superior because of flowability and weather considerations. Sand does require the installation of heavier plates to seal the equipment from the pressures of the sand. In addition, introduction of the sand requires the cutting of access ports in the equipment. Vent ports are also required, and contamination control filters must be attached. The sand needs to be kept dry, and implementing this process option would require covered storage areas and potentially dry weather operations only.

Placement of the equipment in the disposal facility could require additional equipment, depending on the location of the sand introduction. After placement, special efforts to fill and compact around the equipment would be necessary.

Sand Cost. Filling with sand has some significant material costs, but comparatively little capital cost for processing equipment. Costing for this process option assumes plates, pouring holes, and vent holes are installed during equipment removal. Placement would involve crane movement for the equipment. The costs are as follows:

1. Removal and installation of plates, and pouring and vent holes	$51.9 million
2. Sand capital and operating cost	$31.1 million
3. Disposal facility capital and operating cost (including trucking) for 219,000 cy	$200.2 million
Total Capital Costs	**$283.2 million**

G.4.8 GROUTING

Grouting Effectiveness – Good. Introduction of grout materials with sufficient structural strength into the process equipment at the disposal cell would prevent subsidence indefinitely. This process option, however, does nothing to reduce the overall process equipment volume placed in the disposal facility.

Grouting Implementability – Very Good. Grouting can be implemented during normal disposal facility operations, and it could avoid or minimize additional equipment movement for processing. Grouting is not as labor-intensive as the segmentation process options. It is applicable to both converters and compressors.

Grouting does require the installation of heavier plates to seal the equipment from the pressures of the grout. Also, introduction of the grout requires the cutting of access ports in the equipment. Vent ports are also required, and contamination control filters must be attached. Cold weather grouting requires additional curing measures to assure solidification.

Placement of the equipment in the disposal facility could require additional equipment, depending on the location of the grouting. After placement, special efforts to fill and compact around the equipment would be necessary. Grouting operations at the disposal facility would also be somewhat weather dependent because grouting would cease during rain or snow events.

Grouting Costs. Grouting has some significant material costs, but comparatively little capital cost for processing equipment. Costing for this process option assumes plates, cutting of injection and vent holes during equipment removal, and grout injection (as opposed to gravity flow). Placement would involve crane movement for all equipment. The costs are as follows:

1. Removal, including installation of plates, injection ports, and vent ports	$51.9 million
2. Grouting capital and operating cost	$35.3 million
3. Disposal facility capital and operating cost (including trucking) for 219,000 cy	$200.0 million
Total Capital Costs	**$287.2 million**

G.4.9 SURROUND WITH CONCRETE FILL

Surround with Concrete Fill Effectiveness – Fair. The effectiveness of surrounding the process equipment with concrete fill is based on verification of two factors: (1) the ability of concrete fill to inhibit corrosion of the external steel surfaces for the design life of the disposal facility cap, and (2) the strength of the unfilled process equipment to withstand the structural pressures of the disposal facility. Surrounding with concrete does not reduce the total in situ process equipment and piping volume (219,000 cy) destined for the disposal facility.

Research shows that corrosion inhibition of concrete for oxidation of steel is significantly slower than for soils. If this slower reaction is more than a factor of 4 to 6, then it is possible for the process equipment encased in concrete fill to survive without rusting away and collapsing for the design life of the disposal facility cap.

Although the equipment strength would have to be confirmed with calculations, the cylindrical shapes of the major equipment are sufficiently similar to those of large corrugated piping (21 ft in diameter) tested at significant burial depths (up to 75 ft), which showed that the piping could potentially support the soil pressure with minimal deflection (< 5 percent) (Ohio Department of Transportation [ODOT] 2004).

Surround with Concrete Implementability – Fair. This process option's implementability is dependent upon a ready source of concrete fill, such as the concrete rubble from the process building floors and slabs. This presents a logistics problem because the process equipment would be available for burial and require staging in the process buildings well before the concrete is rubblized, at least for the first process building demolished. Concrete rubble from other demolished buildings could be used, but it would likely be deficient in quantity (nominally 10,000 - 25,000 cy would be required initially). It would also require a segregation effort to extract the concrete rubble from other D&D waste.

If available, this process option offers a direct equipment placement technique that avoids all specific processing and movements other than the initial logistics of obtaining sufficient concrete fill for placement around the equipment.

Surround with Concrete Costs. This process option has the second lowest capital and operating costs of all of the process options, assuming concrete fill is available. The costs are as follows:

1. Removal	$47.7 million
2. Concrete rubblization	$31.3 million
3. Disposal facility capital and operating cost (including trucking) for 219,000 cy	$200.0 million
Total Capital Costs	**$279.0 million**

G.4.10 CORROSION-INHIBITING EXTERNAL FIXATIVE

Corrosion Fixative Effectiveness – Fair. This process option's effectiveness is fair, provided the fixative can withstand the burial process, and has a design life that is a significant fraction of the cap design life. As with the previously discussed concrete-fill process option, the ability of the unfilled process equipment to withstand the structural pressures of the disposal facility is a necessary element of its effectiveness. There is no reduction in volume of the process equipment with this option. External fixatives have not been used by DOE as a method of corrosion inhibition in disposal facilities.

Corrosion Fixative Implementability – Very Good. Fixatives would be easy to implement if effective spray technologies can be developed. Such technologies must provide sufficient coverage and thickness to ensure the corrosion inhibitor would not degrade within the design life of the disposal facility. If viable as a spray, the optimum method for implementing this process option would be spraying in place prior to removal, spraying at a local spraying station in the process buildings before movement to a disposal facility, or spraying at the disposal facility prior to placement. If the inhibitor requires more aggressive application (surface preparation, dipping, two-part application), then these methods would require development, and the equipment may have to be moved to a processing area similar to the one for the segmentation process options.

Corrosion Fixative Costs. The costs are somewhat uncertain and are dependent on design requirements such as containment and method of application. It is assumed for this study that surface preparation is not required and that spray gun application is possible. Curing times are assumed to be several hours, allowing application in an assembly line method. This approach would be best performed in place inside the cell enclosures just before cutting and capping for removal, or immediately afterwards. The costs are as follows:

1. Removal	$38.0 million
2. Fixative application capital and operating costs	$19.9 million
3. Disposal facility capital and operating cost (including trucking) for 219,000 cy	$200.0 million
Total Capital Costs	**$257.8 million**

Table G.4 provides an evaluation summary for the previously discussed subsidence avoidance process options.

Table G.4. Summary of the Subsidence Avoidance Process Option Evaluation for PORTS

Void Reduction Process Option	Effectiveness	Implementability	Capital Cost
Segmentation to small size	Pro – Waste would be similar to construction debris; eliminates large majority of void Con – Tubing would be intact for short lengths; would be many curved surfaces that do not nest well in packages or landfill Good effectiveness	Pro – Currently in use; facilitates material removal if necessary; allows segregation of classified materials; achieves ability to cover disposal lifts; reduces process equipment volume in disposal facility from 219,000 cy to 60-70,000 cy Con – Extensive labor; hot cutting is a safety risk; double handling; processing classified equipment is a security risk; requires some new fixtures Good Implementability	Pro – Existing space and equipment; support and documentation largely in place; people are trained Con – Removal and segmentation are both labor-intensive $227 million
Shearing In Place	Pro – Would be demolition waste; eliminates large majority of void Con – Not applicable to converters Good effectiveness	Pro – Same equipment as used to shear structural steel in field; waste shipped with other building waste; significantly reduces pre-demolition equipment removal and segmentation. Improved safety. Reduces process equipment volume to 60-70,000 cy Con – Contamination would spread if not fixed/foamed Excellent Implementability	Pro – Avoids removal, movement, and segmentation (but not cutting) of all equipment and piping except converters Con – Increases demolition equipment and labor costs; adds capital and labor cost of fixation equipment; still requires segmentation of converters $204 million

Table G.4. Summary of the Subsidence Avoidance Process Option Evaluation for PORTS (Continued)

Void Reduction Process Option	Effectiveness	Implementability	Capital Cost
Compaction	Pro – Eliminates large majority of void; would crush tubing Con – Requires partial segmentation to enter compactor throat; curved heavy metal plate may not compact totally, leaving void Very good effectiveness	Pro – Same as segmentation; less hot cutting required Con – Same as segmentation but less cutting required; converter bundles must be handled separately; compaction is new operation, has new safety concerns, and is single point constraint if not operating; facility construction; 12 to 18 months to operation start Fair Implementability	Pro – Reduces segmentation to disassembly and segmentation to fit compactor; reduces disposal facility size and placement cost slightly from segmentation process option Con – Not viable for converters; double handling; construction and operating cost of compactor $220 million
Shredding	Pro – Eliminates large majority of void; good uniform waste matrix; mixes easily with fill Con – Requires partial segmentation to enter shredder throat; expands volume of plate steel walls Very good effectiveness	Pro – Same as compaction Con – Same as compaction Fair implementability	Pro – Reduces disposal facility size and placement cost slightly from segmentation process option Con – Increases amount of segmentation slightly; double handling; construction and operating cost of shredder $227 million
Melting	Pro – Eliminates all void Con – Requires partial segmentation to enter melter Excellent effectiveness	Pro – Same as compaction; eliminates classification constraints with processed waste Con – Same as compaction but greater safety issues; 2 to 4 years to operation start Fair implementability	Pro – Reduces disposal facility size and placement cost considerably from segmentation process option Con – Increases segmentation cost slightly to fit melter; double handling; construction and operating cost of melter $513 million

Table G.4. Summary of the Subsidence Avoidance Process Option Evaluation for PORTS (Continued)

Void Reduction Process Option	Effectiveness	Implementability	Capital Cost
Foaming	Pro – Fills large majority of void Con – Does not appreciably enter tubes; fills void, does not eliminate it Good effectiveness	Pro – Allows pipe shearing during demolition; provides effective contamination control; avoids classified segmentation; avoids all movement and effort of other processes Con – Must foam after cutting; additional equipment movement during demolition; requires equipment placement and filling around in disposal facility; would not apply to surge drums (continue to segment) Good implementability	Pro – Avoids all equipment removal (but not cutting) and segmentation except surge tanks; avoids equipment movement to processing Con – Requires additional foam holes in equipment; adds capital, material, and operating cost of foaming $397 million
Sand	Pro – Fills majority of voids Con – Does not appreciably enter tubes; requires filling at or near disposal facility; fills void, does not eliminate it Good effectiveness	Pro – Potentially single move to disposal; equipment preparation minimal; not labor-intensive; avoids classified segmentation; sand operations can be constructed during disposal facility construction Con – Requires placement and filling around in disposal facility; material must be kept dry; material takes up disposal cell space; not as effective as grout in reducing voids; would not apply to surge drums (continue to segment) Good implementability	Pro – Avoid segmentation costs for most of the equipment; avoid movement to segmentation Con –adds capital, material, and operating cost of sand filling $283 million
Grouting	Pro – Fills majority of void; provides long term structural stability Con – Same as sand Good effectiveness	Pro – Same as sand Con – Requires placement and filling around in disposal facility; material takes up disposal cell space; cold weather grouting requires additional curing measures; would not apply to surge drums (continue to segment) Very good implementability	Pro – Same as sand Con – adds capital, material, and operating cost of grouting $287 million

Table G.4. Summary of the Subsidence Avoidance Process Option Evaluation for PORTS (Continued)

Void Reduction Process Option	Effectiveness	Implementability	Capital Cost
Surround with Concrete Fill	Pro – Protects against subsidence Con – Corrosion inhibition for design life not technically proven; does not eliminate void Fair effectiveness	Pro – Eliminates need for additional move and segmentation; provides use for concrete fill waste; avoids classified segmentation Con – Introduces logistics of managing concrete; requires placement and fill in disposal facility; likely not logical for surge drums Fair implementability	Pro – Avoids all equipment removal (but not cutting) and segmentation except surge tanks; avoids equipment movement to processing Con – Requires special processing of concrete beyond that for normal demolition $280 million
Corrosion-inhibiting external fixative	Pro – Protects against subsidence Con – Corrosion inhibition for design life not technically proven; does not eliminate void Fair effectiveness	Pro – Eliminates need for additional move and segmentation; avoids classified segmentation Con – Introduces external fixation process before removal; requires placement and fill in disposal facility; likely not logical for surge drums Very good implementability	Pro – Avoids all equipment removal (but not cutting) and segmentation except surge tanks; avoids equipment movement to processing Con – Adds capital and operating cost for external fixation $258 million

G.5. SUMMARY

Numerous potential process options and approaches can be used to minimize future subsidence in a potential OSDC. An evaluation of the effectiveness, implementability, and cost of the process options that could be applied to the waste shows that some of the options are not viable for further consideration at PORTS. Those process options with a high reliance on newly designed and constructed facilities such as a compactor, shredder, or melter are no longer considered viable because of the increased schedule delays that would occur as a result of designing these facilities, constructing them, and training a work force to operate them. More importantly, these facilities could add additional costs with only a minimal improvement in effectiveness over segmentation or shearing to reduce voids and prevent subsidence. A compactor was shown to be effective in Oak Ridge, and the extra costs for the compactor could be offset by a reduction in the volume disposed on Site, but the schedule delays for design and construction are still considerations. These process options were summarized and screened out in Section 7 of the waste disposition Remedial Investigation/FS Report.

The other process options not considered to be viable are the corrosion inhibition process options. This is attributed to significant uncertainty about their long-term effectiveness. The tests necessary to demonstrate their ability to prevent equipment degradation for the required 1,000 years have not been performed. Tests to duplicate the uncertain environment of a disposal cell would be very difficult to

design. Although these process options are much less expensive and easier to implement than all of the others, they are no longer considered for application at PORTS.

The two cutting options (segmentation using workers and shearing using heavy equipment) and the three filling process options remain viable for further consideration in the process building FS for PORTS. It is expected that all process equipment containing deposits or excessive deposition that would represent a criticality concern or exceed the disposal facility WAC would be removed, disassembled to remove uranium materials to abate the concern, and then segmented using workers to small pieces for disposal using the segmentation-to-small-size process option. Based on the existing NDA data, this process will be used on only a small percentage (less than 10 percent) of the process equipment.

Two representative process options for the majority of the remaining process equipment are selected for the equipment not requiring segmentation for deposit removal; grout filling and shearing. These process options will be used in the process building FS to develop alternatives. The other filling process options could be reconsidered during design as well as other techniques to control subsidence.

Grout filling is selected as the representative process option for subsidence avoidance of the major process equipment in the FS. In this scenario, the majority of the process equipment (compressors, converters, coolers) would be removed before demolition. The majority of the equipment would be transported to a staging area or a potential OSDC where they would be filled with grout. This process option avoids the large amount of effort, safety issues, and cost involved with disassembly and segmentation of the converters, compressors, and coolers to small size.

Shearing will be the representative process option in the FS for subsidence avoidance of the piping and valves. The piping and valves in the cell and unit bypasses would be sheared into waste during demolition of the process buildings. This option significantly reduces the amount of manual pipe cutting necessary for D&D and is much more cost-effective than filling.

The combined use of segmentation, shearing, and grout filling results in a safe and cost-effective method of preparing the process equipment and piping for disposal, one that recognizes the various equipment designs. It is effective in avoiding subsidence by filling or destructing the voids in the process gas equipment. Implementing these process options is reasonable because all of them have been used in demolition of like uranium enrichment buildings and equipment. This combination of representative process options will allow the FS to present a fair analysis of the impacts of avoiding subsidence at a potential OSDC by additional handling of the waste.

G.6. REFERENCES

ODOT 2004, *Pressure Distribution Around a Metal Pipe Under Deep Cover*, FHWA/OH-2004/019, Office of Research & Development, Executive Summary Report, December.

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ATTACHMENT G.1: BASIS OF ESTIMATES

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Estimates have been for comparison purposes only between possible process options. To the extent practical, existing estimates have been utilized, with adjustment to escalated dollars based on the schedule for process building decontamination and decommissioning (D&D). No contingency has been applied. If existing estimates are mostly applicable but require minor reductions or additions, those modifications are described in the basis to estimate the process option costs. Some estimates are based on existing experience and productivity factors from other D&D activities or based on communications from other D&D projects.

The scope for all estimates is assumed to be all of the X-330 and X-333 converters and compressors, but not the X-326 converters and compressors which are currently planned to be disposed off Site without processing (see Tables G.1 and G.2 in the main appendix text).

Segmentation to Small Size

Removal

1. Used the estimate for converter and compressor removal costs in escalated dollars from Appendix F of the process building Remedial Investigation/Feasibility Study (RI/FS) estimate for D&D work breakdown structures (WBSs) EM.PO.04.01.01.02.12 for X-333 and EM.PO.04.01.02.02.12 for X-330. Included cutting, capping, and movement to facility exit. Assume all piping or other process equipment removal in these estimates is minimal and within the accuracy of the estimate.

Movement

2. Used waste transport to on-Site disposal cell (OSDC) in RI/FS estimate for equivalent movement of components to X-700 and X-705 facilities for disassembly and segmentation. Escalated rate per cubic yard to the midpoint of X-330 and X-333 deactivation (assumed fiscal year [FY] 2019). Applied rate per in situ cubic yard for 219,000 cy of converters and compressors.

Disassembly and segmentation systems capital and operating cost

3. Used the estimate for refurbishment and capital modifications to disassemble and segment X-330 and X-333 converters and compressors from the process building RI/FS, Appendix F, Sensitivity Analysis of D&D with Off-Site Disposal of Wastes under process building D&D WBS PORTS: EM.PO.04.01.02.02.05 X-330 – X-700 Refurbishment. Costs are in escalated dollars.

4. Used the estimate for operating costs to disassemble and segment all of the X-330 and X-333 converters and compressors from the process building RI/FS, Appendix F, Sensitivity Analysis of D&D with Off-Site Disposal of Wastes under process building D&D WBS PORTS: EM.PO.04.01.01.02.05 X-333 – Material Removal-Process Deposit Mat and Recover Nickel and EM.PO.04.01.02.02.05 X-330 – Material Remove-Process Deposit Mat and Recover Nickel. Costs are in escalated dollars.

Trucking of segmented materials

5. This cost is included in the disposal facility capital and operating costs below.

Disposal facility capital and operating cost for 66,000 cy

6. Used the waste disposition RI/FS cost estimate for planning, design, capital construction, operating, and closure costs (but not long-term surveillance and maintenance) divided by the total waste volume to be disposed (1,300,000 cy) to determine a total disposal cost per cubic yard of waste. Escalated this rate per cubic yard to the midpoint of X-330 and X-333 deactivation (assumed FY 2019). Applied the rate per processed cubic yard for 66,000 cy of segmented converters and compressors.

Shearing in Place

Removal (X-330 and X-333 converters and cutting and capping compressors)

1. Used the removal estimate for Segmentation to Small Size. Note the adjustment in item 2 below.

Fixation with CCFix® (compressors only, not converters)

2. Assumed the cutting included with Removal above makes the compressors accessible for introduction of fixative. Application of the fixative inside the compressors will increase the removal labor costs by 15 percent but will avoid the lifting and crane transport of the compressors to the crane hatches for transport (assumed to be 8 percent of the removal cost). Therefore, the net labor increase for compressor fixative is 7 percent of the removal labor cost.

3. Added fixation equipment (electric-powered spray machines with hose delivery), total of three with two spares. Added material costs of $1/sq ft coated. Assumed compressors are 65,000 cy, and the conversion factor is 0.5 sq ft/cf. This equals 878,000 sq ft and is conservative because of the amount of equipment surface inaccessible for coating.

Movement (X-330 and X-333 converters)

4. Used Waste Transport to OSDC in RI/FS estimate for equivalent movement of converters to the X-700 facility for disassembly and segmentation. Escalated rate per cubic yard to the midpoint of X-330 and X-333 deactivation (assumed FY 2019). Applied rate per in situ cubic yard for 154,000 cy of converters.

Disassembly and segmentation systems (X-330 and X-333 converters) capital and operating cost

5. Used the estimate for refurbishment and capital modifications to disassemble and segment X-330 and X-333 converters from the process building RI/FS, Appendix E, Cost Estimate under process building D&D WBS PORTS: EM.PO.04.01.02.02.05 X-330 – X-700 Refurbishment. Costs are in escalated dollars.

6. Used the estimate for operating costs to disassemble and segment all of the X-330 and X-333 converters from the process building RI/FS, Appendix E, Cost Estimate under process building D&D WBS PORTS: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel and EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel. Costs are in escalated dollars.

Shearing of compressors in place

7. Used the cost estimates for X-330 and X-333 Building Demolitions in the process building RI/FS, Appendix E, Cost Estimate, WBSs EM.PO.04.01.01.03.03 and EM.PO.04.01.02.03.03. Assumed that compressor density and complexity would increase the demolition effort by 50 percent for the cubic yards of compressors over the average cubic yard of building waste. The total cubic yards in situ of X-330 and X-333 building waste (excluding slabs and underground structures and piping) is 426,000 cy. Used the demolition estimates divided by the waste volume to determine the rate per cubic yard. Increased this rate by 50 percent and applied it to 65,000 cy of compressors. Costs are in escalated dollars.

Trucking of sheared materials (and segmented X-330 and X-333 converters)

8. This cost is included in the disposal facility capital and operating costs below.

Disposal facility capital and operating savings for 66,000 cy

9. Used the waste disposition RI/FS cost estimate for planning, design, capital construction, operating, and closure costs (but not long-term surveillance and maintenance) divided by the total waste volume to be disposed (1,300,000 cy) to determine a total disposal cost per cubic yard of waste. Escalated this rate per cubic yard to the midpoint of process building D&D (assumed FY 2019). Applied the rate per processed cubic yard for 66,000 cy of segmented converters and sheared compressors.

Compaction

Removal

1. Same estimate as segmentation.

Movement

2. Same estimate as segmentation.

Disassembly and segmentation systems (X-330 and X-333 converters and compressors) capital and operating cost

3. Used segmentation estimate, but reduced the operating cost by 5 percent for less segmentation required to fit compactor throat.

Compaction capital and operating cost (including movement)

4. Assumed two compactors similar to those estimated in the Critical Decision-1 estimate. Added 30 percent for supporting equipment and materials. Escalated to the midpoint of capital construction (assumed FY 2015).

5. For additional compactor operations, added one foreman, six D&D laborers, four D&D workers, and four rad techs for duration of operation (assumed 6 years). Added 20 percent for support equipment and materials beyond compactors. Escalated to the midpoint of process building D&D (assumed FY 2019).

Trucking of compacted materials (and segmented converter bundles)

6. This cost is included in the disposal facility capital and operating costs below.

Disposal facility capital and operating savings for 45,000 cy

7. Used same approach as segmentation except for 45,000 cy.

Shredding

Removal

1. Same estimate as segmentation.

Movement

2. Same estimate as segmentation.

Disassembly and segmentation systems (X-330 and X-333 converters and compressors) capital and operating cost

3. Used segmentation estimate, but increased segmentation operations cost by 5 percent for additional segmentation necessary to meet shredder throat size.

Shredding capital and operating cost (including movement)

4. Used the shredding automated sorting process white paper as a cost basis with the changes below. Assumed classified shredding would add a single shredder and conveyor equal to the secondary shredder.

5. Deducted the cleaning station, eddy current separator, ferrous sorting belts, nonferrous sorting belts, and radiation detection and monitoring allowance.

6. Removed contingency and escalated to the midpoint of capital construction (assumed FY 2015).

7. For shredding operations, added one foreman, six D&D laborers, four D&D workers, and four rad techs for duration of operation (assumed 6 years). Added 20 percent for support equipment and materials beyond shredding equipment. Escalated to the midpoint of process building D&D (assumed FY 2019).

Trucking of compacted materials

8. This cost is included in the disposal facility capital and operating cost below.

Disposal facility capital and operating savings for 35,000 cy

9. Used same approach as segmentation except for 35,000 cy.

Melting

Removal

1. Same estimate as segmentation.

Movement

2. Same estimate as segmentation.

Disassembly and segmentation systems (X-330 and X-333 converters and compressors) capital and operating cost

3. Used segmentation estimate with changes below.

4. Increased the segmentation operations cost for converters and compressors by 10 percent for more cuts required.

Melting capital and operating cost (including movement)

5. Used *Cost Estimate to Meet CERCLA Needs Related to Constructing a Melter Thermal Waste Treatment Alternative* (Restoration Services, Inc. [RSI] 2011) for capital costs. Added an additional 5-ton melter for barrier. For operating costs, used shredder operating costs plus 10 percent. Escalated to the midpoint of capital construction (assumed FY 2015).

6. Used the following assumptions for melting operations costs. Assumed a standalone facility with full operations support. Labor costs included one project manager, three engineers, three health and safety specialists, one radiological engineer, five rad techs, one quality specialist, two quality techs, two waste management specialists, two foremen, five waste management workers, four laborers, three equipment operators, two mechanics, two electricians, and one truck driver. Assumed materials and equipment costs at 30 percent of labor costs. Assumed facility power costs are 4 megawatts on

average. Assumed subcontract costs are $500,000 annually. Escalated to the midpoint of process building deactivation (assumed FY 2019).

Trucking of melted materials

7. This cost is included in the disposal facility capital and operating cost below.

Disposal facility capital and operating savings for 15,000 cy

8. Used same approach as segmentation except for 15,000 cy.

Foaming

Cutting and preparation

1. Used segmentation process option removal costs. Added three additional D&D workers each to three crews for the period of D&D deactivation. Assumed the personnel associated with rigging and moving the equipment and piping, plus the three additional workers per crew, will now be dedicated to the foaming process after cutting and installing caps on the equipment and piping.

Installation of plates, foam injection ports, and vent ports

2. Additional cutting for foam holes adds one additional D&D worker and one additional high-lift platform to each of the three removal crews for the period of D&D deactivation.

3. Plates must be sheet metal and be taped or epoxy-attached, not covered with plastic. Added one D&D worker for each of the three removal crews. Increased material costs for 3,548 converters and compressors by $700 each.

Foam capital and operating cost

4. Capital cost for foaming assumed as one foaming unit for the three removal crews plus two spares at $75,000 per unit (total of five), heated foam storage units (three each) at $30,000, four each 5,000-lb forklifts, and two additional high-efficiency particulate air units per crew (total of six).

5. Material cost for foam assumed as $500 (FY 2013 dollars) per cy foamed. Conservatively, assumed all 219,000 cy are foamed.

6. Operating costs for foaming are included in the cutting estimate above. Foaming support costs for all the removal crews assumed as two D&D workers and one equipment operator for movement and control of foam materials for each crew for the period of D&D deactivation.

Movement to disposal facility

7. This cost is included in the disposal facility capital and operating cost below.

Disposal facility capital and operating cost for 219,000 cy

8. Used same approach as segmentation except for 219,000 cy. Added disposal facility capital and operating costs for a 100-ton crane for the period of D&D deactivation.

Sand Filling

Removal

1. Used the same estimate as segmentation. Adjusted for different plate strengths and ports in next item.

Installation of plates, pouring, and vent ports

2. Added 30 percent additional labor (including the cleared workers for converters) to removal and movement to install heavier plates, and to cut and temporarily seal pour and vent ports.

3. Added material costs of $1,200/component for 3,548 converters and compressors for heavier bracing on large plates and fabrication costs for port seals.

Movement to disposal facility

4. This cost is included in the disposal facility capital and operating cost below.

Sand capital and operating cost

5. Assumed design and construction of a covered materials storage area for 1,000 cy of sand. Assumed use of front end loaders for loading sand into dump trucks.

6. Assumed dry materials for 219,000 cy of sand, two front end loaders, and two 5,000-lb forklifts.

7. Major equipment to handle the process gas equipment and piping assumed to be two trucks, two 25-ton forklifts, and one 100-ton mobile crane. Escalated to the midpoint of capital construction (assumed FY 2015).

8. Operations personnel assumed to be one supervisor, one foreman, four waste management workers, three equipment operators, two craftsmen, and two rad techs for a period of 6 years (length of X-330 and X-333 deactivation). Escalated to the midpoint of process building deactivation (assumed FY 2019).

Disposal facility capital and operating cost for 219,000 cy

9. Used same approach as segmentation except for 219,000 cy. Added disposal facility capital and operating costs for a 100-ton crane and two sand auger conveyors for the period of D&D deactivation.

Grouting

Removal

1. Used the same estimate as segmentation. Adjusted for different plate strengths and ports in next item. Installation of plates, injection ports, and vent ports.

2. Added 30 percent additional labor (including the cleared workers for converters) to removal and movement to install heavier plates, injection ports, and vent ports.

3. Added material costs of $1,200 each for 3,548 converters and compressors for heavier bracing on large plates and fabrication costs for injection and vent ports.

Movement to disposal facility

4. This cost is included in the disposal facility capital and operating costs below.

Grouting capital and operating cost

5. Used the process building RI/FS D0 cost estimate for grouting at the OSDC. Removed the estimates for movement and trucking (included elsewhere in this estimate).

Disposal facility capital and operating cost for 219,000 cy

6. Used same approach as segmentation except for 219,000 cy. Added disposal facility capital and operating costs for a 100-ton crane for the period of D&D deactivation.

Surround with Concrete Fill

Removal

1. Used the same estimate as segmentation. Adjusted for heavy plate installation in the next item.

2. Added 20 percent additional labor (including the cleared workers for converters) to Removal to install heavier plates.

3. Added material costs of $900 each for 3,548 converters and compressors costs for heavier bracing on large plates.

Concrete rubblization and staging

4. For an in situ equipment and piping volume of 219,000 cy, the as-placed volume was assumed to be nominally 360,000 cy; therefore, assumed that 141,000 cy of rubblized concrete fill is required. Used 160,000 cy for edge effects. Because concrete is already part of the D&D waste, the process option estimate used assumption to segregate, process, and manage it for use as fill around the equipment.

5. Segregation assumed to be with one track-mounted machine outfitted with a grappler and one front end loader to remove concrete slabs and chunks. Processing assumed to be with two track-mounted machines outfitted with concrete pulverizers (this is because of the rate of generation; if faster is required, then add a concrete crusher) and two front end loaders. Trucks and drivers for movement of concrete fill are already included in the D&D estimate.

6. Labor and materials cost included one supervisor, one foreman, seven equipment operators, two D&D workers, three craftsmen (maintenance), and two rad techs for the period of D&D deactivation. Material costs included pulverizer teeth changeout each 500 cy and maintenance contracts on equipment.

Movement to disposal facility

7. This cost is included in the disposal facility capital and operating costs below.

Disposal facility capital and operating cost for 219,000 cy

8. Used same approach as segmentation except for 219,000 cy. Added disposal facility capital and operating costs for a 100-ton crane.

Corrosion-Inhibiting Fixative

Removal

1. Same estimate as segmentation.

Fixative application capital and operating costs

2. Added two additional D&D workers, two laborers, and one equipment operator to each of the three removal crews for converters and compressors. These personnel assumed to be dedicated to the fixation process after cutting and installing caps on the equipment.

3. Added coating equipment (electric-powered spray machines with hose delivery), one per cutting/coating crew with two spares for a total of five. Added material costs of $4/sq ft coated. Assumed process equipment is 219,000 cy and the conversion factor is 0.5 sq ft/cf because of the larger diameters. This equals 3.0 million sq ft.

Movement to disposal facility

4. This cost is included in the disposal facility capital and operating cost below.

Disposal facility capital and operating cost for 219,000 cy

5. Used same approach as segmentation except for 219,000 cy. Added disposal facility capital and operating costs for a 100-ton crane.

REFERENCE

RSI 2011, *Cost Estimate to Meet CERCLA Needs Related to Constructing a Melter Thermal Waste Treatment Alternative*, RSI/PORTS-187 (Rev. 0), Prepared for the U.S. Department of Energy, Portsmouth/Paducah Project Office, Lexington, KY, April.

ATTACHMENT G.2: SEGMENTATION TO SMALL SIZE COST ESTIMATE

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SEGMENTATION TO SMALL SIZE

PROJ. ESTIMATOR: C. Oldham

TITLE Segmentation to Small Size — PROJECT LOCATION: Portsmouth, Ohio — DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis) for both converter and compressor removal														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
													EQUIPMENT REMOVAL TOTAL		**$ 37,957,687**
	MOVE EQUIPMENT TO X-700/X-705														
1	Use Estimate Assembly No XWST 1060R1 (Transport Debris in Articulated Dump) for cost per cy in FY 13 dollars	219,000	CY		0			0		0		0	22.48	4,922,479	4,922,479
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										4,922,479	753,139	753,139
													MOVEMENT TOTAL		**$ 5,675,619**

SEGMENTATION TO SMALL SIZE

													PROJ. ESTIMATOR:	C. Oldham	
TITLE	Segmentation to Small Size			PROJECT LOCATION:	Portsmouth, Ohio								DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	DISASSEMBLY AND SEGMENTATION														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.02.02.05 X-330 - X-700 Refurbishment Total	1	EA		256,979			14,288,014		7,182,555		4,550,730		0	26,021,300
2	WBS Ports: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel Total	1	Lot		513,128			29,176,434		9,729,675		998,236		0	39,904,345
3	WBS Ports: EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel Total	1	Lot		711,540			39,561,648		11,591,495		6,427,533		0	57,580,675
											DISASSEMBLY AND SEGMENTATION TOTAL				$ 123,506,320
	DISPOSAL FACILITY-(Includes Trucking)														
1	Use summary cost estimate (without long- term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	66,000	CY		0			0		0		0	784	51,744,000	51,744,000
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										51,744,000	7,916,832	7,916,832
												DISPOSAL FACILITY TOTAL			59,660,832
												SEGMENTATION TOTAL			$ 226,800,458

ATTACHMENT G.3: SHEARING IN PLACE COST ESTIMATE

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SHEARING IN PLACE

TITLE	Shearing in Place			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
3	Coating Equipment --- Electric powered spray machines with hose delivery (1 ea). Assume 3 each required including 2 each spares.	3	Ea		0			0		0	5,000	15,000	0	0	15,000
4	Fixation material for compressors only--CCFix at $1.00 / SF ($1.15 escalated) of coated surface	878,000	SF		0			0	1.15	1,009,700		0	0	0	1,009,700
5	Increased labor to apply fixation material to compressors, assume increase of 7% of X-330 and X-333 Equipment Removal labor cost above - (12,005,899 + 18,178,253) X .07 = $2,112,891	1	Lot		0			2,112,891		0		0	0	0	2,112,891
												EQUIPMENT REMOVAL TOTAL			$ 41,095,278

SHEARING IN PLACE

TITLE	Shearing in Place			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	MOVE EQUIPMENT TO X-700/X-705														
1	Use Estimate Assembly No XWST1060R1 (Transport Debris in Articulated Dump) for cost per cy in FY 13 dollars for movement of converters	154,000	CY		0			0		0		0	22.48	3,461,470	3,461,470
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										3,461,470	529,605	529,605
													MOVEMENT TOTAL		**$ 3,991,074**
	DISASSEMBLY AND SEGMENTATION														
	Use estimates prepared in Process Building RI/FS Cost Estimate (See Appendix F) for converter segmentation only														
1	WBS Ports: EM.PO.04.01.02.02.05 X-330 - X-700 Refurbishment Total	1	EA		232,560			12,930,330		6,500,050		4,118,308		0	23,548,687
2	WBS Ports: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel Total	1	Lot		346,589			19,707,074		8,189,943		1,866,495		0	29,763,511
3	WBS Ports: EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel Total	1	Lot		460,199			25,587,086		8,178,769		3,410,517		0	37,176,372
											DISASSEMBLY AND SEGMENTATION TOTAL				**$ 90,488,571**

SHEARING IN PLACE

													PROJ. ESTIMATOR:		C. Oldham	
TITLE	Shearing in Place			PROJECT LOCATION:		Portsmouth, Ohio							DATE:		July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)	
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE		
	SHEARING OF COMPRESORS IN PLACE															
	Use proration of demolition estimates prepared in Process Building RI/FS document (See Appendix F)															
	WBS Ports: EM.PO.04.01.01.03.03 X-333 - Building Demolition Total													19,880,301		
	WBS Ports: EM.PO.04.01.02.03.03 X-330 - Building Demolition Total													17,192,941		
										BUILDING DEMOLITION SUBTOTAL				37,073,241		
1	COMPRESSOR SHEARING COST: Building demolition cost of $37,073,241 is for a total waste volume of ~426.000 cy equating to a cost of $87.03/cy Assume compressor shearing at a 50% increase or $130.55/cy. Compressor volume is ~65,000 cy .	65,000	CY										130.55	8,485,750	8,485,750	
										SHEARING OF COMPRESORS IN PLACE TOTAL					$ 8,485,750	
	DISPOSAL FACILITY-(includes Trucking)															
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	66,000	CY		0			0		0		0	784	51,744,000	51,744,000	
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										51,744,000	7,916,832	7,916,832	
												DISPOSAL FACILITY TOTAL			59,660,832	
												SHEAR IN PLACE TOTAL			$ 203,721,505	

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ATTACHMENT G.4: COMPACTION COST ESTIMATE

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COMPACTION

PROJ. ESTIMATOR: C. Oldham

TITLE Compaction PROJECT LOCATION: Portsmouth, Ohio DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis) for removal of converters and compressors.														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
													EQUIPMENT REMOVAL TOTAL		**$ 37,957,687**
	MOVE EQUIPMENT TO X-700/X-705														
1	Use Estimate Assembly No XWST 1060R1 (Transport Debris in Articulated Dump) for cost per cy in FY 13 dollars	219,000	CY		0			0		0		0	22.48	4,922,479	4,922,479
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										4,922,479	753,139	753,139
													MOVEMENT TOTAL		**$ 5,675,619**
	DISASSEMBLY AND SEGMENTATION														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														

COMPACTION

TITLE	Compaction			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
1	WBS Ports: EM.PO.04.01.02.02.05 X-330 - X-700 Refurbishment Total	1	EA		256,979			14,288,014		7,182,555		4,550,730		0	26,021,300
2	WBS Ports: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel Total	1	Lot		513,128			29,176,434		9,729,675		998,236		0	39,904,345
3	WBS Ports: EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel Total	1	Lot		711,540			39,561,648		11,591,495		6,427,533		0	57,580,675
4	Reduction in Material Removal labor cost due to less Segmentation required to fit Compactor throat Assume 5% reduction.	1	Lot					(3,436,904)		0		0		0	(3,436,904)
											DISASSEMBLY AND SEGMENTATION TOTAL				$ 120,069,416
	COMPACTION-CAPITAL and OPERATING														
1	Compaction equipment--procure and install--cost in FY 2015 $	2	EA		0			0		0		0	425,000	850,000	850,000
2	Supporting equipment and materials at 30% of equipment costs in FY 2015 $	1	Lot		0			0		0		0		255,000	255,000
	Compactor operations consisting of the following staff and material. Assume an operating duration of 6 years at 2,080 hrs/year /employee (12,480 hours)														
3	Foreman/supervisor	1	EA	12,480	12,480	SUP	56.68	707,366		0		0		0	707,366
4	Laborer (USW)	6	EA	12,480	74,880	LAB	44.50	3,332,160		0		0		0	3,332,160
5	D & D worker	4	EA	12,480	49,920	D/D	49.59	2,475,533		0		0		0	2,475,533
6	Radiological Control Tech	4	EA	12,480	49,920	R/T	44.64	2,228,429		0		0		0	2,228,429
7	Supporting materials and equipment for the above labor crew at 20% of labor costs	1	Lot		0			0		0		0		1,748,698	1,748,698
8	PPE Level D	187,200	Hrs						1.38	258,336		0		0	258,336
9	Indirects @ 12%	12.0%													1,422,663
														Subtotal	13,278,184
10	Operations Costs only:-Escalation to midpoint of X 333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										13,278,184	2,031,562	2,031,562

COMPACTION

TITLE	Compaction			PROJECT LOCATION:	Portsmouth, Ohio							PROJ. ESTIMATOR:	C. Oldham		
												DATE:	July 17, 2013		
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
											COMPACTION-CAPITAL and OPERATING TOTAL				$ 15,309,746
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	45,000	CY		0			0		0		0	784	35,280,000	35,280,000
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										35,280,000	5,397,840	5,397,840
												DISPOSAL FACILITY TOTAL			40,677,840
												COMPACTION TOTAL			$ 219,690,308

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ATTACHMENT G.5: SHREDDING COST ESTIMATE

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SHREDDING

TITLE	Shredding			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham	
													DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
													EQUIPMENT REMOVAL TOTAL		$ 37,957,687
	MOVE EQUIPMENT TO X-700/X-705														
1	Use Estimate Assembly No XWST 1060R1 (Transport Debris in Articulated Dump) for cost per cy in FY 13 dollars	219,000	CY		0			0		0		0	22.48	4,922,479	4,922,479
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										4,922,479	753,139	753,139
													MOVEMENT TOTAL		$ 5,675,619

SHREDDING

TITLE	Shredding			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	DISASSEMBLY AND SEGMENTATION														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.02.02.05 X-330 - X-700 Refurbishment Total	1	EA		256,979			14,288,014		7,182,555		4,550,730		0	26,021,300
2	WBS Ports: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel Total	1	Lot		513,128			29,176,434		9,729,675		998,236		0	39,904,345
3	WBS Ports: EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel Total	1	Lot		711,540			39,561,648		11,591,495		6,427,533		0	57,580,675
4	Increase in Material Removal labor cost due to more Segmentation required to meet Shredder throat size. Assume 5% increase	1	Lot					3,436,904		0		0		0	3,436,904
											DISASSEMBLY AND SEGMENTATION TOTAL				$ **126,943,224**
	SHREDDING-CAPITAL and OPERATING														
	The Capital Costs of this estimate are based on a "White Paper Study for a Shredding Automated Sorting Process" prepared by RSI in FY 2011 with modifications as noted below														
	CAPITAL COSTS														
1	Shredding equipment--procure and install-Capital cost Total in FY 2011 dollars	1	Lot		0			0		0		0		27,517,500	27,517,500

SHREDDING

TITLE: Shredding				PROJECT LOCATION: Portsmouth, Ohio									PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
2	Add a Shredder and Conveyor equal to the Secondary Shredder listed in the White Paper for shredding the classified waste. Use $650,000 for the Shredder plus $100,000 for the Conveyor plus $350,000 for the control station.	1	Lot											1,100,000	1,100,000
3	Deduct the Cleaning Station	1	EA		0			0		0		0		(50,000)	(50,000)
4	Deduct the Eddy Current Separator	1	EA		0			0		0		0		(200,000)	(200,000)
5	Deduct the Ferrous Sorting Belts	1	EA		0			0		0		0		(150,000)	(150,000)
6	Deduct the Non-Ferrous Sorting Belts	1	EA		0			0		0		0		(75,000)	(75,000)
7	Deduct the Rad Detection and sorting	1	EA		0			0		0		0		(10,000,000)	(10,000,000)
8	Remove Contingency cost	1	EA		0			0		0		0		(7,643,750)	(7,643,750)
	Subtotal														10,498,750
9	Capital cost-- Escalation-- FY 2011 to midpoint of facility construction --FY 2015 (4 years) @ 2.4%/year	10.0%	per cent										10,498,750	1,049,875	1,049,875
	Capital Total-Escalated $														11,548,625
	OPERATING COSTS														
	Assume Shredding operations consisting of the following staff and material. Assume an operating duration of 6 years at 2,080 hrs/ year /employee (12,480 hours)														
1	Foreman/supervisor	1	EA	12,480	12,480	SUP	56.68	707,366		0		0		0	84,884
2	Laborer (USW)	6	EA	12,480	74,880	LAB	44.50	3,332,160		0		0		0	3,332,160
3	D & D worker	4	EA	12,480	49,920	D/D	49.59	2,475,533		0		0		0	2,475,533
4	Radiological Control Tech	4	EA	12,480	49,920	R/T	44.64	2,228,429		0		0		0	2,228,429
5	Supporting materials and equipment for the above labor crew at 20% of additional labor costs	1	Lot		0			0		0		0		1,748,698	1,748,698
6	PPE Level D	187,200	Hrs						1.38	258,336		0		0	258,336
7	Indirects @ 12 %	12.0%													1,215,365
	Operating Total-FY 2013 $														11,343,404

SHREDDING

													PROJ. ESTIMATOR:	C. Oldham	
TITLE	Shredding			PROJECT LOCATION:	Portsmouth, Ohio								DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR UNIT MH	LABOR TOTAL MH	LABOR CRAFT	LABOR $/MH	LABOR $ VALUE	MATERIAL $/UNIT	MATERIAL $ VALUE	EQUIPMENT $/UNIT	EQUIPMENT $ VALUE	SUBCONTRACT or UNIT RATE $/UNIT	SUBCONTRACT or UNIT RATE $ VALUE	TOTAL ($)
8	Operations cost--Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										11,343,404	1,735,541	1,735,541
															13,078,945
	Operating Total-Escalated $														
											SHREDDING-CAPITAL and OPERATING TOTAL				$ 24,627,570
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	35,000	CY		0			0		0		0	784	27,440,000	27,440,000
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										27,440,000	4,198,320	4,198,320
												DISPOSAL FACILITY TOTAL			31,638,320
												SHREDDING TOTAL			$ 226,842,420

ATTACHMENT G.6: MELTING COST ESTIMATE

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MELTING

TITLE Melting				PROJECT LOCATION: Portsmouth, Ohio									PROJ. ESTIMATOR: C. Oldham DATE: July 17, 2013		
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
													EQUIPMENT REMOVAL TOTAL		$ 37,957,687
	MOVE EQUIPMENT TO X-700/X-705														
1	Use Estimate Assembly No XWST 1060R1 (Transport Debris in Articulated Dump) for cost per cy in FY 13 dollars	219,000	CY		0			0		0		0	22.48	4,922,479	4,922,479
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										4,922,479	753,139	753,139
													MOVEMENT TOTAL		$ 5,675,619

MELTING

TITLE Melting				PROJECT LOCATION: Portsmouth, Ohio										PROJ. ESTIMATOR: C. Oldham DATE: July 17, 2013		
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	DISASSEMBLY AND SEGMENTATION														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.02.02.05 X-330 - X-700 Refurbishment Total	1	EA		256,979			14,288,014		7,182,555		4,550,730		0	26,021,300
2	WBS Ports: EM.PO.04.01.01.02.05 X-333 - Material Removal-Process Deposit Mat and Recover Nickel Total	1	Lot		513,128			29,176,434		9,729,675		998,236		0	39,904,345
3	WBS Ports: EM.PO.04.01.02.02.05 X-330 - Material Remove-Process Deposit Mat and Recover Nickel Total	1	Lot		711,540			39,561,648		11,591,495		6,427,533		0	57,580,675
4	Increase in labor cost due to more cuts required during disassembly and segmentation. Assume 10% increase.	1	Lot					6,873,808		0		0		0	6,873,808
												DISASSEMBLY AND SEGMENTATION TOTAL			$ 130,380,128
	MELTING-CAPITAL and OPERATING														
	This estimate is based on Document RSI/PORTS-187, Rev 0 titled "Cost Estimate to Meet CERCLA Needs Related to Constructing a Melter Thermal Waste Treatment Alternative" prepared by RSI in FY 2011 with modifications as noted below														
	CAPITAL COSTS														
1	Capital cost of Designing and Constructing a 30-ton Melting Furnace Facility (in FY 2011 $) without Contingency.	1	Lot		0			0		0		0		192,207,020	192,207,020

MELTING

TITLE	Melting			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
2	Add a 5-ton Melting Furnace unit for Barrier and Security Sensitive waste. Assume 20% of the 30 Ton total cost.	1	Lot											38,441,404	38,441,404
	CAPITAL SUBTOTAL-FY 2011 $														230,648,424
3	Capital cost-- Escalation-- FY 2011 to midpoint of facility construction --FY 2015 (4 years) @ 2.4%/year	10.0%	per cent										230,648,424	23,064,842	23,064,842
	Capital Total-Escalated $														253,713,266
	OPERATING COSTS														
	Assume Melting Facility operations consisting of the following staff, materials, and utilities Assume an operating duration of 6 years at 2,080 hrs/year /employee (12,480 hours)														
1	Project Manager-Mid-FGG	1	EA	12,480	12,480	PM	99.94	1,247,254		0		0		0	1,247,254
2	Engineer-Jr-FGG	3	EA	12,480	37,440	ENG	67.90	2,542,176		0		0		0	2,542,176
3	Health and Safety Specialist	3	EA	12,480	37,440	H/S	29.57	1,107,101		0		0		0	1,107,101
4	Radiological Engineer	1	EA	12,480	12,480	R/E	53.37	666,095		0		0		0	666,095
5	Radiological Control Tech	5	EA	12,480	62,400	R/T	44.64	2,785,536		0		0		0	2,785,536
6	Quality Specialist	1	EA	12,480	12,480	Q/E	72.51	904,925		0		0		0	904,925
7	QA/QC Representative/Technician	2	EA	12,480	24,960	Q/T	48.98	1,222,541		0		0		0	1,222,541
8	Waste Management Specialist	2	EA	12,480	24,960	WM	57.60	1,437,609		0		0		0	1,437,609
9	Foreman/supervisor	2	EA	12,480	24,960	SUP	56.68	1,414,733		0		0		0	1,414,733
10	Waste Management Worker	5	EA	12,480	62,400	WW	50.40	3,144,735		0		0		0	3,144,735
11	Laborer (USW)	4	EA	12,480	49,920	LAB	44.50	2,221,440		0		0		0	2,221,440
12	Equipment Operator	3	EA	12,480	37,440	OP	48.52	1,816,589		0		0		0	1,816,589
13	Mechanic	2	EA	12,480	24,960	ME	49.88	1,244,990		0		0		0	1,244,990
14	Electrician	2	EA	12,480	24,960	ENG	49.30	1,230,486		0		0		0	1,230,486
15	Truck Driver	1	EA	12,480	12,480	TD	45.98	573,830		0		0		0	573,830
16	PPE Level D	461,760	Hrs						1.38	637,229		0		0	637,229
17	Supporting materials and equipment for the above labor crew at 30% of labor costs	1	Lot		0					0		0		7,068,012	7,068,012

MELTING

													PROJ. ESTIMATOR:	C. Oldham	
TITLE	Melting			PROJECT LOCATION:	Portsmouth, Ohio								DATE:	July 17, 2013	
				LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		
Item No.	DESCRIPTION	QTY	UNIT	UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	TOTAL ($)
18	Assume Power cost at 4 megawatts annually average for operating duration of 6 years. Assume 24-hour electrical required for operational needs-8,760 hr/year Cost per year at $0.10 per kW hr.=$3,504,000	6	Years		-			0		0		0	3,504,000	21,024,000	21,024,000
19	Assume Subcontracts of $500,000 annually for operating duration of 6 years	6	Years		-			0		0		0	500,000	3,000,000	3,000,000
20	Indirects @ 12%	12.0%			-					0		0			6,634,713
	Operating Total-FY 2013 $														61,923,992
21	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										61,923,992	9,474,371	9,474,371
	Operating Total-Escalated														71,398,363
											MELTING-CAPITAL and OPERATING TOTAL				$ 325,111,630
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	15,000	CY		0					0		0	784	11,760,000	11,760,000
2	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										11,760,000	1,799,280	1,799,280
												DISPOSAL FACILITY TOTAL			13,559,280
												MELTING TOTAL			$ 512,684,344

ATTACHMENT G.7: FOAMING IN SITU COST ESTIMATE

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FOAMING

TITLE	Foaming			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham		
													DATE:	July 17, 2013		
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
3	Additional material required for sheet metal, ports, etc., and attachments. Allow $700 ($810 escalated) for each of 3,548 converters and compressors.	3548	EA		0			0	810	2,873,880		0		0	2,873,880
4	Additional labor associated with removal, and installation of plates/ports. Assume 3 crews and an operating duration of 6 years at 2,080 hrs/year /employee (12,480 hours). Add 5 each D & D workers per crew at $49.59/hr ($57.18/hr escalated).	15	EA	12,480	187,200	D/D	57.18	10,703,585		0		0		0	10,703,585
												EQUIPMENT REMOVAL TOTAL			51,535,152

FOAMING

TITLE	Foaming			PROJECT LOCATION:	Portsmouth, Ohio							PROJ. ESTIMATOR:	C. Oldham	
												DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	FOAMING-CAPITAL and OPERATING														
	CAPITAL COSTS														
1	Provide one Foaming unit per removal crew (3 each), plus 2 spares for a total of 5 units.	5	EA					0		0	75,000	375,000		0	375,000
2	Heated Foam storage units	3	EA		0			0		0	30,000	90,000	0	0	90,000
3	HEPA units @ 2 per crew; 3-crews	6	EA		0			0		0	10,000	60,000	0	0	60,000
4	High-lift platform @ 1 per crew: 3 crews	3	EA		0			0		0	45,000	135,000	0	0	135,000
5	Forklift 5,000 lb capacity	4	EA		0			0		0	30,000	120,000	0	0	120,000
6	Indirects @ 12%	12.0%													93,600
	CAPITAL SUBTOTAL-FY 2013 $														873,600
7	Capital cost-- Escalation-- FY 2013 to midpoint of facility construction --FY 2015 (2 years) @ 2.4%/year	4.9%	per cent										873,600	42,806	42,806
	Capital Total-Escalated $														916,406
	OPERATING COSTS														
	Operating costs for Foaming are included in Equipment Removal costs above. Assume additional support cost to Foaming operations consisting of the following staff and materials. Assume an operating duration of 6 years at 2,080 hr/year /employee (12,480 hours)														
1	Foaming material @ $500/cy	219,000	CY					0	500	109,500,000		0		0	109,500,000
2	D & D worker	2	EA	12,480	24,960	D/D	49.59	1,237,766		0		0		0	1,237,766
3	Equipment Operator	1	EA	12,480	12,480	OP	48.52	605,530		0		0		0	605,530
4	Supporting materials and equipment for the above labor crew at 10% of additional labor costs	1	Lot					0		0		0		184,330	184,330

FOAMING

TITLE	Foaming			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham	
													DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
5	PPE Level D	37,440	Hrs						1.38	51,667		0		0	51,667
6	Equipment operating and maintenance--Allowance @ $2,000/ mo for 72 months	72	MO					0		0	2,000	144,000		0	144,000
7	Indirects @ 12%	12.0%													13,406,795
	Operating Total-FY 2013 $														125,130,088
8	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										125,130,088	19,144,903	19,144,903
	Operating Total- Escalated $														144,274,991
											FOAMING-CAPITAL and OPERATING TOTAL				$ 145,191,398
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	219,000	CY					0		0		0	784	171,696,000	171,696,000
2	Procure a 100-ton crane	1	EA					0		0	900,000	900,000	0	0	900,000
3	Equipment Operations/Maintenance: Crane @ $12,250/month for the duration of the operation of 72 months	72	MO					0		0	12,250	882,000		0	882,000
4	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										173,478,000	26,542,134	26,542,134
												DISPOSAL FACILITY TOTAL			200,020,134
												FOAMING TOTAL			$ 396,746,684

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ATTACHMENT G.8: SAND FILLING COST ESTIMATE

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SAND FILLING

														PROJ. ESTIMATOR:		C. Oldham
TITLE	Sand Filling			PROJECT LOCATION:		Portsmouth, Ohio								DATE:		July 17, 2013
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)	
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE		
	EQUIPMENT REMOVAL															
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)															
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618		15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457		22,681,213
3	Additional labor required for installation of plates, pouring, and vent ports on removed equipment. Assume 30% increase in equipment removal labor above	1	Lot		0			9,055,245		0		0		0		9,055,245
4	Additional material required for plates, bracing, and fabrication cost for port seals. Allow $1,200 ($1,380 escalated) for each of 3,548 converters and compressors.	3548	EA		0			0	1,380	4,896,240		0		0		4,896,240
													EQUIPMENT REMOVAL TOTAL		$	51,909,172

SAND FILLING

TITLE	Sand Filling			PROJECT LOCATION:	Portsmouth, Ohio							PROJ. ESTIMATOR:	C. Oldham		
												DATE:	July 17, 2013		
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	SAND FILLING-CAPITAL and OPERATING														
	CAPITAL COSTS														
1	Design & Construct a Material Storage Area and to hold 1,000 cy of sand and a sand Conveyor System (Located at Cell) that will process 100 cy of sand per day. Assume this area will be constructed within close proximity of the OSDC Area. Cost elements include the following: Planning & Design --- $200,000; Mob --- 50,000; Cut/Grade/Prep --- 150,000; Sand Auger Conveyor System -(2 Ea)--- 1,300,000; Storage Building --- 200,000; Demob --- 50,000.	1	Lot					0		0		0		1,950,000	1,950,000
2	Two Frontend Loaders & two 5,000 lb Forklifts.	1	Lot		0			0		0	275,000	275,000	0	0	275,000
3	Two Trucks; two 25-ton Forklifts; and one 100-ton mobile crane.	1	Lot		0			0		0	1,300,000	1,300,000	0	0	1,300,000
4	Indirects @ 12%	12.0%													423,000
	CAPITAL SUBTOTAL-FY 2013 $														3,948,000
5	Capital cost-- Escalation-- FY 2013 to midpoint of facility construction --FY 2015 (2 years) @ 2.4%/year	4.9%	per cent										3,948,000	193,452	193,452
	Capital Total-Escalated $														4,141,452
	OPERATING COSTS														
	Assume Sand Filling operations consisting of the following staff and materials. Assume an operating duration of 6 years at 2,080 hrs/year /employee (12,480 hours)														
1	Foreman/supervisor	2	EA	12,480	24,960	SUP	56.68	1,414,733		0		0		0	1,414,733
2	Waste Management worker	4	EA	12,480	49,920	WW	50.40	2,515,788		0		0		0	2,515,788
3	Equipment Operator	3	EA	12,480	37,440	OP	48.52	1,816,589		0		0		0	1,816,589
4	D & D worker	2	EA	12,480	24,960	D/D	49.59	1,237,766		0		0		0	1,237,766
5	Radiological Control Tech	2	EA	12,480	24,960	R/T	44.64	1,114,214		0		0		0	1,114,214

SAND FILLING

TITLE	Sand Filling			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham	
													DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR UNIT MH	LABOR TOTAL MH	LABOR CRAFT	LABOR $/MH	LABOR $ VALUE	MATERIAL $/UNIT	MATERIAL $ VALUE	EQUIPMENT $/UNIT	EQUIPMENT $ VALUE	SUBCONTRACT or UNIT RATE $/UNIT	SUBCONTRACT or UNIT RATE $ VALUE	TOTAL ($)
6	Supporting materials and equipment for the above labor crew at 20% of additional labor costs	1	Lot					0		0		0		1,619,818	1,619,818
7	PPE Level D	162,240	Hrs						1.38	223,891		0		0	223,891
8	Sand, clean, fine, Assume 30 mile haul	219,000	CY						50.00	10,950,000		0		0	10,950,000
9	Indirects @ 12%	12.0%													2,507,136
	Operating Total-FY 2013 $														23,399,936
9	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										23,399,936	3,580,190	3,580,190
	Operating Total- Escalated $														26,980,126
											SAND FILLING-CAPITAL and OPERATING TOTAL				$ 31,121,578
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS - DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	219,000	CY					0		0		0	784	171,696,000	171,696,000
2	Equipment Operations/Maintenance: Crane @ $12,250/month for the duration of the operation of 72 months= $882,000; Utility Trucks- 2 each @$2,000 ea/Mo for 72 months=$288,000: Front end Loaders--2 each @ $4,500 ea/mo for 72 months= $648,000; Other equipment cost=allowance of $100,000. TOTAL=$1,918,000	1	Lot					0		0	1,918,000	1,918,000		0	1,918,000
3	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										173,614,000	26,562,942	26,562,942
												DISPOSAL FACILITY TOTAL			200,176,942
												SAND FILLING TOTAL			$ 283,207,693

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ATTACHMENT G.9: GROUTING COST ESTIMATE

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GROUTING

TITLE	Grouting			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham	
													DATE:	July 17, 2013	
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
3	Additional labor required for installation of plates, and injection and vent ports on removed equipment. Assume 30% increase in equipment removal labor above	1	Lot		0			9,055,245		0		0		0	9,055,245
4	Additional material required for plates, bracing, and fabrication cost for ports. Allow $1,200 ($1,380 escalated) for each of 3,548 converters and compressors.	3548	EA		0			0	1,380	4,896,240		0		0	4,896,240
													EQUIPMENT REMOVAL TOTAL		$ 51,909,172

GROUTING

TITLE	Grouting	PROJECT LOCATION:	Portsmouth, Ohio	PROJ. ESTIMATOR:	C. Oldham
				DATE:	July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	GROUTING-CAPITAL and OPERATING														
	Use estimates prepared in Process Building D&D RI/FS D0 document (dated 2-8-2012)														
1	Grouting of Process Equipment Total	1	Lot		0			0		0		0	38,618,634	38,618,634	38,618,634
2	Delete "Movement"	1	Lot		0			0		0		0	(1,699,164)	(1,699,164)	(1,699,164)
3	Delete "Trucking"	1	Lot		0			0		0		0	(1,599,190)	(1,599,190)	(1,599,190)
	Capital and Operating Total-Escalated $														35,320,280
											GROUTING-CAPITAL and OPERATING TOTAL				**$ 35,320,280**
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long- term S&M) from "Alternative 2: On-site Disposal RI/FS-DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	219,000	CY					0		0		0	784	171,696,000	171,696,000
2	Procure a 100-ton crane	1	EA					0		0	900,000	900,000	0	0	900,000
3	Equipment Operations/Maintenance: Crane @ $12,250/month for the duration of the operation of 72 months	72	MO					0		0	12,250	882,000		0	882,000
4	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										173,478,000	26,542,134	26,542,134
												DISPOSAL FACILITY TOTAL			**200,020,134**
													GROUTING TOTAL		**$ 287,249,586**

ATTACHMENT G.10: SURROUND WITH CONCRETE COST ESTIMATE

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SURROUND WITH CONCRETE FILL

PROJ. ESTIMATOR: C. Oldham

TITLE Surround with Concrete Fill PROJECT LOCATION: Portsmouth, Ohio DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
3	Additional material required for metal plates, bracing, etc., and attachments. Allow $900 ($1,040 escalated) for each of 3,548 converters and compressors.	3548	EA		0			0	1,040	3,689,920		0		0	3,689,920
4	Additional labor required for installation of plates on removed equipment. Assume 20% increase in equipment removal labor above	1	Lot		0			6,036,830				0		0	6,036,830
												EQUIPMENT REMOVAL TOTAL			47,684,437
	CONCRETE RUBBLIZATION-CAPITAL and OPERATING														
	CAPITAL COSTS														
1	Procure a track-mounted excavator w/grappler for removal of concrete slabs and chunks.	1	EA					0		0	860,000	860,000		0	860,000
2	Procure front end loaders for removal of concrete slabs and concrete processing.	3	EA		0			0		0	550,000	1,650,000	0	0	1,650,000

SURROUND WITH CONCRETE FILL

													PROJ. ESTIMATOR:	C. Oldham	
TITLE	Surround with Concrete Fill			PROJECT LOCATION:	Portsmouth, Ohio								DATE:	July 17, 2013	
				LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		
Item No.	DESCRIPTION	QTY	UNIT	UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	TOTAL ($)
3	Procure track-mounted excavator with concrete pulverizer for processing the concrete.	2	EA		0			0		0	1,100,000	2,200,000	0	0	2,200,000
4	Indirects @ 12%	12.0%													565,200
	CAPITAL SUBTOTAL-FY 2013 $														5,275,200
5	Capital cost-- Escalation-- FY 2013 to midpoint of facility construction --FY 2015 (2 years) @ 2.4%/year	4.9%	per cent										5,275,200	258,485	258,485
	Capital Total-Escalated $														5,533,685
	OPERATING COSTS														
	Assume Concrete fill operations consist of the following staff and materials. Assume an operating duration of 6 years (72 months) at 2,080 hrs/year /employee (12,480 hours)														
1	Foreman/supervisor	2	EA	12,480	24,960	SUP	56.68	1,414,733		0		0		0	1,414,733
2	D & D worker	2	EA	12,480	24,960	D/D	49.59	1,237,766		0		0		0	1,237,766
3	Equipment Operator	7	EA	12,480	87,360	OP	48.52	4,238,707		0		0		0	4,238,707
4	Mechanic	3	EA	12,480	37,440	ME	49.88	1,867,485		0		0		0	1,867,485
5	Radiological Control Tech	2	EA	12,480	24,960	R/T	44.64	1,114,214		0		0		0	1,114,214
6	Supporting materials and equipment for the above labor crew at 10% of additional labor costs	1	Lot					0		0		0		987,291	987,291
7	PPE Level D	199,680	Hrs						1.38	275,558		0		0	275,558
8	Equipment operating and maintenance-- Excavators-3 each @ $30,400/ea/mo for 72 months	72	MO					0		0	91,200	6,566,400		0	6,566,400
9	Equipment operating and maintenance--Front end loaders- 3 each @ $8,800/ea/mo for 72 months	72	MO					0		0	26,400	1,900,800		0	1,900,800

SURROUND WITH CONCRETE FILL

PROJ. ESTIMATOR: C. Oldham

TITLE Surround with Concrete Fill PROJECT LOCATION: Portsmouth, Ohio DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR UNIT MH	LABOR TOTAL MH	LABOR CRAFT	LABOR $/MH	LABOR $ VALUE	MATERIAL $/UNIT	MATERIAL $ VALUE	EQUIPMENT $/UNIT	EQUIPMENT $ VALUE	SUBCONTRACT or UNIT RATE $/UNIT	SUBCONTRACT or UNIT RATE $ VALUE	TOTAL ($)
10	Pulverizer teeth changeout--assume changeout required each 500 cy. Concrete fill required =141,000 cy; therefore 282 changeouts required	282	MO					0		0	1,200	338,400		0	338,400
11	Indirects @ 12%	12.0%													2,392,963
	Operating Total-FY 2013 $														22,334,317
12	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										22,334,317	3,417,151	3,417,151
	Operating Total- Escalated $														25,751,468
											CONCRETE FILL CAPITAL and OPERATING TOTA				$ 31,285,152
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	219,000	CY					0		0		0	784	171,696,000	171,696,000
2	Procure a 100 ton crane	1	EA					0		0	900,000	900,000	0	0	900,000
3	Equipment Operations/Maintenance: Crane @ $12,250/month for the duration of the operation of 72 months	72	MO					0		0	12,250	882,000		0	882,000
4	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										173,478,000	26,542,134	26,542,134
												DISPOSAL FACILITY TOTAL			200,020,134
										SURROUND WITH CONCRETE FILL TOTAL					$ 278,989,724

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ATTACHMENT G.11: CORROSION-INHIBITING FIXATIVE COST ESTIMATE

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CORROSION-INHIBITING FIXATIVE

PROJ. ESTIMATOR: C. Oldham

TITLE Corrosion-Inhibiting Fixative PROJECT LOCATION: Portsmouth, Ohio DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	EQUIPMENT REMOVAL														
	Use estimates prepared in Process Building RI/FS document (See Appendix G Sensitivity Analysis)														
1	WBS Ports: EM.PO.04.01.01.02.12 X-333 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		211,131			12,005,899		1,216,977		2,020,980		32,618	15,276,474
2	WBS Ports: EM.PO.04.01.02.02.12 X-330 Equipment Removal - Remove and Package Converters, Compressors, Process Equip, & Piping Total	1	Lot		326,947			18,178,252		2,044,441		2,391,064		67,457	22,681,213
													EQUIPMENT REMOVAL TOTAL		37,957,687
	CORROSION-INHIBITING FIXATIVE-CAPITAL and OPERATING														
	CAPITAL COSTS														
1	Provide one each coating equipment (electric powered spray machine with hose delivery) per removal crew (3 each), plus 2 spares for a total of 5 units	5	EA					0		0	3,000	15,000		0	15,000

CORROSION-INHIBITING FIXATIVE

TITLE	Corrosion-Inhibiting Fixative			PROJECT LOCATION:	Portsmouth, Ohio								PROJ. ESTIMATOR:	C. Oldham
													DATE:	July 17, 2013
Item				LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		
No.	DESCRIPTION	QTY	UNIT	UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	TOTAL ($)
2	Indirects @ 12%	12.0%													1,800
	CAPITAL SUBTOTAL-FY 2013 $														16,800
3	Capital cost-- Escalation-- FY 2013 to midpoint of facility construction --FY 2015 (2 years) @ 2.4%/year	4.9%	per cent										16,800	823	823
	Capital Total-Escalated $														17,623
	OPERATING COSTS														
	Operating costs for Corrosion-Inhibiting Fixative are additional to the Equipment Removal costs above. Assume additional support cost for Fixative operations consisting of the following crafts and materials. Assume an operating duration of 6 years at 2.080 hrs/year /employee (12,480 hours)														
1	Fixative material cost --- Use $4.00/SF coated. Process Equipment footage = 219,000 cy x 0.5 SF/cy x 27 CF/cy = 2,956,500 SF coated. Say 3.0 million SF	3,000,000	SF					0	4	12,000,000		0		0	12,000,000
2	D & D worker	2	EA	12,480	24,960	D/D	49.59	1,237,766		0		0		0	1,237,766
3	Laborer	2	EA	12,480	24,960	L	44.50	1,110,720		0		0		0	1,110,720
4	Equipment Operator	1	EA	12,480	12,480	OP	48.52	605,530		0		0		0	605,530
5	Supporting materials and equipment for the above labor crew at 10% of additional labor costs	1	Lot					0		0		0		295,402	295,402

CORROSION-INHIBITING FIXATIVE

PROJ. ESTIMATOR: C. Oldham

TITLE Corrosion-Inhibiting Fixative PROJECT LOCATION: Portsmouth, Ohio DATE: July 17, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT or UNIT RATE		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
6	PPE Level D	62,400	Hrs						1.38	86,112		0		0	86,112
7	Equipment operating and maintenance--Allowance @ $500/ mo for 72 months	72	MO					0		0	500	36,000		0	36,000
8	Indirects @ 12%	12.0%													1,844,584
	Operating Total-FY 2013 $														17,216,113
9	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										17,216,113	2,634,065	2,634,065
	Operating Total- Escalated $														19,850,178
											FIXATIVE--CAPITAL and OPERATING TOTAL				$ 19,867,802
	DISPOSAL FACILITY-(includes Trucking)														
1	Use summary cost estimate (without long-term S&M) from "Alternative 2: On-site Disposal RI/FS -DFFO/CERCLA Case" for cost per cy of waste in FY 2013 dollars (1,300,000 cy).	219,000	CY					0		0		0	784	171,696,000	171,696,000
2	Procure a 100-ton crane	1	EA					0		0	900,000	900,000	0	0	900,000
3	Equipment Operations/Maintenance: Crane @ $12,250/month for the duration of the operation of 72 months	72	MO					0		0	12,250	882,000		0	882,000
4	Escalation to midpoint of X-333 and X-330 Deactivation--FY 2019 (6 years) at 2.4%/year	15.3%	per cent										173,478,000	26,542,134	26,542,134
												DISPOSAL FACILITY TOTAL			200,020,134
										CORROSION-INHIBITING FIXATIVE TOTAL					$ 257,845,623

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APPENDIX H: FILL SOURCE EVALUATION FOR THE ON-SITE DISPOSAL COMPONENT OF ALTERNATIVE 2, THE COMBINED ON-SITE AND OFF-SITE DISPOSAL ALTERNATIVE

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ACRONYMS

D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DNAPL	dense nonaqueous phase liquid
DOE	U.S. Department of Energy
EC	engineering category
EPA	U.S. Environmental Protection Agency
FS	feasibility study
NPV	net present value
Ohio EPA	Ohio Environmental Protection Agency
OSDC	on-Site disposal cell
PCB	polychlorinated biphenyl
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RI	remedial investigation
ROD	Record of Decision
TCE	trichloroethene
WAC	waste acceptance criteria

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H.1 INTRODUCTION

The permanent disposition of the Portsmouth Gaseous Diffusion Plant (PORTS) decontamination and decommissioning (D&D) waste in a potential new on-Site disposal cell (OSDC) requires a substantial quantity of structural fill soil ("fill") to achieve OSDC design and compaction requirements for waste placement. "Fill" in this appendix refers to engineering category (EC)-1 as defined in Section 1.1 of the main text of the Site-wide Waste Disposition Evaluation Remedial Investigation/Feasibility Study (waste disposition RI/FS). The potential construction of a new OSDC to compliantly dispose of the D&D waste that would result from the takedown of the PORTS buildings and structures is part of Alternative 2, the combined on-Site and off-Site disposal alternative, under evaluation in the waste disposition RI/FS. The waste disposition RI/FS is being conducted to satisfy requirements in *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) (Ohio Environmental Protection Agency [Ohio EPA] 2012).

This appendix presents the results of a fill source evaluation study to identify and evaluate the options for obtaining fill in sufficient quantities to meet potential on-Site D&D waste placement needs, if Alternative 2 is selected for implementation in the waste disposition Record of Decision (ROD).

Alternative 2 is described in detail in Section 8.3.2 Description of Alternative 2 in the main body of the RI/FS report. The primary feature of Alternative 2 is the design and construction of a new OSDC in an area of the plant where the most favorable underlying geology is present to support an on-Site waste disposal approach. The intent of the fill source evaluation presented in this appendix is to identify a range of viable options (termed "process options") that can satisfy a potential OSDC's projected fill needs, and to then identify a representative process option for inclusion in the formulation of Alternative 2 to support the detailed alternative evaluation presented in Section 9 of the RI/FS report.

The concept of using representative process options to formulate and evaluate RI/FS alternatives is a fundamental tool recognized in the U.S. Environmental Protection Agency's (EPA's) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 1988). During the development of alternatives, "…technology processes (called process options) considered to be implementable are evaluated in greater detail before selecting one process to represent each technology type to simplify the subsequent development and evaluation of alternatives without limiting flexibility during remedial design. The representative process provides a basis for developing performance specifications during preliminary design; however, the specific process actually used to implement the remedial action at a site may not be selected until the remedial design phase." The fill source evaluation presented in this appendix adopts the representative process option concept, as recognized by the EPA RI/FS guidance, to arrive at the identified option for inclusion in Alternative 2. All viable process options, however, including the representative option, would remain available for consideration during remedial action selection, design, and implementation as necessary, consistent with the representative process option concept adopted by the RI/FS guidance.

H.1.1 PROJECTION OF OSDC FILL VOLUME REQUIREMENTS IN THE DEVELOPMENT OF ALTERNATIVE 2

Under Alternative 2, it is estimated that 1.078 million cy of D&D waste requiring fill (EC-2) would require placement in a potential OSDC. FS-level design calculations for a potential OSDC indicate that a 2:1 EC-1/EC-2 ratio would be required to achieve design and compaction requirements in the placement of the waste (2 cy of soil [EC-1] required for each cy of waste requiring fill [EC-2] placed in a potential OSDC). Using this target 2:1 ratio, there is a need for 2.156 million cy of fill to satisfy projected waste

placement demands. The final EC-1/EC-2 ratio would be established during detailed remedial design, if Alternative 2 is selected as the preferred remedial action for the ROD. For FS-level planning purposes, however, the 2:1 ratio is considered representative and is used to support all calculations in the waste disposition RI/FS and this companion fill source evaluation appendix.

In the DFF&O (Para. 5(e)(3) and 5(e)(4)(ii)), residual soil is identified as soil which adheres to the equipment, structures, piping, building contents, concrete foundations, etc., while integral soil refers to soil that otherwise must be excavated as part of dismantlement, demolition, and removal activities, or as an integral part of a removal or remedial action pursuant to the DFF&O. It is estimated that 53,000 cy of "residual soil" (EC-1) would be generated concurrently with and as a consequence of demolition activities. The residual soil is primarily from adherence to slabs and subsurface structures, utility corridor excavations, and the need for laybacks to support removal of building foundations. The residual soil (EC-1) volume offsets a portion of the projected fill requirement, resulting in a net need for 2.103 million cy of fill. This 2.103 million cy net projection is used throughout this appendix to develop and evaluate process options for meeting the projected needs.

H.1.2 IDENTIFICATION OF PROCESS OPTIONS TO MEET PROJECTED FILL VOLUME REQUIREMENTS

The fill source evaluation considered the following range of viable process options to meet the 2.103 million cy projected OSDC fill volume requirements under Alternative 2:

- **Source Option 1:** Purchase clean fill from commercial off-PORTS sources (referred to as the "Buy" option).

- **Source Option 2:** Use on-PORTS clean soil obtained from one or more new on-PORTS soil borrow areas that would be developed within the boundaries of the PORTS reservation, including the possibility of borrow sources within the potential OSDC construction footprint itself (referred to as the "Make/Clean" option).

- **Source Option 3:** Use on-PORTS sources of non-D&D contaminated soil obtained from various areas of the plant (referred to as the "Make/Contaminated" option).

Each of these three source options is described in detail in Section H.2 and then evaluated in Section H.3. In Section H.4, the representative process option is identified, based on the overall evaluation. For orientation purposes, Figure H.1 shows the locations of the soil contamination areas (EC-1) at PORTS that are candidates for inclusion in developing Source Option 3, regardless of the regulatory authority required to excavate and dispose of the soil. Within the identified area there are several closed landfills or land disposal units, including X-231A, X-231B, X-749, X-749A, and X-749B. The identified areas also include many solid waste management units, some of which have not been fully characterized and were deferred under the Ohio Consent Decree.

H.1.3 APPROACH TO EVALUATING AND COMPARING FILL SOURCE OPTIONS

The source-option evaluation is conducted by first assessing the ability of each potential option to meet the engineering needs, quantity demands, and timing of the fill requirement. All three of the potential source options are considered able to meet the engineering needs, quantity demands, and timing, and are therefore identified as viable options for inclusion in the detailed evaluation.

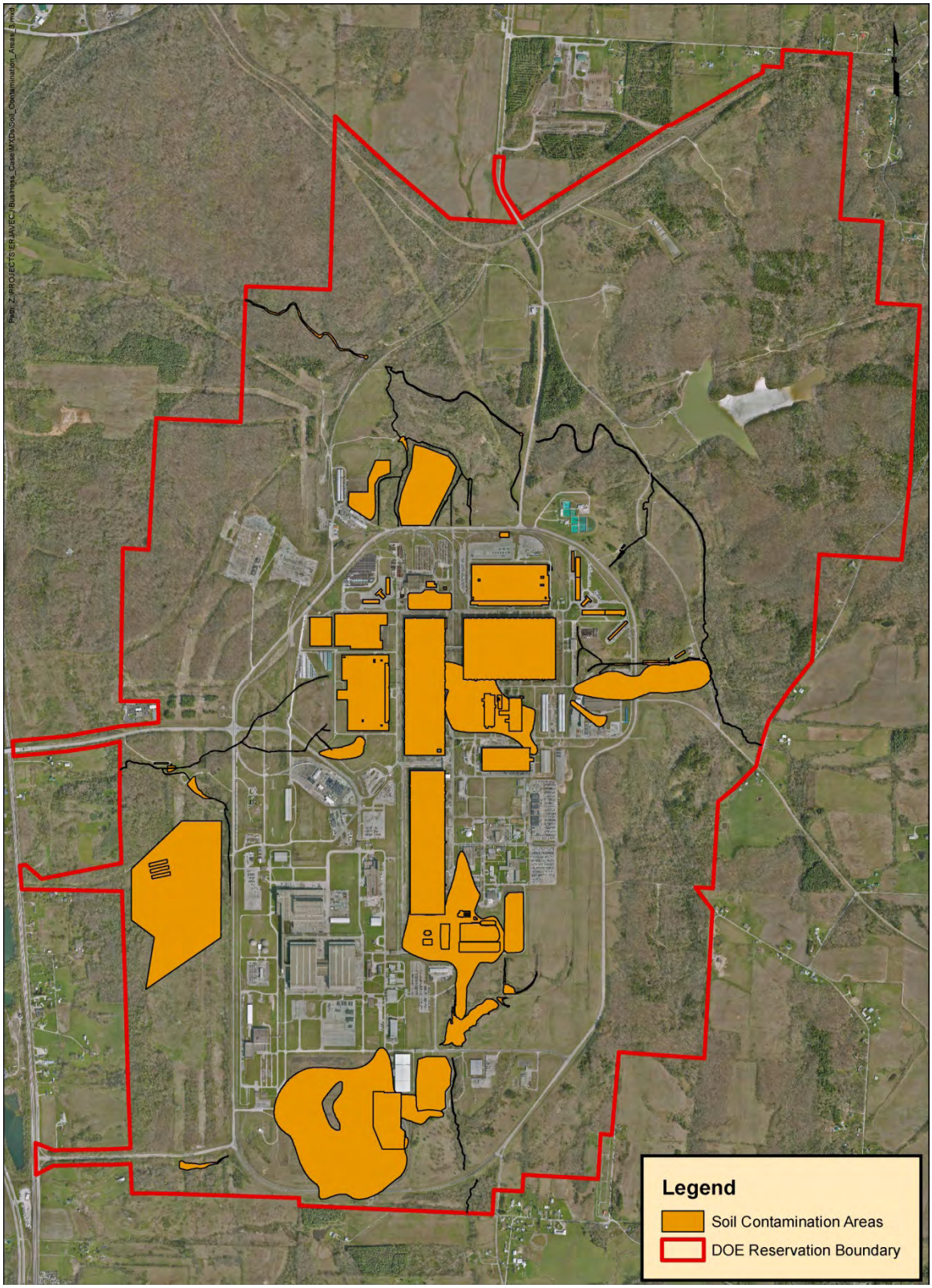

Figure H.1. Candidate Soil Contamination Areas for Consideration as Sources of Fill

The evaluation considers the cost of the three viable source options to support the identification of the representative option. This is presented in detail in Section H.3. The representative process option that is identified in Section H.4 of this appendix is then carried forward to support the formulation of waste-disposal Alternative 2.

Excavation of non-D&D contaminated soil for use as fill could impact areas that have undergone final or interim action under the Ohio Consent Decree. Those areas include landfills that have caps that would be removed if the underlying soil were used as a source of fill and areas with active groundwater interim remedies including monitoring wells and other components that could be impacted by fill excavation activities. The U.S. Department of Energy (DOE) would be required to seek and gain approval from Ohio EPA before undertaking any fill excavation activities that would impact such areas. Completing this process with Ohio EPA would increase the administrative requirements for implementing Alternative 2. Following completion of any fill excavation activities, any follow-on evaluation or remedial activities for affected areas would be conducted in accordance with the Ohio Consent Decree.

H.1.4 APPENDIX H ORGANIZATION

The remainder of Appendix H is organized into the following major sections and contents:

Section H.2 **Options to Obtain Fill for a Potential OSDC:** Describes each of the three source options individually and identifies the major potential sources of contaminated soil for inclusion in the development of Source Option 3.

Section H.3 **Cost Comparison of the Three Options to Obtain Fill:** Evaluates and compares the cost of the three options.

Section H.4 **Identification of the Representative Process Option:** Reviews the results of the evaluation and identifies the representative fill source option for inclusion in waste disposal Alternative 2 in the main body of the RI/FS report.

H.2 OPTIONS TO OBTAIN FILL FOR A POTENTIAL OSDC

As discussed in Section H.1.2, several viable options for obtaining fill are available, consisting of: (1) buying clean fill from off-PORTS sources; (2) excavating clean fill from on-PORTS source areas (e.g., site preparation activities in the potential OSDC footprint); and (3) excavating contaminated soil from various locations across the PORTS reservation. The following subsections describe these three primary options in detail.

H.2.1 SOURCE OPTION 1: BUYING CLEAN FILL FROM OFF-PORTS SOURCES

In this option, fill would be purchased from an off-PORTS vendor and managed by plant personnel for delivery into a potential OSDC, concurrent with waste placement activities within a potential OSDC.

As discussed in Section H.1.1, the volume of fill required is 2.103 million cy. Trucks would transport soil from a vendor facility to an approved clean stockpile area within a potential OSDC operations footprint and staged adjacent to a potential OSDC. When waste placement operations within a potential OSDC require fill, the requisite volume of soil would be transferred from the staging area into a potential OSDC. This operation is anticipated to be two-fold. Load-out operations would be conducted using “clean” heavy equipment to load the transport trucks. The transport trucks would be required to enter the waste areas within a potential OSDC and as such they would be considered “contaminated”, requiring

segregation to prevent contaminating clean areas. This segregation of equipment would allow the fill staging area to remain clean, permitting the vendor to consistently operate unencumbered by radiological control operations associated with OSDC waste placement.

H.2.2 SOURCE OPTION 2: EXCAVATION OF CLEAN SOIL FROM ON-PORTS BORROW AREAS FOR USE AS FILL

This option considers the generation of clean soil from areas within the PORTS reservation for the creation of 2.103 million cy of fill. Specifically, the source area is the footprint of a potential OSDC where site preparation activities would generate soil and rock that can be amended with the soil to satisfy the fill requirements, along with other clean source areas at PORTS. The use of the materials generated from the construction of a potential OSDC was reviewed as a source due to the fact that the materials would be generated as part of OSDC construction activities and made readily available at that time.

During the construction of a potential OSDC, several million cubic yards of overburden soil and rock would be generated. The excess soil and rock would be stockpiled adjacent to the construction area, and this mixture of soil and rock would be processed into a product that would meet design specifications and could be used as fill. This processing would include such operations as screening and crushing, which add to the typical borrow area costs of simple excavation and transportation of clean material.

Processing would take place in a designated clean area near a potential OSDC. The rock from site preparation activities would be screened and crushed for size-reduction and then amended with the soil generated from those same site preparation activities, creating a usable and compactable material. When waste placement operations within a potential OSDC require fill, the requisite volume of soil would be transferred from the staging area into a potential OSDC.

This operation is anticipated to be two-fold. Screening and crushing operations would be conducted using "clean" heavy equipment to load the transport trucks. The transport trucks would be required to enter the waste areas within a potential OSDC, and as such they would be considered "contaminated", requiring segregation to prevent contaminating clean areas. This segregation of equipment would allow the fill staging area to remain clean, permitting the plant personnel to consistently operate unencumbered by radiological operations.

H.2.3 SOURCE OPTION 3: EXCAVATION OF NON-D&D CONTAMINATED SOIL FROM ON-PORTS BORROW AREAS FOR USE AS FILL

Using non-D&D contaminated soil from various on-PORTS sources is a more complex option that requires a more detailed evaluation than the previous two options. The operational history at PORTS has resulted in the presence of surface and near-surface soil contamination areas, closed landfills, and contaminated groundwater areas. Together, these serve as the potential source(s) of contaminated fill for consideration in developing Source Option 3.

Surface and Near-Surface Soil Contamination Areas

There are various soil areas across the PORTS reservation that are expected to be contaminated as a result of historical plant operations, including, for example, the management of radiological and/or chemical materials or waste. The majority of these expected soil contamination areas are within Perimeter Road and are associated with the three main process buildings and the ancillary support facilities, while the remainder are just outside Perimeter Road and are associated with laydown or material staging areas. Although these soil areas have not yet been fully characterized, existing process knowledge and the available characterization conducted to date indicate these areas are viable sources of contaminated soil that could help satisfy fill quantity requirements for a potential OSDC.

Most of the contamination is expected to be limited to within the top few feet due to surficial contaminant deposition, with some contamination expected to be greater than 10 ft deep following preferential pathways near disturbed areas associated with subsurface structures. The estimated volume of non-D&D contaminated soil (EC-1) associated with these areas is 710,000 cy. The location and volume of the surface and near-surface soil contamination areas makes them ideal candidates for consideration under Source Option 3 to help satisfy the demands for fill.

Subsurface Soils Associated With On-PORTS Groundwater Contamination Areas

The contaminated subsurface soils that are in contact with contaminated groundwater at PORTS (EC-1) are the largest source of contaminated fill available for consideration in developing Source Option 3, and could complement the estimated 710,000 cy of potential fill projected to be available from the surface and near-surface soil contamination areas discussed above. While DOE does not expect to excavate Ohio Consent Decree plumes for groundwater remediation, those areas may be used to obtain additional fill. This subsection describes the five groundwater contamination areas at PORTS and identifies the subsurface contaminated soil quantities within the groundwater contamination areas that could serve as a source of fill for further consideration in developing Source Option 3 to achieve the 2.103-million-cy projected fill demand.

There are five general groundwater contamination areas at PORTS: X-701B, X-740, X-749/120, 7-Unit, and 5-Unit. Trichloroethene (TCE) is the primary contaminant in the groundwater. Based on the sizes and concentrations of TCE contamination observed in the groundwater, it is evident that in certain circumstances TCE has entered the subsurface as free-phase dense nonaqueous phase liquid (DNAPL) and created dissolved TCE groundwater plumes in the Gallia sand and gravel formation. In certain circumstances, DNAPL may have also accumulated in the weathered portion of the Sunbury shale formation below the Gallia sand and gravel formation, as illustrated in Figure H.2.

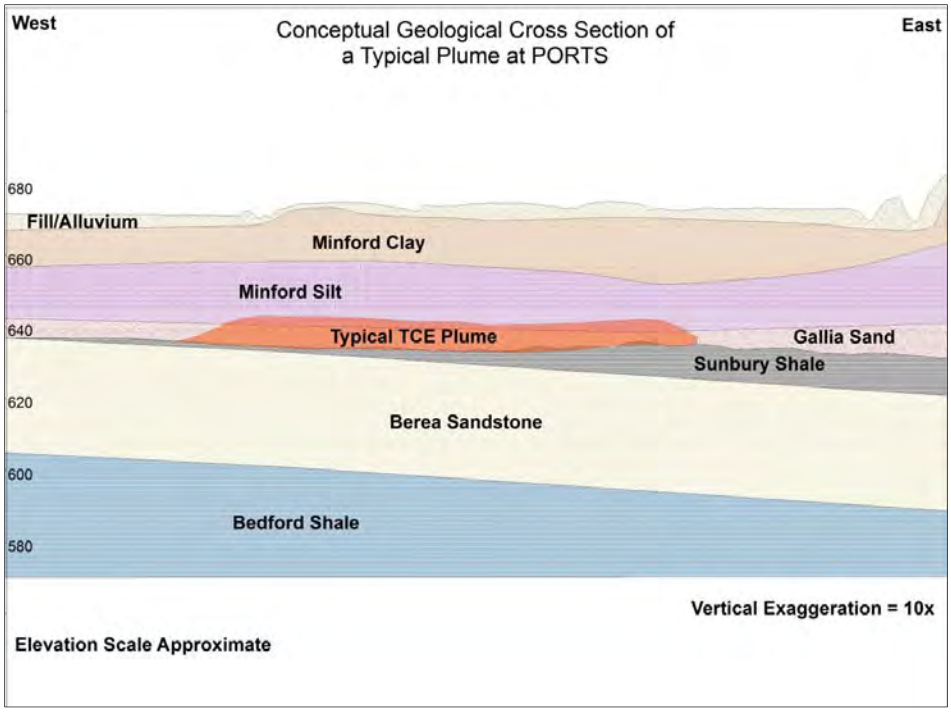

Figure H.2. Example of Cross Section of Typical Plume (not to scale)

The highest-concentration dissolved TCE groundwater contamination locations in the five groundwater contamination areas (and the areas where DNAPL contamination may be present) are the highest priority areas considered in this evaluation for obtaining contaminated fill from the groundwater contamination areas (EC-1).

An evaluation of the fill available from the subsurface soils in each of the five groundwater contamination areas is summarized below. The sources of this information are the PORTS Geographical Information System and interpretations of geological cross sections.

X-701B Groundwater Area
The X-701B soil contamination area that is impacted by the groundwater unit is generally defined as a roughly 7 ft thick Gallia Formation, plus 1 ft of overlying Minford silt sitting atop the Sunbury shale. This layer of contaminated soil, on average, is approximately 22 ft below ground surface and is beneath layers of alluvium, Minford clay, and the majority of the Minford silt. (Together these layers comprise the overburden material.)

Using the thickness of approximately 7 ft, the volume of contaminated soil within this area is 267,000 cy. Overlying that same area, the volume of overburden material is 719,000 cy.

In the X-701B area, the primary constituents of contamination concern are TCE and its degradation products. However, there also is a minor presence of polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act of 1976, as amended (RCRA) metals, and limited radionuclides (uranium and technetium-99).

X-740 Groundwater Area
The X-740 soil contamination area that is impacted by the groundwater unit is generally defined as a roughly 4-ft-thick Gallia Formation, plus 1 ft of overlying Minford silt sitting atop the Berea. This layer of contaminated soil, on average, is approximately 29 ft below ground surface and is beneath layers of alluvium, Minford clay, and the majority of the Minford silt (combined comprises the overburden material).

Using the thickness of approximately 4 ft, the volume of contaminated soil within this area is 15,000 cy. Overlying that same area, the volume of overburden material is 68,000 cy.

In the X-740 area, the primary constituents of contamination concern are TCE and its degradation products.

X-749/120 Groundwater Area
The X-749/120 soil contamination area that is impacted by the groundwater unit is generally defined as a roughly 6-ft-thick Gallia Formation, plus 1 ft of overlying Minford silt sitting atop the Sunbury shale. This layer of contaminated soil, on average, is approximately 19 ft below ground surface and is beneath layers of alluvium, Minford clay, and the majority of the Minford silt (combined comprises the overburden material).

Using the thickness of approximately 6 ft, the volume of contaminated soil within this area is 643,000 cy. Overlying that same area, the volume of overburden material is 1,367,000 cy.

In the X-749/120 area, the primary constituents of contamination concern are TCE and its degradation products. However, PCBs, RCRA metals, and limited radionuclides (uranium and technetium-99) also are present.

7-Unit Groundwater Area
The 7-Unit soil contamination area that is impacted by the groundwater unit is generally defined as a 9-ft-thick Gallia Formation, plus 2 ft of overlying Minford silt sitting atop the Sunbury shale. This layer of contaminated soil, on average, is approximately 30 ft below ground surface and is beneath layers of alluvium, Minford clay, and the majority of the Minford silt (combined comprises the overburden material).

Using the thickness of approximately 9 ft, the volume of contaminated soil within this area is 278,000 cy. Overlying that same area, the volume of overburden material is 789,000 cy.

In the 7-Unit area, the primary constituents of contamination concern are TCE and its degradation products. However, there also is a minor presence of technetium-99.

5-Unit Groundwater Area
The 5-Unit soil contamination area that is impacted by the groundwater unit is generally defined as a roughly 7-ft-thick Gallia Formation, plus 1 ft of overlying Minford silt sitting atop the Sunbury shale. This layer of contaminated soil, on average, is approximately 27 ft below ground surface and is beneath layers of alluvium, Minford clay, and the majority of the Minford silt (combined comprises the overburden material).

Using the thickness of approximately 7 ft, the volume of contaminated soil within this area is 292,000 cy. Overlying that same area, the volume of overburden material is 903,000 cy.

In the 5-Unit area, the primary constituents of contamination concern are TCE and its degradation products.

Several of the subsurface contamination areas described above include landfills that are positioned on top of the subsurface contaminated soil. These landfills contain contaminated soil (EC-1) along with waste requiring fill (EC-2). These landfills could also serve as a potential source of fill for a potential OSDC.

H.2.3.1 Assessment of Non-D&D Contaminated Soil as Fill Quantities for Developing Source Option 3

As discussed in Section H.1.1, the volume of fill required for a potential OSDC is 2.103 million cy in order to meet the waste placement requirements. The majority of contaminated soil on the PORTS reservation that would serve to satisfy this fill requirement would need to originate from the subsurface soil associated with the groundwater contamination areas (EC-1), supplemented with the estimated 710,000 cy of contaminated soil projected to be available from the surface and near-surface soil contamination areas (EC-1).

Landfills that would be potential sources of contaminated fill (EC-1 and EC-2) are located over or adjacent to two of the previously discussed soil contamination areas associated with the groundwater contamination. These landfills, X-231A, X-231B, X-749, X-749A, and X-749B, in general, have clean material (soil) serving as their associated caps, and the groundwater contamination areas have a relatively thick stratum of clean overburden overlying the subsurface contaminated soil. The approach for dealing with the clean cap and overburden soil is discussed in detail in the following section (Section H.2.3.2).

The landfills in question would have to be removed to provide access to the soil contamination areas associated with the groundwater contamination areas. These landfills contain, in total, approximately 223,000 cy of waste requiring fill (EC-2) and an estimated 345,000 cy of contaminated soil (EC-1) beneath their caps. At the expected 2:1 EC-1/ EC-2 ratio, use of the landfills would require an additional 446,000 cy of fill in order to be placed in a potential OSDC. Therefore, the fill requirement under Source Option 3 is increased by 101,000 cy (from 2.103 million cy to 2.204 million cy) after accounting for both the contaminated soil (EC-1) and also the waste requiring fill (EC-2) anticipated to be encountered during excavation of the landfills.

Table H.1 identifies the fill needs associated with Source Option 3 and outlines the proposed scenario for use of contaminated soil to meet those fill needs. Table H.1 is organized to present the waste volume requiring fill (EC-2) expected to be generated from the five targeted contaminated soil areas, in addition to the waste volumes requiring fill that would be generated from the D&D of the buildings (EC-2). The table then provides a breakdown of the additional soil (EC-1) required for placement of the additional waste requiring fill (EC-2) in the proposed OSDC. The volume of soil expected to be generated from the excavation of the landfills is then compared to the soil volume required for placement and the remaining soil needs are listed. The final column of the table goes on to show how contaminated soil would be used to balance all needs. The breakdown presented in this table summarizes the detailed planning that has been used in the development of Source Option 3. The table confirms that the use of contaminated soil under Source Option 3 can meet the projected fill requirements of a potential OSDC, even when the additional waste requiring fill from the landfills is considered.

H.2.3.2 Implementation Approach for Source Option 3

For Source Option 3, the intent is to cost-effectively satisfy the fill requirements for a potential OSDC using contaminated soil as the source of the fill. This intention considers that an area-by-area excavation process would be implemented — targeting the abundant source of contaminated subsurface soil associated with the groundwater contamination areas as the primary source of fill, and supplemented with the contaminated soil available from the surface and near-surface soil contamination areas. As described above in Section H.2.3.1, each of the subsurface fill sources associated with the groundwater areas lies beneath a “layer” of clean overburden soil. Therefore, the clean overburden materials would be removed and stockpiled in an adjacent and approved location for later use as backfill for the contaminated subsurface soil excavation area.

Several of the subsurface contamination areas include historical landfills that are positioned on top of the subsurface contaminated soil. These landfills, as encountered, would be excavated to the extent of their documented or delineated boundaries and depths with excavation continuing into the contaminated subsurface soil associated with groundwater contamination in order to obtain the required volumes from each area needed to satisfy the 2.204-million-cy projected fill demand.

Similar to the clean overburden associated with the subsurface contaminated soils, the landfills have caps constructed of clean soil, which would be stockpiled and utilized in the same manner as the aforementioned clean overburden. For purposes of cost analysis, the majority of the contaminated waste requiring fill (EC-2) encountered within the exposed landfills is assumed to meet the expected waste acceptance criteria (WAC) for a potential OSDC and waste meeting such WAC would be disposed at a potential OSDC. The landfills also contain contaminated soil (EC-1), which DOE anticipates using as fill to support waste placement in a potential OSDC.

Table H.1. Contaminated Source Areas for OSDC Fill under Source Option 3

Source Area	Waste Requiring Fill (EC-2) (cy)	Fill (EC-1) Required at 2:1 Ratio (cy)	Residual Soil (EC-1) (cy)	Contaminated Soil from Landfills (EC-1) (cy)	Net Fill (EC-1) Required (cy)	Contaminated Soil from Surface, Near Surface, and Subsurface Areas to be Used as Fill (EC-1) (cy)
Building Waste	1,078,000	2,156,000	53,000	--	2,103,000	--
Subtotal	***1,078,000***	***2,156,000***	***53,000***		***2,103,000***	*--*
Surface and Near-Surface Soil Contamination Areas	--	--	--	--		710,000
X-701B Groundwater Area Subsurface Soil	--	--	--	--		267,000
X-740 Groundwater Area Subsurface Soil	--	--	--	--		15,000
X-749/120 Groundwater Area Subsurface Soil *(beneath the X-749 & X-749B Landfills)*	204,000	408,000	--	200,000	208,000	642,000
7-Unit Groundwater Area Subsurface Soil	--	--	--	--		278,000
5-Unit Groundwater Area Subsurface Soil *(beneath the X-231A&B and X-749A Landfills)*	19,000	38,000	--	145,000	-107,000	292,000
Subtotal	***223,000***	***446,000***	***0***	***345,000***	***101,000***	***2,204,000***
Grand Total	**1,301,000**	**2,602,000**	**53,000**	**345,000**	**2,204,000**	**2,204,000**

EC = engineering category

Any waste that did not meet the approved OSDC WAC would be sent off Site for treatment and/or disposal, as required.

Following completion of excavation of selected landfills and/or groundwater plumes, the set aside clean overburden from the same area would be used to backfill the excavated area. The filled footprint would be graded to drain. Following this excavation, backfill with the clean overburden soil, and re-grading process, there would not be deep holes and/or steep slopes left in the excavated areas. Range of the final soil surface contours within the Perimeter Road would be within approximately 10 ft and still relatively flat. The re-graded contours would also promote surface water drainage in a pattern similar to the pre-excavation conditions, so future surface water flow rates in the existing surface water drainage areas would not be significantly impacted. Based on preliminary cut and fill calculations, this final site condition can be achieved without importing clean fill.

H.3 COST COMPARISON OF THE THREE SOURCE OPTIONS FOR OBTAINING FILL

Each of the three source options ("Buy," "Make/Clean," and "Make/Contaminated") to obtain fill (EC-1) for a potential OSDC has been estimated independently from each other, allowing their costs to be used in concert with the remaining costs associated with Alternative 2, to provide an assessment of each source option's impact on Alternative 2.

H.3.1 SOURCE OPTION 1: "BUY" OPTION

The total estimated cost of Source Option 1 is $50 million, which is built up by the estimated purchase price of approximately $11/cy at 2.1 million cy, equaling $24 million for the materials with an additional $26 million for handling on-Site stockpile management, and placing with the contaminated D&D waste. In order to evaluate all options on equal ground, this constant dollar cost was converted into net present value (NPV), as recommended in EPA's Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, cost-estimating guidance (EPA 2000). With that, the NPV for the use of purchased clean soil as fill in a potential OSDC is $43 million.

H.3.2 SOURCE OPTION 2: "MAKE/CLEAN" OPTION

The total estimated cost of Source Option 2 is $61 million, which is built up by the estimated cost of the screening and crushing of the excavated rock at $52 million. The remaining $9 million is attributed to the transportation and use as fill. For the same reasons as stated above, this estimate was converted into NPV, resulting in a cost estimate of $53 million.

H.3.3 SOURCE OPTION 3: "MAKE/CONTAMINATED" OPTION

The total estimated cost of Source Option 3 is $299 million. This cost is built up by $136 million associated with excavation of the non-D&D contaminated soil as well as the staging and replacement of the clean overburden and caps. The remaining $163 million is attributed to the transportation and use as fill. As stated earlier, to provide an accurate comparison to the other options, the cost was converted into NPV. This results in an NPV cost estimate of $251 million for this option in total.

H.4 IDENTIFICATION OF THE REPRESENTATIVE PROCESS OPTION

In consideration of the three options evaluated in this appendix, Source Option 3 is identified as the representative process option to carry forward into Alternative 2 in the main body of the RI/FS report.

As the representative process option, Source Option 3 utilizes both the contaminated surface and near-surface soils and the subsurface soils from PORTS' groundwater contamination areas as the primary sources of OSDC fill — coupled with the concurrent removal of historical landfills from within the boundaries of Perimeter Road (EC-1 and EC-2).

In the short term, Source Option 3 has a higher cost compared to the clean fill options represented by Source Options 1 and 2. However, Source Option 3 has the potential to beneficially impact the final groundwater remedial actions that would be conducted under the Ohio Consent Decree and reduce the potential cost of such actions.

H.5 REFERENCES

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APPENDIX I: DRAFT PERFORMANCE-BASED ACTIVITY AND CHEMICAL CONCENTRATION WASTE ACCEPTANCE DEVELOPMENT CRITERIA

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ACRONYMS

ACM	asbestos-containing material
AMSL	above mean sea level
ARAR	applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	ambient water quality criteria
California EPA	California Environmental Protection Agency
COC	contaminant of concern
CSM	conceptual site model
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
EC	engineering category
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
FML	flexible membrane liner
FS	feasibility study
GCL	geosynthetic clay liner
HDPE	high-density polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
MCL	maximum contaminant level
NRC	U.S. Nuclear Regulatory Commission
OAC	*Ohio Administrative Code*
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OSDC	on-Site disposal cell
PCB	polychlorinated biphenyl
PGE	process gas equipment
POA	point of assessment
POC	point of compliance
PORTS	Portsmouth Gaseous Diffusion Plant
RAIS	Risk Assessment Information System
RC	regulatory category
RCRA	Resource Conservation and Recovery Act of 1976 (as amended)
RCW	recirculating cooling water
RI	remedial investigation
RMD	Risk Methods Document
SAP	sampling and analysis plan
STOMP	Surface Transport Over Multiple Phases
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
3-D	three-dimensional
TPMC	Theta Pro2Serve Management Company, LLC
VOC	volatile organic compound
WAC	waste acceptance criteria
WHO	World Health Organization

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Decontamination and decommissioning (D&D) and waste disposition planning activities at the U.S. Department of Energy (DOE) Portsmouth Gaseous Diffusion Plant (PORTS) include the evaluation of on-Site waste disposal (Alternative 2) within an engineered on-Site disposal cell (OSDC) designed, constructed, operated, and closed to safely dispose of waste that would meet waste acceptance criteria (WAC) developed for such a potential OSDC. Waste that does not meet the WAC of such a potential OSDC would either be treated to meet the WAC or be disposed off Site at a DOE-approved waste disposal facility.

In accordance with *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) (Ohio Environmental Protection Agency [Ohio EPA] 2012), the Remedial Investigation (RI)/Feasibility Study (FS) is to include draft WAC. Per the DFF&O, WAC means "the criteria developed by Respondent with community input and approved by Ohio EPA which specify standards that must be met by each waste prior to its acceptance into any on-site disposal facility." WAC are the criteria which specify standards that must be met by each waste prior to its acceptance into a specific on-Site disposal facility. The WAC are comprised of prohibitions resulting from applicable or relevant and appropriate requirements (ARARs), as well as DOE operational decisions, and the six DFF&O components defined in Paragraph 5.mm as: (1) activity criteria and chemical concentration criteria, (2) waste evaluation and characterization standards, (3) waste physical characteristics standards, (4) waste packaging standards, (5) waste safe handling standards, and (6) waste transportation standards. A waste stream must meet each component before being allowed to be disposed in a potential OSDC.

The activity and chemical concentration WAC consider both results from fate and transport modeling to determine levels to ensure long-term protectiveness (performance-based criteria) and regulations that specify concentration limits for waste that may be placed in a potential OSDC. This appendix presents the fate and transport modeling completed to develop performance-based activity and chemical concentration WAC (referred to as modeled WAC).

I.1. INTRODUCTION

These performance-based activity and chemical concentration WAC (modeled WAC), are based on compliance with the long-term protectiveness requirements for a potential OSDC by applying fate and transport analysis conducted using conceptual design elements of a potential OSDC and industry-accepted groundwater and dose modeling approaches In development of draft modeled WAC, site-specific information obtained in accordance with the *Geotechnical Sampling and Analysis Plan for the Sitewide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011a), referred to as the Geotechnical Sampling and Analysis Plan (SAP), such as hydraulic conductivity, distribution coefficient (K_d) values, etc., was used. Absent site-specific values, model default values, literature values, or values used in the PORTS-wide groundwater model, were used for the analysis and modified for specific geologic strata based on the site-specific uranium K_d relationships observed in the data. The modeling approaches used for this analysis are consistent with those described in *Work Plan for Modeling Analysis in Support of Regulatory Decisions at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011b).

I.2. REPRESENTATIVE OSDC LOCATION

I.2.1 REPRESENTATIVE LOCATION SELECTION AND FIELD INVESTIGATIONS

Appendix D of the *Remedial Investigation and Feasibility Study Report for the Site-wide Waste Disposition Evaluation Project at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, referred to hereafter as the waste disposition RI/FS, presents an analysis of four potential areas for siting a potential OSDC at PORTS, Study Areas A, B, C, and D (Figure I.1). Selection of a representative location, as well as development of a potential OSDC, requires data on hydrogeologic and geochemical properties of soil and rock for subsurface flow and transport modeling and modeled WAC development. Geotechnical data are also needed to determine soil properties such as subsidence, compaction, and permeability.

For these data collection efforts, several intrusive field methods were used to obtain the required geotechnical, geochemical, and analytical data, as outlined in the Geotechnical SAP (DOE 2011a). These methods include, but are not limited to, cone penetration testing, drilling in both unconsolidated and bedrock formations to collect soil samples for geotechnical and geochemical testing, and installation of monitoring wells and piezometers.

The Geotechnical SAP was written to ensure that the field investigation and sampling were performed in a technically acceptable manner. The specific types of data collected included the following:

- Hydrogeologic data such as depth to groundwater and vertical permeability for evaluating sites for a potential OSDC
- Geochemical data such as contaminant adsorption coefficients and fraction of organic carbon in soil to support modeling
- Geotechnical and analytical data from the four RI/FS study areas being evaluated
- Investigation of nearby surface water streams and installation of test pits to observe subsurface conditions.

Appendix D of the waste disposition RI/FS report evaluates the information available about each of the potential study areas. On the basis of geology, constructability, and public input, Study Areas A and B were removed from consideration. Study Areas C and D provide a superior level of protection and therefore were considered further. Study Area D in the northeast portion of the PORTS Facility was selected as the representative location for modeled WAC development because of the geology as well as improved operations and capacity for a facility at this location.

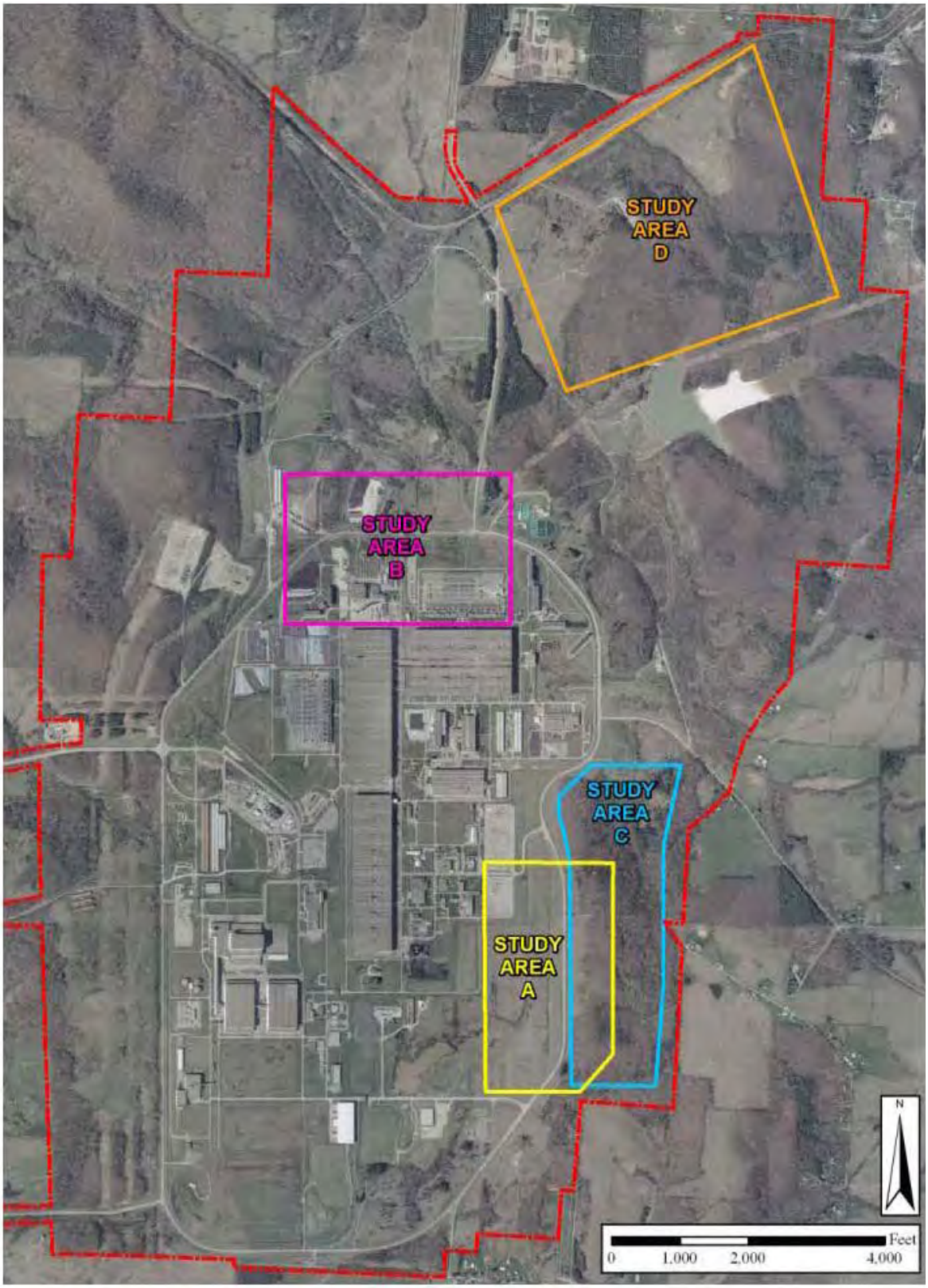

Figure I.1. Potential Study Areas for Waste Disposal at PORTS

I.2.2 HYDROGEOLOGIC CONDITIONS

A general cross section of the geology and hydrogeology of the PORTS study areas and the relative position of Study Area D are shown in Figure I.2.

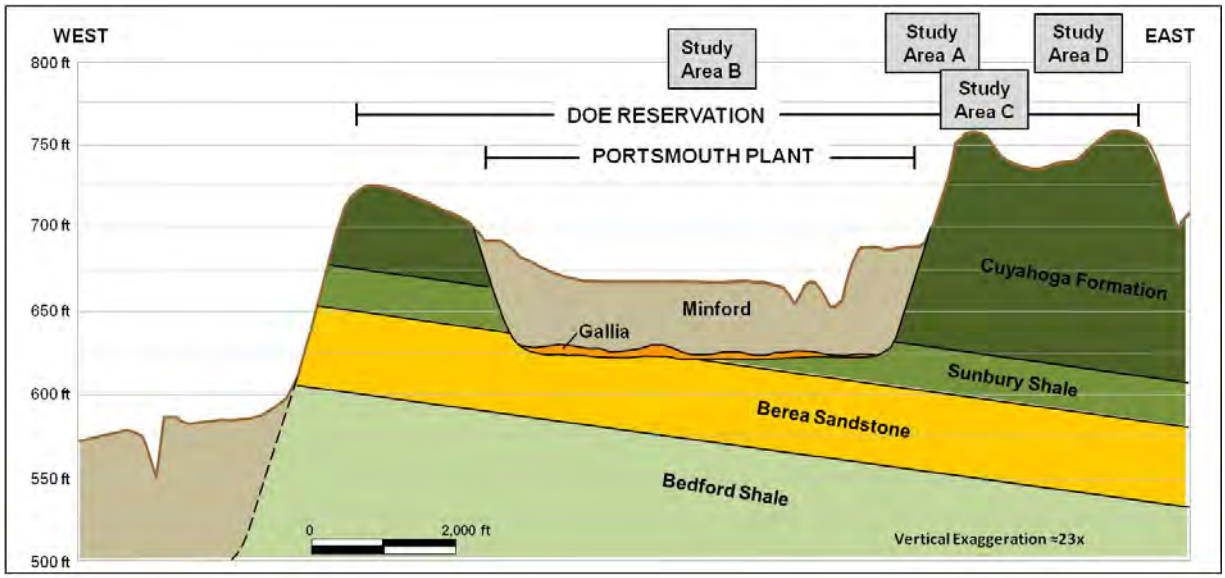

Figure I.2. Geological Cross Section of the PORTS Facility

Study Area D lies in an upland area predominantly outside the ancestral Portsmouth River valley. Stratigraphic units from oldest to youngest in age (Upper Devonian and Mississippi strata) include the Bedford shale, Berea sandstone, Sunbury shale, and Cuyahoga Formation. The Quaternary Teays Formation (Minford Member/Gallia Member) unconformably overlies the bedrock within the ancestral valley and pinches out on the western and northern flanks of the uplands.

The northern and western portions are underlain by the Minford/Gallia whereas most of the study area is underlain by the Cuyahoga Formation. Figure I.3 is a three-dimensional (3-D) representation of the major geologic formations at Study Area D. The depth to bedrock in Study Area D ranges from less than 10 ft in the upland areas to up to 40 ft deep on the western and northern boundaries. The Cuyahoga Formation is overlain by a combination of a thin veneer of Minford silt/clay and residual soil developed on the bedrock. The maximum thickness of the Cuyahoga Formation is estimated to be up to 120 ft where the uplands are at their greatest height. The Cuyahoga Formation is a moderately hard, thinly laminated shale with sandstone laminations. The Cuyahoga at Study Area D contains numerous thin (less than 3-in. thick) sandstone layers, and borings indicate a 2-ft-thick sandstone layer at an approximate elevation of 680 ft above mean sea level (AMSL). This layer is continuous across the study area. The sandstone layer extends outside of the study area eastward. This 2-ft-thick sandstone layer may be correlated to the 5-ft-thick "670 Sandstone Unit" at the Pike Sanitation, Inc. landfill located approximately 5 miles north-northwest of Study Area D (both units occur 30 to 40 ft above the contact between the Cuyahoga and Sunbury). Figure I.4 is a representation of the geologic formations at Study Area D showing the 2-ft-thick sandstone layer existing beneath Site D within the Cuyahoga shale and outcrops at several locations along the edges of the hillside, as well as the extent of this layer outside the DOE boundary. Currently, the water elevation in the X-611B Sludge Pond is approximately 680 ft AMSL, which is mostly above the elevation of the expected sandstone outcrops along the northern edge of the pond (approximately 675 – 681 ft AMSL). However, the assumed future condition of the X-611B Sludge Pond

is that the water is drained and the remaining lime deposits are covered with soil to a final elevation at or below the elevation of the sandstone outcrops. This provides a natural discharge pathway from the sandstone layer.

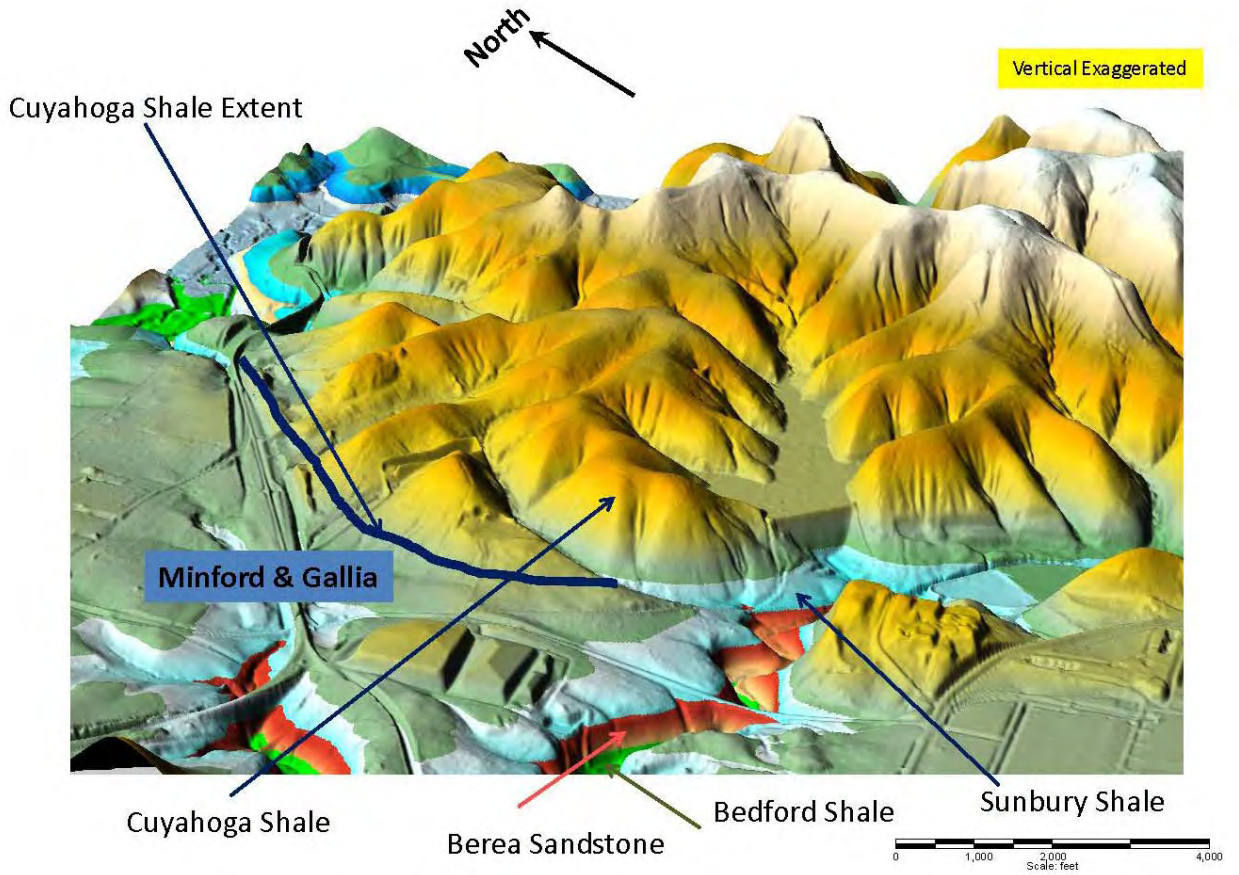

Figure I.3. Three-Dimensional Representation of Geologic Units at Site D

The Cuyahoga Formation also contains other thin, discontinuous sandstone layers with several layers occurring near the 720-ft AMSL horizon. These sandstone units are thinner (average approximately 0.5 ft thick) than the 680-ft sandstone layer and are not readily correlated from one boring to the next. These upper Cuyahoga Formation sandstone units have been grouped into geologic facies based on the presence of the different sandstone layers. The individual sandstone layers that comprise the 720-ft sandstone facies are difficult to correlate from boring to boring and do not appear to be continuous across Study Area D. Saturated conditions within the 720-ft sandstone facies appear to be limited or localized near the shallow hill slope area on the eastern side of the site.

The Cuyahoga is underlain by the Sunbury shale (approximately 20 ft thick) and the Berea sandstone (average thickness of approximately 35 ft) in the PORTS area. The Berea is composed of a light gray, hard, thickly bedded, fine-grained sandstone with thin shale laminations. The Berea sandstone overlies the Bedford shale. The bedrock formations dip gently to the east-southeast at approximately 30 ft/mile.

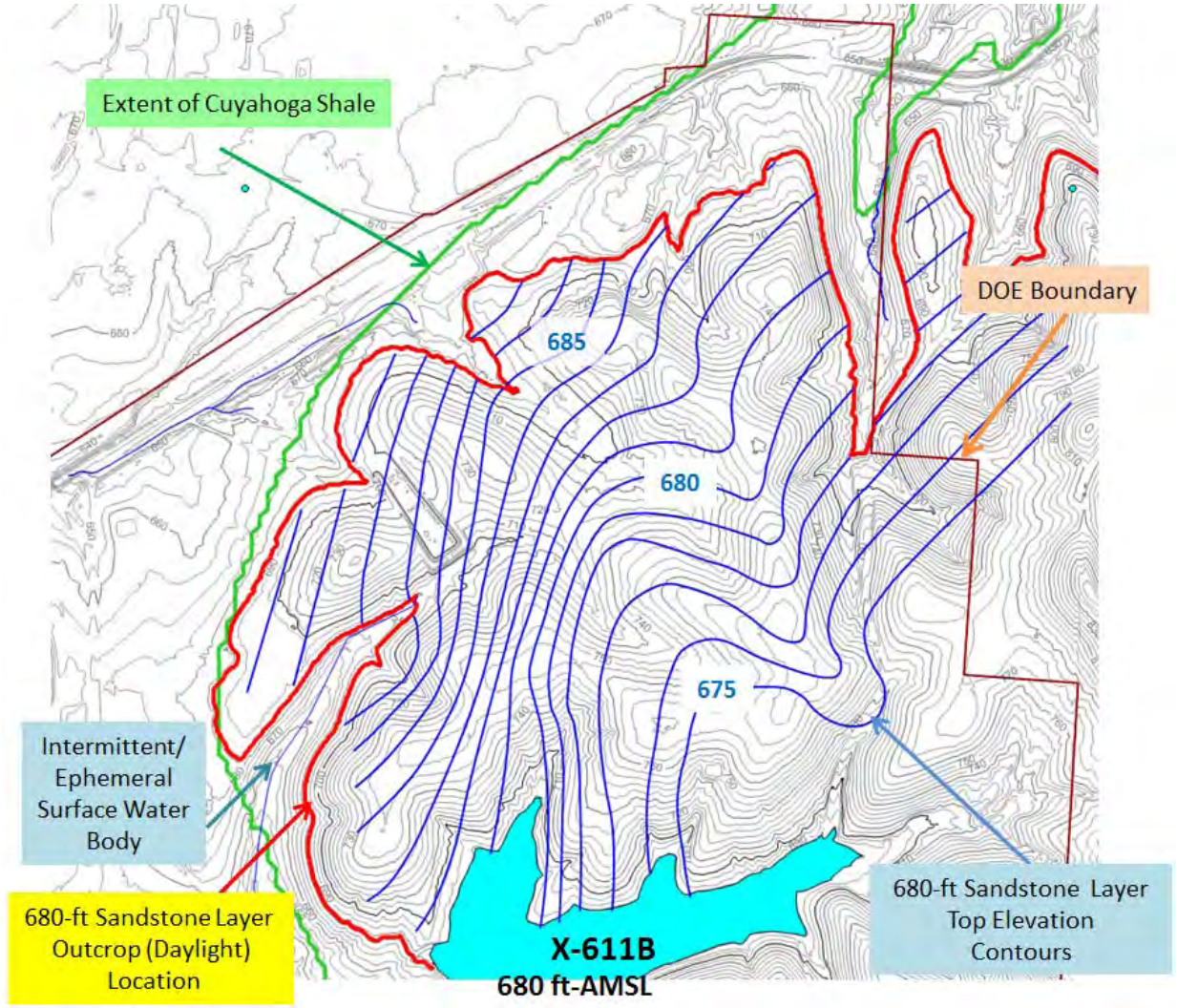

Figure I.4. Cuyahoga Shale and the Sandstone Layer Distribution and Exposure at Study Area D

The groundwater flow system at Study Area D includes the aquifers of the unconsolidated Gallia sand and gravel and the Berea sandstone, along with the aquitards of Cuyahoga/Sunbury shale, Bedford shale, and unconsolidated Minford clay and silt. The basal portion of the Minford is generally grouped with the Gallia to form the uppermost and primary aquifer beneath the industrial portion of PORTS. The Minford/Gallia are found only in the western and extreme northern portions of the study area and are absent in the upland areas where a potential OSDC would likely be located.

Natural recharge to the groundwater flow system comes mainly from precipitation, although land use and the presence of the bedrock shale units effectively reduce recharge to underlying units. Discharge of groundwater to the surface occurs primarily along streams that transect the plant. Natural recharge to the central portion of the plant is approximately 4 to 7 in./yr whereas recharge in the uplands, such as those at Study Area D (areas underlain by shale bedrock), is only 2 to 4 in./yr (Ohio Department of Natural Resources [ODNR] 2003). The recharge is less in the upland areas because of topography and low

permeability of the bedrock and residual clayey soil. Water that infiltrates through the residuum likely moves laterally upon reaching the base of the deeply weathered zone because of the very low vertical permeability of the unweathered Cuyahoga Formation (1E-03 to 1E-05 ft/day).

Groundwater flow in the Gallia is essentially toward Little Beaver Creek and an unnamed tributary to Little Beaver Creek that lies west of the study area. The hydraulic gradient in the Gallia is low (ranging from less than 0.004 ft/ft to 0.015 ft/ft) with the steeper gradients existing closer to the discharge areas. Horizontal gradients measured in the Gallia during an 8-month period in 1994 averaged 0.0041 ft/ft. In the far western portion of Study Area D, groundwater flow in the Berea is towards the south-southwest, also discharging to Little Beaver Creek, with a gradient varying from less than 0.002 to 0.004 ft/ft (Figure D.26 in Appendix D of the waste disposition RI/FS report). Also, horizontal gradients measured at the same time in the Berea averaged 0.0025 ft/ft, slightly lower than that measured in the Gallia. Monitoring wells in the western portion of Study Area D showed no difference in water level elevation between the Gallia and Berea and suggest free groundwater exchange between the two units in this area. Within the remaining portion of Study Area D, groundwater flow in the Berea is predominantly eastward with a horizontal hydraulic gradient of approximately 0.006 ft/ft.

The thin sandstone layer within the Cuyahoga Formation may provide a significant zone of saturation. It appears saturated in portions of Study Area D. The horizontal permeability determined on tests of Berea sandstone cores ranges from 5.4E-03 to 9.9E-02 ft/day with a mean value of 2.0E-02 ft/day. Vertical permeability was slightly less than horizontal permeability with a mean value of 1.0E-02 ft/day. Based on tests of Berea cores from the X-737 area, the horizontal conductivity varied from 1 to 2.5 times greater than the vertical conductivity. Porosity of the Berea, measured in the western portion of Site D, was approximately 15 to 20 percent.

Borehole geophysical tools were used in selected soil borings at Study Area D to investigate the possible existence of fractures in the bedrock. An acoustic televiewer log was used because of its capability to provide an image similar to that of a video camera, and to provide azimuth and dip information for fractures and bedding structures. The data from this tool, used in conjunction with other geophysical tools described below, provided the location and orientation information for features such as fractures and lithologic contacts.

A suite of geophysical logs was collected in each piezometer in Study Area D, including caliper, natural gamma, single-point resistance, normal and lateral resistivity, and the digital acoustic televiewer. Variations in the resistance, resistivity, and natural gamma logs, in conjunction with the caliper and acoustic televiewer log responses, allowed the identification of lithologic changes and geologic features in the bedrock. Bedding plane fractures were noted at the upper bedding contact of the 2-ft-thick sandstone layer in piezometers WD-PZ08C and WD-PZ13C. No additional fractures or joints were identified in the geophysical logs. Additionally, a vertical fracture appears to exist as evidenced in WD-PZ09C, based on the geophysical log for this boring.

To visually assess the shallow subsurface bedrock features, a rock trencher was used to cut two vertical trenches in the bedrock (Cuyahoga shale) at two locations prior to excavating the rock between the trenches. Two parallel, 50-ft-long trenches were initially cut into the exposed rock surface to a depth of 4 ft. The trenches were 15 ft apart and ran in an east-west direction. Observations from the test pit included the following:

- Fractures seen on the surface of the 2-ft-thick sandstone in the Cuyahoga Formation continued throughout the thickness of the sandstone layer but did not extend into the underlying shale. Fractures in the 2-ft-thick sandstone layer also contained clayey soil approximately 0.5 in. thick.

- A 4-in.-thick sandstone layer was observed at a depth of approximately 4 ft. It was fractured in a fairly regular pattern with each piece exhibiting an average diameter of approximately 12 in. This layer was easily broken with the ripper attachment.

- Observed fractures and/or joints were limited to the more brittle sandstone layers. No fractures or joints were observed in the shale.

- The degree of weathering of the shale, as expected, diminished with depth. The moisture content of the shale was observed to be higher near the surface, and it decreased with depth.

- The bulldozer could easily remove the shale to a depth of 8 ft with the blade only, but a ripper attachment was needed to go deeper.

I.2.3 LABORATORY STUDIES AND GEOCHEMICAL CONDITIONS

Partition coefficient (K_d) analyses were performed to determine how species of uranium and technetium-99 in groundwater and soil partition between phases. This information is important in the analysis and evaluation of the retardation of uranium and technetium, the two primary contaminants of concern (COCs) at PORTS, and potential contaminant transport through the geologic strata. To obtain the most representative results, standard adsorption tests following American Society for Testing and Materials C 1733 were performed on collected soil/rock samples, using both contaminated groundwater from the plant and spiked water. The initial levels, or concentrations, of uranium and technetium-99 in the soil/rock samples and groundwater were determined by laboratory analyses. A summary of the results of the K_d analyses is listed in Table I.1 for the various geologic units at PORTS, including geometric means and arithmetic means (referred to as mean) of the data sets. All K_d results and laboratory reports are provided in Appendix C of the waste disposition RI/FS report. To be conservative, the lower values between the geometric means and the arithmetic means of these data are used in the modeling as described in Section I.5.2.2. These lower K_d values result in relatively higher mobility potential and therefore lower modeled WAC values. The exceptions are the Sunbury and Berea datasets in which the arithmetic means are used because the dataset is not large enough to calculate a geometric mean.

Table I.1. K_d Analytical Results for PORTS

Constituent	Geologic Unit	Min (mL/g)	Max (mL/g)	Median (mL/g)	Geometric Mean (mL/g)	Mean (mL/g)	Standard Error on the Mean (mL/g)	Number of Samples
Technetium-99	Waste	2.02	2.05	NA	NA	2.035	0.015	2
	Minford	2.72	4.97	4.01	3.79	3.84	0.16	15
	Gallia	4.32	8.16	7.29	6.36	6.59	1.16	3
	Regolith[1]	3.08	5.93	4.28	4.29	4.37	0.25	12
	Cuyahoga	3.17	8.86	4.33	4.60	4.87	0.83	6
	Cuyahoga (sandstone layer)	3.27	3.49	3.38	3.38	3.38	0.11	2
	Sunbury	130	303	217	198	217	86.5	2
	Berea[2]	3.29	3.38	3.34	3.33	3.34	0.045	2
Uranium	Waste	246	634	NA	NA	440	194.03	2
	Minford	3.67	118	10.4	14.2	26.1	11.1	10
	Gallia	12.3	118	15.3	28.1	48.5	34.7	3
	Regolith[1]	4.20	687	17.9	22.6	77.6	55.6	12
	Cuyahoga	2.04	58.5	7.03	6.60	14.82	8.96	6
	Cuyahoga (sandstone layer)	64.4	71.7	68.1	68	68.1	3.65	2
	Sunbury	757	757	NA	NA	NA	NA	1
	Berea[2]	1.13	1.94	1.54	1.48	1.54	0.41	2

[1]Regolith consists of in place weathered materials above the Cuyahoga shale.
[2]Discrepencies in the K_d results for the geologic units are due to differing geochemical conditions within the units which alter the sorption affinity of both technetium-99 and uranium.

Max = maximum detected value
Min = minimum detected value
NA = not applicable

I.2.4 CONCEPTUAL SITE MODEL

Development of a conceptual site model (CSM) is necessary prior to evaluating the likely impact of potential contaminants that might emanate from a potential OSDC at Study Area D. A CSM is a visual representation that identifies the types and locations of all potential sources and how and where exposure may occur. Figure I.5 illustrates the current condition CSM. This figure illustrates the relative ground elevations (vertically exaggerated) along with the underlying geology previously discussed for Study Area D. Visually establishing the current conditions from a geological/hydrogeological perspective ensures that the important components of the site are identified and an understanding of how they may be modified by or affected by the potential construction of a disposal facility at Study Area D is important to development of a future condition CSM.

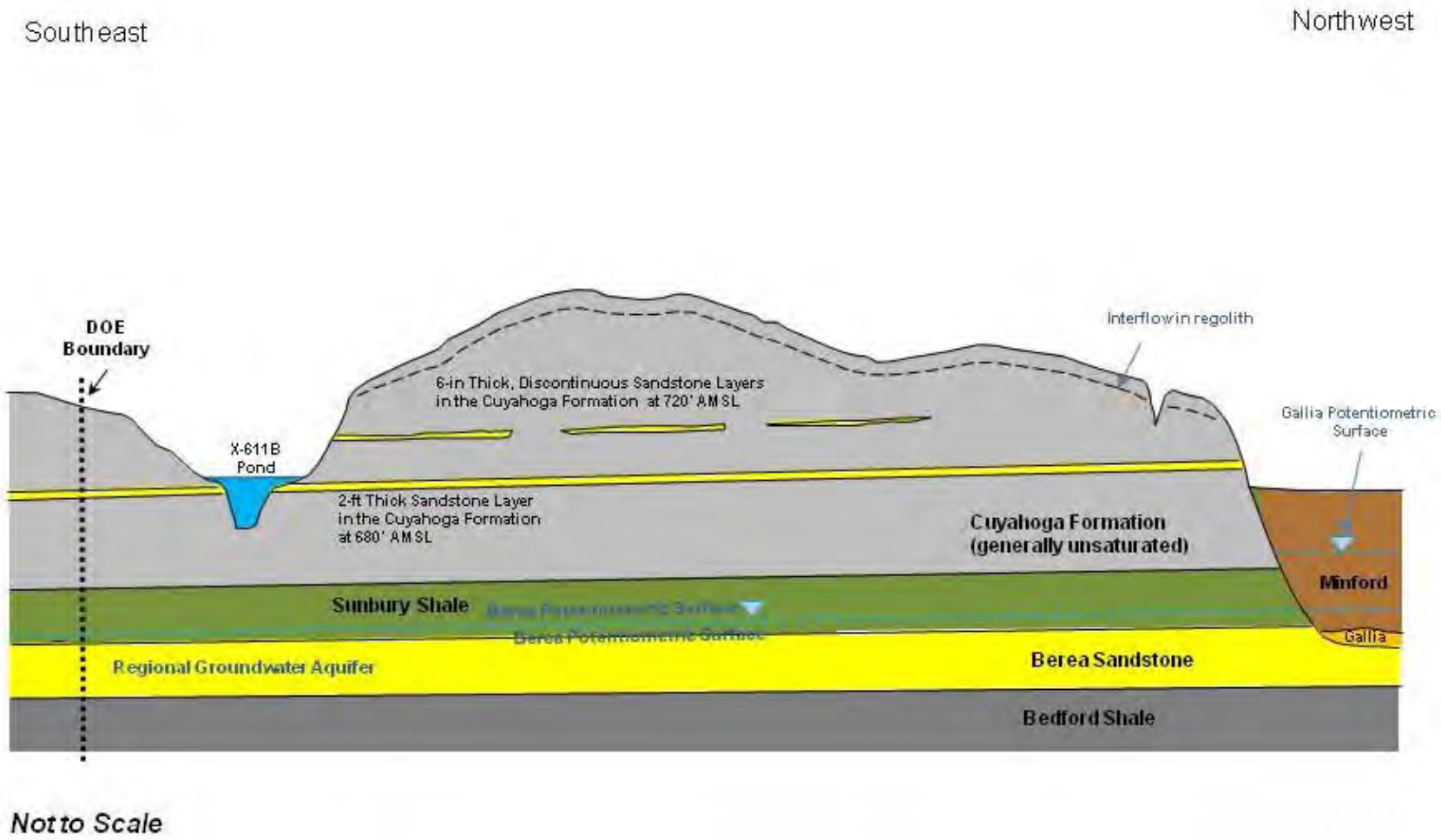

Figure I.5. Conceptual Site Model for PORTS Modeled Waste Acceptance Criteria – Current Condition

A future condition CSM identifies the key elements of fate and transport, which include the media that the contaminants may move through and the receptor that could become exposed to such contaminants. The locations of these receptors are termed point of assessment (POA) or point of compliance (POC) and are used to define the exposure assumptions that are to be considered in the modeled WAC development. A POA is a point at which it is assumed that a receptor may come in contact with media that may be contaminated by a potential OSDC based on fate and transport modeling and current and future site characteristics. POA locations are selected based on water flow directions beneath the site and likely future use scenarios in the vicinity of a potential OSDC, resulting in potential exposure to a receptor. Based on characteristics of the relevant exposure media and locations, specific exposure scenarios apply to the POAs which are considered in the development of modeled WAC to ensure protection of human health and the environment. The POC is a regulatory-driven requirement and is the basis for future monitoring of groundwater in the regional aquifer. The following summarizes the POAs and the POC that are to be evaluated in the WAC modeling for a potential OSDC:

- POA-1: maximum impacted surface water/sediment at the 680-ft sandstone discharge.

- POA-2: maximum impacted groundwater at facility boundary (300 ft from waste boundary [i.e., unit boundary]) within the 680-ft sandstone layer.

- POA-3: maximum impacted groundwater at facility boundary (300 ft from unit boundary) within the Berea sandstone under an open borehole configuration to allow for mixing from the 680-ft sandstone layer. (Note – under this POA scenario it is assumed that well water is withdrawn from the regional groundwater aquifer [Berea sandstone] in which an open borehole configured well is the only hydraulic connection between the regional groundwater aquifer and the shallow zone of saturation [i.e., 680-ft sandstone layer located immediately downgradient from the potential OSDC.])

- POA-4: maximum impacted groundwater/surface water under a future residential farmer scenario.

- POA-5 maximum impacted groundwater in Berea sandstone in the nearest downgradient point along the DOE property boundary which represents potential impacts of a potential OSDC to the regional groundwater aquifer (potential impacts to the Berea sandstone from the 680-ft sandstone layer is limited due to a greater distance from the waste).

- POC: groundwater monitoring at a point in the Berea sandstone at the downgradient edge of the unit boundary.

While this future condition CSM is a simplification of the fate and transport processes, it provides a visualization and general understanding of the potential impacts from a potential OSDC that are used to develop the WAC modeling processes.

Figure I.6 illustrates the future condition CSM applicable to Study Area D and, specifically, the primary steps in the modeled WAC development process for the constituents expected to be present in waste that could migrate from a potential OSDC to the applicable POA or POC. The steps include the following:

Step 1 Developing a source term for each constituent for the waste

Step 2 Estimating the infiltration rate for water moving through the cap and into the waste mass

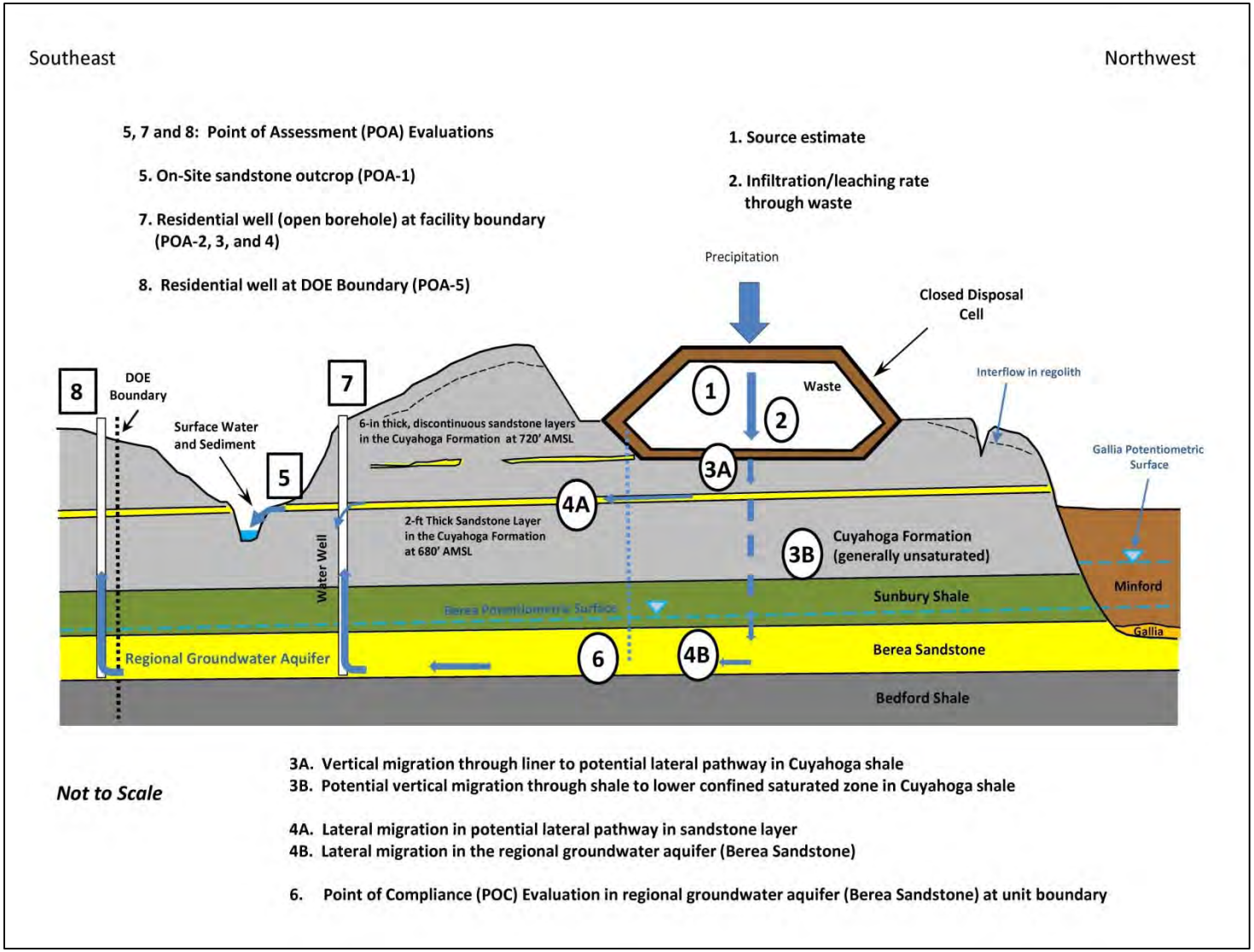

Figure I.6. Conceptual Site Model for PORTS Modeled Waste Acceptance Criteria – Future Condition

Step 3 Estimating the leaching rate of each constituent through the base liner materials and various layers (vadose and saturated zones) beneath the OSDC

Step 4 Predicting the lateral migration through the saturated zones (water bearing 2-ft sandstone layer in the unsaturated Cuyahoga Shale and regional Berea groundwater aquifer) within the compliance period of 1,000 years

Step 5 If applicable, estimating the contaminant concentration in surface water and sediment at POA-1 (sandstone outcrop) in the maximum impact direction from the OSDC within the compliance period of 1,000 years under a recreational exposure scenario

Step 6 If applicable, estimating the contaminant concentration in groundwater at the POC within the compliance period of 1,000 years

Step 7 If applicable, estimating the contaminant concentrations in groundwater at POA-2, POA-3, and POA-4 within the compliance period of 1,000 years and using maximum contaminant levels (MCLs)/risk-based concentrations for POA-2 and POA-3, and risk-based concentrations for all pathways under a future residential farmer scenario for POA-4

Step 8 If applicable, estimating the contaminant concentration in groundwater at POA-5 within the compliance period of 1,000 years using MCLs/risk-based concentrations.

The footprint for a potential OSDC at Study Area D and the basis for the CSM are the conceptual design described in Section 8 and drawings presented in Appendix J of the waste disposition RI/FS report. For purposes of modeled WAC development, a footprint applicable to an 11 cell, 5-million-cy capacity requiring 66 acres is assumed. The bottom liner of the facility is to be built on competent Cuyahoga shale in order to provide a stable base. As noted in the facility cross sections in Appendix J, the bottom elevations of the individual cells are cut below the existing grade elevation between approximately 10 ft and 45 ft. Therefore, construction of a potential OSDC at Study Area D would result in excavation of the weathered zone (i.e., regolith) within the footprint. Additionally, the bottom elevations of much of the base liner are below the discontinuous sandstone layer identified at 720 ft AMSL resulting in excavation of much of this sandstone. Excavation and/or isolation of the 720-ft sandstone layer under the potential OSDC during liner construction will be specified in the final design of the sub-grade to sufficiently eliminate this layer from becoming a lateral pathway for potential leaks to migrate outside of the potential OSDC footprint. Monitoring of the remaining portion of this layer outside but adjacent to the potential OSDC will also be conducted as part of the overall potential OSDC monitoring system. Therefore, no additional engineered features would be necessary to address the shallow subsurface water flow beneath a potential OSDC at Study Area D.

For each constituent that is modeled to reach the POA or POC within the compliance time frame, draft modeled WAC are derived using the ratios of risk-based or regulatory-based performance standards to model-predicted values to derive the maximum concentrations or maximum activity of COCs that may be placed in a potential OSDC at Study Area D.

I.3. WASTE STREAMS, WASTE ACCEPTANCE CRITERIA CONTAMINANTS, AND PERFORMANCE STANDARDS

Most of the waste planned to be generated is building waste (regulatory category [RC]-1, engineering category [EC]-2), the majority of it from the three large process buildings. The primary contaminants at PORTS are radionuclides, but other contaminants such as metals, organics, etc. are present. The large volume of soil assumed to be generated under the Ohio Consent Decree (RC-2, EC-1) is uncertain because remedial action objectives have not yet been established, and the soils beneath the process buildings and across much of PORTS have not been fully characterized. Soil brings a host of additional contaminants to the waste streams, which must be managed in a safe and compliant manner. In general, most of the waste streams are classified as low-level waste. Section I.3.1 discusses the waste types and volumes which subsequent sections discuss how contaminants were selected for modeled WAC development.

I.3.1 WASTE STREAMS, WASTE FORMS, AND CONTAMINANTS

The vast majority of waste expected to be generated during D&D of PORTS (RC-1) would originate from the three large gaseous diffusion process buildings, X-326, X-330, and X-333. The waste volumes include the structure of each facility, all process gas equipment (PGE) (except from X-326) and industrial equipment within each facility, and facility slabs. The balance of the expected volume is from hundreds of smaller buildings and man-made structures. This volume of waste requiring fill (RC-1, EC-2) (1.4 million cy) requires a disposal facility with a total capacity of approximately 3.9 million cy, assuming an EC-1/EC-2 ratio of 2 to 1. However, as a contingency for containing additional waste that may be generated at PORTS, a disposal facility with a total capacity of 5 million cy is assumed for modeled WAC development.

The primary waste forms associated with D&D of PORTS (RC-1) requiring on-Site disposal are as follows:

- Other building waste
- Concrete waste
- PGE waste
- Residual soils.

While not all of these wastes are candidates for disposal on Site, there would be large portions of each waste form that would be able to meet a potential OSDC WAC.

A starting point for characterization of the waste expected to be generated is identifying and understanding the processes that created radiological and/or chemical waste. Most of the effort in developing waste types has focused on the three process buildings because D&D at these facilities would generate a majority of the waste volume.

The primary radiological COCs within the process buildings are uranium (uranium-234, uranium-235, uranium-238) and technetium-99. The uranium contamination results from the gaseous diffusion process. Most of the technetium-99 was introduced into the cascade system either as direct feed of reactor returns or through feeding of Paducah product (UF_6) material. Radionuclides introduced into the gaseous diffusion system from the processing of reactor returns were typically generated through the plutonium uranium extraction PUREX process. A byproduct of this process was uranium trioxide, which was returned to the uranium feed cycle for the production of UF_6 feed materials. The PUREX process was highly efficient at separating out fission products and transuranic elements from its product streams.

However, for some radionuclides, the PUREX separation process was not fully effective. These reactor returns were introduced into the gaseous diffusion process to facilitate increased production and reduced reliance on commercial uranium ore mining and milling. As a result, the contaminants present in the feed materials generated from reactor returns are known to have contained measurable concentrations of fission products and transuranic elements, including most notably technetium-99, neptunium-237, and plutonium-239. Small quantities of transuranic elements, neptunium-237 and plutonium-239, are also suspected of being introduced into PORTS during the feeding of reprocessed uranium feed stock.

Exterior surface uranium contamination exists in all three PORTS process buildings (X-326, X-330, and X-333). Contamination resulted from maintenance activities and infrequent leaks of process gas during greater than atmospheric pressure operations in the X-330 and X-333 Buildings. Both fixed and removable contamination can be found on the operating and cell floors.

Chemical trapping materials in the process buildings include alumina, such as aluminum oxide (Al_2O_3) and sodium fluoride (NaF). These trapping materials contain elevated concentrations of uranium, hydrogen fluoride, technetium-99, and heavy metals. The alumina traps were used as final filtration before discharge of light gases to the atmosphere. Sodium fluoride was used to recover UF_6 from purge gas streams before return to the cascade and final purging. Magnesium fluoride (MgF_2) side-stream traps were installed in the X-326 Building (Cells 25-7-15, 17, and 19) to remove technetium-99 in the top of the cascade. This trapping system was successful in reducing the cascade technetium-99 inventory, but created a source of concentrated technetium-99 trap media. Also, there is an assumption that plutonium and neptunium may also be present on the magnesium fluoride trapping material. The traps have been disconnected from the cascade. Currently, they are compliantly stored in the X-326 Building (on the operating floor).

The primary COCs are polychlorinated biphenyls (PCBs), metals, asbestos, and strong oxidizing agents (as described in Section 5 of the waste disposition RI/FS). PCBs from electrical capacitors, transformers, and impregnated ventilation gaskets; metals such as lead and silver solder from tube fittings and other applications; cadmium and other metals from alloys and trapping materials; strong oxidizing agents from the residual UF_6 (fluorine); and hydrogen fluoride are anticipated to be present.

Initially, the PORTS recirculating cooling water (RCW) treatment system contained hexavalent chromium to prevent corrosion. In the 1990s, treatment of the cooling water was changed to a more environmentally acceptable phosphate-based system. Therefore, residual chromate and phosphate compounds are anticipated in the RCW system within the three process buildings. In addition, residual chromate is likely to be present in cooling towers and possibly other PORTS RCW support systems.

Residual amounts of hydrocarbon oils used to lubricate the process compressors and motors may be encountered in the lubricating oil headers, filters, tanks, and hydraulic lines, once drained from the system.

Small amounts of mercury are contained in various specialized instruments essential to the proper functioning and operation of the process equipment. For example, mercury is commonly found in temperature/pressure contact switches, chemical traps, fire pull stations, and mercury vapor lamps used for high-bay lighting (Theta Pro2Serve Management Company, LLC [TPMC] 2006). The X-326 Building instrument and sampling lines contain small mercury traps that were used to remove corrosive gases within the line and prevent damage to the mass spectrometer line recorders.

Arsenic may be found primarily in the X-326 Building instrument lines and sampling lines as a result of treatment gases. Beryllium is present in aluminum compressor blades and compressor impellers in low parts-per-million quantities.

I.3.2 MODELED WASTE ACCEPTANCE CRITERIA CONTAMINANT OF CONCERN SELECTION PROCESS

A qualitative human health and ecological risk assessment was conducted to assess the threat of contamination in the buildings at PORTS if no action is taken in the future and the buildings are allowed to degrade with no waste disposed. This assessment (Section 5 of the waste disposition RI/FS) identified the following COCs in the buildings at PORTS:

- Uranium isotopes (uranium-234, uranium-235, and uranium-238)
- Total uranium
- Technetium-99
- Asbestos-containing material (ACM)
- Trichloroethene
- PCBs (Aroclor-1254, Aroclor-1260)
- Chromium (including chromium III and VI).

These contaminants require an assessment of potential fate and transport through a potential OSDC into the underlying media. Because ACM is only a threat through inhalation and not a viable pathway from a closed cell, the compound was not modeled.

The risk assessment was qualitative and based on process knowledge. Existing data suggest that other contaminants are present, they could be placed in the OSDC, and such potential placement merits consideration. Based on existing analytical data from the process equipment, the following contaminants have also been assessed:

- Thorium-228
- Thorium-230
- Uranium-236
- Neptunium-237
- Plutonium-238
- Plutonium-239/240
- Americium-241.

Based on existing analytical data from the environmental media, the contaminants in Table I.2 have also been assessed as they may be present in other waste streams generated under the Ohio Consent Decree (RC-2) or as fill (RC-2, RC-3, EC-1) used in the operations of a potential OSDC. This list is derived by tabulating every COC that exceeded remedial action objectives or preliminary remediation goals in previous quadrant-specific Resource Conservation and Recovery Act of 1976 (as amended) (RCRA) Facility Investigations (DOE 1996a, 1996b, 1996c, 1996d), Corrective Measure Study documents (DOE 1998a, 1998b, 2000, 2001), the PORTS Baseline Human Health Risk Assessment (DOE 1995a) and the PORTS Baseline Ecological Risk Assessment (DOE 1996e), with the exception of naturally occurring daughter isotopes in the uranium and thorium decay chains. Data presented in these documents represent releases from activities that originally occurred in or around the buildings or as a result of waste generated in the buildings. As such, these contaminants are present in environmental media that may be candidates for disposal in a potential OSDC.

Table I.2. Modeled Waste Acceptance Criteria Contaminants of Concern from PORTS Environmental Data

Organic Constituents		Inorganic Constituents
Acenapthylene	Endosulfan II	Antimony
Benzene	Endosulfan sulfate	Arsenic
Benzo(a)anthracene	Endrin ketone	Barium
Benzo(a)pyrene	Ethylbenzene	Beryllium
Benzo(b)fluoranthene	Heptachlor	Cadmium
Benzo(g,h,i)perylene	Hexachlorobenzene	Cobalt
Benzo(k)fluoranthene	Hexachlorocyclohexane-alpha	Copper
Bis(2-chloroethyl)ether	Hexanone, 2-	Cyanide
Bromoform	Indeno(1,2,3-cd)pyrene	Fluoride
Butanone, 2-	Methoxychlor	Lithium
Carbon Tetrachloride	Methylnaphthalene, 2-	Manganese
Chlordane-gamma	Napthalene	Mercury
Chloro,3-methylphenol, 4-	Nitrobenzene	Nickel
Chloroform	Nitrobenzeneamine, 4-	Selenium
Chrysene	Nitrophenol, 4-	Silver
Dibenz(a,h)anthracene	n-Nitroso-di-n-propylamine	Vanadium
Dibenzofuran	Phenanthrene	Zinc
Dibromochloromethane	Tetrachloroethene	
Dichloroethane, 1,2-	Toluene	
Dichloroethene, 1,1-	Tribromomethane	
Dichloroethene, 1,2-	Trichloroethane, 1,1,1-	
Dieldrin	Trichloroethane, 1,1,2-	
Dimethylphthalate	Vinyl acetate	
Dinitrotoluene, 2,4-	Vinyl chloride	

As previously mentioned, a contingency volume is assumed for sizing a potential OSDC. Because this additional waste may contain constituents that could be classified as hazardous waste under RCRA, a consideration is made to include all constituents that are found on the Toxicity Characteristic Leaching Procedure (TCLP) table in 40 *CFR* 261. Table I.3 identifies additional modeled WAC COCs from the TCLP list.

Table I.3. Additional Modeled Waste Acceptance Criteria Contaminants of Concern from Toxicity Characteristic Leaching Procedure List

Organic Constituents		Inorganic Constituents
Chlordane	Methylphenol, 3- (m-Cresol)	Lead
Chlorobenzene	Methylphenol, 4- (p-Cresol)	
Cresol	Pentachlorophenol	
Dichlorobenzene, 1,4-	Pyridine	
Endrin	Toxaphene	
Hexachlorobutadiene	2,4-D	
Hexachloroethane	2,4,5-TP (Silvex)	
Lindane	2,4,5-Trichlorophenol	
Methylphenol, 2- (o-Cresol)	2,4,6-Trichlorophenol	

Finally, a review of landfills at the former DOE Oak Ridge K-25 site (now East Tennessee Technology Park), which are similar to those at PORTS, was performed in order to identify additional constituents for WAC modeling. These landfills (i.e., K-1070-A and K-1070-B landfills) received waste items and materials from the gaseous diffusion process and have been sampled and profiled for disposal at the on-site waste disposal facility in Oak Ridge. Using these data as proxy for the similar landfills at PORTS and comparing the maximum detected concentrations or activity concentrations to risk-based concentrations results in the addition of 8 organic constituents. Table I.4 identifies the additional modeled WAC COCs for PORTS.

Table I.4. Additional Modeled Waste Acceptance Criteria Contaminants of Concern Consistent with Similar Landfills at other DOE Sites

Organic Constituents
Acetone
Aroclor-1242
Anthracene
Methylene chloride

Source: Bechtel Jacobs Company LLC 2010.

I.3.3 PERFORMANCE STANDARDS

The performance standards for modeled WAC development are consistent with the remedial action objectives presented in Section 7.3 of the waste disposition RI/FS. Risk-based performance standards ensure that the excess lifetime cancer risk (ELCR) for each constituent is set at 1E-05 and the hazard quotient is set at 1. The regulatory-based performance standards consist of MCLs for protection of human health and Ohio ambient water quality criteria (AWQC) for the protection of aquatic species.

Based on the previously described POAs, the following receptors and exposure pathways are considered for the POAs:

- Recreational scenario (POA-1) – includes incidental ingestion and dermal contact with sediment and surface water potentially emanating from the 680-ft sandstone layer

- Ecological receptors (POA-1) – includes AWQC from *Ohio Administrative Code (OAC)* 3745-1-07 applicable to surface water potentially emanating from the 680-ft sandstone layer

- MCLs in groundwater (POA-2, POA-3, and POA-5) from the U.S. Environmental Protection Agency (EPA) publication *National Primary Drinking Water Regulations* (EPA 2009)

- Future residential farmer scenario (POA-4) – includes groundwater ingestion and ingestion of food crops and animal products (milk and beef) irrigated and watered with surface water and/or groundwater, as applicable.

The sources of the performance standards are as follows:

1) For sediment, values are calculated using the DOE Risk Assessment Information System (RAIS) with user-defined, site-specific exposure parameters consistent with *Methods for Conducting Human Health Risk Assessments and Risk Evaluations at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, (DOE 2011c) (referred to as the Risk Methods Document [RMD]) under a recreational teen exposure scenario (scaled to a hazard quotient of 1 or ELCR of 1E-05) (blue highlight).

2) For surface water, values are from RMD (yellow highlight) and RAIS (blue highlight) for constituents not listed in the RMD.

3) Ecological standards are from *OAC* 3745-1-70, Table 7-1, inside the mixing zone (green highlight).

4) MCLs are from EPA 2009 (orange highlight).

5) For groundwater and ingestion of vegetables, milk, and beef under a future resident farmer, all values are from RAIS (blue highlight).

The performance standards used in the derivation of modeled WAC are shown in Table I.5.

It should be noted that the radionuclide performance standards are risk- or ARAR-based. These standards are either equivalent to a 1E-5 ELCR, in the case for the recreational and resident farmer scenarios, or are based on the MCL for alpha or beta activity-related nuclides for groundwater exposure. *OAC* 3701:1-54-08(B)(1) requires that concentrations of radioactive material released to the general environment in groundwater, surface water, air, soil, plants, and animals must not result in an annual dose exceeding the equivalent of 25 mrem to the whole body, 75 mrem to the thyroid, or 25 mrem to any other organ to any member of the public. The risk- and ARAR-based performance standards meet (or exceed) this requirement. First, the risk-based performance standard concentrations are based on an ELCR that is nearly an order of magnitude lower than the equivalent risk associated with an annual dose of 25 mrem/yr to the whole body or any organ, which according to EPA equates to an approximate 5E-4 ELCR (EPA 1997), and an order of magnitude lower than the equivalent risk associated with an annual dose of 75 mrem/yr to the thyroid. Second, the MCL-based performance standards equate to an annual dose of between 2 and 11 mrem/yr to the whole body or any organ, again lower than the required dose.

Table I.5. Performance Standards at Exposure Locations

COCs	POA-1			POA-2	POA-3	POA-4	POA-5
	Recreational Scenario Risk-based Surface Water Concentration (µg/L or pCi/L)	Recreational Scenario Risk-based Soil Concentration (mg/kg or pCi/g)	Ecological Standards Ohio Ambient Water Quality Criteria Concentration (µg/L)	Groundwater in 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea mixing with 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Future Resident Farmer Scenario – All Pathways Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea at DOE Property Line MCL or Risk-based Concentration (µg/L or pCi/L)
Radionuclides							
Americium-241	801	311	NV	15	15	4.3	15
Neptunium-237	1,350	325	NV	15	15	7.1	15
Plutonium-238	636	343	NV	15	15	3.4	15
Plutonium-239	617	301	NV	15	15	3.3	15
Plutonium-240	617	301	NV	15	15	3.3	15
Thorium-228	779	3,000	NV	15	15	153	15
Thorium-230	916	408	NV	15	15	4.1	15
Technetium-99	30,300	10,600	NV	900	900	4.9	900
Uranium-234	1,180	525	NV	7.48	7.48	6.1	7.48
Uranium-235	1,200	68.1	NV	7.6	7.6	6.2	7.6
Uranium-236	1,240	558	NV	7.9	7.9	6.5	7.9
Uranium-238	1,300	582	NV	8.27	8.27	6.8	8.27
Inorganics							
Antimony	254	1,020	NV	6	6	8.49	6
Arsenic	57	88.7	680	10	10	0.30	10
Barium	72,000	511,000	NV	2,000	2,000	4,232	2,000
Beryllium	87	5,110	NV	4	4	37.9	4
Cadmium	136	2,200	9	5	5	13	5
Chromium	118,667	3,830,000	1,100	100	100	29,335	100
Chromium VI	8.9	296	31	0.41	0.41	0.35	0.41
Cobalt	510	767	NV	13.1	13.1	6	13.1
Copper	58,667	102,000	27	1,300	1,300	764	1,300
Fluoride (salts)	76,333	10,200	NV	4,000	4,000	759	4,000
Lead	16,900	17,500	190	15	15	14	15

Table I.5. Performance Standards at Exposure Locations (Continued)

COCs	POA-1			POA-2	POA-3	POA-4	POA-5
	Recreational Scenario Risk-based Surface Water Concentration (µg/L or pCi/L)	Recreational Scenario Risk-based Soil Concentration (mg/kg or pCi/g)	Ecological Standards Ohio Ambient Water Quality Criteria Concentration (µg/L)	Groundwater in 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea mixing with 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Future Resident Farmer Scenario – All Pathways Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea at DOE Property Line MCL or Risk-based Concentration (µg/L or pCi/L)
Inorganics (continued)							
Lithium	16,700	5,110	NV	57.3	57.3	23	57.3
Manganese	5,367	61,300	NV	983	983	836	983
Mercury	108	409	2.9	2	2	3	2
Nickel	15,233	51,100	940	863	863	428	863
Selenium	7,333	12,800	NV	50	50	19	50
Silver	1,733	12,800	NV	210	210	61	210
Uranium	4,440	7,670	NV	30	30	67	30
Vanadium	13,200	12,900	NV	393	393	149	393
Zinc	483,333	766,000	230	13,133	13,133	2,912	13,133
Cyanide	29,300	1,530	44	200	200	4.86	200
Organics							
Acenapthylene	NV	NV	NV	NV	NV	NV	NV
Acetone	1,486,667	2,300,000	NV	24,467	24,467	1,351	24,467
Anthracene	267	505,000	NV	140	140	138	140
Aroclor-1242	1.23	47.8	NV	0.5	0.5	0.16	0.5
Aroclor 1254	0.17	32.8	NV	0.5	0.5	0.10	0.5
Aroclor 1260	0.25	47.8	NV	0.5	0.5	0.01	0.5
Benzene	367	854	NV	5	5	3.05	5
Benzo(a)anthracene	0.072	134	NV	0.2	0.2	0.02	0.2
Benzo(a)pyrene	0.072	13.4	NV	0.2	0.2	0.02	0.2
Benzo(b)fluoranthene	0.072	134	NV	0.2	0.2	0.02	0.2
Benzo(g,h,i)perylene	267	NV	NV	0.2	0.2	140	0.2
Benzo(k)fluoranthene	0.072	1,340	NV	0.2	0.2	0.02	0.2
Bis(2-chloroethyl)ether	65.6	98	NV	0.118	0.118	0.08	0.118

Table I.5. Performance Standards at Exposure Locations (Continued)

COCs	POA-1			POA-2	POA-3	POA-4	POA-5
	Recreational Scenario Risk-based Surface Water Concentration (µg/L or pCi/L)	Recreational Scenario Risk-based Soil Concentration (mg/kg or pCi/g)	Ecological Standards Ohio Ambient Water Quality Criteria Concentration (µg/L)	Groundwater in 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea mixing with 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Future Resident Farmer Scenario – All Pathways Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea at DOE Property Line MCL or Risk-based Concentration (µg/L or pCi/L)
Organics (continued)							
Bromoform	6,890	13,500	NV	85.1	85.1	73	85.1
2-Butanone	886,667	1,530,000	NV	2,240	2,240	1,016	2,240
Carbon Tetrachloride	274	518	NV	5	5	3.3	5
Chlordane	85	367	NV	2	2	1.6	2
gamma-Chlordane	85	367	NV	6.4	6.4	6.4	6.4
4-Chloro, 3-methylphenol	NV	NV	NV	NV	NV	NV	NV
Chlorobenzene	4,067	51,100	NV	100	100	81	100
Chloroform	1,180	295	NV	1.93	1.93	1.75	1.93
Chrysene	0.072	13,400	NV	0.02	0.02	0.02	0.02
Cresol (including o-, m-, p-)	2,920	91,300	NV	215	215	193	215
Dibenz(a,h)anthracene	0.072	13.4	NV	0.2	0.2	0.01	0.2
Dibenzofuran	63	2,560	NV	35	35	19	35
Dibromochloromethane	2,363	494	NV	5	5	3.1	5
1,4-Dichlorobenzene	1,510	2,390	NV	75	75	4.23	75
1,2-Dichloroethane	540	374	NV	5	5	1.09	5
1,1-Dichloroethene	20,700	128,000	NV	7	7	264	7
1,2-Dichloroethene	4,000	23,000	NV	70	70	126	70
Dieldrin	1.51	6.66	0.47	0.4	0.4	0.03	0.4
Dimethylphthalate	NV	NV	NV	NV	NV	NV	NV
2,4-Dinitrotoluene	186	342	NV	2.17	2.17	1	2.17
2,4-D	11,500	21,300	NV	70	70	140	70
Endosulfan II	6,167	NV	NV	261	261	261	261
Endosulfan sulfate	7,433	NV	NV	262	262	262	262
Endrin	124	548	0.17	2	2	6	2

Table I.5. Performance Standards at Exposure Locations (Continued)

COCs	POA-1			POA-2	POA-3	POA-4	POA-5
	Recreational Scenario Risk-based Surface Water Concentration (µg/L or pCi/L)	Recreational Scenario Risk-based Soil Concentration (mg/kg or pCi/g)	Ecological Standards Ohio Ambient Water Quality Criteria Concentration (µg/L)	Groundwater in 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea mixing with 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Future Resident Farmer Scenario – All Pathways Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea at DOE Property Line MCL or Risk-based Concentration (µg/L or pCi/L)
Organics (continued)							
Endrin ketone	NV	NV	NV	NV	NV	NV	NV
Ethylbenzene	644	4,270	NV	700	700	12.9	700
Heptachlor	6.9	23.7	NV	0.4	0.4	0.08	0.4
Hexachlorobenzene	1.74	66.6	NV	1	1	0.26	1
Hexachlorobutadiene	75.3	1,370	NV	28.6	28.6	10.8	28.6
alpha-Hexachlorocylcohexane	2.5	16.9	NV	0.11	0.11	0.07	0.11
Hexachloroethane	83.6	1,280	NV	7.88	7.88	6.27	7.88
2-Hexanone	4,600	12,800	NV	49	49	26	49
Indeno(1,2,3-cd)pyrene	0.072	134	NV	0.2	0.2	0.02	0.2
Lindane	14.1	117	1.9	0.2	0.2	0.4	0.2
Methoxychlor	687	9,130	0.03	40	40	105	40
Methylene Chloride	7,230	15,300	NV	48	48	26	48
2-Methylnaphthalene	606	6,730	NV	48.8	48.8	38	48.8
Naphthalene	267	3,740	NV	140	140	118	140
4-Nitrobenzeneamine	3,260	5,330	NV	32.6	32.6	11	32.6
Nitrobenzene	1,453	5,030	NV	1.22	1.22	1.18	1.22
4-Nitrophenol	NV	NV	NV	NV	NV	NV	NV
n-Nitroso-di-n-propylamine	9.4	15.2	NV	0.1	0.1	0.03	0.1
Pentachlorophenol	2.55	187	29	1	1	0.32	1
Phenanthrene	267	NV	NV	140	140	140	140
Pyridine	6,090	2,560	NV	28.4	28.4	4	28.4
Tetrachloroethene	18.9	15,300	NV	5	5	1.08	5
Toluene	14,800	204,000	NV	1,000	1,000	1,234	1,000
Toxaphene	0.987	96.8	NV	3	3	0.12	3

Table I.5. Performance Standards at Exposure Locations (Continued)

COCs	POA-1			POA-2	POA-3	POA-4	POA-5
	Recreational Scenario Risk-based Surface Water Concentration (µg/L or pCi/L)	Recreational Scenario Risk-based Soil Concentration (mg/kg or pCi/g)	Ecological Standards Ohio Ambient Water Quality Criteria Concentration (µg/L)	Groundwater in 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea mixing with 680-ft Sandstone Layer MCL or Risk-based Concentration (µg/L or pCi/L)	Future Resident Farmer Scenario – All Pathways Risk-based Concentration (µg/L or pCi/L)	Groundwater in Berea at DOE Property Line MCL or Risk-based Concentration (µg/L or pCi/L)
Organics (continued)							
1,1,1-Trichloroethane	776,667	5,110,000	NV	200	200	9,144	200
1,1,2-Trichloroethane	668	841	NV	5	5	1.92	5
Trichloroethene	4,100	1,020	NV	5	5	5.65	5
2,4,5-Trichlorophenol	26,600	183,000	NV	1,630	1,630	1,172	1,630
2,4,6-Trichlorophenol	278	1,830	NV	16.6	16.6	12	16.6
2,4,5-TP (Silvex)	7,680	18,300	NV	50	50	143	50
Vinyl acetate	5,900,000	2,560,000	NV	411	411	382	411
Vinyl chloride	57.6	2.33	NV	2	2	0.13	2

Notes:
Yellow: PORTS RMD, Table 1, scaled to ELCR of 1×10^{-5} or hazard quotient of 1.
Blue: DOE's RAIS at http://rais.ornl.gov/ using exposure factors consistent with PORTS RMD document.
Green: *OAC* 3745-1-07, Table 7-1 and 7-9, IMZM classification
Orange: EPA 816-F-09-004, May 2009.

Because the performance standards are risk-based using typical exposure parameters, some constituents have standards greater than unity (that is 100%). This is an artifact of the method for calculating the performance standards and where this occurs, the physical limit becomes the *de facto* standard.

COC = contaminant of concern
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
IMZM = inside mixing zone maximum
MCL = maximum contaminant level
NV = no value
OAC = *Ohio Administrative Code*
POA = point of assessment
PORTS = Portsmouth Gaseous Diffusion Plant
RAIS = Risk Assessment Information System
RMD = Risk Methods Document

I.4. PRELIMINARY OSDC DESIGN

A conceptual design for a potential OSDC has been used for modeling and considers the volumes and types of waste (radiological and chemical waste streams) potentially projected to be placed in such a facility, consistent with those presented in Section 4 of the waste disposition RI/FS report. Because a potential OSDC would manage waste with RCRA, Toxic Substances Control Act of 1976, and radioactive contaminants, the conceptual design incorporates a number of elements associated with the various design requirements in the waste management regulations for each of these waste types. This includes a multilayer base liner system and a multilayer cap system. Understanding the physical design of a potential OSDC is essential to properly account for the impact of these design features in modeling contaminant transport. The description of a potential OSDC herein is for illustrative purposes only as the basis for draft modeled WAC development, and it should not be construed that Alternative 2 has actually been selected.

I.4.1 OSDC FOOTPRINT AND LAYOUT

A potential OSDC assumed in this modeled WAC analysis considers a 5 million cy volume capacity facility, which is the volume necessary to contain the DFF&O waste as well as additional waste that may be generated during the cleanup of PORTS. The disposal cells at Study Area D would sit on a topographic high area (Figures I.7 and I.8) and entirely on top of competent Cuyahoga shale, which includes both weathered shale and competent shale. The depth to bedrock in Study Area D ranges from less than 10 ft in the upland areas to up to 40 ft deep on the western and northern boundaries.

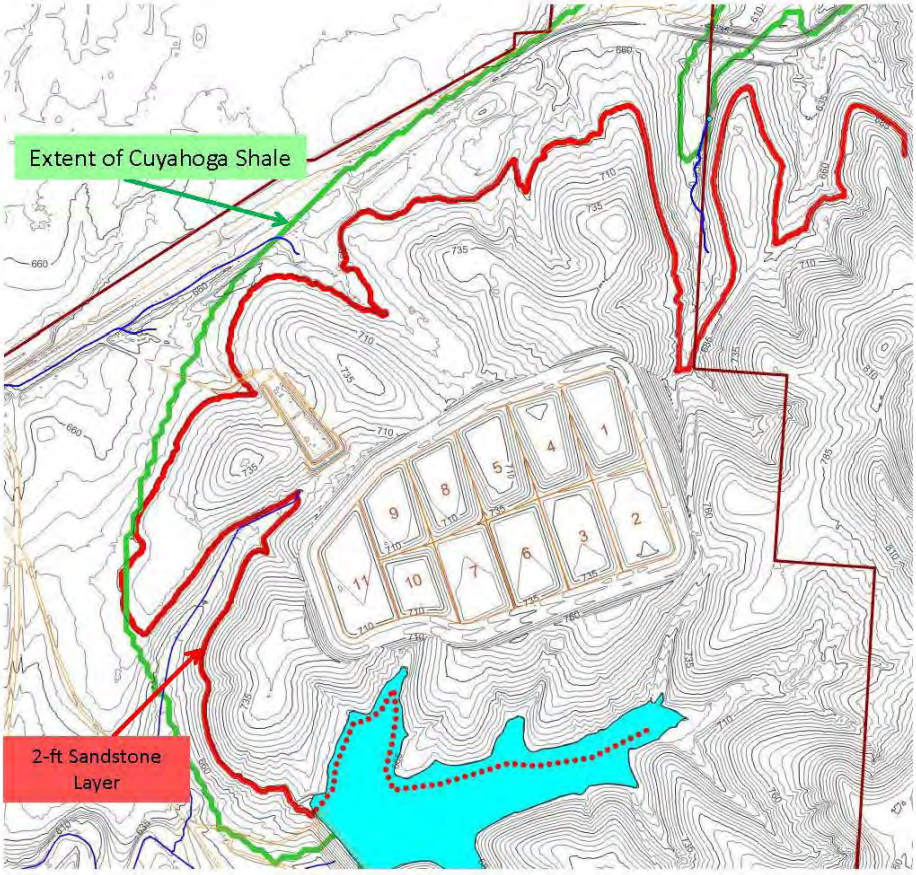

Figure I.7. Conceptual Location of a Potential OSDC at PORTS

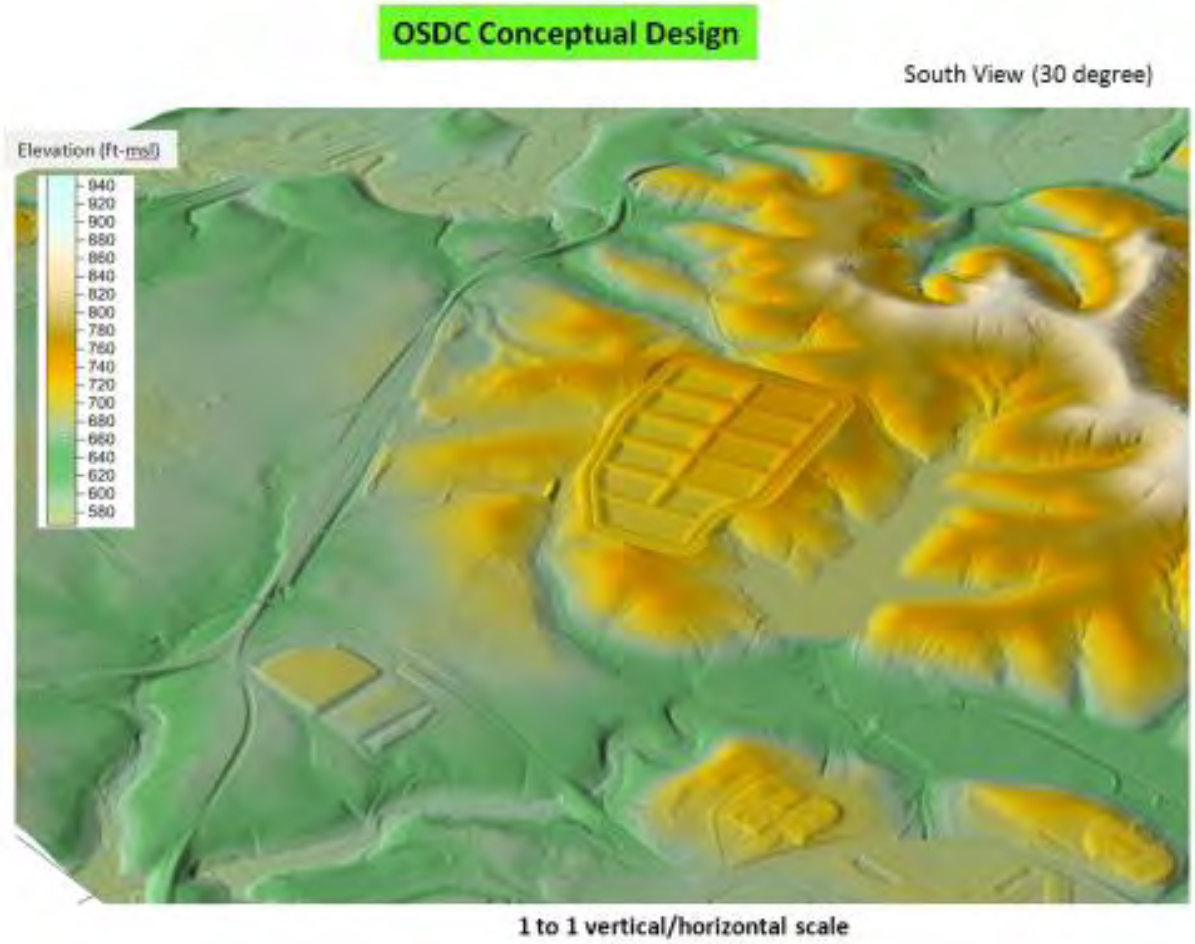

Figure I.8. Three-Dimensional Representation of OSDC Cells at PORTS

I.4.2 MULTILAYER BASE LINER SYSTEM

The purpose of this system is to prevent leachate from migrating out of the disposal unit. A compacted clay liner with a double geocomposite liner system is proposed, along with two low-permeability liners, a leachate collection and removal system, and a leak detection system. The primary liner would be constructed of a geomembrane to prevent migration of hazardous constituents into the secondary liner for the active life and post-operations care period. The secondary component of the composite bottom-liner would be designed and constructed using materials to minimize the migration of hazardous constituents if a breach in the primary liner were to occur. The active leachate collection system, which includes a drainage layer above the primary liner, would be designed, assembled, and installed to be fully functional for at least 30 years of post-operations, while the leak detection system between the primary and secondary layers would be capable of detecting leachate movement through the primary liner in excess of the action leakage rate. After the post-operations period ends, leachate would continue to be collected, although the amount generated is expected to be low. This leachate would be directed through the passive treatment system. The base liner proposed for the conceptual design includes the following layers from the cell base up:

- Compacted clay liner: A 3-ft-thick, low-permeability clay layer would be placed above the cut elevation (stable soil or bedrock) and have a hydraulic conductivity ≤ 1E-07 cm/s.

- Secondary liner: A geosynthetic clay liner (GCL) and flexible membrane liner (FML) would be installed. The FML would be a man-made geosynthetic barrier composed of materials compatible with the waste and resistant to degradation by the chemical constituents expected to be present in the leachate. A typical GCL consists of sodium bentonite encapsulated between two geotextiles. The GCL, which is less than 1 in. thick, typically has a hydraulic conductivity on the order of 5E-09 cm/s.

- Leak detection system drainage layer: This is a 1-ft gravel leak detection layer sandwiched between two geotextile layers on the cell floor. On the sloping (3 horizontal to 1 vertical) walls of the facility, geonet (a plastic grid sandwiched between two layers of geotextile with triple the flow capacity of gravel) would be used to transmit any leachate that penetrates the primary liner to the gravel leak detection system drainage layer on the cell base. This layer would be graded to drain toward detection piping. At each location where the leak detection piping penetrates a layer of the primary and secondary liner, an antiseep collar would be installed to prevent development of a preferential flow pathway. The detection piping would be connected to a separate detection sump in the leachate collection and transfer facility downgradient of the disposal cell. Little or no leachate is expected to be captured by this system during the operations or post-operations period.

- Primary liner: The primary liner would retard leachate migration out of the disposal cell and direct leachate into the primary leachate collection layer. The conceptual design includes an FML and a low-permeability GCL.

- Leachate collection system drainage layer: The primary leachate collection system drainage layer consists of a 1-ft-thick gravel layer on top of the primary liner on the cell floor and on the sloping walls. The leachate collection system drainage layer is sandwiched between two layers of geotextile on the cell floor and would collect significant volumes of leachate draining through the waste mass during operations and before placement of the cap. It would also collect small volumes of leachate during the post-operations period. The geotextile layers would cushion and protect the primary liner and retard infiltration of fines from the overlying soil and waste into the gravel, which would prolong the functional life of the leachate recovery system. Perforated leachate collection pipes would be placed in the gravel drainage layer and collect leachate in a central line that gravity flows out of the cell to a collection sump in the leachate collection and transfer facility. The primary leachate collection system would be designed with perforated collection piping and antiseep collars similar to those in the leak detection system drainage layer. On the sloping walls of the disposal cell, geonet (a plastic grid sandwiched between two layers of geotextile and with triple the flow capacity of gravel) would be used to transmit leachate to the gravel leachate collection system on the cell base. Man-made materials would be selected for compatibility with the expected leachate chemistry.

- 1-ft protective soil layer: A protective layer at least 1 ft thick would be placed over the upper leachate collection system geotextile to prevent damage to the underlying layers during operations.

Figure I.9 shows a typical cross section of a RCRA Subtitle C hazardous waste landfill liner system with the various layers that form a portion of the waste containment system.

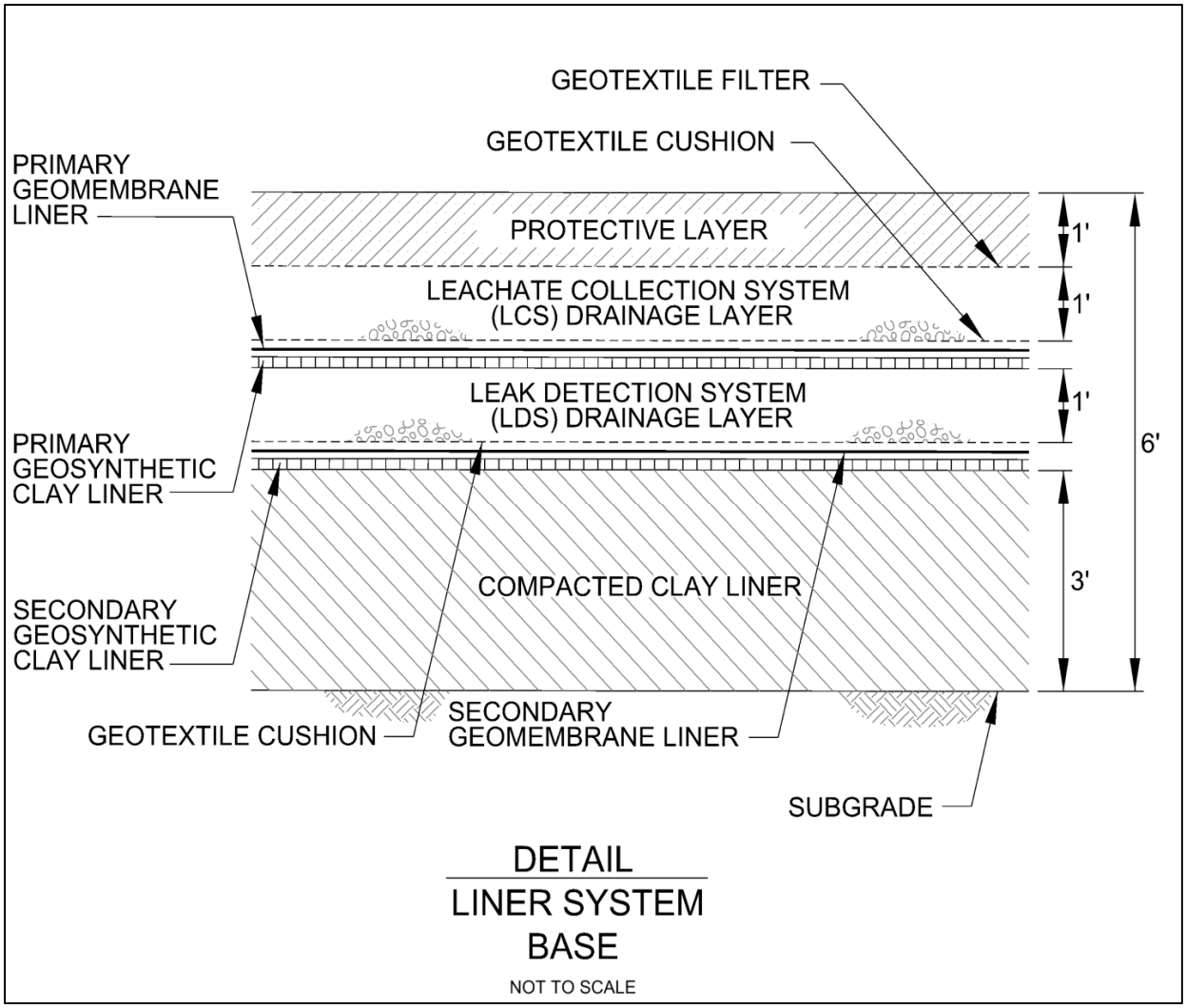

Figure I.9. Typical Section View – Landfill Base Liner System Details for a Potential OSDC at PORTS

I.4.3 COVER SYSTEM

The final cover would be designed and constructed for the following purposes:

- Minimize migration of liquids (precipitation) into the closed disposal cell over the long term
- Promote drainage and minimize erosion or abrasion of the cover
- Accommodate settling and subsidence to maintain the cover's integrity
- Provide a permeability less than or equal to the permeability of any bottom-liner system or natural subsoils present

- Resist intrusion of humans, plants, and animals

- Minimize future maintenance.

The cover would be sloped to facilitate runoff and would be placed over the waste and into the perimeter of the disposal cells. The conceptual design for the nominal 10-ft-thick cover consists of the following elements from the top of the waste to the top of the cap:

- Soil contour layer: Following the placement of waste to final grade in any area, a soil contour layer would be placed over the waste to reduce infiltration and contain the waste before capping. The soil contour layer would include a 1-ft minimum clay contour soil layer to provide an intermediate uniform layer between the wastes and the final cover. This cover would bring the disposal cell to final grade in preparation for cover placement, reduce infiltration, and protect the permanent cover layer from settlement within the waste cell. With proper maintenance of the soil contour layer, this temporary cover would reduce infiltration sufficiently, pending installation of the other cap components.

- Secondary hydraulic barrier: during final capping, a 2-ft-thick, low-permeability clay layer would be placed above the soil contour layer. This layer is considered to be the secondary hydraulic barrier and would be similar in design to the low-permeability clay layer in the secondary base liner.

- Primary hydraulic barrier: A GCL and FML would be installed above the low-permeability soil layer. The GCL would serve as an additional low-permeability layer and would prevent infiltration. A thin layer of low-permeability clay would be placed above the GCL to prevent migration of the bentonite into the drainage layer in the event the geotextiles deteriorate.

- Drainage layer: Above the FML would be a 1-ft gravel drainage layer sandwiched between two layers of geotextile. The upper geotextile would minimize clogging of the drainage layer, and the lower geotextile would protect the FML from puncture.

- Biointrusion barrier: A 3-ft biointrusion barrier would prevent burrowing animals and plant root systems from penetrating the cover system and would also discourage inadvertent human intrusion by increasing the difficulty of digging or drilling into the cell. This layer would be constructed of cobbles (large, rounded stones) and is assumed to be a vertical percolation layer only to facilitate infiltration of water into the drainage layer, however some benefit to lateral drainage may be expected. A 6-in., graded natural filter (granular layer) would overlie the biointrusion layer to prevent clogging of the porous layer with overlying soil.

- Vegetative soil layer: A 2-ft vegetated soil layer over the filter layer (at a 2 to 2.5 percent grade on top of the cap) would provide conditions that support a vegetative cover to reduce erosion. A 6-in.-thick layer of topsoil would provide for permanent vegetation on top of the cap. To eliminate erosion until the permanent vegetation is established, an erosion mat would be installed to protect the other cover layers from the effects of wind and water erosion. It would accommodate the typical root systems of planted and native vegetation. This layer, the drainage layer, and the biointrusion layer together would be much thicker than the local frost depth, preventing frost damage to the FML and the low-permeability soil layer. Side slopes (6 ft horizontal to 1 ft vertical) of the cover system would be covered with a 2-ft soil/rock matrix and a 3-ft riprap layer to minimize erosion.

Figure I.10 shows a typical cross section of a RCRA Subtitle C hazardous waste landfill cap system with the various layers that form a portion of the waste containment system.

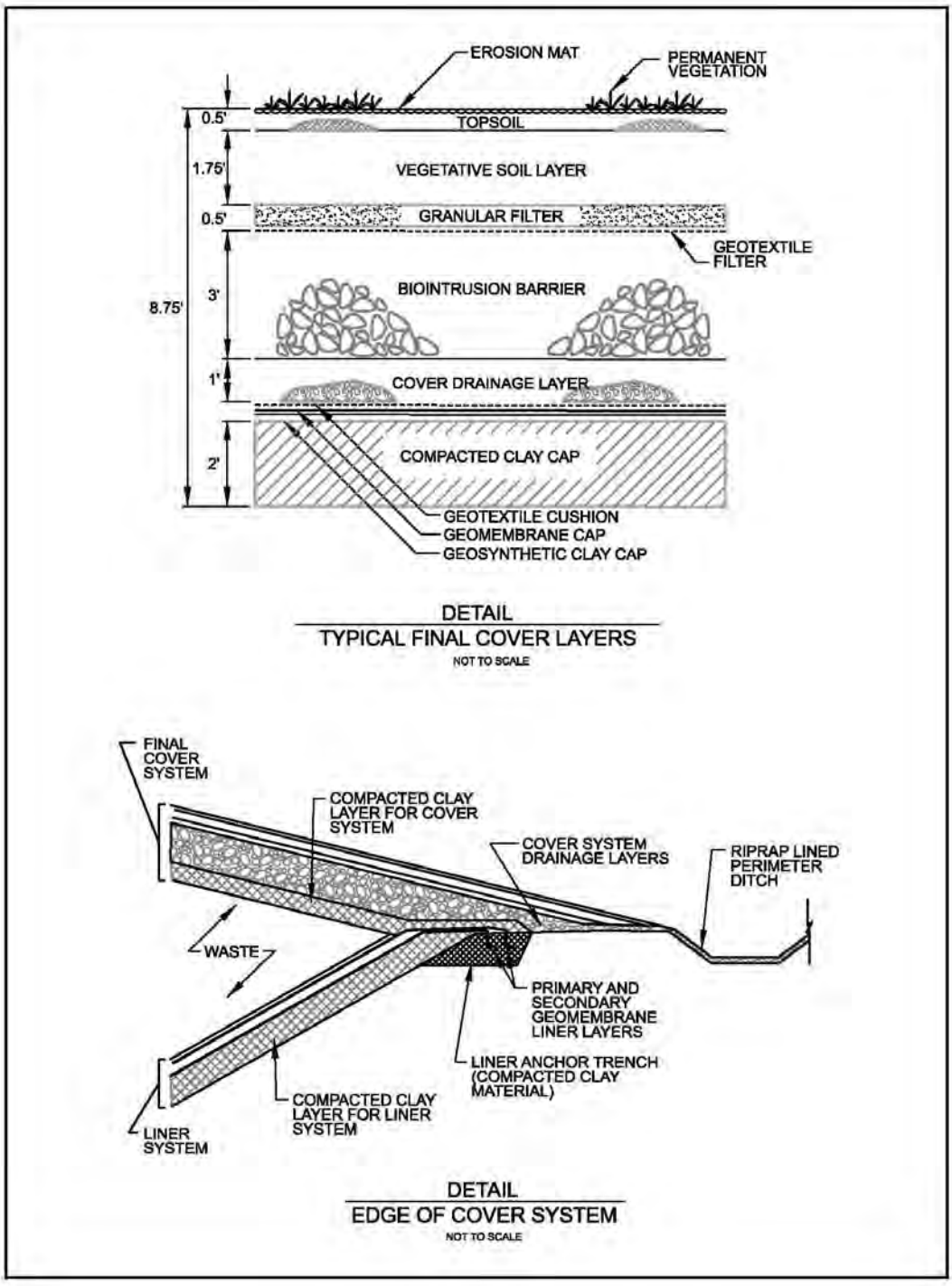

Figure I.10. Typical Section View – Landfill Final Cap Cover for a Potential OSDC at PORTS

The waste layer (averages approximately 50 ft thick) is assumed to consist primarily of contaminated soil and soil-like materials (EC-1), as well as scrap metal, cement-solidified waste, and other building waste (EC-2), based on analysis of the waste generation forecast presented in Section 4 of the RI/FS report. These wastes are assumed to be placed in vertical lifts sufficient to minimize void spaces within the waste layer. Specific OSDC waste loading and operational plans and procedures will be developed in post-Record of Decision documentation. For the purposes of draft modeled WAC development, the waste matrix is assumed to consist primarily of soil-like material (EC-1) since the waste (EC-2) is mixed with fill soil (EC-1) at a 2 to 1 ratio in order to meet waste compaction requirements.

The use of high-density polyethylene (HDPE) geomembrane liners in both the landfill cover and base liner systems (typically both a primary and secondary liner) are specifically prescribed by RCRA Subtitle C hazardous waste disposal regulations. Their purpose is primarily to retard the vertical migration of liquids (liners have extremely low hydraulic conductivity values), particularly when high volumes of leachate are expected, such as during operations, and secondarily to facilitate leachate collection and removal. Until very recently, there were little to no long-term performance metrics for HDPE liners. Landfill design and disposal experts have recently developed evidence, through empirical testing and research, that HDPE liners could perform their intended function for upwards of 500 to 1,000 years or more (Rowe et al. 2009). Currently, neither EPA nor the U.S. Nuclear Regulatory Commission (NRC) has developed regulations or guidance specific to assumptions regarding the expected longevity of HDPE liners. However, the NRC held a barriers workshop in August 2010 to gather information necessary to support development of future guidance. The document titled *Composite Barrier Longevity in Service at the Potential Portsmouth On-Site Disposal Cell* (Phifer and Denham 2012) indicates that the minimum service life of HDPE membranes in a potential OSDC would be on the order of 600 to 1,400 years. Nevertheless, for this draft modeled WAC evaluation, the DOE assumption is that no long-term credit is taken for the HDPE membranes in either the cap or liner systems after 200 years.

I.5. MODELED WASTE ACCEPTANCE CRITERIA

I.5.1 MODELING APPROACH AND MODELING CODES

This section provides descriptions of the computer models that were used to analyze fate and transport for a potential OSDC at Site D. To support the specific objectives of this analysis, existing and proven modeling tools, input parameters, and processes were used. The models selected are consistent with those described in the *Work Plan for Modeling Analysis in Support of Regulatory Decisions at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011b).

The Hydrologic Evaluation of Landfill Performance (HELP) model (Schroeder et al. 1994) was used to evaluate the water budget for a potential OSDC cell. The purpose of the model is to calculate the infiltration rates to groundwater through the varying layers of a potential OSDC, including the cover (or cap), waste layer, liner system, and unsaturated zone.

The HELP computer program is a quasi-two-dimensional hydrologic model of water movement across, into, through, and out of landfills. This model accepts weather, soil, and design data. It uses solution techniques that account for the effects of surface storage; snowmelt; runoff; infiltration; evapotranspiration; vegetative growth; soil moisture storage; lateral subsurface drainage; leachate recirculation; unsaturated vertical drainage; and leakage through soil, geomembrane, or composite liners. Landfill systems with various combinations of vegetation, cover soils, waste cells, lateral drain layers, low-permeability barrier clays and/or soils, and synthetic geomembrane liners may be modeled. The

HELP model was developed to assist landfill designers and regulators evaluate the hydrologic performance of proposed landfill designs. The program was designed to conduct water balance analyses for landfills, cover systems, and solid waste disposal and containment facilities. As such, the model facilitates rapid estimation of the amounts of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected to result from operations involving a wide variety of landfill designs. The HELP model requires general climatic data, design parameters, and soil characteristics to perform the analysis. These are as follows:

- **Climatic data**. The needed general climatic data include growing season, average quarterly relative humidity, normal mean monthly temperatures and precipitation, maximum leaf area index, evaporative zone depth, and latitude. PORTS Facility meteorological data were used where available. Other parameters such as solar radiation and growing season were taken from the database provided in the HELP model, using the default values for the PORTS area.

- **Design parameters**. Potential OSDC design parameters include such items as the slope and maximum drainage distance for lateral drainage layers, layer thickness, layer description, area, leachate recirculation procedures, subsurface inflows, surface characteristics, and geomembrane characteristics.

- **Soil characteristics**. Necessary soil data include porosity, field capacity, wilting point, saturated hydraulic conductivity, initial moisture storage, and the U.S. Soil Conservation Service runoff curve number. The porosity, field capacity, wilting point, and saturated hydraulic conductivity are used to estimate the soil-water evaporation coefficient and Brooks-Corey soil moisture retention parameters. The HELP model contains default soil characteristics for 42 material types that are used when measurements or site-specific estimates are not available. Geotechnical parameters used in the model for each layer will also be based on final design criteria as information becomes available.

The HELP model simulations also calculate the soil moisture contents for the model layers. To determine the change in soil moisture content and calculate the steady-state soil moisture contents for the long-term scenario, multiple time periods are simulated. HELP Model (Version 3) (Schroeder et al. 1994), a readily available code in the public domain that was developed for EPA, is used to conduct the HELP model construction and simulations.

The Surface Transport Over Multiple Phases (STOMP) model (White and Oostrom 2000, 2006) was developed by Pacific Northwest National Laboratory for modeling subsurface flow and transport systems and remediation technologies. The fundamental purpose of the STOMP simulator is to produce numerical predictions of thermal and hydrogeologic flow and transport phenomena in variably saturated and fractured subsurface environments that are contaminated with radionuclides and volatile or nonvolatile organic compounds.

Quantitative predictions from the STOMP simulator are generated from the numerical solution of partial differential equations that describe subsurface environmental transport phenomena. Description of the contaminated subsurface environment is founded on governing conservation equations and constitutive functions. Governing coupled flow equations are partial differential equations for the conservation of water mass, air mass, carbon dioxide mass, methane mass, volatile organic compound (VOC) mass, salt mass, and thermal energy. Constitutive functions relate primary variables to secondary variables. Solution of the governing partial differential equations occurs by the integral volume finite difference method. The governing equations that describe thermal and hydrogeological flow processes are solved simultaneously using Newton Raphson iteration to resolve the nonlinearities in the governing equations.

Governing transport equations are partial differential equations for the conservation of solute mass. The governing equations for solute mass conservation are solved sequentially, following the solution of the coupled flow equations. This model has been applied at many DOE facilities.

MODFLOW (McDonald and Harbaugh 1988) and Modular Transport 3-Dimensional (MT3D) may be used to predict the impacts of a potential OSDC on regional groundwater zones and receptors away from the OSDC. The estimated parameters include groundwater flow path, travel time, velocity, flux rate, and concentration.

MODFLOW is a modular, block-centered, finite-difference groundwater flow code developed by the U.S. Geological Survey. It is capable of simulating both transient and steady-state saturated groundwater flow in one, two, or three dimensions. MODFLOW calculates potentiometric head distribution, flow rates, velocities, and water balances throughout an aquifer system. It also includes modules simulating recharge; flow towards wells; and groundwater flow into drains, streams, and rivers. A number of different boundary conditions are available, including specified head, areal recharge, injection or extraction wells, evapotranspiration, drains, streams, or rivers. Aquifers can be simulated as unconfined, confined, or a combination of unconfined and confined.

MODFLOW is used for the analysis because it is in the public domain; is widely used by the industrial, scientific, and governmental communities; has been rigorously tested and verified; and has a variety of software tools that are publicly available for graphical preprocessing and post-processing. In addition, MODFLOW has been used as the code for the PORTS-wide groundwater flow model.

The movement of contaminants in groundwater from the waste cell to points of exposure outside of the waste disposal site are simulated by using the MT3D model (Zheng 1990), a 3-D contaminant fate and transport model code.

MT3D is a comprehensive, 3-D numerical model for simulating solute transport in complex hydrogeologic settings. It is a numerical simulation code that models the fate and transport of dissolved, single-species contaminants in saturated groundwater systems. MT3D calculates concentration distributions, concentration histories at selected receptor points, hydraulic sinks (extraction wells), and the mass of contaminants in the groundwater system. The code can simulate 3-D transport in complex, steady-state, and transient flow fields. It can also represent anisotropic dispersion, source-sink mixing processes, first order transformation reactions, and linear and nonlinear sorption. MT3D offers the user a choice of four solution options, which makes it well suited for handling a wide range of conditions.

MT3D is linked with MODFLOW and is designed specifically to handle advectively dominated transport problems without the need to construct refined models specifically for solute transport. It is a popular 3-D solute transport code and has been used successfully to model hydrogeologic conditions at a variety of sites. MT3D is widely accepted by regulators and the groundwater consulting and research communities.

Because of the lithologic complexity of the potential OSDC site and the unique objectives of the models, links and interactions among the models are required. Potential OSDC design and performance assessment, involving many man-made and design features, are best evaluated with the HELP model. The output data, in terms of water flux to the underlying media, are used as the input parameters for the STOMP model, which is used to predict water and contaminant movement at the OSDC site in unsaturated, water-bearing, and small-area-scale groundwater zones. For the recognized regional groundwater zone beneath the OSDC, such as the Berea sandstone, the MODFLOW model is used.

Figure I.11 shows the model linking and relationships between them.

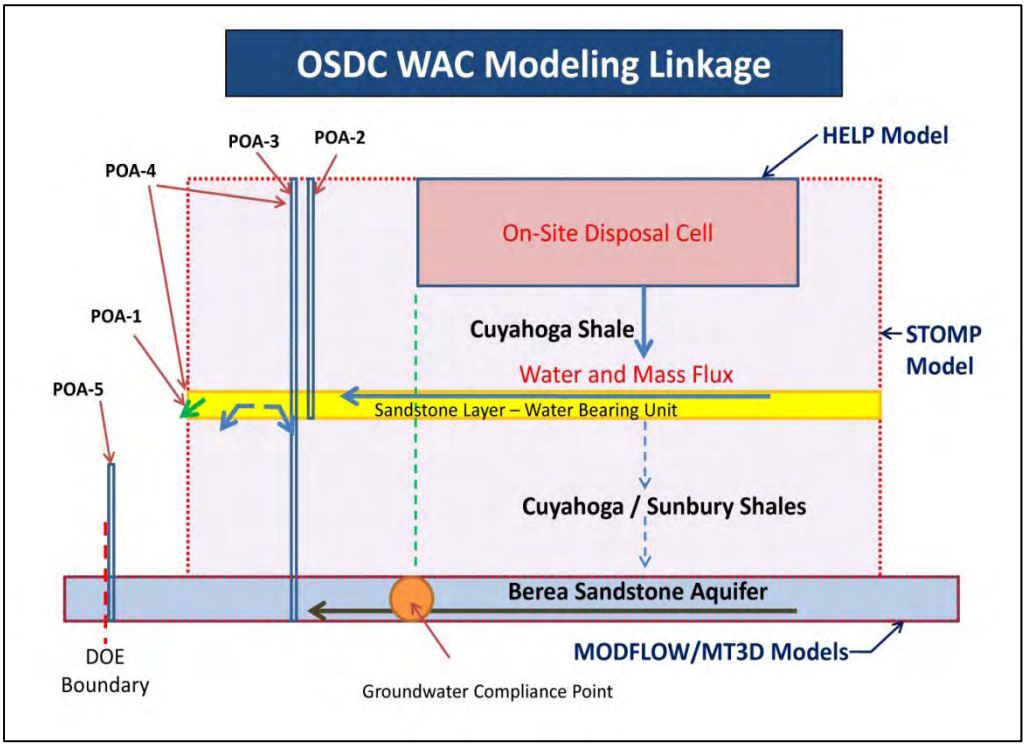

Figure I.11. Waste Acceptance Criteria Model Linkage and Application for PORTS

I.5.2 KEY ASSUMPTIONS AND SITE-SPECIFIC MODELS CONSTRUCTION

I.5.2.1 HELP Model

Climatic Parameters

The general climatic data include weather and evapotranspiration data. These data include growing season, average quarterly relative humidities, normal mean monthly temperatures and precipitation, maximum leaf area index, evaporative zone depth, and latitude. For detailed simulations, daily precipitation and temperature data are also required, either with area-specific data or simulated data based on short-period data for the maximum modeling period for each simulation (100 years).

Daily precipitation and temperature data have been recorded (starting in 1893) continuously at the nearby Waverly weather station, about 5 miles north of the plant. This station is currently operated by the National Oceanic and Atmospheric Administration. It is the most complete long-term weather data available in the area, including 117 years of data ranging from 1893 to 2011. Therefore, the daily data are used for the detailed HELP simulation. The data are also summarized to develop site-specific monthly averages of precipitation and temperature for the HELP model.

The evapotranspiration data for the Cincinnati area, such as solar radiation and growing season, from the database in the HELP model were used. The Cincinnati area has the same latitude (39 degrees) as PORTS.

Table I.6 summarizes the weather and evapotranspiration data used in the HELP model.

Table I.6. Summary of Evapotranspiration and Weather Data in HELP Model

Station Latitude	=	39.10 degrees
Maximum Leaf Area Index	=	2.00
Start Of Growing Season (Julian Date)	=	104
End Of Growing Season (Julian Date)	=	295
Evaporative Zone Depth	=	21.0 in.
Average Annual Wind Speed	=	9.10 mph
Average 1st Quarter Relative Humidity	=	70.00%
Average 2nd Quarter Relative Humidity	=	67.00%
Average 3rd Quarter Relative Humidity	=	73.00%
Average 4th Quarter Relative Humidity	=	72.00%

Normal Mean Monthly Precipitation (in.)

January/July	February/August	March/September	April/October	May/November	June/December
3.23	2.63	3.83	3.54	4.12	3.82
4.21	3.82	2.76	2.45	2.76	2.99

Normal Mean Monthly Temperature (ºF)

January/July	February/August	March/September	April/October	May/November	June/December
31.30	33.20	43.00	53.00	62.80	71.30
74.80	73.40	67.00	55.20	43.90	34.00

Design Parameters and Material Characteristics

Design specifications for a potential OSDC at Site D include such items as the slope and maximum drainage distance for lateral drainage layers, layer thickness, layer description, area, leachate recirculation procedures, subsurface inflows, surface characteristics, and geomembrane characteristics.

Necessary data on the soil material include porosity, field capacity, wilting point, saturated hydraulic conductivity, initial moisture storage, and Soil Conservation Service runoff curve number. The porosity, field capacity, wilting point, and saturated hydraulic conductivity are used to estimate the soil-water evaporation coefficients and Brooks-Corey soil moisture retention parameters. The HELP model contains default soil characteristics for 42 material types. They are used when site-specific measurements or estimates are not available.

The proposed engineering design for the disposal cells is used for the design specification, as shown in Section I.4. The geotechnical parameters used in the model for each layer are also based on design criteria. The soil, waste, and geosynthetic material characteristics used in the HELP model are presented in Table I.7.

Table I.7. Design Profile and Soil Characteristics

Layer Number	Material	Layer Type[a]	Layer Thickness (in.)	Soil Texture[b] Type	Total Porosity (vol/vol)	Field Capacity (vol/vol)	Wilting Point (vol/vol)	Sat. Hyd. Conductivity (cm/sec)	Drainage Length (ft)	Drain Slope (%)
1	Top Soil	1	6	10	0.398	0.244	0.136	1.20E-04		
2	Soil	1	21	10	0.398	0.244	0.136	1.20E-04		
3	Filter Sand	1	6	2	0.437	0.062	0.024	5.80E-03		
4	Bio-intrusion (Barrier)	1	36	1	0.417	0.045	0.018	3.0E-01		
5	Drainage	2	12	21	0.397	0.032	0.013	0.300	700	10
6	HDPE (FML)	4	0.06	35				2.00E-13		
7	GCL	3	0.24	17	0.75	0.747	0.4	3.00E-09		
8	Cover Compacted Clay	1	24	16	0.427	0.418	0.367	1.00E-07		
9	Waste	1	600	22	0.419	0.307	0.18	1.90E-05		
10	Protective Layer	1	12	26	0.445	0.393	0.277	1.90E-06		
11	Drainage (Leachate Collection)	2	12	21	0.397	0.032	0.013	0.300	200	2.12
12	HDPE (FML)	4	0.06	35				2.00E-13		
13	GCL	3	0.24	17	0.75	0.747	0.4	3.00E-09		
14	Drainage (Leak Detection)	2	12	21	0.397	0.032	0.013	0.300	200	2.12
15	HDPE (FML)	4	0.06	35				2.00E-13		
16	GCL	3	0.24	17	0.75	0.747	0.4	3.00E-09		
17	Liner Compacted Clay	1	36	16	0.427	0.418	0.367	1.00E-07		

[a]Layer type:
1 - vertical percolation
2 - lateral drainage
3 - barrier soil liner
4 - geomembrane liner

[b]Soil texture type and its characteristics are defined in HELP (Schroeder et. al. 1994)

HDPE = high-density polyethylene
FML = flexible membrane liner
GCL = geosynthetic clay liner

HELP Model Simulation and Results

Because of the long time period considered in the modeled WAC analysis, the designed cell cover and liner system performance will change over time. To account for changes to the material characteristics, the following four scenarios are considered for disposal cell performance:

- Complete design performance – All layers are functional and simulated. It is the design scenario for the duration of the cell operation and the initial full maintenance period. Every aspect of the system is expected to perform as designed, including all engineering-design features such as the HDPE, leachate collection system, and drainage layers.

- Partial design performance – Geomembrane liner layers, consisting of HDPE, are assumed to be totally ineffective after 200 years post-operations. Because there is uncertainty regarding the longevity of the HDPE layers, which have the extremely low permeability of 2E-13 cm/s, it is assumed that the geomembrane liners will no longer function as impermeable layers in the cover and liner systems.

- Long period performance – All engineered GCL layers are assumed to be totally ineffective. The drainage layers in the liner systems are assumed to be ineffective as well, and the drainage layers in the liner system become vertical percolation layers. No water will flow out from these drainage layers of the liner system. The rest of the natural soil materials will maintain their properties.

Figure I.12 shows the general long-term performance of the disposal cell layers and associated modeling assumptions. For the OSDC WAC modeling only, it is assumed that DOE would operate and cap a potential OSDC within an approximate 20-year period. Generally, all engineered systems are assumed to remain fully functional for at least 200 years, with loss in functionality of certain portions of the system after this time frame.

Based on the OSDC design criteria, literature research, applications at other DOE sites, and discussions with Ohio EPA, it is determined that the following performance periods are to be applied for HELP and draft WAC modeling:

- 0-200 years - Complete design performance
- 200-500 years - Partial design performance
- 500-1,000 years - Long-term performance.

Conservative assumptions (those which are lower than expected values) were applied for many of these performance periods resulting in higher modeled contaminant migration rates. For example, various cited references have documented that the HDPE geomembrane liner will last for a period of over 600 years under the typical physiochemical conditions in the landfill system. However, only a 200-year credit is considered for the geomembrane liners. The hydraulic property for the GCL layer in the liner system is also considered to be degraded from 3.0E-09 to 5.0E-08 because of very conservative potential chemical reaction considerations during the partial design performance period. The extremely long period assumed for the cover/liner clays indicates that they will degrade from their initial hydraulic properties to the site-specific Minford clay properties. However, the liner clay layers will be under much greater depth than the Minford clay. Therefore, it is likely that they will remain saturated, which makes the degradation highly unlikely.

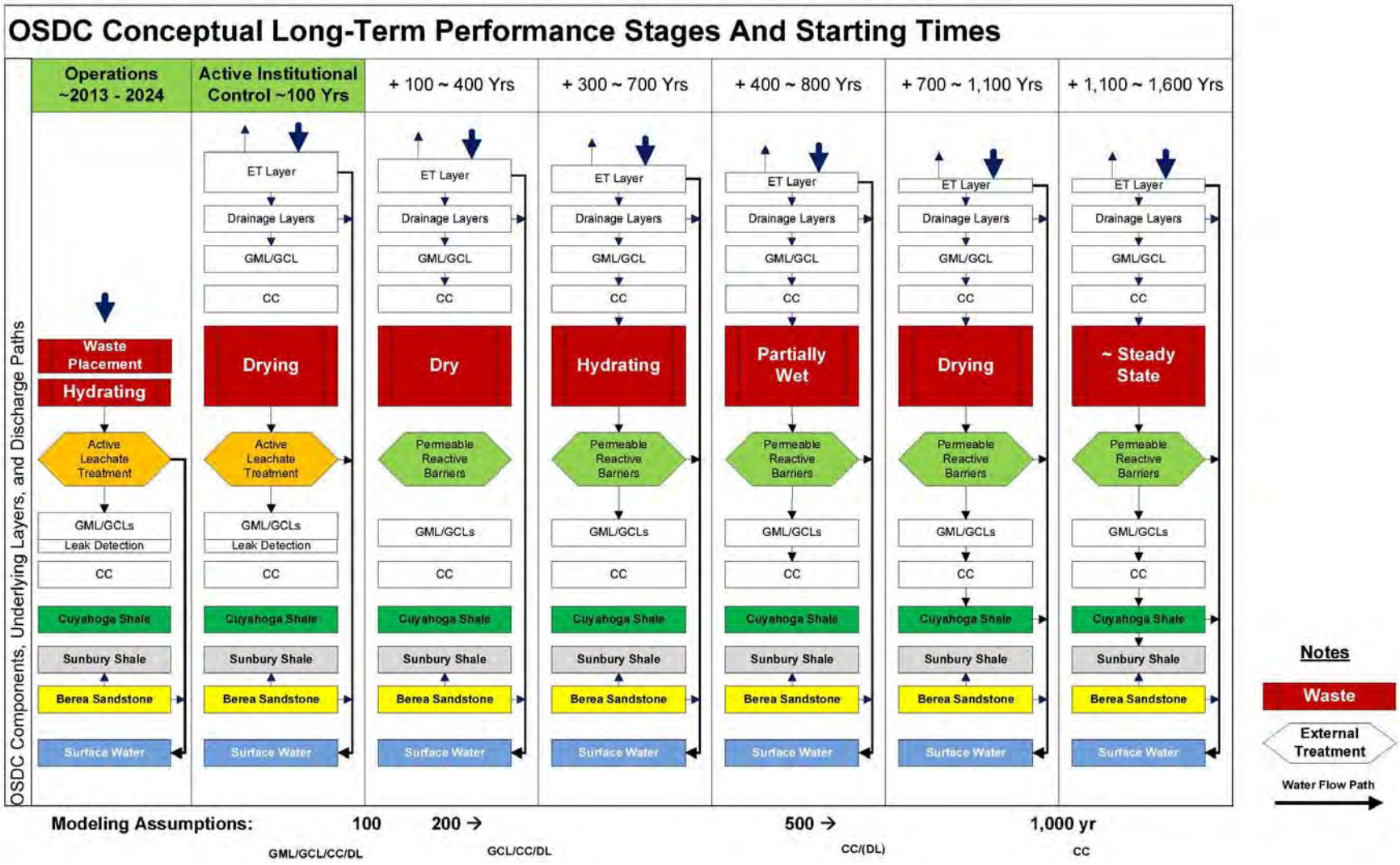

Figure I.12. OSDC Conceptual Long-term Performance at PORTS

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HELP model simulations were conducted for each performance period discussed above. Table I.8 summarizes the modeling layer assumptions for the four performance periods and presents the HELP model results.

Table I.8. HELP Model Predicted Mass Balance and Infiltration Rates for Various Performance Periods

Cell Layer System		Period (Years after Cell Capping)	Year 0-200		Year 201-500		Year 501-1,000	
Cover System	Layer Performance	Topsoil/soil (0.5 ft + 1.75 ft)	Yes		Yes		Yes	
		Sand (0.5 ft)	Yes		Yes		Yes	
		Biointrusion Layer (3 ft Large Cobbles)	Yes		Yes		Yes	
		Drainage (Slope [%]/Length[ft])	10% / 700		10% / 700		10% / 700	
		FML	Yes		Degraded		Degraded	
		GCL	3.0E-09 (cm/s)		3.0E-09 (cm/s)		Degraded (1.0E-07 cm/s)	
		Compacted Clay/ Contour Clay	1.0E-07 cm/s		1.0E-07 cm/s		1.0E-07 cm/s	
	Modeled Results		**(in./yr)**	**(%)**	**(in./yr)**	**(%)**	**(in./yr)**	**(%)**
		Precipitation	39.52	100	39.52	100	39.52	100
		Runoff	3.25	8.23	3.25	8.23	3.25	8.23
		Evapotranspiration	27.74	70.18	27.74	70.18	27.74	70.18
		Drain Collection	8.54	21.62	8.49	21.49	7.02	17.76
		Flux Rate into Waste (in./yr)	**1.00E-05**	0.00004	**0.05**	0.14	**1.08**	3.86
Waste								
Liner System	Layer Performance	Soil	Yes		Yes		Yes	
		Leachate Collection Drainage (Slope [%]/Length[ft])	2.12% / 200		2.12% / 200		Not Functional	
		FML	Yes		Degraded		Degraded	
		GCL	Yes		Degraded to (5.0E-08 cm/s)		Degraded (1.0E-07 cm/s)	
		Leak Detection Drainage (Slope [%]/Length[ft])	2.12% / 200		2.12% / 200		Not Functional	
		FML	Yes		Degraded		Degraded	
		GCL	3.0E-09 (cm/s)		Degraded to (5.0E-08 cm/s)		Degraded (1.0E-07 cm/s)	
		Compacted Clay	1.0E-07 cm/s		1.0E-07 cm/s		1.0E-07 cm/s	
	Modeled Results		**in./yr**	**%**	**in./yr**	**%**	**in./yr**	**%**
		Leachate Drain Collection	0.00001	0.00003	0.00061	0.00154		
		Leak Drain Collection	0	0	0.0006	0.00153		
		Flux Rate through Clay Liner (in./yr)	**0.00**	0	**0.05**	0.14	**1.08**	3.84

FML = flexible membrane liner
GCL = geosynthetic clay liner

As shown in Table I.8, no infiltration is expected through the bottom of the liner clay layer and into the underlying Cuyahoga shale for the first 200 years. Additionally, almost no water will enter the waste through the designed cover system for this period (flux of 1E-05 in./yr).

Between 200 and 500 years, a very minimum flux of water is predicted. It enters the waste and is collected by the drainage layer in the liner system. The water flux rate is estimated to be 0.05 in./yr. Between 500 and 1,000 years, the predicted infiltration rate is predicted to increase to 1.08 in./yr. It is noted that the two infiltration rates predicted by the HELP model are higher than the likely natural infiltration rate through the shale formation, based on current investigation and STOMP model simulation of the current conditions. Therefore, applying the higher infiltration rates from the HELP model to the WAC models likely results in higher mass flux to the underlying unit, thereby making the WAC model more conservative.

Various scenarios of cover degradation over time with potential erosion to the biointrusion layer are also simulated with the HELP model. These sensitivity runs provided slightly more variable infiltration rates through the disposal cell, but the results did not change greatly from the base case. Thus, the base case results are used as inputs for the STOMP model.

I.5.2.2 STOMP Model

STOMP Model Construction

A 3-D STOMP model has been developed for the potential OSDC area at Site D. The model domain is selected on the basis of OSDC design, lithological unit distribution, and potential risk receptors. The conceptual OSDC will sit on top of the Cuyahoga shale, which is underlain by Sunbury shale and Berea sandstone. The Berea sandstone is mostly saturated in the area and is considered to be a groundwater aquifer unit. The Berea sandstone is underlain by Bedford shale, a thick shale unit considered to be an aquitard for the area.

During the preliminary investigation, a continuous 2-ft sandstone layer (680-ft sandstone), occurring in the middle of the Cuyahoga shale, was identified as the potential water bearing unit and migration pathway for the contaminants released from the potential OSDC. Therefore, the STOMP model domain is set to include all the potential discharge locations and exposure points associated with the sandstone layer. Figure I.13 shows the model domain used for the 3-D STOMP model.

Construction of the model requires a detailed 3-D representation of the various rock/soil zonations and definition of the boundary conditions. The following data are used to construct the 3-D model:

- Topography
- Lithology
- Cell design.

Based on the site-specific investigation, as discussed in Section 2 of the waste disposition RI/FS report, a detailed 3-D lithologic mapping analysis was conducted during STOMP model development. The distribution of all the stratigraphic units (rock/soil type) is defined in the X, Y, and Z directions. The stratigraphic units include weathered residuum, weathered shale, upper Cuyahoga shale (above the 680-ft sandstone layer), 680-ft sandstone layer, Cuyahoga shale, Sunbury shale, and Berea sandstone. The 680-ft sandstone unit consists of a continuous 2-ft layer and a 6-in. layer separated by a 2-ft shale. Therefore, the unit is represented as a 5-ft-thick layer in the model.

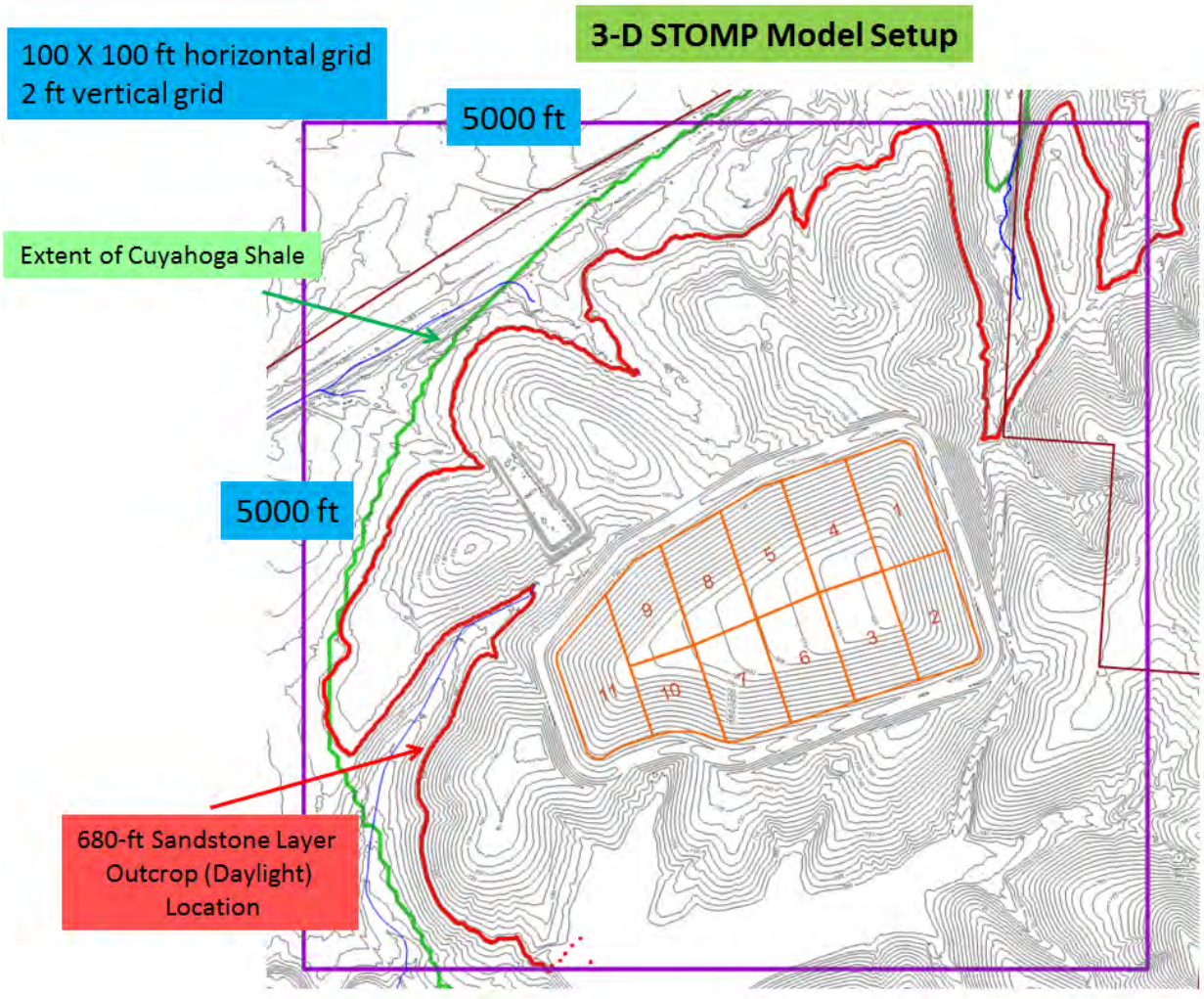


Figure I.13. STOMP Model Domain and Representation for Site D at PORTS

Conceptual design data, previously discussed, are used to define the cover, waste, and liner system. The design data are combined with the current site-specific lithologic data to generate the future stratigraphic distribution of the potential OSDC site. Figure I.14 shows the 3-D distribution of the key layers within the Study Area D model domain.

A horizontally uniform grid system is used to construct the 3-D STOMP model for simplification of model calculation. A grid space of 100 ft is used in both the X and Y directions. Inactive cells are assigned where shale is absent or the area is hydraulically disconnected from the potential OSDC area.

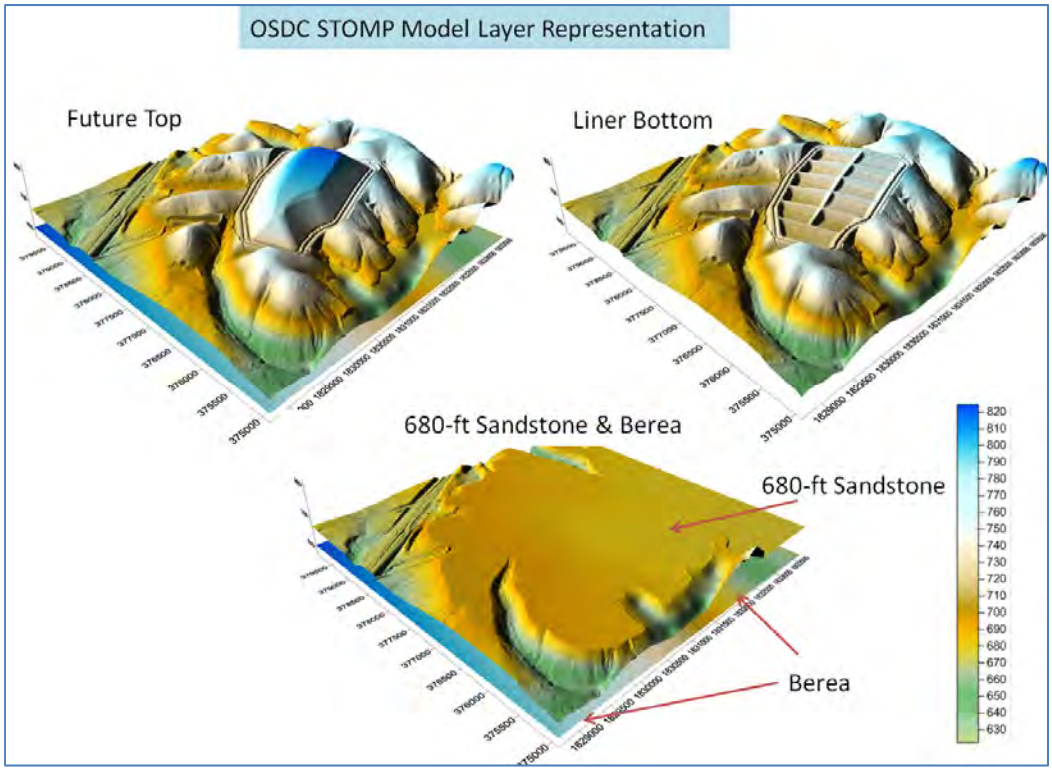


Figure I.14. Three-Dimensional Representation of Key Layers within the Model Domain

Figure I.15 shows a grid setup in the horizontal directions. Fifty cells are used in both the X and Y directions.

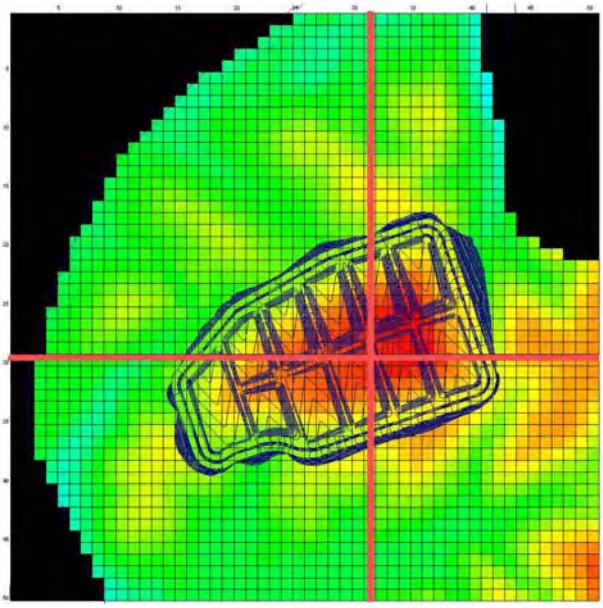


Figure I.15. STOMP Model Grid Setup for Site D at PORTS

A more refined and uniform 2-ft grid space is used to represent the lithologic variation in the vertical direction. The refined grid space in vertical direction allows the model to represent the lithologic variation more precisely and to predict movement of the contaminants in the unsaturated zone beneath the cell because of the unique features of Study Area D. There are 124 layers in the model.

The topography from the conceptual cell design for the affected area and the existing topography outside of the cells are used to establish the top of the active model layer where the top of the Bedford shale is assumed to be the bottom of the active model cells. A free-air flow boundary condition is assigned for all the top nodes of the model layer and all boundary nodes where an unsaturated condition is present. Depending on the water-air pressure relationship, the defined node boundary condition allows the water to get out of the model domain (discharge) if the water pressure is greater than the atmospheric pressure.

The 3-D distribution of the rock/soil types is then represented in the STOMP model. Figures I.16 and I.17 show the vertical representations of the lithologies in the west-east and south-north directions across the potential OSDC footprint. As discussed earlier, the future condition for the X-611B Sludge Pond includes the assumption that the sandstone layer at the northern slope of the pond will be exposed and the assumption that the pond will be drained below the elevation of the sandstone layer; therefore, the current hydraulic head at the X-611B Sludge Pond was not included in the model.

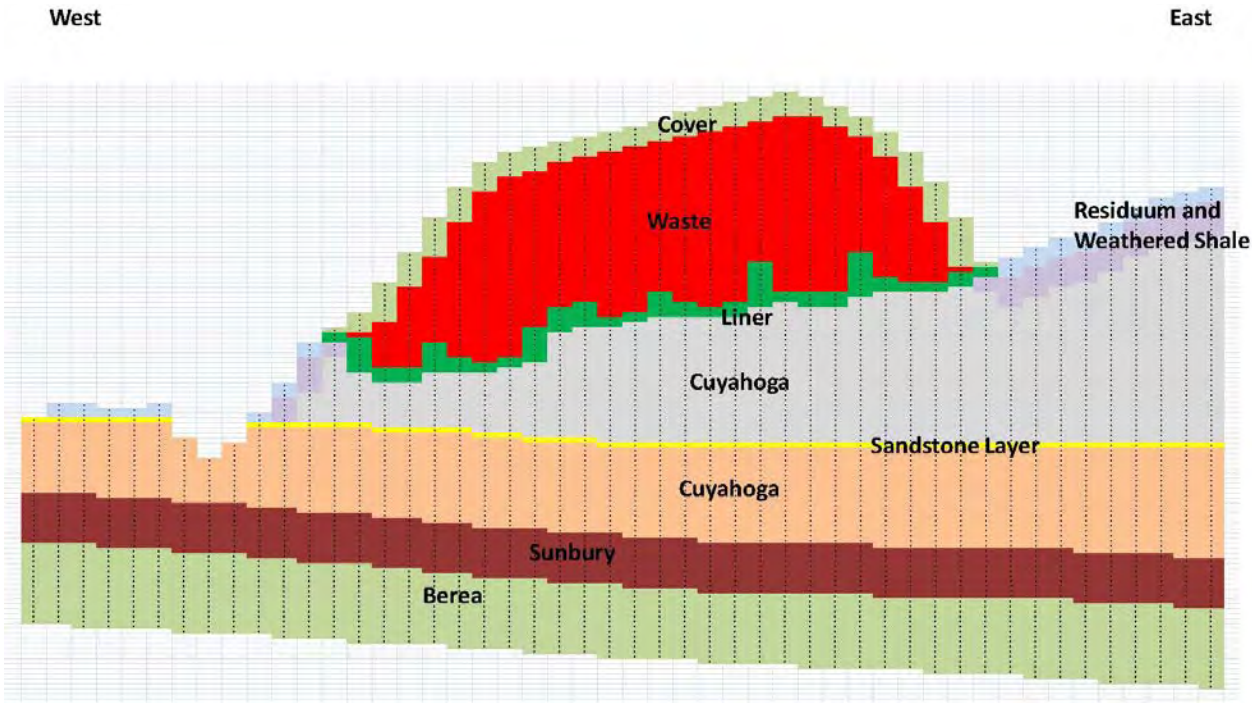


Figure I.16. Vertical Presentation (West-East) in the STOMP Model for Site D at PORTS

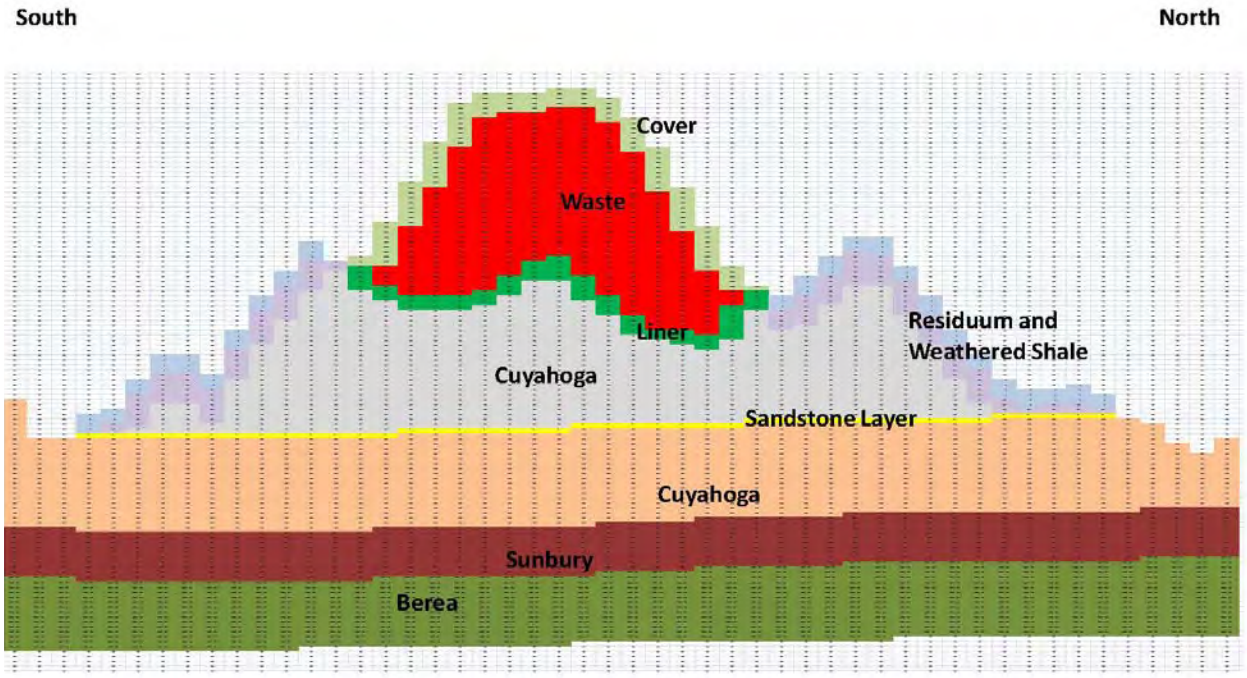


Figure I.17. Vertical Presentation (South-North) in the STOMP Model for Site D at PORTS

Table I.9 summarizes the model construction parameters and the media types represented in the model. Ten rock/soil types are used in the STOMP model.

Table I.9. STOMP Model Summary

Model Grid	Number of Model Columns (along the X Direction)	50
	Number of Model Rows (along the Y Direction)	50
	Number of Model Layers (along the Z Direction)	124
	Number of Model Nodes	310,000
	Number of Active Nodes	182,550
Model Grid Size (ft)	X (uniform)	100
	Y (uniform)	100
	Z (uniform)	2
Material (Rock/Soil) Type	Number of Rock/Soil Types	10
	Rock/Soil Types Modeled	Cell Cover
		Waste
		Liner-Clay
		Residuum Soil
		Weathered-Shale
		Upper Cuyahoga-Shale
		Sandstone-Layer
		Cuyahoga-Shale
		Sunbury-Shale
		Berea-Sandstone

STOMP Model Input Parameters

The input parameter categories required to conduct a STOMP simulation include media, mechanical, and hydraulic properties; saturation function; aqueous relative permeability; solute-fluid interaction; and solute-porous media interaction. These include the following:

- Mechanical properties such as particle density, porosity (total and effective), specific storativity, compressibility, and tortuosity function for each defined rock/soil type
- Hydraulic properties such as intrinsic permeability or hydraulic conductivities in the 3-D directions for each defined rock/soil type
- Saturation function, which defines a saturation-capillary pressure function for each defined rock/soil type
- Aqueous relative permeability, which defines a relative permeability-saturation function for the aqueous phase for each defined rock/soil type
- Solute-fluid interaction, which defines solutes, solute-fluid interactions, and solute radioactive decay path parameters, including diffusion coefficients, radioactive decay rate, and half-life
- Solute-porous media interaction, which defines solid-aqueous phase partition coefficients (K_d) and porous-media-dependent hydraulic dispersivities. The solute-porous parameters are dependent on both the solute and rock/soil type.

All of the input parameters used to conduct the STOMP model are based on investigation data collected at Site D. The investigation, as discussed in Section 2 of the waste disposition RI/FS report, includes the following:

- Lithologic borings
- Water levels and aquifer pump tests
- Geotechnical data
    - Porosity
    - Moisture content
    - Grain size distribution
    - Specific gravity
    - Permeability
    - Hydraulic conductivity.
- Geochemical parameters.
    - Total organic carbon
    - K_d.

The mechanical properties of the conceptual OSDC components, such as cover and liner materials, are based on typical design criteria and the HELP model database. Tables I.10 and I.11 summarize the physical and hydraulic parameters used in the STOMP model for the rock/soil types. The aquifer tests

conducted in the 680-ft sandstone identified two hydraulic conductivity zones for the unit. Most of Site D has relatively lower yield; however, this appears to have a higher K zone in the southern part of Site D around PZ-09C and PZ-12C. The southern area near WD-PZ09C and WD-PZ12C appears to be influenced by interconnected fractures and bedding plane partings within the 680-ft sandstone that allow greater transmissivity. Therefore, various hydraulic conductivity values were used during model simulation and sensitivity analysis for the modeled WAC development.

Table I.10. Summary of Soil/Rock Physical Properties in Site D at PORTS

Rock/Soil Types	Particle Density (kg/m^3)	Porosity	Effective (Diffusive) Porosity[1]
Cover	2,650	0.4	0.4
Waste	2,650	0.419	0.419
Liner-Clay	2,650	0.427	0.427
Regolith	2,650	0.4	0.4
Weathered-Shale	2,650	0.25	0.25
Upper Cuyahoga-Shale	2,650	0.16	0.16
Sandstone-Layer	2,650	0.18	0.18
Cuyahoga-Shale	2,650	0.14	0.14
Sunbury-Shale	2,650	0.13	0.13
Berea-Sandstone	2,650	0.21	0.21

[1]For this analysis, effective porosity is assumed to be equivalent to porosity.

Table I.11. Summary of Soil/Rock Hydraulic Conductivities in Site D at PORTS

Rock/Soil Types	K(x) (cm/s)	K(y) (cm/s)	K(z) (cm/s)
Cover	1.00E-05	1.00 E-05	1.00 E-05
Waste	1.00E-04	1.00 E-04	1.00 E-04
Liner-Clay	1.00E-07	1.00 E-07	1.00 E-07
Regolith	5.00E-04	5.00 E-04	1.00 E-04
Weathered-Shale	1.00E-05	1.00 E-05	1.00 E-06
Upper Cuyahoga-Shale	3.20E-06	3.20 E-06	3.20 E-07
Sandstone-Layer	1.00E-04 – 1.40E-02	1.00E-04 – 1.40E-02	1.00 E-05
Cuyahoga-Shale	1.30E-08	1.30 E-08	1.30 E-09
Sunbury-Shale	4.40E-08	4.40 E-08	4.40 E-09
Berea-Sandstone	1.90E-04	1.90 E-04	3.80 E-05

K = hydraulic conductivity

The solute-fluid and solute-porous media interaction parameters are needed to conduct the fate and transport analysis for all the constituents. These parameters are obtained from various sources (in addition to site-specific data). Partition coefficients (K_d values) for technetium-99 and uranium have been obtained from analysis of all the rock/soil types at PORTS, as well as from specific waste items to provide waste-matrix K_d values. For other radionuclide and nonradionuclide constituents, a comprehensive compilation of the K_d values was conducted from DOE and EPA documents (DOE 1995b, EPA 1999a, 1999b, 2004; Yu et al. 2001) and WAC studies conducted for other DOE sites such as Fernald (DOE 1996f) and Oak Ridge (DOE 1998c), and Utah Class A Disposal Cell (Whetstone Associates 2011). Based on the compilation, K_d values in the waste for other radionuclides were selected. To reflect the K_d variation in various rock/soil types, the same relationship observed from site-specific uranium K_d values measured in natural media was applied for these radionuclides. Table I.12 lists the K_d

values applied in the STOMP model for the radionuclides in each rock/soil type. The table also lists the half-life and specific activity of each radionuclide.

Compilation of K_d values for inorganic constituents was also conducted by using various sources (EPA 1996, EPA 1999a, EPA 1999b, EPA 2004, EPA 2005, DOE 2009a, DOE 2009b). Based on the data comparison, the K_d values presented in the latest DOE RAIS database (DOE 2012) were used for most of the COC waste source zone K_d values. Compared with the EPA data range, the RAIS data have generally lower K_d values (more mobile); therefore, model results tend to be more conservative. To reflect the K_d variation in various rock/soil types, the same relationship observed from site-specific uranium K_d values among native media was applied for these inorganic constituents. The K_d values for the soil/rock types used in the STOMP model for inorganic constituents are shown in Table I.13.

The chemical-specific parameters for organic constituents, including the octanol-water partition coefficient (K_{OC}), diffusivity in water, and solubility are obtained from the DOE RAIS database (DOE 2012) and the Agency for Toxic Substances and Disease Registry (ATSDR) database (ATSDR 2012). Using the site-specific total organic carbon values for various media and the K_{OC} values, K_d values for the organic constituents were calculated. Table I.14 lists these values.

Most of the organic compounds, especially VOCs and semivolatile organic compounds (SVOCs), undergo biodegradation under typical environmental conditions. The half-life, which represents the time for one-half of the mass of the compound to degrade and be lost, varies greatly as reported in the literature and depends on environmental conditions and the contaminated media. Extensive literature research was conducted to compile all available organic COC half-life values; California Environmental Protection Agency [California EPA] 2000; and World Health Organization [WHO] 2004). The higher values for half-life for the organic COCs from these sources were used and are listed in Table I.14.

Table I.12. K_d Values and Half-life of Radionuclides Used in the STOMP Model

Radionuclide COC	K_d (mL/g)[1] Waste	Liner Clay (Minford)	Regolith	Upper Cuyahoga Shale	Sandstone Layer	Lower Cuyahoga Shale	Sunbury Shale	Berea Sandstone[2]	Half-Life (yrs)	Specific Activity (pCi/g)
Technetium-99	2.03	3.79	4.29	4.60	3.38	4.60	217.00	3.34	2.13E+05	1.70E+10
Uranium-234	395	14.20	22.60	6.60	68.00	6.60	757.00	1.54	2.45E+05	6.25E+09
Uranium-235	395	14.20	22.60	6.60	68.00	6.60	757.00	1.54	7.04E+08	2.16E+06
Uranium-236	395	14.20	22.60	6.60	68.00	6.60	757.00	1.54	2.34E+07	6.47E+07
Uranium-238	395	14.20	22.60	6.60	68.00	6.60	757.00	1.54	4.47E+09	3.36E+05
Americium-241	1,700	1,700	2,705.6	790.1	790.1	790.1	90,626.8	184.4	432	3.44E+12
Neptunium-237	500	500	795.8	232.4	232.4	232.4	26,654.9	54.2	2.14E+06	7.05E+08
Plutonium-238	900	900	1,432.4	418.3	418.3	418.3	47,978.9	97.6	87.7	1.71E+13
Plutonium-239	900	900	1,432.4	418.3	418.3	418.3	47,978.9	97.6	2.41E+04	6.22E+10
Plutonium-240	900	900	1,432.4	418.3	418.3	418.3	47,978.9	97.6	6,540	2.28E+11
Thorium-228	3,400	3,400	5,411.3	1,580.3	1,580.3	1,580.3	181,253.5	368.7	1.91	8.20E+14
Thorium-230	3,400	3,400	5,411.3	1,580.3	1,580.3	1,580.3	181,253.5	368.7	7.70E+04	2.02E+10

[1]PORTS site-specific K_d sample data; geometric means presented for Tc-99, U-234, U-235, U-236, and U-238. For other radionuclide COCs, K_d values for waste are from literature values and for other media K_d values are derived based on site-specific uranium K_d relationship.
[2]Descrepencies in the K_d results for the geologic units are due to differing geochemical conditions within the units which alter the sorption affinity of both Tc-99 and uranium.

COC = contaminant of concern
PORTS = Portsmouth Gaseous Diffusion Plant

Table I.13. K_d Values of Inorganics Used in the STOMP Model

Inorganic COCs	K_d (mL/g)[1]								Density (g/cm^3)
	Waste	Liner Clay (Minford)	Regolith	Upper Cuyahoga Shale	Sandstone Layer	Lower Cuyahoga Shale	Sunbury Shale	Berea Sandstone	
Antimony	45.00	45.00	71.62	20.92	20.92	20.92	2398.94	4.88	5.20
Arsenic	208.0	208.0	331.0	96.7	96.7	96.7	11,088.5	22.6	5.75
Barium	200	200	318.3	93	93	93	10,662	21.7	3.62
Beryllium	790.0	790.0	1257.3	367.2	367.2	367.2	42,114.8	85.7	1.85
Cadmium	48.5	48.5	77.2	22.5	22.5	22.5	2585.5	5.3	8.69
Chromium	810.0	810.0	1,289.2	376.5	376.5	376.5	43,181.0	87.8	5.22
Chromium (VI)	7.0	7.0	11.1	3.3	3.3	3.3	373.2	0.8	7.15
Cobalt	45.0	45.0	71.6	20.9	20.9	20.9	2,398.9	4.9	8.86
Copper	35.0	35.0	55.7	16.3	16.3	16.3	1,865.8	3.8	8.96
Fluoride	150.0	150.0	238.7	69.7	69.7	69.7	7,996.5	16.3	1.55
Lead	28,300.0	28,300.0	45,040.8	13,153.5	13,153.5	13,153.5	1,508,669.0	3,069.2	11.3
Lithium	300.0	300.0	477.5	139.4	139.4	139.4	15,993.0	32.5	0.534
Manganese	16.5	16.5	26.3	7.7	7.7	7.7	879.6	1.8	7.3
Mercury	41.0	41.0	65.3	19.1	19.1	19.1	2,185.7	4.4	13.5
Nickel	65.0	65.0	103.5	30.2	30.2	30.2	3,465.1	7.0	8.9
Selenium	15.0	15.0	23.9	7.0	7.0	7.0	799.6	1.6	4.81
Silver	8.3	8.3	13.2	3.9	3.9	3.9	442.5	0.9	10.5
Uranium	395.0	14.2	22.60	6.60	6.60	6.60	757.00	1.48	19.1
Vanadium	100.0	100.0	159.2	46.5	46.5	46.5	5331.0	10.8	6.0
Zinc	62.0	62.0	98.7	28.8	28.8	28.8	3,305.2	6.7	7.13
Cyanide	9.9	9.9	15.8	4.6	4.6	4.6	527.8	1.1	NV

[1] K_d values for uranium are from site-specific data. K_d values for other COCs for the waste/liner clay media are obtained from literature sources, while K_d values for other media are derived based on site-specific uranium K_d value relationship.

COC = contaminant of concern
NV = no value

Table I.14. Chemical Properties for Organic Constituents Applied in the STOMP Model

Organic COCs	Diffusivity in Water (cm^2/s)	K_{oc} (mL/g)	K_d (mL/g)[1]								Half-Life[2] (years)	Solubility (mg/L)
			Waste	Liner Clay (Minford)	Regolith	Upper Cuyahoga Shale	Sandstone Layer	Lower Cuyahoga Shale	Sunbury Shale	Berea Sandstone		
Acenaphthylene	6.98E-06	5.03E+03	1.03E+01	1.03E+01	2.53E+01	3.52E+01	1.79E+01	3.52E+01	4.19E+02	1.79E+01	2	1.61E+01
Acetone	1.15E-05	2.36E+00	4.82E-03	4.82E-03	1.18E-02	1.65E-02	8.41E-03	1.65E-02	1.97E-01	8.41E-03	1	1.00E+06
Anthracene	7.85E-06	1.64E+04	3.35E+01	3.35E+01	8.23E+01	1.15E+02	5.85E+01	1.15E+02	1.37E+03	5.85E+01	2	4.34E-02
Aroclor 1242	5.04E-06	7.81E+04	1.60E+02	1.60E+02	3.92E+02	5.47E+02	2.78E+02	5.47E+02	6.50E+03	2.78E+02	2.58	2.77E-01
Aroclor 1254	4.68E-06	1.31E+05	2.68E+02	2.68E+02	6.58E+02	9.18E+02	4.67E+02	9.18E+02	1.09E+04	4.67E+02	2.58	4.30E-02
Aroclor 1260	4.12E-06	3.50E+05	7.16E+02	7.16E+02	1.76E+03	2.45E+03	1.25E+03	2.45E+03	2.91E+04	1.25E+03	2.58	1.44E-02
Benzene	1.03E-05	1.46E+02	2.98E-01	2.98E-01	7.33E-01	1.02E+00	5.21E-01	1.02E+00	1.22E+01	5.21E-01	2.2	1.79E+03
Benzo[a]anthracene	5.94E-06	1.77E+05	3.62E+02	3.62E+02	8.89E+02	1.24E+03	6.31E+02	1.24E+03	1.47E+04	6.31E+02	2	9.40E-03
Benzo[a]pyrene	5.56E-06	5.87E+05	1.20E+03	1.20E+03	2.95E+03	4.11E+03	2.09E+03	4.11E+03	4.89E+04	2.09E+03	2	1.62E-03
Benzo[b]fluoranthene	5.56E-06	5.99E+05	1.22E+03	1.22E+03	3.01E+03	4.20E+03	2.14E+03	4.20E+03	4.99E+04	2.14E+03	1	1.50E-03
Benzo[g,h,i]perylene	5.23E-06	1.95E+06	3.99E+03	3.99E+03	9.79E+03	1.37E+04	6.95E+03	1.37E+04	1.62E+05	6.95E+03	2	2.60E-04
Benzo[k]fluoranthene	5.56E-06	5.87E+05	1.20E+03	1.20E+03	2.95E+03	4.11E+03	2.09E+03	4.11E+03	4.89E+04	2.09E+03	2	8.00E-04
Bis(2-chloroethyl)ether	8.71E-06	3.22E+01	6.58E-02	6.58E-02	1.62E-01	2.26E-01	1.15E-01	2.26E-01	2.68E+00	1.15E-01	3	1.72E+04
Bromoform	1.04E-05	3.18E+01	6.50E-02	6.50E-02	1.60E-01	2.23E-01	1.14E-01	2.23E-01	2.65E+00	1.14E-01	1	3.10E+03
2-Butanone	1.02E-05	4.51E+00	9.22E-03	9.22E-03	2.26E-02	3.16E-02	1.61E-02	3.16E-02	3.76E-01	1.61E-02	1	2.23E+05
Carbon Tetrachloride	9.78E-06	4.39E+01	8.97E-02	8.97E-02	2.20E-01	3.08E-01	1.57E-01	3.08E-01	3.66E+00	1.57E-01	10	7.93E+02
Chlordane	5.45E-06	6.75E+04	1.38E+02	1.38E+02	3.39E+02	4.73E+02	2.41E+02	4.73E+02	5.62E+03	2.41E+02	2	5.60E-02
Chlordane, gamma-	1.04E-05	3.18E+01	6.50E-02	6.50E-02	1.60E-01	2.23E-01	1.13E-01	2.23E-01	2.65E+00	1.13E-01	5	3.10E+03
Chloro, 3-methylphenol, 4-	4.02E-06	6.75E+04	1.38E+02	1.38E+02	3.39E+02	4.73E+02	2.41E+02	4.73E+02	5.62E+03	2.41E+02	2	5.60E-02
Chlorobenzene	9.48E-06	2.34E+02	4.78E-01	4.78E-01	1.17E+00	1.64E+00	8.34E-01	1.64E+00	1.95E+01	8.34E-01	2	4.98E+02
Chloroform	1.09E-05	3.18E+01	6.50E-02	6.50E-02	1.60E-01	2.23E-01	1.13E-01	2.23E-01	2.65E+00	1.13E-01	1	7.95E+03
Chrysene	6.75E-06	1.81E+05	3.70E+02	3.70E+02	9.09E+02	1.27E+03	6.45E+02	1.27E+03	1.51E+04	6.45E+02	2	2.00E-03
Cresol, m-	9.32E-06	3.00E+02	6.13E-01	6.13E-01	1.51E+00	2.10E+00	1.07E+00	2.10E+00	2.50E+01	1.07E+00	1	2.27E+04
Cresol, o-	9.32E-06	3.07E+02	6.28E-01	6.28E-01	1.54E+00	2.15E+00	1.09E+00	2.15E+00	2.56E+01	1.09E+00	1	2.59E+04
Cresol, p-	9.24E-06	3.00E+02	6.13E-01	6.13E-01	1.51E+00	2.10E+00	1.07E+00	2.10E+00	2.50E+01	1.07E+00	1	2.15E+04
Cresols	9.78E-06	3.07E+02	6.28E-01	6.28E-01	1.54E+00	2.15E+00	1.09E+00	2.15E+00	2.56E+01	1.09E+00	1	2.59E+04
Dibenz[a,h]anthracene	5.21E-06	1.91E+06	3.90E+03	3.90E+03	9.59E+03	1.34E+04	6.81E+03	1.34E+04	1.59E+05	6.81E+03	2	2.49E-03
Dibenzofuran	7.38E-06	9.16E+03	1.87E+01	1.87E+01	4.60E+01	6.42E+01	3.27E+01	6.42E+01	7.63E+02	3.27E+01	2	3.10E+00
Dibromochloromethane	1.06E-05	3.18E+01	6.50E-02	6.50E-02	1.60E-01	2.23E-01	1.13E-01	2.23E-01	2.65E+00	1.13E-01	1	2.70E+03
Dichlorobenzene, 1,4-	8.68E-06	3.75E+02	7.67E-01	7.67E-01	1.88E+00	2.63E+00	1.34E+00	2.63E+00	3.12E+01	1.34E+00	1	8.13E+01

Table I.14. Chemical Properties for Organic Constituents Applied in the STOMP Model (Continued)

Organic COCs	Diffusivity in Water (cm^2/s)	K_{oc} (mL/g)	K_d (mL/g)[1]								Half-Life[2] (years)	Solubility (mg/L)
			Waste	Liner Clay (Minford)	Regolith	Upper Cuyahoga Shale	Sandstone Layer	Lower Cuyahoga Shale	Sunbury Shale	Berea Sandstone		
Dichloroethane, 1,2-	1.10E-05	3.96E+01	8.10E-02	8.10E-02	1.99E-01	2.77E-01	1.41E-01	2.77E-01	3.30E+00	1.41E-01	2	8.60E+03
Dichloroethene, 1,1-	1.10E-05	3.18E+01	6.50E-02	6.50E-02	1.60E-01	2.23E-01	1.13E-01	2.23E-01	2.65E+00	1.13E-01	0.91	2.42E+03
Dichloroethene, 1,2-	1.12E-05	3.96E+01	8.10E-02	8.10E-02	1.99E-01	2.77E-01	1.41E-01	2.77E-01	3.30E+00	1.41E-01	0.91	3.50E+03
Dieldrin	6.01E-06	2.01E+04	4.11E+01	4.11E+01	1.01E+02	1.41E+02	7.17E+01	1.41E+02	1.67E+03	7.17E+01	5	1.95E-01
Dimethylphthalate	7.14E-06	3.16E+01	6.46E-02	6.46E-02	1.59E-01	2.21E-01	1.13E-01	2.21E-01	2.63E+00	1.13E-01	1	4.00E+03
Dinitrotoluene, 2,4-	7.90E-06	5.76E+02	1.18E+00	1.18E+00	2.89E+00	4.04E+00	2.05E+00	4.04E+00	4.80E+01	2.05E+00	2	2.00E+02
D, 2,4-	6.07E-06	2.96E+01	6.05E-02	6.05E-02	1.49E-01	2.07E-01	1.06E-01	2.07E-01	2.47E+00	1.06E-01	1	6.77E+02
Endosulfan II	4.04E-06	6.76E+03	1.38E+01	1.38E+01	3.39E+01	4.74E+01	2.41E+01	4.74E+01	5.63E+02	2.41E+01	6	4.50E-01
Endosulfan sulfate	3.94E-06	9.85E+03	2.01E+01	2.01E+01	4.94E+01	6.90E+01	3.51E+01	6.90E+01	8.20E+02	3.51E+01	6	4.80E-01
Endrin	4.22E-06	2.01E+04	4.11E+01	4.11E+01	1.01E+02	1.41E+02	7.17E+01	1.41E+02	1.67E+03	7.17E+01	12	2.50E-01
Endrin ketone	4.22E-06	9.72E+03	1.99E+01	1.99E+01	4.88E+01	6.81E+01	3.47E+01	6.81E+01	8.09E+02	3.47E+01	14	7.55E-02
Ethylbenzene	8.46E-06	4.46E+02	9.12E-01	9.12E-01	2.24E+00	3.12E+00	1.59E+00	3.12E+00	3.71E+01	1.59E+00	1	1.69E+02
Heptachlor	5.70E-06	4.13E+04	8.44E+01	8.44E+01	2.07E+02	2.89E+02	1.47E+02	2.89E+02	3.44E+03	1.47E+02	2	1.80E-01
Hexachlorobenzene	7.85E-06	6.20E+03	1.27E+01	1.27E+01	3.11E+01	4.34E+01	2.21E+01	4.34E+01	5.16E+02	2.21E+01	6	6.20E-03
Hexachlorobutadiene	7.03E-06	8.45E+02	1.73E+00	1.73E+00	4.24E+00	5.92E+00	3.01E+00	5.92E+00	7.04E+01	3.01E+00	2	3.20E+00
Hexachlorocyclohexane, alpha-	5.06E-06	2.81E+03	5.74E+00	5.74E+00	1.41E+01	1.97E+01	1.00E+01	1.97E+01	2.34E+02	1.00E+01	1	2.00E+00
Hexachloroethane	8.89E-06	1.97E+02	4.03E-01	4.03E-01	9.89E-01	1.38E+00	7.02E-01	1.38E+00	1.64E+01	7.02E-01	1	5.00E+01
Hexanone, 2-	8.44E-06	1.50E+01	3.07E-02	3.07E-02	7.53E-02	1.05E-01	5.35E-02	1.05E-01	1.25E+00	5.35E-02	5	1.72E+04
Indeno[1,2,3-cd]pyrene	5.23E-06	1.95E+06	3.99E+03	3.99E+03	9.79E+03	1.37E+04	6.95E+03	1.37E+04	1.62E+05	6.95E+03	2	1.90E-04
Lindane	5.06E-06	2.81E+03	5.74E+00	5.74E+00	1.41E+01	1.97E+01	1.00E+01	1.97E+01	2.34E+02	1.00E+01	2	7.30E+00
Methoxychlor	5.59E-06	2.69E+04	5.50E+01	5.50E+01	1.35E+02	1.88E+02	9.59E+01	1.88E+02	2.24E+03	9.59E+01	1	1.00E-01
Methylene Chloride	1.25E-05	2.17E+01	4.44E-02	4.44E-02	1.09E-01	1.52E-01	7.74E-02	1.52E-01	1.81E+00	7.74E-02	5	1.30E+04
Methylnaphthalene, 2-	7.78E-06	2.48E+03	5.07E+00	5.07E+00	1.24E+01	1.74E+01	8.84E+00	1.74E+01	2.07E+02	8.84E+00	2	2.46E+01
Naphthalene	8.38E-06	1.54E+03	3.15E+00	3.15E+00	7.73E+00	1.08E+01	5.49E+00	1.08E+01	1.28E+02	5.49E+00	0.4	3.10E+01
Nitrobenzeneamine, 4-	9.75E-06	1.09E+02	2.23E-01	2.23E-01	5.47E-01	7.64E-01	3.89E-01	7.64E-01	9.08E+00	3.89E-01	1	7.28E+02
Nitrobenzene	9.45E-06	2.26E+02	4.62E-01	4.62E-01	1.13E+00	1.58E+00	8.06E-01	1.58E+00	1.88E+01	8.06E-01	1	2.09E+03
Nitrophenol, 4-	9.94E-06	2.91E+02	5.95E-01	5.95E-01	1.46E+00	2.04E+00	1.04E+00	2.04E+00	2.42E+01	1.04E+00	1	1.16E+04
n-Nitroso-di-n-propylamine	7.76E-06	2.75E+02	5.62E-01	5.62E-01	1.38E+00	1.93E+00	9.80E-01	1.93E+00	2.29E+01	9.80E-01	1	1.30E+04
Pentachlorophenol	8.01E-06	4.96E+03	1.01E+01	1.01E+01	2.49E+01	3.48E+01	1.77E+01	3.48E+01	4.13E+02	1.77E+01	1	1.40E+01

Table I.14. Chemical Properties for Organic Constituents Applied in the STOMP Model (Continued)

Organic COCs	Diffusivity in Water (cm^2/s)	K_{oc} (mL/g)	K_d (mL/g)[1]								Half-Life[2] (years)	Solubility (mg/L)
			Waste	Liner Clay (Minford)	Regolith	Upper Cuyahoga Shale	Sandstone Layer	Lower Cuyahoga Shale	Sunbury Shale	Berea Sandstone		
Phenanthrene	6.69E-06	1.67E+04	3.41E+01	3.41E+01	8.38E+01	1.17E+02	5.95E+01	1.17E+02	1.39E+03	5.95E+01	2	1.15E+00
Pyridine	1.09E-05	7.17E+01	1.47E-01	1.47E-01	3.60E-01	5.02E-01	2.56E-01	5.02E-01	5.97E+00	2.56E-01	1	1.00E+06
Tetrachloroethene	9.46E-06	9.49E+01	1.94E-01	1.94E-01	4.76E-01	6.65E-01	3.38E-01	6.65E-01	7.90E+00	3.38E-01	2.08	2.06E+02
Toluene	9.20E-06	2.34E+02	4.78E-01	4.78E-01	1.17E+00	1.64E+00	8.34E-01	1.64E+00	1.95E+01	8.34E-01	1	5.26E+02
Toxaphene	4.00E-06	7.72E+04	1.58E+02	1.58E+02	3.88E+02	5.41E+02	2.75E+02	5.41E+02	6.43E+03	2.75E+02	12	7.40E-01
Trichloroethane, 1,1,1-	9.60E-06	4.39E+01	8.97E-02	8.97E-02	2.20E-01	3.08E-01	1.57E-01	3.08E-01	3.66E+00	1.57E-01	6	1.29E+03
Trichloroethane, 1,1,2-	1.00E-05	6.07E+01	1.24E-01	1.24E-01	3.05E-01	4.25E-01	2.16E-01	4.25E-01	5.05E+00	2.16E-01	10	4.59E+03
Trichloroethene	1.02E-05	6.07E+01	1.24E-01	1.24E-01	3.05E-01	4.25E-01	2.16E-01	4.25E-01	5.05E+00	2.16E-01	10	1.28E+03
Trichlorophenol, 2,4,5-	8.09E-06	1.78E+03	3.64E+00	3.64E+00	8.94E+00	1.25E+01	6.35E+00	1.25E+01	1.48E+02	6.35E+00	1	1.20E+03
Trichlorophenol, 2,4,6-	8.09E-06	1.78E+03	3.64E+00	3.64E+00	8.94E+00	1.25E+01	6.35E+00	1.25E+01	1.48E+02	6.35E+00	1	8.00E+02
TP, 2,4,5-T (Silvex)	5.32E-06	1.75E+02	3.58E-01	3.58E-01	8.78E-01	1.23E+00	6.24E-01	1.23E+00	1.46E+01	6.24E-01	1	7.10E+01
Vinyl acetate	1.00E-05	5.58E+00	1.14E-02	1.14E-02	2.80E-02	3.91E-02	1.99E-02	3.91E-02	4.65E-01	1.99E-02	1	2.00E+04
Vinyl chloride	1.20E-05	2.17E+01	4.44E-02	4.44E-02	1.09E-01	1.52E-01	7.74E-02	1.52E-01	1.81E+00	7.74E-02	7.91	8.80E+03

Water diffusivity, K_{OC}, and solubility data are from DOE 2012.

[1] K_d values derived based on geometric means of site-specific organic carbon content for the media. The following F_{oc} values are used: Waste/Liner Clay - 0.00204; Residuum/Weathered Shale - 0.00502; Cuyahoga Shale - 0.00701; Sunbury Shale - 0.0833; and Sandstone Layer/Berea Sandstone - 0.00357.
[2] For short half-life COCs, 1 year half-life was assumed.

COC = contaminant of concern
DOE = U.S. Department of Energy

STOMP Model Simulations

Using the parameters discussed above, the STOMP model simulations are conducted in both water-only and coupled-water fate and transport analysis. For water-only simulations, the movement of the water is predicted as the travel time and flux to the underlying sandstone layer and ultimately to the potential receptor locations, as well as to the Berea sandstone, and is presented as saturation profiles over time.

The following water infiltration rates predicted by the HELP model are used as the top boundary flux rates within the OSDC footprint over the modeled WAC time period (1,000 years) with the following time frames and assumptions considered:

- 0-200 years - 0.00 in./yr (no water influx into the cells)
- 200-500 years - 0.054 in./yr
- 500-1,000 years - 1.08 in./yr.

Figure I.18 shows the water saturation profile with time, based on the STOMP model calibration run for one of the cell locations. The saturation curve changes in response to the change of water influx rate within the cell, especially after 500 years post-operations when a higher infiltration rate (1.08 in./yr) was applied. The figure also shows that the lower hydraulic conductivities in the lower Cuyahoga and Sunbury impeded the downward movement of water. The relatively more permeable sandstone layer in the Cuyahoga provides a preferable water pathway for horizontal movement.

Depending on the cell location (in relation to depth to the sandstone layer), the arrival times of water to the sandstone layer ranged from 550 to 600 years. It will take an additional 10-30 years for horizontal migration to occur and reach the sandstone exposure locations along the western stream ditch and X-611 Sludge Pond.

Initial moisture content assigned to the layers in the model has a large impact on the initial water arrival time. Additionally, the moisture content will impact the initial arrival time of constituents. However, the initial moisture content has less impact on peak concentration because the constituent mass flux from the OSDC footprint is controlled by the performance of the potential OSDC.

Using the solute-porous media and solute-fluid parameters, as discussed earlier, the fate and transport of the constituents are modeled. The waste zones in the cells are assigned as the source zone, and an initial unit mass concentration is assigned. The fate and movement of the constituents are then modeled to 1,000 years.

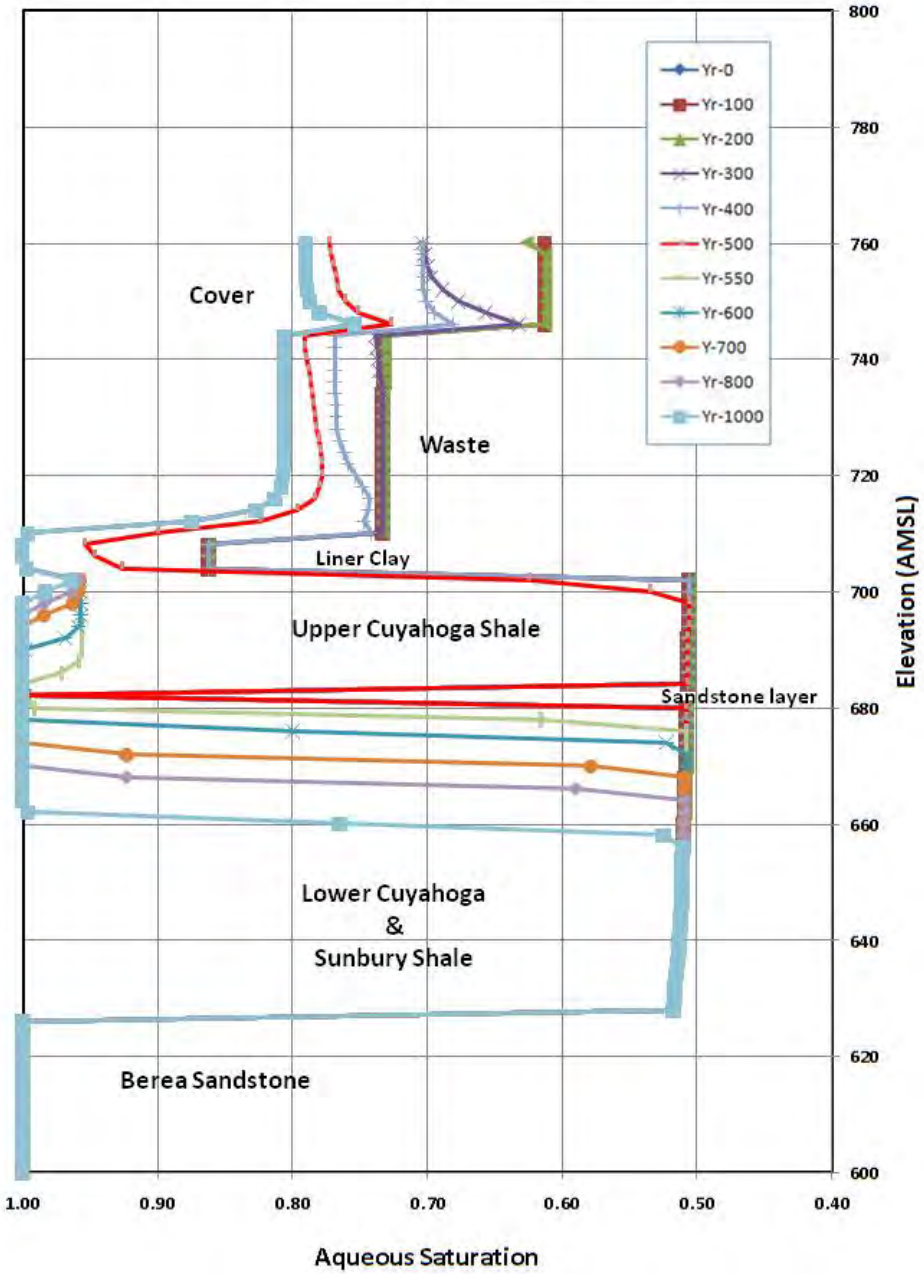


Figure I.18. Water Saturation Profile with Time in Site D at PORTS

The initial unit source concentration of 1 g/cm^3 is assigned for each COC. The source concentration (C) is a combined solute mass absorbed on soil (C_S) and dissolved in the aqueous phase (C_L), based on linear partitioning of solutes between the porous media and aqueous phase:

$$C = C_L \times \text{Porosity} \times \text{Aqueous initial saturation} + C_S \times (1\text{- porosity})$$

where $C_L = C_S / (K_d \times \text{Particle density})$.

Therefore, the source concentration of each solute at the source in the model simulation is dependent on the source K_d values. The initial aqueous saturation of 0.73 for the source zone is based on HELP model results. It is the ratio of field capacity and porosity. Based on this K_d relationship, the initial source leachate concentration calculated for the organic COCs are higher than their respective solubility limits. Therefore, for these COCs the initial source leachate concentration will be set to the solubility limits.

It should be noted that the mass of constituents considered in the waste placed in a potential OSDC would be subjected to processes that result in reduction over time, including:

- Mass removed during cell operations by contact water collection and removal
- Mass removed by the leachate collection system between years 0 and 500
- Mass migration to beneath the potential OSDC and potentially to environmental media after 500 years.

Batch leach test results conducted using samples from the PGE at PORTS confirmed that contaminant mass may be reduced during initial potential OSDC operations, throughout the operation of the leachate collection system, and due to the reducing geochemical environment along the migration pathway (DOE 2013). However, for conservatism, these processes are not considered in the STOMP model. Therefore, all constituent mass that would be present in the waste when the potential OSDC is capped is assumed to be available for migration to the environmental media, resulting in overestimation of the resultant concentrations and thus lower modeled WAC limits.

As shown in Figure I.19, the 680-ft sandstone layer becomes the major migration pathway for COC movement due to the lower permeability nature of the lower Cuyahoga. Thus, the movement of COCs within the 680-ft sandstone layer is analyzed. As previously stated, the 680-ft sandstone layer tilts to the southeast at Site D. With the design of the conceptual OSDC at Site D, the facility would have the highest cell, relative to the sandstone layer, on the east side, with the bottom of the facility stepping down closer to the sandstone layer toward the west end. Therefore, the vertical distance between the bottom of the facility and the 680-ft sandstone varies across the potential OSDC with the highest in the southeast corner, and it gradually decreases to the west. Because the migration of the COCs occurs within the unsaturated zone, the plume development with time in the 680-ft sandstone layer is influenced by the thickness of the unsaturated zone relative to the bottom of the facility.

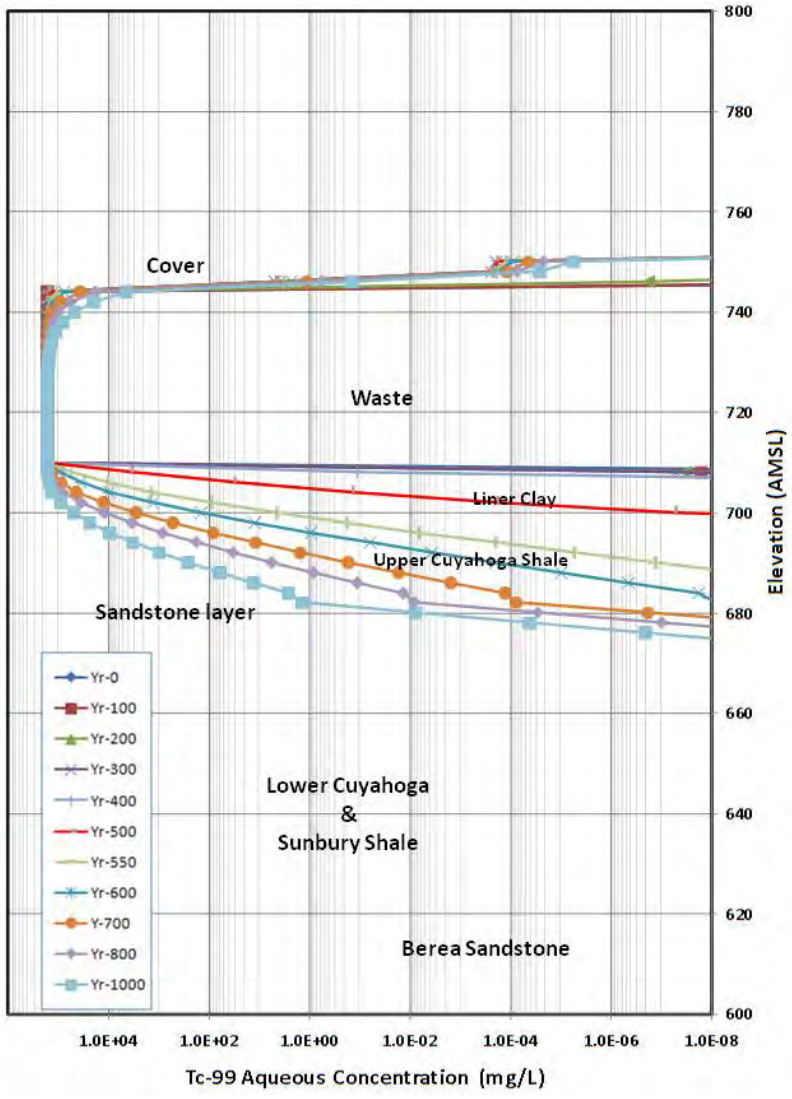


Figure I.19. Technetium-99 Fate and Transport within a Vertical Profile Beneath a Cell

Figure I.20 shows both the model predicted water flow field and technetium-99 relative concentration distribution at various time steps after a potential OSDC closure. At year 500, there is no impact in both water flow direction and contaminant concentration in the 680-ft sandstone layer. Water, along with contaminant mass from a potential OSDC, will reach the 680-ft sandstone layer in year 600, with the highest impact occurring directly beneath Cell #11 because of the underlying shortest vertical distance between the waste and 680-ft sandstone layer. Due to the higher recharge rate assumed for the waste cell area (1.08 in./year), the model predicts that the groundwater potentiometric head will gradually increase and form a groundwater mound near the center of a potential OSDC. As a result, the COCs will gradually spread horizontally within the 680-ft sandstone layer. Over time, the plume will increase in lateral extent, as shown in the time progression figures between 600 and 1,000 years. As depicted in Figure I.20, the plume will have the greatest migration impact to the west and northwest of the cell. When the plume reaches the 680-ft sandstone layer daylight locations, it will discharge to the surface resulting in concentrations in surface soil and water at the discharge locations.

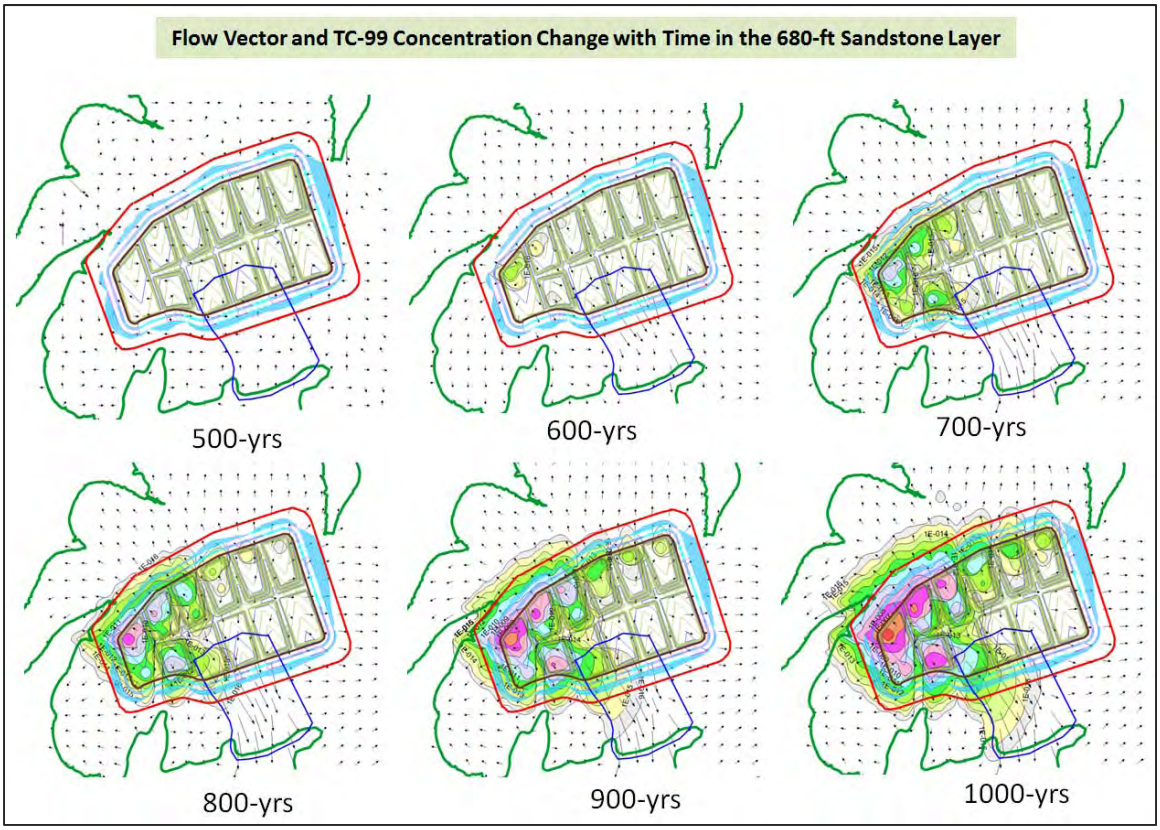


Figure I.20. Flow Vector and Technetium-99 Concentration Change with Time in the 680-ft Sandstone Layer

As discussed in Section I.2, various POAs are considered for modeled WAC development. Based on the model sensitivity runs, the POAs were located to the maximum impact location based on the following criteria:

- COC concentration distribution at 1,000 years
- 680-ft sandstone exposure distance to a potential OSDC
- Suitable topography and land area
- Regulatory requirement and DOE boundary location.

In all cases, the maximum impact location (worst case) is used for modeled WAC development to derive the lowest modeled WAC. The highest concentration at 300 ft from the waste unit is used for POA-2 and POA-3. For POA-1, the location with the maximum concentration is also used. For POA-4, which assumes a potential resident farmer scenario, the receptor location with the maximum plume migration potential is used. A DOE boundary location with the shortest downgradient distance to a potential OSDC is used for POA-5. Figure I.21 shows the POA locations that were used to calculate the lowest modeled WAC for each pathway.

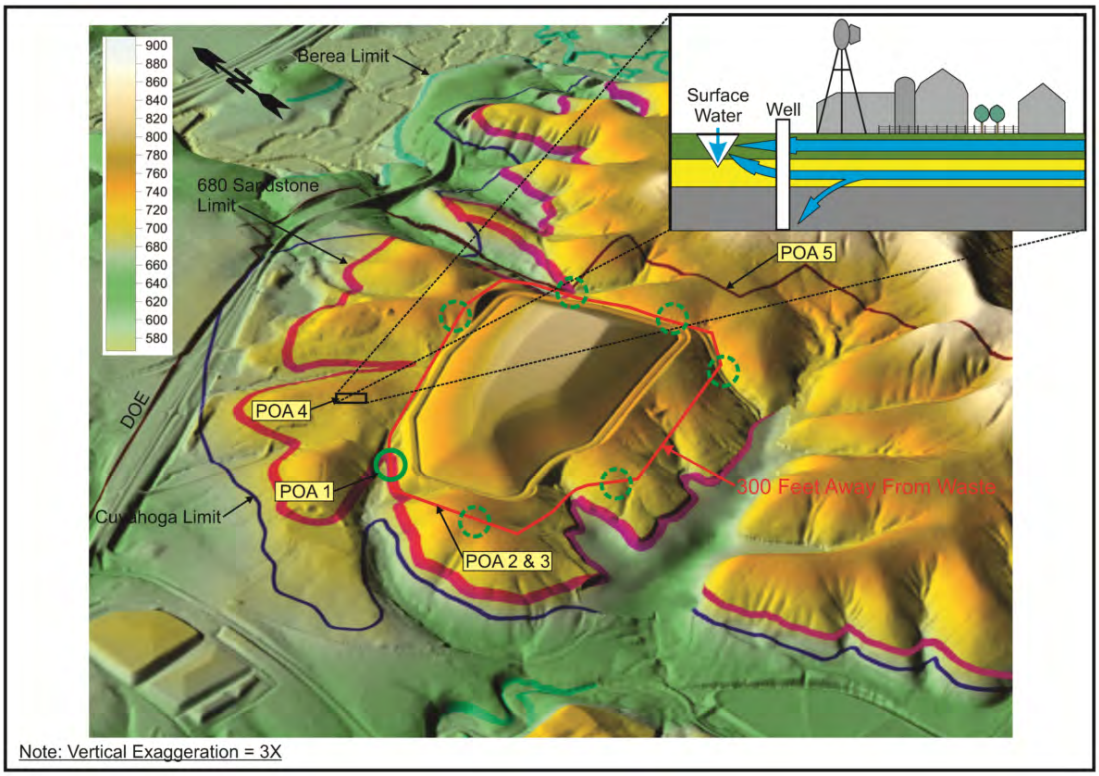


Figure I.21. Point of Assessment Locations for which Waste Acceptance Criteria are Modeled

Extensive sensitivity analyses were conducted before the final STOMP model simulation to determine the best condition representation for the modeling effort. All potential influence parameters, including hydraulic conductivity of the 680-ft sandstone, hydraulic anisotropic ratios, surface water boundary conditions, and recharge rates outside of the cell, were analyzed. Table I.15 lists the sensitivity runs and their potential impacts to the model results for flow and concentration in the 680-ft sandstone. Based on this sensitivity analysis, the base model was determined to have the best representation for the WAC modeling effort.

Table I.15. Results of Sensitivity Runs for the STOMP Model

Sensitivity Scenario	Impact on Flow and Concentration of 680-ft Sandstone Layer
Hydraulic conductivity vertical ratio (Kx/Kz) for upper Cuyahoga shale	Minimal impact on flow or concentration
Uniform hydraulic conductivity distribution (with higher K)	Lowered concentration in exposure locations
Hydraulic conductivity value of 680-ft sandstone layer (uniform higher)	Slightly higher concentration (less than 20 percent) to north and west, lower in other areas
Anisotropic ratio - (Kx/Kz) of 680-ft sandstone layer	Minimal impact
Initial saturation impact of 680-ft sandstone layer	Minimal impact at 1,000 years
Impact of 2-ft vs. 5-ft sandstone layer thickness	Slightly higher concentration with 2-ft zone (less than 50 percent)

Table I.15. Results of Sensitivity Runs for the STOMP Model (Continued)

Sensitivity Scenario	Impact on Flow and Concentration of 680-ft Sandstone Layer
Larger higher K zone in the south	Reduced exposure concentration at west and north
Waste placement impact (1.5 times in Cells 1-6; 0.5 times in Cells 7-11)	Lower concentration in exposure locations
Lower Cuyahoga Kx/Kz (10/1)	No impact on concentration in 680-ft sandstone layer at 1,000 years
Localized higher recharge rate outside cell	Reduced exposure concentration
X-611B future condition impact	Minimal impact at 1,000 years

The base model was then used to conduct fate and transport analysis for all 106 COCs to derive modeled WAC. The COC concentration distribution in the 680-ft sandstone layer for each COC was processed to determine the maximum concentration at 300-ft locations (POA-2 and POA-3) and the daylight location (POA-1), and the concentration at the farmer scenario (POA-4). The concentrations were then used to compare with respective POA-specific performance standards to calculate the maximum allowable waste concentrations in the source area (i.e., draft modeled WAC).

Figure I.22 shows the radionuclide aqueous concentration variation with time at the waste source zone within a cell. The line represents the ratio of aqueous concentration over time to initial aqueous concentration at the source zone. The concentration decreases with time as a result of radioactive decay and migration out of the source zone. A fast decrease in concentrations of thorium-228, plutonium-238, and americium-241 are caused by their fast radioactive decay (short half-life). Other radionuclides show very little source reduction as a result of long radionuclide half-life and negligible migration over the 1,000-year time frame.

Inorganic constituent concentrations in the source zone are shown in Figure I.23. All of the inorganic constituents are relatively immobile within the first 1,000 years because of higher K_d values.

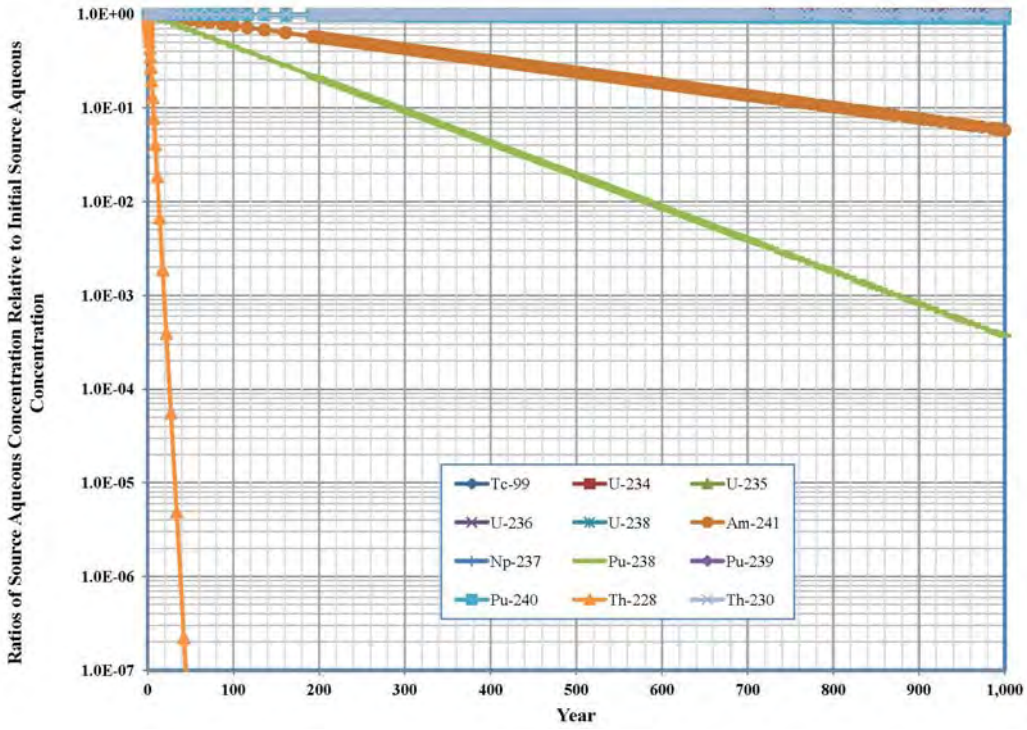


Figure I.22. Radionuclide Contaminant of Concern Aqueous Concentration Change in the Source Zone

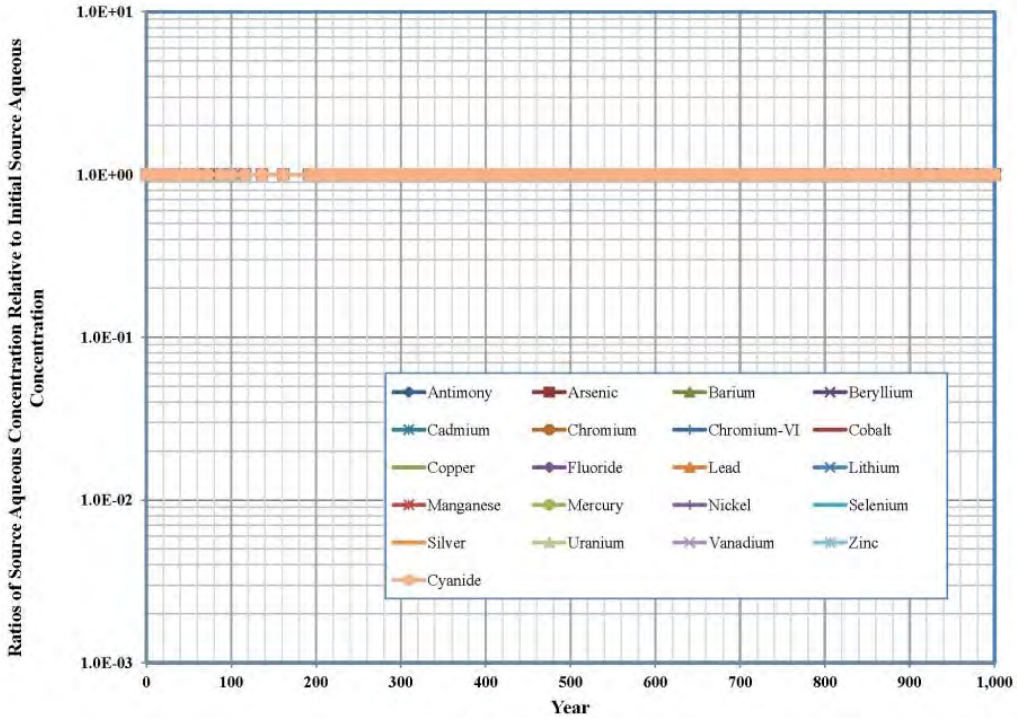


Figure I.23. Inorganic Contaminant of Concern Aqueous Concentration Change in the Source Zone

The fate of selected organic constituents in the source zone is shown in Figure I.24. The source concentrations for these constituents decrease rapidly with the occurrence of biodegradation, which is defined by a constituent's half-life. Some of the constituents have half-lives of less than 1 year.

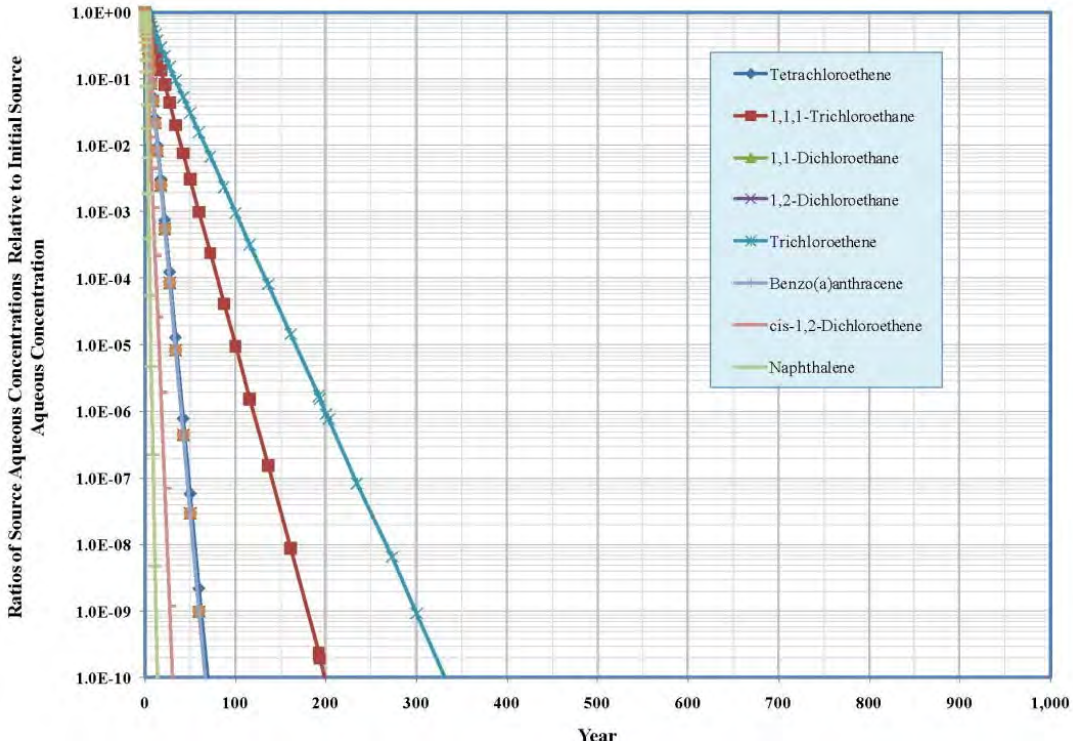


Figure I.24. Organic Contaminant of Concern Aqueous Concentration Change in the Source Zone

Model-predicted concentration profiles of radionuclide constituents at the sandstone layer location at the facility boundary (300 ft from the unit boundary) are presented in Figure I.25. This location is predicted to have the highest migration impact from a potential OSDC. The curves represent the ratios of aqueous concentration over time to the initial source aqueous concentration. The concentration curve for technetium-99 shows an increasing trend during the modeled WAC compliance period (1,000 years). However, the aqueous concentrations are extremely low. All other radionuclides will not reach the POA within the 1,000-year compliance period.

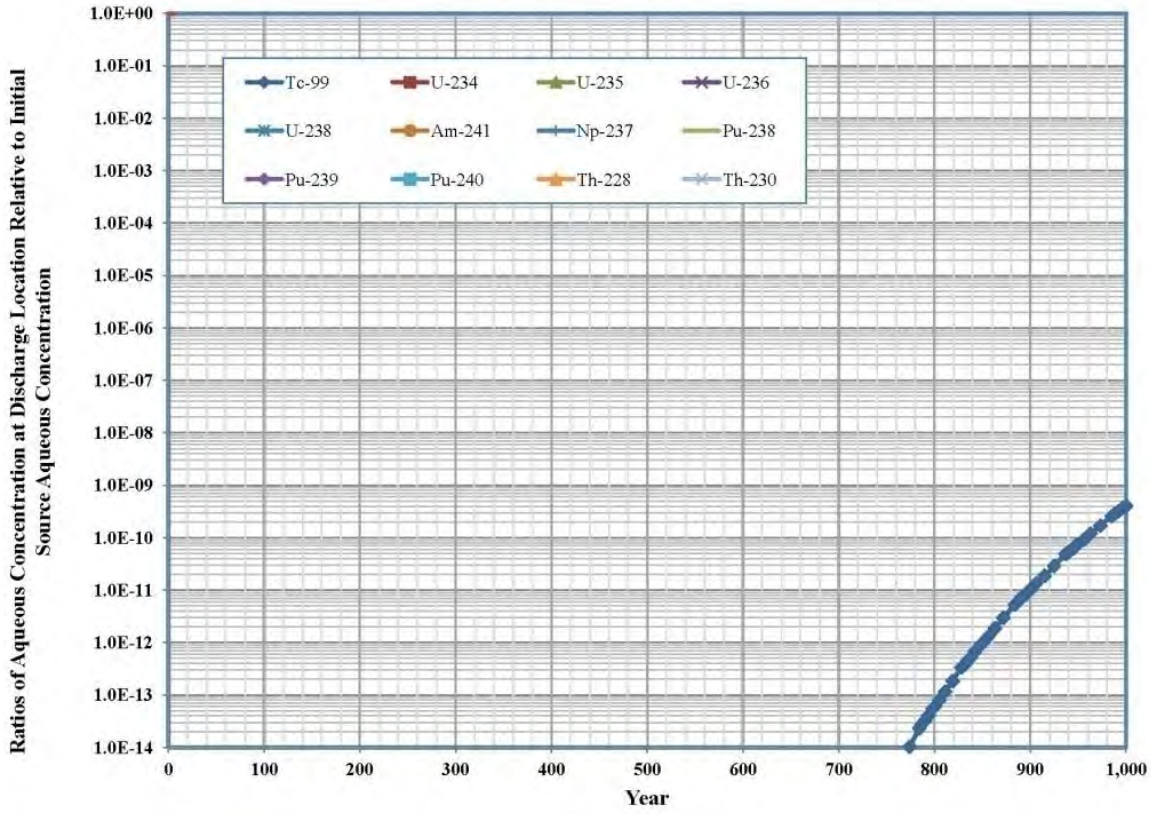


Figure I.25. Concentration Profile of Radionuclide Constituents at the Potential Sandstone Layer Receptor

Figure I.26 shows the inorganic constituent profiles at the same west receptor location. The most mobile contaminants within the 1,000-year compliance period are chromium-VI, silver, and cyanide, all showing increasing trends although the aqueous concentrations are extremely low. As expected, both the arrival time and concentration magnitude are controlled by the K_d values for these constituents.

No organic constituents are shown to migrate to the 680-ft sandstone layer because of either their short half-life or higher K_d values (>10 mL/g).

As discussed earlier, there is no migration of any of the constituents to the Berea sandstone groundwater from a potential OSDC within the modeled WAC compliance period.

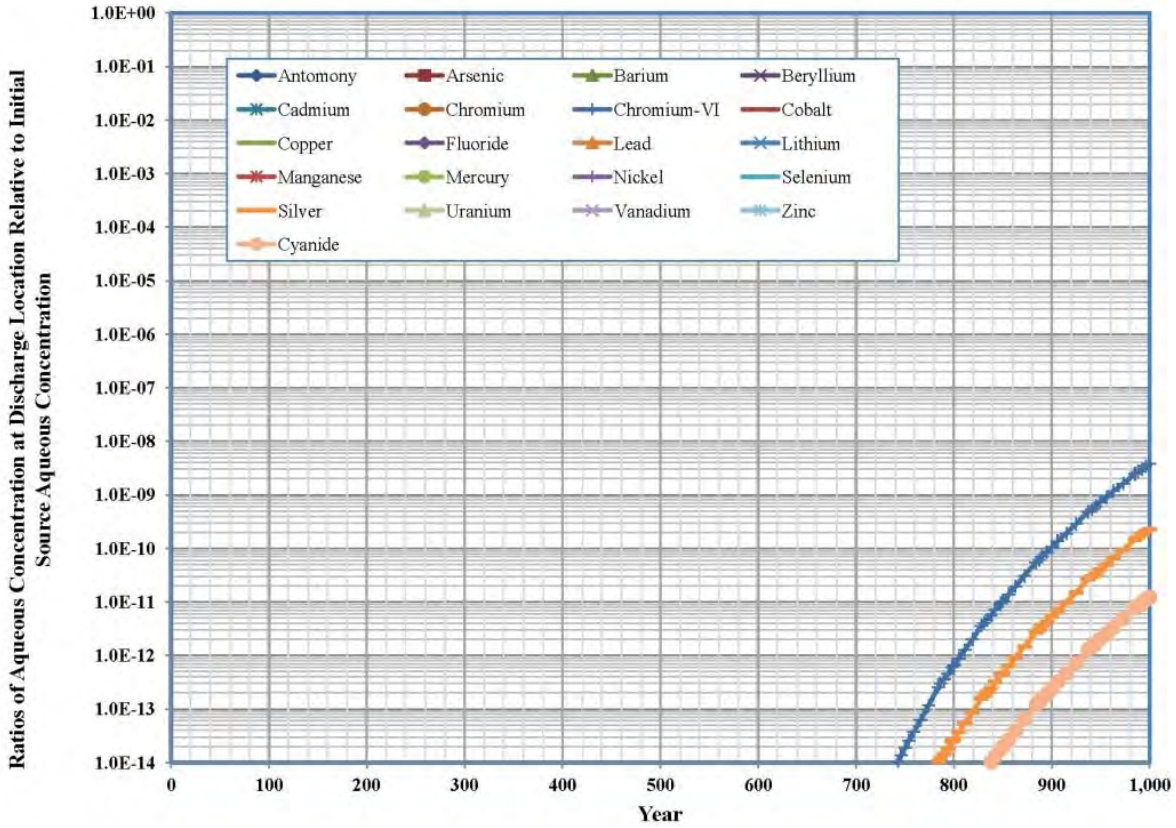


Figure I.26. Concentration Profile of Inorganic Constituents at the Potential Sandstone Layer Receptor

Table I.16 lists the initial source aqueous concentration for a unit source of 1 gm/cm^3, the initial arrival and peak times, and the maximum ratio of aqueous concentrations relative to the initial source concentration predicted for all the constituents within the 1,000-year compliance period for POAs -1, -2, and -3. For POA-2 and POA-3, only technetium-99, uranium-234, uranium-235, uranium-236, uranium-238, chromium VI, silver, and uranium (total) are predicted to arrive between 640 and 900 years post-closure. Only technetium-99, chromium VI, and silver are predicted to arrive at year 700 at extremely low concentrations at POA-1. There is no migration of any organic COC to any of the POAs within the 1,000-year compliance period.

Table I.17 lists the initial source aqueous concentration for a unit source of 1 gm/cm^3, initial arrival and peak times, and maximum ratio of aqueous concentrations relative to the initial source concentration predicted for all the constituents within the 1,000-year compliance period for POAs -4 and -5. As noted, only technetium-99, chromium VI, and silver are predicted to arrive at year 800 at extremely low concentrations at POA-4. There is no migration of any organic COC to POA-4 within the 1,000-year compliance period. Finally, the model predicts that no COC will migrate to POA-5 within the 1,000-year compliance period.

Table I.16. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -1, -2, and -3

COC	Waste Source Zone	POA-1 (680-ft Sandstone Layer of Cuyahoga Shale Exposure Points)			POA-2 (680-ft Sandstone Layer - 300 ft Away from Waste Limit)			POA-3 (Berea Sandstone Groundwater Mixing with 680-ft Sandstone - 300 ft Away from Waste Limit)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Americium-241	3.82E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Neptunium-237	1.30E-03	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Plutonium-238	7.22E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Plutonium-239	7.22E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Plutonium-240	7.22E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Thorium-228	1.91E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Thorium-230	1.91E-04	>1,000	>1,000	NA	NA	>1,000	NA	>1,000	>1,000	NA
Technetium-99	2.91E-01	700	>1,000	1.03E-10	650	>1,000	1.72E-09	650	>1,000	9.28E-11
Uranium-234	1.64E-03	>1,000	>1,000	NA	900	>1,000	2.44E-15	900	>1,000	1.32E-16
Uranium-235	1.64E-03	>1,000	>1,000	NA	900	>1,000	2.44E-15	900	>1,000	1.32E-16
Uranium-236	1.64E-03	>1,000	>1,000	NA	900	>1,000	2.44E-15	900	>1,000	1.32E-16
Uranium-238	1.64E-03	>1,000	>1,000	NA	900	>1,000	2.44E-15	900	>1,000	1.32E-16
Antimony	1.44E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Arsenic	3.12E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Barium	3.24E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Beryllium	8.22E-04	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Cadmium	1.33E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Chromium	8.02E-04	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Chromium VI	9.02E-02	700	>1,000	1.11E-09	640	>1,000	1.55E-08	640	>1,000	8.38E-10
Cobalt	1.44E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Copper	1.85E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Fluoride (salts)	4.32E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Lead	2.30E-05	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Lithium	2.16E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA

Table I.16. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -1, -2, and -3 (Continued)

COC	Waste Source Zone	POA-1 (680-ft Sandstone Layer of Cuyahoga Shale Exposure Points)			POA-2 (680-ft Sandstone Layer - 300 ft Away from Waste Limit)			POA-3 (Berea Sandstone Groundwater Mixing with 680-ft Sandstone - 300 ft Away from Waste Limit)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Manganese	3.89E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Mercury	1.58E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Nickel	9.96E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Selenium	4.27E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Silver	7.64E-02	700	>1,000	1.31E-10	650	>1,000	2.62E-09	650	>1,000	1.41E-10
Uranium	1.64E-03	>1,000	>1,000	NA	900	>1,000	2.44E-15	900	>1,000	1.32E-16
Vanadium	6.48E-03	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Zinc	1.04E-02	>1,000	>1,000	NA	>1,000	>1,000	NA	>1,000	>1,000	NA
Cyanide	6.43E-02	850	>1,000	1.87E-11	800	>1,000	2.49E-10	800	>1,000	1.34E-11
Acenaphthylene	1.61E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Acetone	1.00E+00	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Anthracene	4.34E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Aroclor-1242	2.77E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Aroclor 1254	4.30E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Aroclor 1260	1.44E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzene	1.79E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzo(a)anthracene	9.40E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzo(a)pyrene	1.62E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzo(b)fluoranthene	1.50E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzo(g,h,i)perylene	2.60E-10	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Benzo(k)fluoranthene	8.00E-10	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Bis(2-chloroethyl)ether	1.72E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Bromoform		NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2-Butanone	2.23E-01	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA

Table I.16. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -1, -2, and -3 (Continued)

COC	Waste Source Zone	POA-1 (680-ft Sandstone Layer of Cuyahoga Shale Exposure Points)			POA-2 (680-ft Sandstone Layer - 300 ft Away from Waste Limit)			POA-3 (Berea Sandstone Groundwater Mixing with 680-ft Sandstone - 300 ft Away from Waste Limit)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Chlordane	5.60E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
gamma - Chlordane	3.10E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
4-Chloro, 3-methylphenol	5.60E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Chlorobenzene	4.98E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Chloroform	7.95E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Chrysene	2.00E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
m-Cresol	2.27E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
o-Cresol	2.59E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
p-Cresol	2.15E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Cresols	2.59E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Dibenz(a,h)anthracene	2.49E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Dibenzofuran	3.10E-06	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Dibromochloromethane	2.70E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
1,4-Dichlorobenzene	8.13E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
1,2-Dichloroethane	8.60E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
1,1-Dichloroethene	2.42E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
1,2-Dichloroethene	3.50E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Dieldrin	1.95E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Dimethylphthalate	4.00E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2,4-Dinitrotoluene	2.00E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2,4-D	6.77E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Endosulfan II	4.50E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Endosulfan sulfate	4.80E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Endrin	2.50E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA

Table I.16. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -1, -2, and -3 (Continued)

COC	Waste Source Zone	POA-1 (680-ft Sandstone Layer of Cuyahoga Shale Exposure Points)			POA-2 (680-ft Sandstone Layer - 300 ft Away from Waste Limit)			POA-3 (Berea Sandstone Groundwater Mixing with 680-ft Sandstone - 300 ft Away from Waste Limit)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Endrin ketone	7.55E-08	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Ethylbenzene	1.69E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Heptachlor	1.80E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Hexachlorobenzene	6.20E-09	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Hexachlorobutadiene	3.20E-06	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
alpha-Hexachlorocyclohexane	2.00E-06	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Hexachloroethane	5.00E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2-Hexanone	1.72E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Indeno(1,2,3-cd)pyrene	1.90E-10	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Lindane	7.30E-06	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Methoxychlor	1.00E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Methylene Chloride	1.30E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2-Methylnaphthalene	2.46E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Naphthalene	3.10E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
4-Nitrobenzeneamine	7.28E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Nitrobenzene	2.09E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
4-Nitrophenol	1.16E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
n-Nitroso-di-n-propylamine	1.30E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Pentachlorophenol	1.40E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Phenanthrene	1.15E-06	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Pyridine	1.00E+00	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Tetrachloroethene	2.06E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Toluene	5.26E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Toxaphene	7.40E-07	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA

Table I.16. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -1, -2, and -3 (Continued)

COC	Waste Source Zone	POA-1 (680-ft Sandstone Layer of Cuyahoga Shale Exposure Points)			POA-2 (680-ft Sandstone Layer - 300 ft Away from Waste Limit)			POA-3 (Berea Sandstone Groundwater Mixing with 680-ft Sandstone - 300 ft Away from Waste Limit)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
1,1,1-Trichloroethane	1.29E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
1,1,2-Trichloroethane	4.59E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Trichloroethene	1.28E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2,4,5-Trichlorophenol	1.20E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2,4,6-Trichlorophenol	8.00E-04	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
2,4,5-TP (Silvex)	7.10E-05	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Vinyl acetate	2.00E-02	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA
Vinyl chloride	8.80E-03	NAP	NAP	NA	NAP	NAP	NA	NAP	NAP	NA

COC = contaminant of concern
NA = not available due to no migration to POA within 1,000 years.
NAP = not applicable due to no COCs migrating to POA
POA = point of assessment

Table I.17. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -4 and -5

COC	Waste Source Zone	POA-4 (Farmer Scenarios near OSDC)			POA-5 (Berea Groundwater at DOE Boundary)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Americium-241	3.82E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Neptunium-237	1.30E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Plutonium-238	7.22E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Plutonium-239	7.22E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Plutonium-240	7.22E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Thorium-228	1.91E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Thorium-230	1.91E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Technetium-99	2.91E-01	800	>1,000	3.44E-12	>1,000	>1,000	NA
Uranium-234	1.64E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Uranium-235	1.64E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Uranium-236	1.64E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Uranium-238	1.64E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Antimony	1.44E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Arsenic	3.12E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Barium	3.24E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Beryllium	8.22E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Cadmium	1.33E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Chromium	8.02E-04	>1,000	>1,000	NA	>1,000	>1,000	NA
Chromium VI	9.02E-02	800	>1,000	1.11E-10	>1,000	>1,000	NA
Cobalt	1.44E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Copper	1.85E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Fluoride (salts)	4.32E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Lead	2.30E-05	>1,000	>1,000	NA	>1,000	>1,000	NA
Lithium	2.16E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Manganese	3.89E-02	>1,000	>1,000	NA	>1,000	>1,000	NA

Table I.17. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -4 and -5 (Continued)

COC	Waste Source Zone	POA-4 (Farmer Scenarios near OSDC)			POA-5 (Berea Groundwater at DOE Boundary)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Mercury	1.58E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Nickel	9.96E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Selenium	4.27E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Silver	7.64E-02	800	>1,000	6.54E-13	>1,000	>1,000	NA
Uranium	1.64E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Vanadium	6.48E-03	>1,000	>1,000	NA	>1,000	>1,000	NA
Zinc	1.04E-02	>1,000	>1,000	NA	>1,000	>1,000	NA
Cyanide	6.43E-02	900	>1,000	7.78E-14	>1,000	>1,000	NA
Acenaphthylene	1.61E-05	NAP	NAP	NA	NAP	NAP	NA
Acetone	1.00E+00	NAP	NAP	NA	NAP	NAP	NA
Anthracene	4.34E-08	NAP	NAP	NA	NAP	NAP	NA
Aroclor-1242	2.77E-07	NAP	NAP	NA	NAP	NAP	NA
Aroclor 1254	4.30E-08	NAP	NAP	NA	NAP	NAP	NA
Aroclor 1260	1.44E-08	NAP	NAP	NA	NAP	NAP	NA
Benzene	1.79E-03	NAP	NAP	NA	NAP	NAP	NA
Benzo(a)anthracene	9.40E-09	NAP	NAP	NA	NAP	NAP	NA
Benzo(a)pyrene	1.62E-09	NAP	NAP	NA	NAP	NAP	NA
Benzo(b)fluoranthene	1.50E-09	NAP	NAP	NA	NAP	NAP	NA
Benzo(g,h,i)perylene	2.60E-10	NAP	NAP	NA	NAP	NAP	NA
Benzo(k)fluoranthene	8.00E-10	NAP	NAP	NA	NAP	NAP	NA
Bis(2-chloroethyl)ether	1.72E-02	NAP	NAP	NA	NAP	NAP	NA
Bromoform		NAP	NAP	NA	NAP	NAP	NA
2-Butanone	2.23E-01	NAP	NAP	NA	NAP	NAP	NA
Chlordane	5.60E-08	NAP	NAP	NA	NAP	NAP	NA

Table I.17. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -4 and -5 (Continued)

COC	Waste Source Zone	POA-4 (Farmer Scenarios near OSDC)			POA-5 (Berea Groundwater at DOE Boundary)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
gamma - Chlordane	3.10E-03	NAP	NAP	NA	NAP	NAP	NA
4-Chloro, 3-methylphenol	5.60E-08	NAP	NAP	NA	NAP	NAP	NA
Chlorobenzene	4.98E-04	NAP	NAP	NA	NAP	NAP	NA
Chloroform	7.95E-03	NAP	NAP	NA	NAP	NAP	NA
Chrysene	2.00E-09	NAP	NAP	NA	NAP	NAP	NA
m-Cresol	2.27E-02	NAP	NAP	NA	NAP	NAP	NA
o-Cresol	2.59E-02	NAP	NAP	NA	NAP	NAP	NA
p-Cresol	2.15E-02	NAP	NAP	NA	NAP	NAP	NA
Cresols	2.59E-02	NAP	NAP	NA	NAP	NAP	NA
Dibenz(a,h)anthracene	2.49E-09	NAP	NAP	NA	NAP	NAP	NA
Dibenzofuran	3.10E-06	NAP	NAP	NA	NAP	NAP	NA
Dibromochloromethane	2.70E-03	NAP	NAP	NA	NAP	NAP	NA
1,4-Dichlorobenzene	8.13E-05	NAP	NAP	NA	NAP	NAP	NA
1,2-Dichloroethane	8.60E-03	NAP	NAP	NA	NAP	NAP	NA
1,1-Dichloroethene	2.42E-03	NAP	NAP	NA	NAP	NAP	NA
1,2-Dichloroethene	3.50E-03	NAP	NAP	NA	NAP	NAP	NA
Dieldrin	1.95E-07	NAP	NAP	NA	NAP	NAP	NA
Dimethylphthalate	4.00E-03	NAP	NAP	NA	NAP	NAP	NA
2,4-Dinitrotoluene	2.00E-04	NAP	NAP	NA	NAP	NAP	NA
2,4-D	6.77E-04	NAP	NAP	NA	NAP	NAP	NA
Endosulfan II	4.50E-07	NAP	NAP	NA	NAP	NAP	NA
Endosulfan sulfate	4.80E-07	NAP	NAP	NA	NAP	NAP	NA
Endrin	2.50E-07	NAP	NAP	NA	NAP	NAP	NA
Endrin ketone	7.55E-08	NAP	NAP	NA	NAP	NAP	NA

Table I.17. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -4 and -5 (Continued)

COC	Waste Source Zone	POA-4 (Farmer Scenarios near OSDC)			POA-5 (Berea Groundwater at DOE Boundary)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
Ethylbenzene	1.69E-04	NAP	NAP	NA	NAP	NAP	NA
Heptachlor	1.80E-07	NAP	NAP	NA	NAP	NAP	NA
Hexachlorobenzene	6.20E-09	NAP	NAP	NA	NAP	NAP	NA
Hexachlorobutadiene	3.20E-06	NAP	NAP	NA	NAP	NAP	NA
alpha-Hexachlorocyclohexane,	2.00E-06	NAP	NAP	NA	NAP	NAP	NA
Hexachloroethane	5.00E-05	NAP	NAP	NA	NAP	NAP	NA
2-Hexanone	1.72E-02	NAP	NAP	NA	NAP	NAP	NA
Indeno(1,2,3-cd)pyrene	1.90E-10	NAP	NAP	NA	NAP	NAP	NA
Lindane	7.30E-06	NAP	NAP	NA	NAP	NAP	NA
Methoxychlor	1.00E-07	NAP	NAP	NA	NAP	NAP	NA
Methylene Chloride	1.30E-02	NAP	NAP	NA	NAP	NAP	NA
2-Methylnaphthalene	2.46E-05	NAP	NAP	NA	NAP	NAP	NA
Naphthalene	3.10E-05	NAP	NAP	NA	NAP	NAP	NA
4-Nitrobenzeneamine	7.28E-04	NAP	NAP	NA	NAP	NAP	NA
Nitrobenzene	2.09E-03	NAP	NAP	NA	NAP	NAP	NA
4-Nitrophenol	1.16E-02	NAP	NAP	NA	NAP	NAP	NA
n-Nitroso-di-n-propylamine	1.30E-02	NAP	NAP	NA	NAP	NAP	NA
Pentachlorophenol	1.40E-05	NAP	NAP	NA	NAP	NAP	NA
Phenanthrene	1.15E-06	NAP	NAP	NA	NAP	NAP	NA
Pyridine	1.00E+00	NAP	NAP	NA	NAP	NAP	NA
Tetrachloroethene	2.06E-04	NAP	NAP	NA	NAP	NAP	NA
Toluene	5.26E-04	NAP	NAP	NA	NAP	NAP	NA
Toxaphene	7.40E-07	NAP	NAP	NA	NAP	NAP	NA
1,1,1-Trichloroethane	1.29E-03	NAP	NAP	NA	NAP	NAP	NA

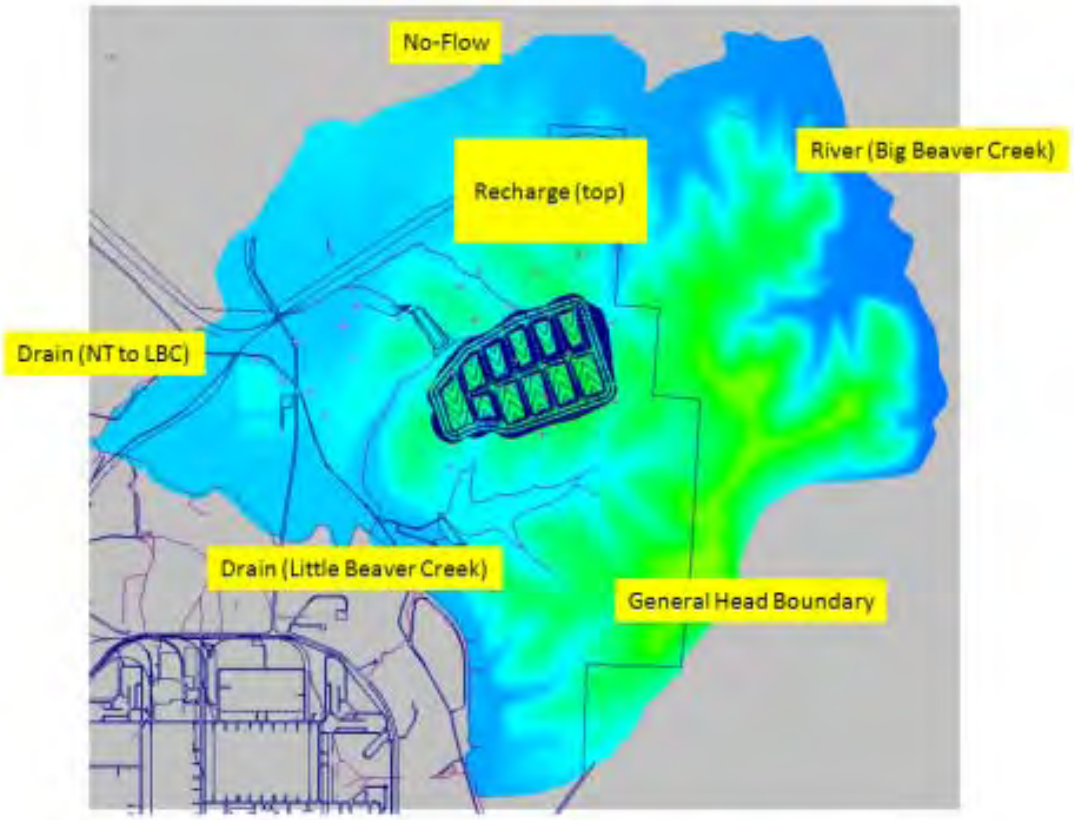
Table I.17. Model-predicted Constituent Arrival Time and Maximum Relative Concentration for POAs -4 and -5 (Continued)

COC	Waste Source Zone	POA-4 (Farmer Scenarios near OSDC)			POA-5 (Berea Groundwater at DOE Boundary)		
	Initial Aqueous Concentration (g/mL) for an Initial Source (Solid+Aqueous) Concentration of 1 (g/cm^3)	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years	Arrival Time (years)	Time (year) of Peak Concentration	Maximum Ratio of Aqueous Concentration to Initial Source Aqueous Concentration at 1,000 years
1,1,2-Trichloroethane	4.59E-03	NAP	NAP	NA	NAP	NAP	NA
Trichloroethene	1.28E-03	NAP	NAP	NA	NAP	NAP	NA
2,4,5-Trichlorophenol	1.20E-03	NAP	NAP	NA	NAP	NAP	NA
2,4,6-Trichlorophenol	8.00E-04	NAP	NAP	NA	NAP	NAP	NA
2,4,5-TP (Silvex)	7.10E-05	NAP	NAP	NA	NAP	NAP	NA
Vinyl acetate	2.00E-02	NAP	NAP	NA	NAP	NAP	NA
Vinyl chloride	8.80E-03	NAP	NAP	NA	NAP	NAP	NA

COC = contaminant of concern
DOE = U.S. Department of Energy
NA = not available due to no migration to POA within 1,000 years.
NAP = not applicable due to no COC migration to POA
OSDC = on-Site disposal cell
POA = point of assessment

I.5.2.3 MODFLOW and MT3D Models

In anticipation of the potential impact to the Berea groundwater from a potential OSDC, a 3-D groundwater model was developed for a potential OSDC at Site D. The groundwater model was constructed using the MODFLOW code. The model domain is shown in Figure I.27. The boundary conditions were set up so the natural flow conditions were used. This model consists of 840 columns and 784 rows with a grid space from 10 to 20 ft. The refined grid allows a detailed representation of the potential OSDC engineering design and key surface features. Seven model layers are used to represent the vertical variation of the hydrological units at the site. The model has over 4.6 million model grids. Figure I.28 shows the model construction summary.



LBC = Little Beaver Creek
NT = Northern Tributary

Figure I.27. Site D Groundwater Model Domain and Boundary Conditions

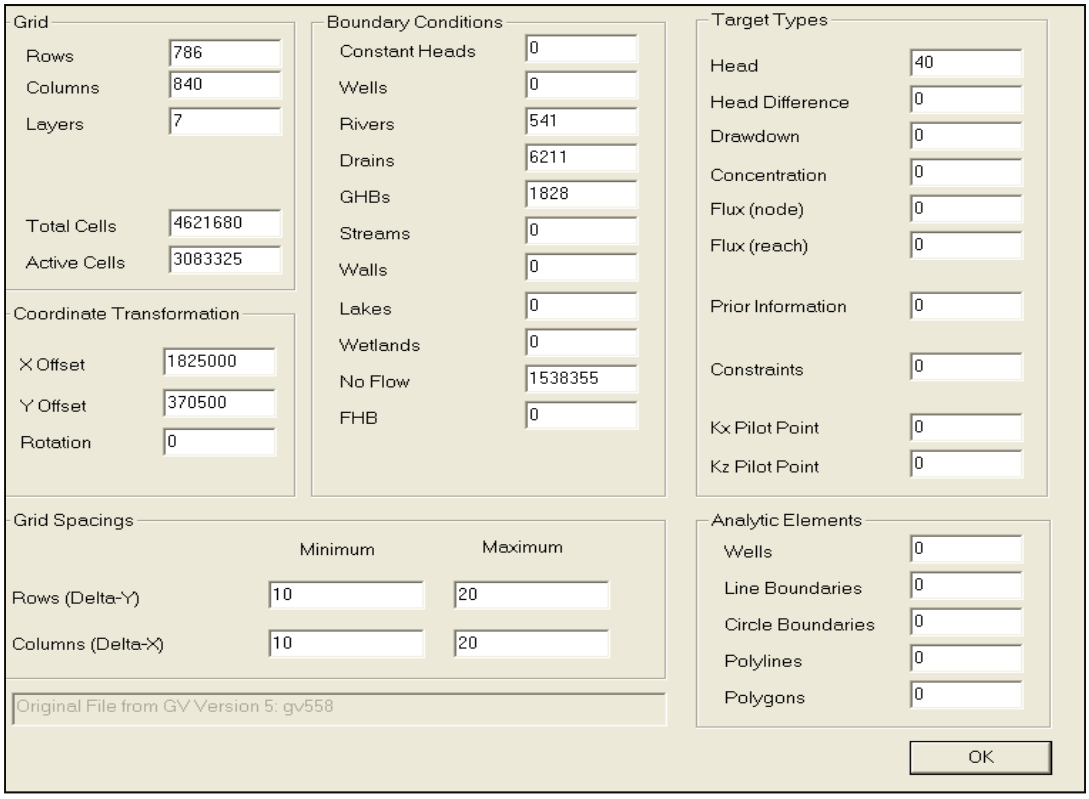


Figure I.28. Site D Groundwater Model Summary

All identified hydraulic units in the area were represented in the model. Figure I.29 shows the model representation of the units in the model top layer and its west-east cross section. Three recharge rates were applied to the top of the model, based on rock and soil types: 4 in./yr was used for the Minford and Gallia formations; 0.4 in./yr was used for the X-735 Landfill; and no recharge was used for the Cuyahoga shale. Due to the thickness of the Cuyahoga shale and the confining nature of the Berea beneath the Cuyahoga and Sunbury shales, it is expected that no precipitation recharge will occur into the Berea sandstone in areas overlaid by the Cuyahoga and Sunbury shales. The hydraulic properties assigned to these units are summarized in Table I.18.

Preliminary model calibration to the current groundwater information at the site was conducted. The model predicted that the flow pattern will be similar to that in the conceptual model.

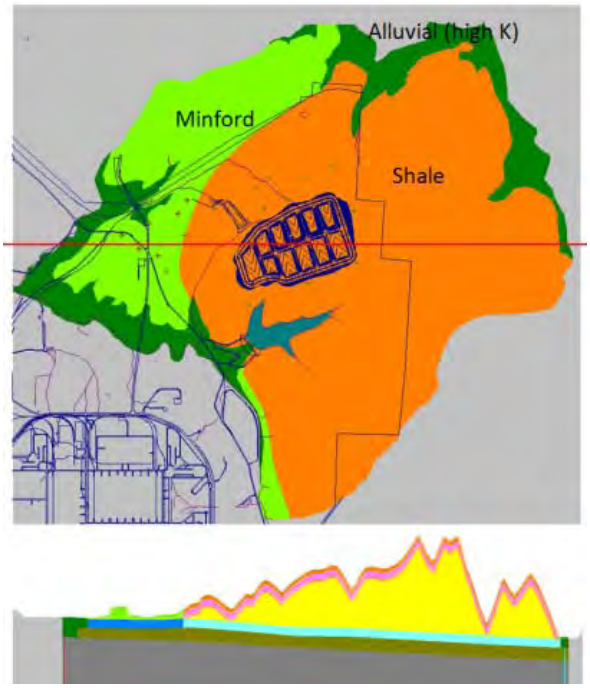


Figure I.29. Model Representation of the Units in the Model Top Layer and Cross-section View

Table I.18. Hydraulic Unit Parameter Summary

Rock/Soil Type	Represented within Model Layer	K(x) (cm/s)	K(y) (cm/s)	K(z) (cm/s)
Regolith	1	2.50E-04	2.50 E-04	5.00 E-05
Weathered Cuyahoga	2	5.00 E-05	5.00 E-05	1.00 E-05
Fractured Cuyahoga	3	2.50 E-05	2.50 E-05	5.00 E-06
Competent Cuyahoga	4	1.30 E-08	1.30 E-08	1.30 E-09
Sunbury shale	5	4.40 E-08	4.40 E-08	4.40 E-09
Berea sandstone	6	1.90 E-04	1.90 E-04	3.80 E-05
Bedford shale	7	5.00 E-09	5.00 E-09	5.00 E-10
Minford	1,2,3,4	1.76 E-04	1.76 E-04	1.76 E-05
Gallia	5	1.76 E-02	1.76 E-02	1.76 E-03
Drain media	1,2,3,4,5,6	1.00 E-01	1.00 E-01	1.00 E-01
X-611 Sludge Basin	1,2,3	1.00 E-04	1.00 E-04	1.00 E-04

K = hydraulic conductivity

The MODFLOW model, along with MT3D code, may be linked to the unsaturated zone model to predict the potential contaminant impact to Berea groundwater at the site and any off-Site location. However, the STOMP model simulation indicated that there will be no contaminant migration to the Berea sandstone within the time frame considered.

I.5.3 MODELED WASTE ACCEPTANCE CRITERIA

In order to calculate draft modeled WAC, the maximum COC concentration predicted at each POA within 1,000 years post-closure was compared to the its respective performance standard as listed in Table I.6. For the surface water/sediment pathway (POA-1), it is assumed that the surface water concentration discharged from the sandstone layer is at the concentration of the groundwater in this layer and that no mixing or dilution with existing surface water occurs. The resulting soil concentration from the discharging seepage is calculated using the K_d relationship previously described. The site-specific Minford K_d values for radionuclides from Table I.12 are used, while the Minford K_d values from Tables I.13 and I.14 were used for other constituents. The lower value of the three performance standards for each COC is used for the draft modeled WAC calculation.

For the 680-ft sandstone groundwater contribution to the Berea groundwater open-hole pathway, an analysis was conducted to determine the contribution percentage. The analysis used both an analytical method of water-bearing zone transmissivity and a numerical method using a 3-D groundwater model of steady-state and transient-state simulation under applicable pumping conditions.

For the analytical method, a constant transmissivity analytical method was used. Thus, the well pumping rate is proportional to the transmissivity of the layers. Assuming the 680-ft sandstone layer and the Berea sandstone have the same hydraulic conductivities and the water will be withdrawn from the total length of the well with both water bearing units, the analytical method yields a result of 5.4 percent contribution of water from the 680-ft sandstone layer to the well completed in the Berea sandstone. The assumption that water is simultaneously withdrawn from the total length of the water-bearing open hole is conservative, resulting in over estimating the percent contribution from the 680-ft sandstone layer. In reality, a groundwater pump is placed in the bottom of the well to provide the maximum yield. When the well is pumped from a confined layer such as the Berea sandstone, the water flow to the well is likely from aquifer storage in the immediate vicinity of the pump. For sedimentary sandstone rock, the water will be drawn preferably from the horizontal directions due to higher permeability in this direction. An additional conservatism is the constant transmissivity for the 680-ft sandstone layer. Due to this layer's limited thickness, the transmissivity from the 680-ft sandstone layer will mostly likely decrease due to drawdown (further reducing the water-bearing layer thickness) at the well location, rather than remain constant. This is the most likely scenario if a high-rate pumping scenario occurs with the Berea aquifer if an open hole exists.

A well drawdown analysis under various usage pumping scenarios typical for domestic use was also used to calculate the 680-ft sandstone water contribution. This method assumes that the bore hole void space above the Berea potentiometric surface is filled with water from the 680-ft sandstone layer. Pumping from a Berea aquifer will cause drawdown in the well, with the water in the drawdown portion of the well above the Berea assumed to be all from the 680-ft sandstone layer. A simplified 3-D flow module within the MODFLOW groundwater model was developed to calculate drawdown from a heterogeneous multi-layer aquifer. Eleven model layers were used to represent the aquifer, water bearing layers, and aquicludes based on Site D site-specific data and K values. Various steady-state and transient-state pumping scenarios representing usage for a family of four, typically 240 gal/day, were conducted for a 6-in. typical water supply well. Based on the modeling results, the calculated contribution percentages ranged from 0.5 to 3.0 percent.

The higher of the simulated values for percent water contribution from the 680-ft sandstone layer to a Berea sandstone well (5.4 percent) based on the two methods described above is used to calculate the groundwater composite concentration in the well. This conservatism is considered to be more protective of human health.

The process used to derive the draft modeled WAC, based on the STOMP model simulation for these COCs predicted to have reached the respective POAs, are discussed below. The model-predicted maximum aqueous concentration for each constituent for a unit source of 1 g/cm^3 at the specific POA within the 1,000 years is compared to the lowest performance standard (allowable aqueous concentration [C-aq $_{(allowable)}$]) from Table I.5. The model-predicted maximum aqueous concentration at a given POA is equal to the concentration ratio times the initial aqueous source concentration. The modeled WAC is then calculated for the waste zone on the basis of the following relationship:

For nonradionuclide COCs,

draft modeled WAC (mg/kg) =
[C-aq $_{allowable}$ ÷ (Concentration ratio × C-aq $_{initial\ source}$)] × [1 (g/cm^3) ÷ Bulk density (g/cm^3)] × 10^6

where :

the concentration ratio is the ratio of the model predicted aqueous concentration at the POA to the initial aqueous concentration for an initial source concentration in the waste zone of 1 g/cm^2

10^6 is the unit conversion factor and $C\text{-}aq_{allowable}$ and $C\text{-}aq_{initial\ source}$ are in µg/L.

For radionuclide COCs,

draft modeled WAC (in pCi/g) =
[C-aq $_{allowable}$ ÷ (Concentration ratio × C-aq $_{initial\ source}$)] × [1 (g/cm^3) ÷ Bulk density (g/cm^3)] × Specific Activity (Ci/g) × 10^{12}

where:

the concentration ratio is the ratio of the model predicted aqueous concentration at the POA to the initial aqueous concentration for an initial source concentration in the waste zone of 1 g/cm^2

10^{12} is the unit conversion factor and $C\text{-}aq_{allowable}$ and $C\text{-}aq_{initial\ source}$ are in pCi/L.

As shown in Table I.19, only technetium-99 and chromium VI have draft modeled WAC that are slightly lower than their respective specific activity or physical limit for POA-2. All calculated draft modeled WAC for the remaining radionuclides and inorganic constituents for other POAs within the 1,000-year compliance period are higher than their respective specific activity or physical limit. Further, none of the organic COCs are modeled to reach the respective POAs within the 1,000-year compliance period,. Based on the analysis performed herein, the exposure scenarios considered (within the compliance period of 1,000 years), and the use of risk-based and MCL-based performance standards, waste from the D&D of PORTS (RC-1) that complies with other DFF&O-required WAC elements, including regulatory-based activity and chemical concentration WAC, may be safely managed in a potential OSDC at Site D.

Table I.19. Potential OSDC Draft Modeled Waste Acceptance Criteria

COC	Draft Concentration-based Modeled WAC[1] (pCi/g or mg/kg)					
	Specific Activity or Physical Limit (pCi/g or mg/kg)	POA-1	POA-2	POA-3	POA-4	POA-5
Radionuclides						
Americium-241	3.44E+12	3.44E+12	3.44E+12	3.44E+12	3.44E+12	3.44E+12
Neptunium-237	7.05E+08	7.05E+08	7.05E+08	7.05E+08	7.05E+08	7.05E+08
Plutonium-238	1.71E+13	1.71E+13	1.71E+13	1.71E+13	1.71E+13	1.71E+13
Plutonium-239	6.22E+10	6.22E+10	6.22E+10	6.22E+10	6.22E+10	6.22E+10
Plutonium-240	2.28E+11	2.28E+11	2.28E+11	2.28E+11	2.28E+11	2.28E+11
Thorium-228	8.20E+14	8.20E+14	8.20E+14	8.20E+14	8.20E+14	8.20E+14
Thorium-230	2.02E+10	2.02E+10	2.02E+10	2.02E+10	2.02E+10	2.02E+10
Technetium-99	1.70E+10	1.70E+10	**9.78E+08**	1.70E+10	1.70E+10	1.70E+10
Uranium-234	6.25E+09	6.25E+09	6.25E+09	6.25E+09	6.25E+09	6.25E+09
Uranium-235	2.16E+06	2.16E+06	2.16E+06	2.16E+06	2.16E+06	2.16E+06
Uranium-236	6.47E+07	6.47E+07	6.47E+07	6.47E+07	6.47E+07	6.47E+07
Uranium-238	3.36E+05	3.36E+05	3.36E+05	3.36E+05	3.36E+05	3.36E+05
Inorganics						
Antimony	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Arsenic	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Barium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Beryllium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Cadmium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chromium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chromium VI	1.00E+06	1.00E+06	**1.59E+05**	1.00E+06	1.00E+06	1.00E+06
Cobalt	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Copper	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Fluoride (salts)	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Lead	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Lithium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Manganese	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Mercury	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Nickel	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Selenium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Silver	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Uranium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Vanadium	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Zinc	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Cyanide	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Organics						
Acenaphthylene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Acetone	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Anthracene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Aroclor 1254	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06

Table I.19. Potential OSDC Draft Modeled Waste Acceptance Criteria (Continued)

COC	Draft Concentration-based Modeled WAC[1] (pCi/g or mg/kg)					
	Specific Activity or Physical Limit (pCi/g or mg/kg)	POA-1	POA-2	POA-3	POA-4	POA-5
Organics (continued)						
Aroclor 1260	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzo(a)anthracene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzo(a)pyrene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzo(b)fluoranthene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzo(g,h,i)perylene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Benzo(k)fluoranthene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Bis(2-chloroethyl)ether	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Bromoform	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2-Butanone	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chlordane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
gamma - Chlordane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
4-Chloro, 3-methylphenol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chlorobenzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chloroform	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Chrysene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
m-Cresol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
o-Cresol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
p-Cresol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Cresols	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Dibenz(a,h)anthracene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Dibenzofuran	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Dibromochloromethane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,4-Dichlorobenzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,2-Dichloroethane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,1-Dichloroethene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,2-Dichloroethene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Dieldrin	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Dimethylphthalate	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2,4-Dinitrotoluene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2,4-D	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Endosulfan II	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Endosulfan sulfate	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Endrin	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Endrin ketone	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Ethylbenzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Heptachlor	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Hexachlorobenzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Hexachlorobutadiene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06

Table I.19. Potential OSDC Draft Modeled Waste Acceptance Criteria (Continued)

COC	Draft Concentration-based Modeled WAC[1] (pCi/g or mg/kg)					
	Specific Activity or Physical Limit (pCi/g or mg/kg)	POA-1	POA-2	POA-3	POA-4	POA-5
Organics (continued)						
alpha-Hexachlorocyclohexane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Hexachloroethane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2-Hexanone	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Indeno(1,2,3-cd)pyrene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Lindane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Methoxychlor	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Methylene Chloride	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2-Methylnaphthalene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Naphthalene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
4-Nitrobenzeneamine	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Nitrobenzene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
4-Nitrophenol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
n-Nitroso-di-n-propylamine	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Pentachlorophenol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Phenanthrene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Pyridine	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Tetrachloroethene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Toluene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Toxaphene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,1,1-Trichloroethane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
1,1,2-Trichloroethane	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Trichloroethene	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2,4,5-Trichlorophenol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2,4,6-Trichlorophenol	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
2,4,5-TP (Silvex)	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Vinyl acetate	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06
Vinyl chloride	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06

[1]Modeled WAC, representing the activity concentration and chemical concentration criteria based solely on protection of human health and the environment, are only one of six DFF&O-required WAC, of which full compliance with all DFF&O WAC is required for disposal in a potential OSDC.

Green = Not restricted due to no migration to POA within 1,000 years.
Yellow = Not restricted due to very low concentration at POA within 1,000 years.

Note: A waste density of 1.84 g/cm^3 is used to calculate the limit.

COC = contaminant of concern
DFF&O = *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
OSDC = on-Site disposal cell
POA = point of assessment
WAC = waste acceptance criteria

It should be noted that significant accumulation of COCs in soils and sediments associated with mineral precipitates at the sandstone layer discharge locations, which may form as a result of reduction-oxidation (redox) reactions when water from the sandstone layer daylights, is not expected for several reasons. First, the OSDC design performance requirements limit the migration of radionuclide and inorganic constituents out of the OSDC and to POA-1 within a 1,000-year timeframe. As shown above, only a few inorganic COCs (technetium-99, chromium VI, silver, and cyanide) are predicted to reach POA-1 within this timeframe. Second, the reducing geochemical environment along the migration pathway, predominately due to pyrite within the sandstone layer, will likely result in precipitation of the major COCs (i.e., uranium and technetium) within this layer, resulting in an overall mass reduction of the COCs released at POA-1. Third, although there is a high affinity for uranium and technetium to be sequestered in iron oxy-hydroxide precipitates at POA-1, there would be very little accumulation of these major COCs in soils and sediments at POA-1 because uranium and technetium concentrations will be very low in the seep water as a result of reducing conditions along the flow path. Fourth, the most restrictive (i.e., lower) media-based risk standards were used at POA-1 as the basis for protecting human health and the environment. For the major COCs, these standards were the surface water-based concentrations, which are well below their respective soil-based standards. Therefore, if the risk standards for surface-water are met at POA-1, there is little concern for risk from the COC levels in soil and sediment. Finally, based on mass flux estimates at POA-1, it is expected that seep water would be of insufficient volume to generate a redox precipitate of sufficient mass to affect the soil-based standards within the 1,000-year timeframe.

I.5.4 AIR PATHWAY ANALYSIS FOR RADON-222 ABOVE THE OSDC CAPS

DOE Order 435.1 requires the radon flux above the cap of a low-level (radioactive) waste disposal facility to be less than 20 $pCi/m^2/s$ above background over a period of 1,000 years. The calculations discussed and presented here indicate that the level of uranium needed to produce a radon-222 flux of 20 $pCi/m^2/s$ above background at 1,000 years is over 1,000 times greater than the uranium mass expected to be placed in the potential OSDC.

Calculations are carried out according to the equations and default parameters in *Radon Attenuation Handbook for Uranium Mill Tailings Cover Design* (NRC 1984) using the material property values from the potential OSDC design (Geosyntec 2012). The calculations and input values are provided in Attachment I-1.

Radon-222, with a half-life of 3.7 days and a daughter in the uranium-238 decay chain, is the only radon isotope with a half-life sufficient to be of concern for transport through the waste and cap. Radon-219, with a half-life of 4.0 s and a daughter in the uranium-235 decay chain, has a half-life that is too short to survive transport through the waste and cap. Radon-220, with a half-life of 56 s, is not considered because it has a short half-life and it is a daughter of thorium-232, which is not a significant parent nuclide in the estimated radionuclide inventory for a potential OSDC at PORTS.

The nuclide that is entered into the radon flux calculation is radium-226, a daughter isotope that is also in the uranium-238 decay chain as the predecessor nuclide to radon-222. At PORTS, there is no detectable quantity of radium-226 in the uranium products processed in the plants, because radium-226 was removed from the uranium-238 decay chain when uranium was purified and converted to uranium hexafluoride prior to processing. Therefore, radium-226, with a half-life of 1,600 years, is not an isotope of concern for PORTS, but it will be produced by the decay of uranium-238, uranium-234, and thorium-230 (nuclides found at PORTS) over the 1,000-year assessment period for a low-level (radioactive) waste disposal facility.

Through an iterative calculation process, it is determined that 385 pCi/g of radium-226 in the waste will produce a radon-222 flux of 20 pCi/m^2/s above a cap with a geosynthetic clay liner and geomembrane no longer effective (a degraded cap). To produce this activity of radium-226 over 1,000 years requires a substantial inventory of uranium-238 to be present in the initial waste streams deposited in the potential OSDC. The amount of uranium-238 needed to yield 385 pCi/g of radium-226 can be calculated using the radium-226/uranium-238 ratio at 1,000 years. This ratio is obtained by performing a Bateman calculation to derive the radium-226/uranium-238 ratio as a function of time.

A Bateman calculation was performed assuming a maximum curie inventory for uranium-238 (87.6 Ci), uranium-234 (188 Ci), and thorium-230 (0.603 Ci) in a potential OSDC to determine the daughter ingrowth in the uranium-238 decay chain over a period of 1,000 years (Savannah River National Laboratory 2013). This calculation yielded a radium-226/uranium-238 activity ratio of 0.00611 at 1,000 years, which means every curie of uranium-238 produces 0.00611 Ci of radium-226 in 1,000 years. As the maximum estimate for uranium-238 is 87.6 Ci, the maximum amount of radium-226 that can be produced in 1,000 years is 0.535 Ci (87.6 × 0.00611). For an average waste density of 1.6 g/cm^3 and 4 million cy of waste, this amount of radium-226 equates to 0.109 pCi/g, which is over 3,000 times lower than the radium-226 activity of 385 pCi/g that is needed to produce the allowed radon-222 flux of 20 pCi/m^2/s above background. This also shows that the estimated maximum inventory for uranium-238 is less than 1 percent of the uranium-238 needed to produce the radon-222 flux of 20 pCi/m^2/s above background. Therefore, the above analysis and radon calculations in Attachment I.1 demonstrate that the radon levels above the cap at 1,000 years will not exceed 20 pCi/m^2/s above background.

I.5.5 SENSITIVITY AND UNCERTAINTY ANALYSIS

There are several uncertainties that may affect the draft modeled WAC modeling results. These uncertainties include site-specific conditions, fate and transport parameters, and potential OSDC conceptual design performance assumptions.

The largest potential impacts to the modeling results are associated with the OSDC performance assumptions for the engineered layers because these assumptions have a direct effect on the source release rate, which manifests as the carrier of the constituents from the disposal cells within the time period considered. For the modeling effort, lower performance assumptions, in terms of the degradation of landfill design components, are used which results in slightly higher modeled release rates than what may actually occur. Further, it is likely that the degradation rates of the facility cover and base liner layers may be different resulting in changes to the moisture content of the waste zone which may increase the source release rate within the first 500 years. However, any such changes would effectively increase the movement of only the more mobile constituents, which are those with lower K_d values.

The models used a soil/water partition relationship to describe the release of the constituents. Thus, the fate and transport parameters, specifically K_d for the source zone, will have direct impacts on the draft modeled WAC. Higher K_d values result in the contaminant being less mobile and thus it will remain in the source zone, whereas those constituents with preference to the aqueous phase (lower K_d) will move with water more readily. The K_d values used for the modeled WAC analysis are mostly within a low to medium range of reported values in the literature. For example, the K_d used for technetium-99 in waste, 2.03 (based on laboratory analysis using soil/rock samples from PORTS), is low, indicating a high potential for migration. This conservative K_d applies to the entire waste mass, which is made up primarily of soil (EC-1), although a high amount of waste other than soil (EC-2), including PGE, will be in the waste mass. The form of technetium-99 can vary, particularly within the barrier of the PGE, based on the chemical conditions. Under oxidizing conditions, technetium-99 is in the soluble and highly mobile oxy anion pertechnetate form, while under reducing conditions it is primarily in the hydrated

oxide form, which is immobile. Nevertheless, for conservatism, the K_d for the more mobile form of technetium-99 was assumed for the waste since the potential OSDC will have a high soil mass which will largely be under oxidizing conditions initially and in the future when the facility begins to rehydrate following a dry phase (see Figure I.11). Final modeled WAC may be developed to consider alternative forms of waste such as scrap metal, concrete, and treated waste forms that will have different K_d values, which means the contamination in the modeled waste would be more or less mobile than assumed for soil-like materials. Although it is likely that contaminants released from variable forms of waste may be different than soil-like material, the overall release from the disposal cell to the underlying geologic layer is controlled by the predominant soil-like matrix of the waste.

Another uncertainty is the biodegradation rate of the organic constituents. Large ranges of half-lives are reported for these compounds. However, most of the literature studies show rapid degradation of these compounds in most environments, except in the presence of a dense, nonaqueous phase liquid source.

One important consideration for some of the constituents is the assumption that the draft modeled WAC calculation considers the time frame post-operations. The fate and reduction of the constituents during the cell operation time frame, often up to 20 years while the waste is being subjected to direct contact with large quantities of rainfall water, are not considered. For some uncontained mobile constituents, the concentration or mass could be reduced greatly during this period through biodegradation and source leaching and removal from the system in landfill water (contact water or leachate). Thus, the applicable modeled WAC for some of these more mobile constituents could be even higher than those calculated through this modeling effect. For most VOCs and some SVOCs, their half-lives during exposed conditions (direct sunlight, etc.) and during likely aerobic conditions are often in the range of days.

Much of the waste disposed in a potential OSDC would be waste that is not soil (EC-2) with the contamination likely occurring on the surface of the material. Thus, the contamination is subject to removal due to washing from precipitation and dust control methods during demolition as well as during cell operations. For this waste, the contaminant mass may be decreased significantly as a result before capping of the potential OSDC. The model and calculation did not consider this contaminant mass removal process, therefore the concentration ratios predicted may be higher than expected resulting in the actual draft modeled WAC calculated herein to be higher.

The waste volume for a potential OSDC is another source of uncertainty. The draft modeled WAC were modeled based on a waste volume of 5 million cy, which results in an 11 cell configuration and resultant areal footprint. Higher flux volumes and concentrations of COCs are generally expected with a larger waste cell footprint (increased waste volume). A higher draft modeled WAC would result for a smaller footprint (and lower waste volume).

The site condition refers to the characterization of the rock/soil mechanical and hydraulic properties. These parameters affect the fate and movement of the contaminants in the environmental media. The parameters, such as porosity, initial moisture content, and hydraulic conductivities, could affect the speed and travel time of the water in the model domain, especially in the predominantly unsaturated zone at Site D. Sensitivity runs during the STOMP simulations showed the water travel time impacts from these factors. Lower porosity or higher initial water content in the rock/soil types will result in a faster water travel time because the available air/pore spaces are lower and additional water may fill up the space quicker, thus promoting the downward movement of the water front. However, the impact on the contaminant concentration profile and maximum peak concentration is low because the contaminant mass flux is determined from the source zone and initial moisture water is free of the contaminant. The initial contaminant front is therefore diluted more with higher initial moisture content. For the lower initial

moisture content media, the mass flux from the cell may arrive later, but the constituents would be in higher concentrations because there would be less dilution along their path.

Because the potential OSDC is on top of the Cuyahoga shale, any connected vertical fractures within the zone could also affect the travel time and create preferable flow paths. However, the current field investigation shows that the fractures in the rock are mostly developed along the horizontal bedding planes because of the difference in material types associated with geologic depositional history. The vertical fractures do not propagate across the bedding planes, suggesting the weathering phenomenon is associated with the horizontal bedding planes.

Climatic data used in the HELP model are from a database consisting of over 100 years of site-specific weather measurements. These long-term data used in the model provided the limits of the normal climate variation. Impact of climatic change on the modeled WAC, unless it is toward one end of an extreme and is sustained over very long periods such that the accelerated degradation of the disposal cell cover system and underlying geologic barrier occurs, would be very minimal.

I.6. SUMMARY OF THE DRAFT MODELED WASTE ACCEPTANCE CRITERIA

The predominant and long-term migration pathway of contaminants from a potential OSDC to human and ecological receptors is through contaminated water that exits the underside of a disposal facility, enters a saturated zone, and traverses laterally downgradient to a receptor located beyond a buffer zone surrounding the disposal facility. Thus, facility design greatly influences modeled WAC because a potential OSDC will include a cover and base liner consisting of multiple layers designed to (1) reduce water infiltration through the cap; (2) maximize leachate collection and leak detection; (3) minimize erosion; (4) prevent human, plant root, and burrowing animal intrusions into the wastes; and (5) retard exfiltration through the liner and into the underlying geologic materials. Additionally, chemical parameters such as the partition coefficient (K_d) control migration of constituents. The underlying geologic material will greatly influence migration, both in terms of flow direction and rate. Therefore, numerical modeling, incorporating water infiltration into the facility, constituent release from the waste matrix, vertical migration through the multiple layers of the facility and existing geologic strata, and ultimately horizontal migration with groundwater flow to the defined receptor location are required to establish modeled WAC.

The list of COCs from the risk assessment (Section 5) in the RI/FS report provides the initial set of constituents for which draft modeled WAC are derived. The COCs are expanded by sampling information from the process buildings and from environmental media. Next, additional constituents found on the RCRA TCLP list were added to ensure that COCs present in contingency waste volumes are represented. Finally, as surrogate constituents, those COCs determined to be present in similar DOE landfills were added to ensure a comprehensive modeled WAC for a potential OSDC at PORTS. In accordance with the DFF&O, the time period (time of compliance) over which the facility must be evaluated to ensure protection of the public and environment is 1,000 years following facility capping.

The contaminant leaching analysis used to model contaminant migration potential for a potential OSDC requires several predictions, which include the following:

- Infiltration of water from precipitation into a potential OSDC

- Leaching of contaminants from the waste disposed within a potential OSDC as a result of infiltration and downward migration through the unsaturated geologic strata beneath the facility (vadose zone) into the underlying groundwater zone

- Transport of contamination in groundwater beneath a potential OSDC to the receptor well and discharge to surface water bodies.

Five POAs and one POC were assessed. Modeling indicated that only five radionuclides and four inorganic constituents are predicted to migrate to the closest POA (POA-2), although at very low concentrations. No other COCs are modeled to reach the POAs within the 1,000-year compliance period. Given that the calculated numbers for the above constituents are either above their respective specific activities or higher than their respective physical concentration limits, coupled with the fact that the balance of the COCs are not predicted to reach any of the POAs within the 1,000-year compliance period and that the estimated radionuclide inventory for the waste destined for a potential OSDC at Study Area D is well below the modeled WAC, there effectively is no modeled limit for these constituents in waste when placed in a potential OSDC at Site D.

Based on input received from members of the public and other considerations, DOE and Ohio EPA have elected not to pursue on-Site disposal of the following waste streams in any future OSDC at PORTS:

- Converters, compressors and coolers from the X-326 Process Building

- Containerized nuclear material inventories of uranium compounds exhibiting enrichments greater than 20 percent (excludes items such as miscellaneous parts, pipes, valves, empty containers etc., with only residual contamination which were packaged for ease of handling and safety reasons).

While these streams are within the calculated values presented in this appendix, they are by agreement not being considered for on-Site disposal. With the elimination by agreement of the waste streams listed in the bullets above, use of a potential OSDC for the remaining waste materials present at PORTS would create a safety factor of at least five orders of magnitude, providing substantial added assurance that no human or ecological receptor would be impacted above established regulatory levels within the 1,000-year design horizon.

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ATTACHMENT I.1: RADON CALCULATIONS

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Radon calculations were performed using the equations and default parameters in *Radon Attenuation Handbook for Uranium Mill Tailings Cover Design* (NRC 1984) and the material property values from the on-Site disposal cell OSDC design (Geosyntec 2012).

Step 1: Radon flux from waste to base of cap at 1,000 years:

Jt = 10^4RρE(λDt)^0.5tanh((λ/Dt)^0.5*Xt)		
Jt = radon flux from the waste materials	calculate	pCi/m^2/s
R = specific activity of Ra-226 in the material	385	pCi/g
ρ = dry bulk density of the material	1.51	g/cm^3
E = radon emanation coefficient	0.2	dimensionless
Dt = radon diffusion coefficient	1.90E-02	cm^2/s
λ = decay constant for Rn-222	2.10E-06	1/s
Xt = thickness of material	1557	cm
Unit conversion from m^2 to cm^2	10,000	
Jt = 2.32E+02 pCi/m^2/s		

Step 2: Values for material properties:

		Geosyntec reported values					Calculated values		
		x	p	MC	SG	Radon	m		
LAYER	layer#	thickness	porosity	moisture	specifc	Diff Coef	moisture	a	b
		cm		content	gravity	cm^2/s	saturation	cm^2/s	1/cm
topsoil	8	15.2	0.398	0.15	2.80	7.66E-03	6.35E-01	3.41E-04	1.66E-02
vegetative soil	7	53.3	0.464	0.15	2.80	1.60E-02	4.85E-01	1.42E-03	1.15E-02
granular fill	6	15.2	0.437	0.08	2.65	3.25E-02	2.73E-01	3.95E-03	8.04E-03
biointrusion barrier	5	91.4	0.397	0.02	2.65	5.59E-02	8.05E-02	7.79E-03	6.13E-03
cover drainage	4	30.5	0.397	0.02	2.65	5.59E-02	8.05E-02	7.79E-03	6.13E-03
geomembrane	3	0.2	0.0001	0.0001	0.95	5.80E-08	--	--	--
Geosyn clay liner	2	0.6	0.750	0.25	2.80	3.64E-02	--	--	--
Compacted clay	1	61.0	0.401	0.17	2.80	4.50E-03	7.11E-01	1.62E-04	2.16E-02
impacted material	0	1557	0.453	0.13	2.76	1.90E-02	4.33E-01	1.80E-03	1.05E-02
CompClay+ImpMat		1618	0.427	0.15	2.78	8.38E-03	5.60E-01	5.25E-04	1.58E-02
			m = SG*MC/(p/(1-p))					a = p^2D(1-(1-k)m)^2	
			k =	0.26	@ 20C	NRC		b = (λ/D)^0.5	

Step 3: Radon flux above the compacted clay layer:

Jc = (2Jt*exp(-bc*xc))/(1+(at/ac)^0.5*tanh(bt*xt))+(1-(at/ac)^0.5*tanh(bt*xt))*exp(-2bc*xc)											
Jc = radon flux at top of cover layer											
ac = pc^2Dc(1-(1-k)mc)^2						at = pt^2Dt(1-(1-k)mt)^2					
bc = (λ/Dc)^0.5						bt = (λ/Dt)^0.5					
Dc = radon total diffusion coefficient for cover layer						Dt = radon total diffusion coefficient for waste layer					
Mc = moisture content (dry wt fraction) for cover layer						Mt = moisture content (dry wt fraction) for waste layer					
mc = fractional moisture saturation						mt = fractional moisture saturation					
pc = porosity of homogenous cover layer						pt = porosity of waste layer					
xc = thickness of homogenous cover layer						xt = thickness of waste layer					
k = radon distribution coefficient for water/air											
Jc1 =	2.99E+01	pCi/m^2/s									

Step 4: Calculate an equivalent source diffusion coefficient for the waste and compacted clay layer:

Dt1 = Dt*exp(-bc1*xc1) + Dc1*(1-exp(-bc1*xc1)) =	8.38E-03	cm^2/s

Step 5: Radon flux through cover drainage and biointrusion layer (NOTE: this is taken as the top of the cap, assuming geosynthetic clay liner and geomembrane have failed, and topsoil, vegetative soil and granular fill are removed by erosion):

Applying equation in Step 3 with the recalculated diffusion coefficient in Step 4:

Jc45 =	1.99E+01	pCi/m^2/s

APPENDIX J: ON-SITE DISPOSAL CELL CONCEPTUAL DESIGN FOR SITE D (ALTERNATIVE 2)

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Table J.1 lists and describes the conceptual design figures for the proposed on-Site disposal cell design, which includes a site plan and cross sections.

Table J.1. Site Plans and Detail Drawings for PORTS

Figure	Brief Description of Figures
J.1 OSDC Site D Location Map	This is the proposed OSDC location with a waste placement area of approximately 66 acres.
J.2 OSDC 3.9 million cy Site D Layout	Assumes 3.9 million cy capacity with a waste placement area of approximately 50 acres. A 5-ft-tall (minimum), structural clay, soil fill berm with 4H:1V side slopes lies at the perimeter of the landfill footprint and around the perimeter of each cell within the landfill. Sedimentation basins for the landfill are shown. An access/haul road and drainage ditches are constructed outside the landfill but inside an interior security fence. A wastewater treatment facility, support facilities and parking, equipment storage/laydown area, and an IMTA are shown inside the external security fence.
J.3 OSDC 3.9 million cy Site D Cross-section Plan	Shows locations of cross sections for the 3.9 million cy capacity layout.
J.4 OSDC 3.9 million cy Site D Cross Sections	Typical cross section view of cell locations shown along grade elevations. As shown, the berm surrounding each cell improves perimeter water control and would allow for landfill capping at any time.
J.5 OSDC 5 million cy Site D Layout	Assumes 5 million cy capacity with a waste placement area of 66 acres. A 5-ft-tall (minimum), structural clay, soil fill berm with 4H:1V side slopes lies at the perimeter of the landfill footprint and around the perimeter of each cell within the landfill. Sedimentation basins for the landfill are shown. An access/haul road and drainage ditches are constructed outside the landfill but inside an interior security fence. A wastewater treatment facility, support facilities and parking, equipment storage/laydown area, and an IMTA are shown inside the external security fence.
J.6 OSDC Haul Road	Shows the proposed OSDC and haul road location.
J.7 OSDC 5 million cy Site D Cross-section Plan	Shows locations of cross sections for the 5 million cy layout.
J.8 OSDC 5 million Site D Cross Sections	Typical cross section view of cell locations shown along grade elevations. As shown, the berm surrounding each cell improves perimeter water control and would allow for landfill capping at any time.

IMTA = impacted material transfer area
OSDC = on-Site disposal cell

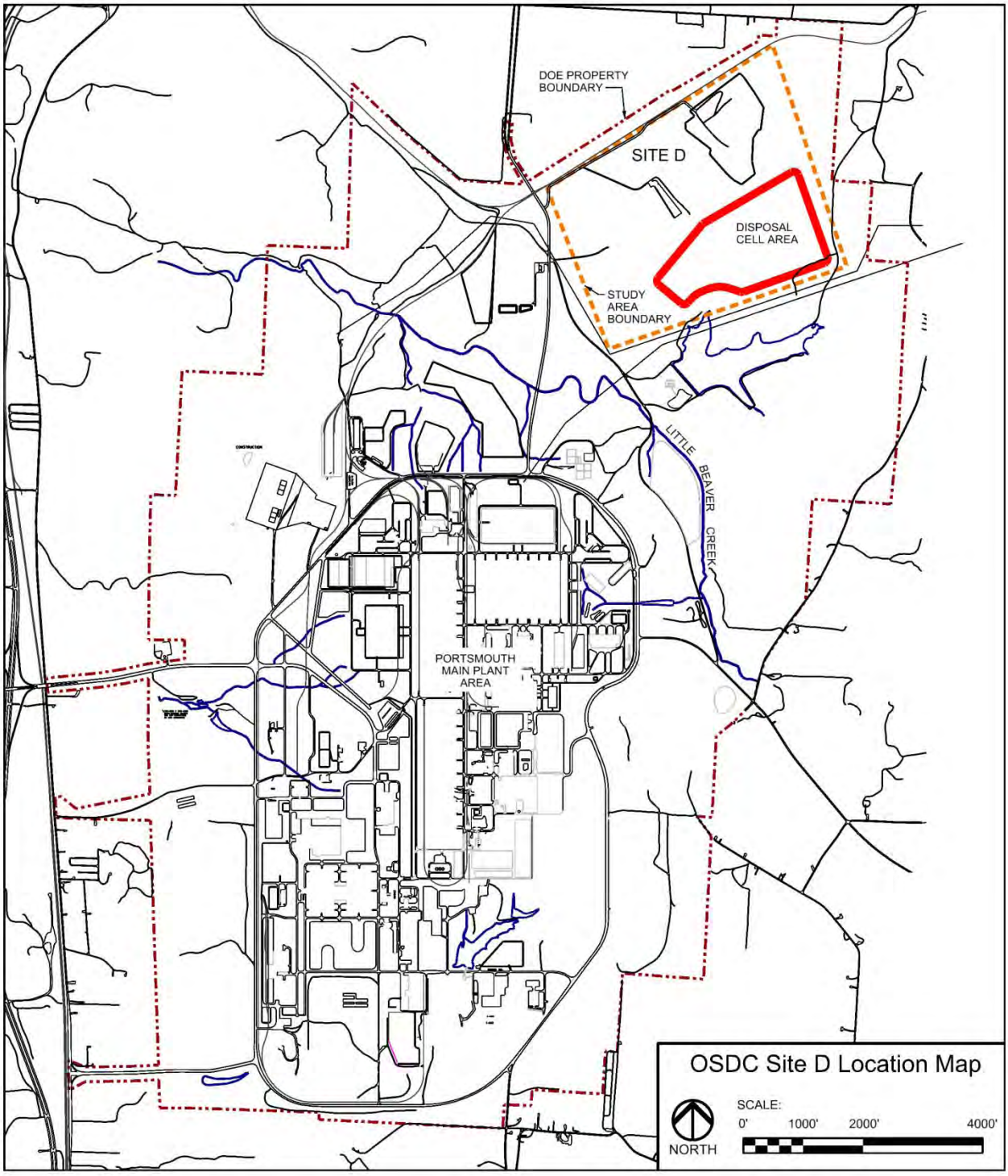

Figure J.1. OSDC Site D Location Map

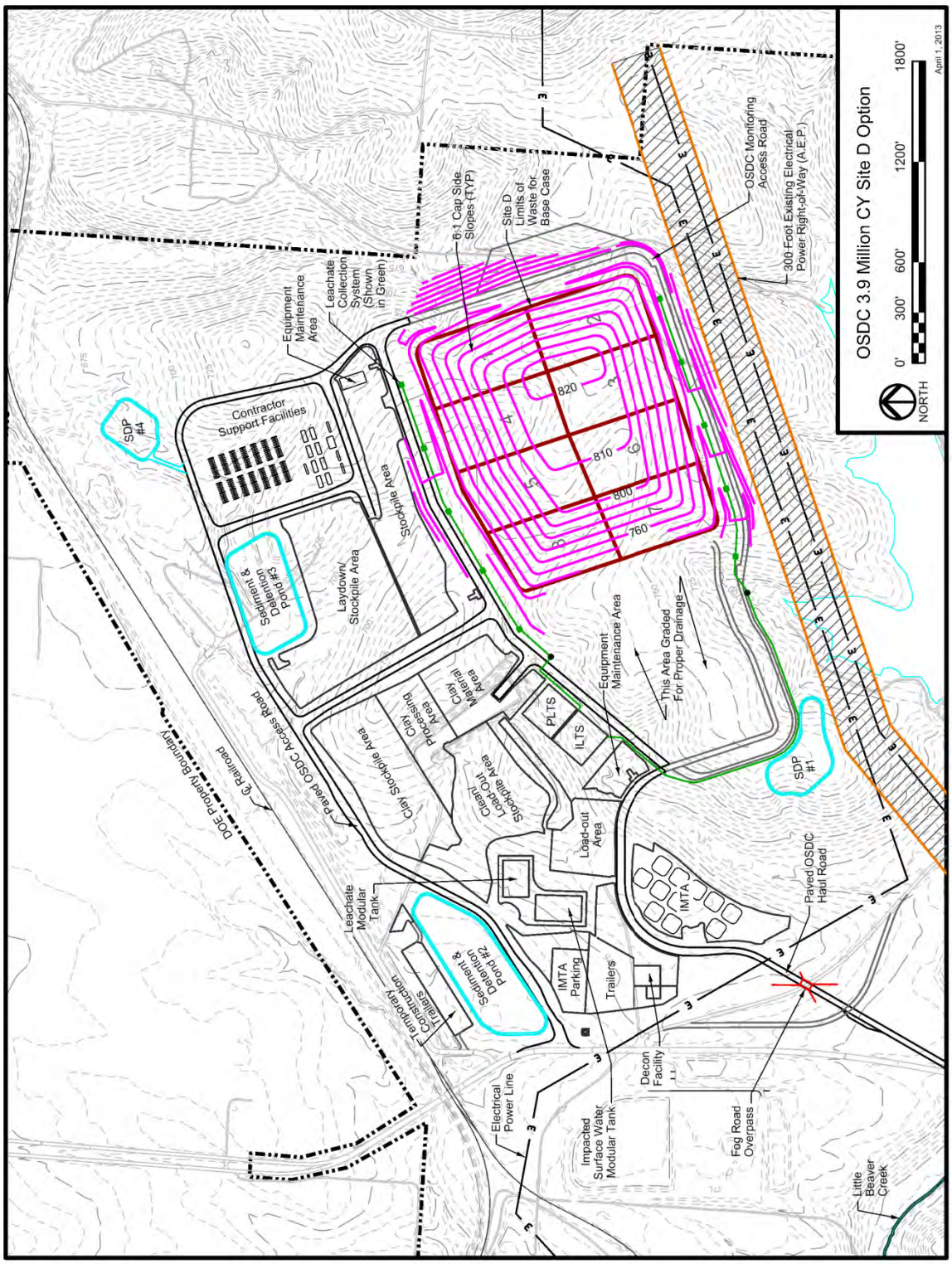

Figure J.2. OSDC 3.9 million cy Site D Layout

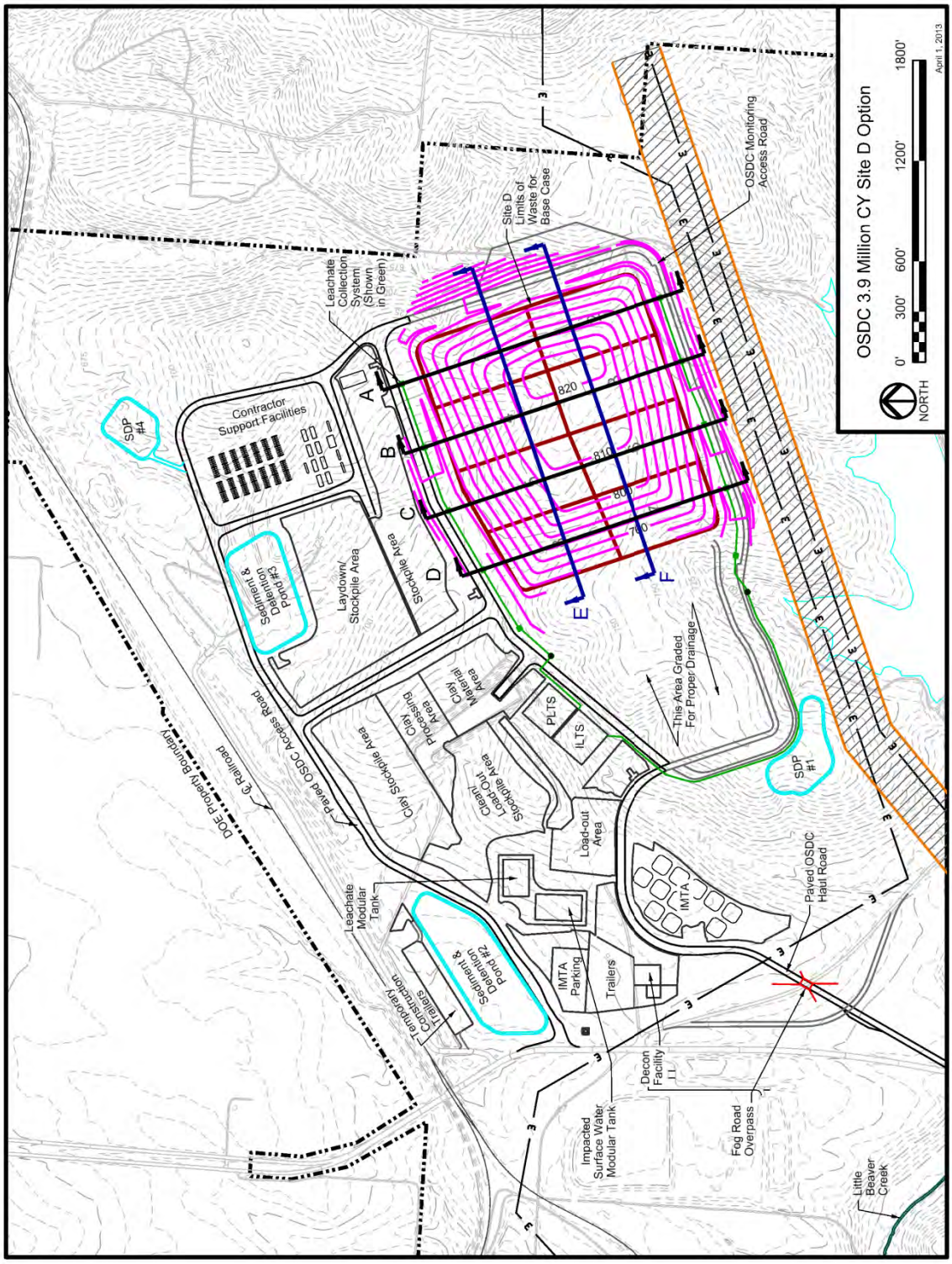

Figure J.3. OSDC 3.9 million cy Site D Cross-section Plan

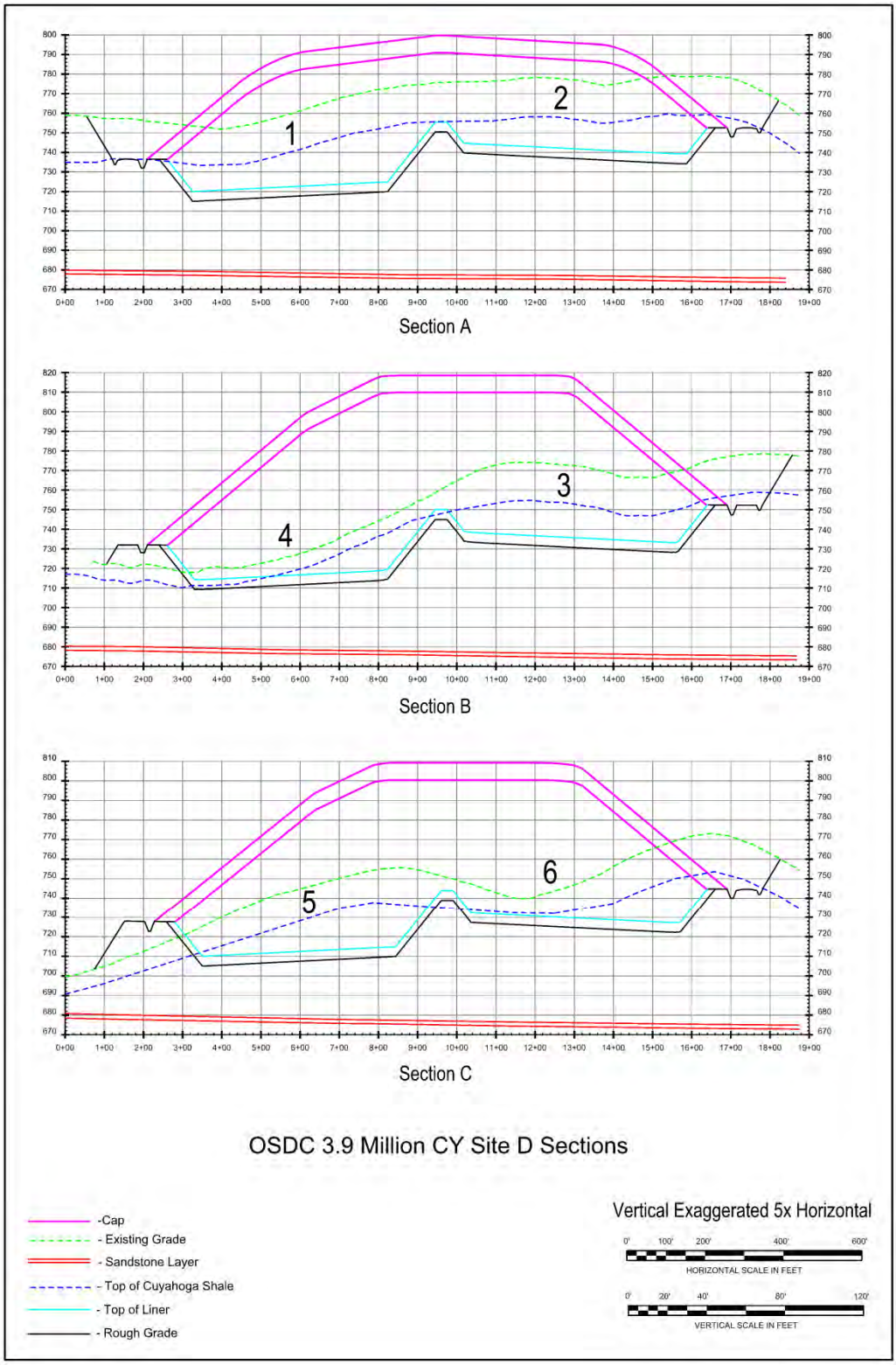

Figure J.4. OSDC 3.9 million cy Site D Cross Sections

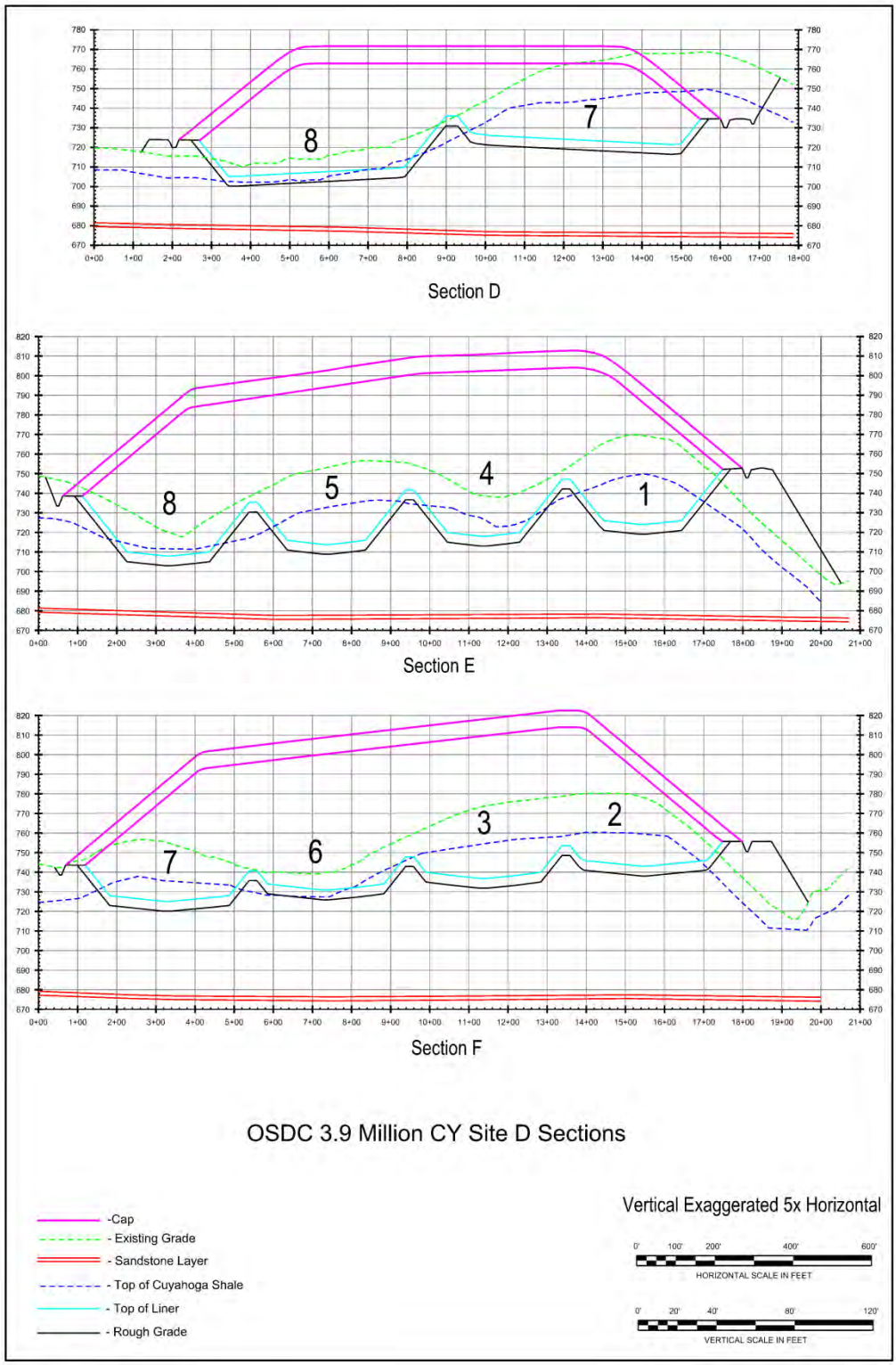

Figure J.4. OSDC 3.9 million cy Site D Cross Sections (continued)

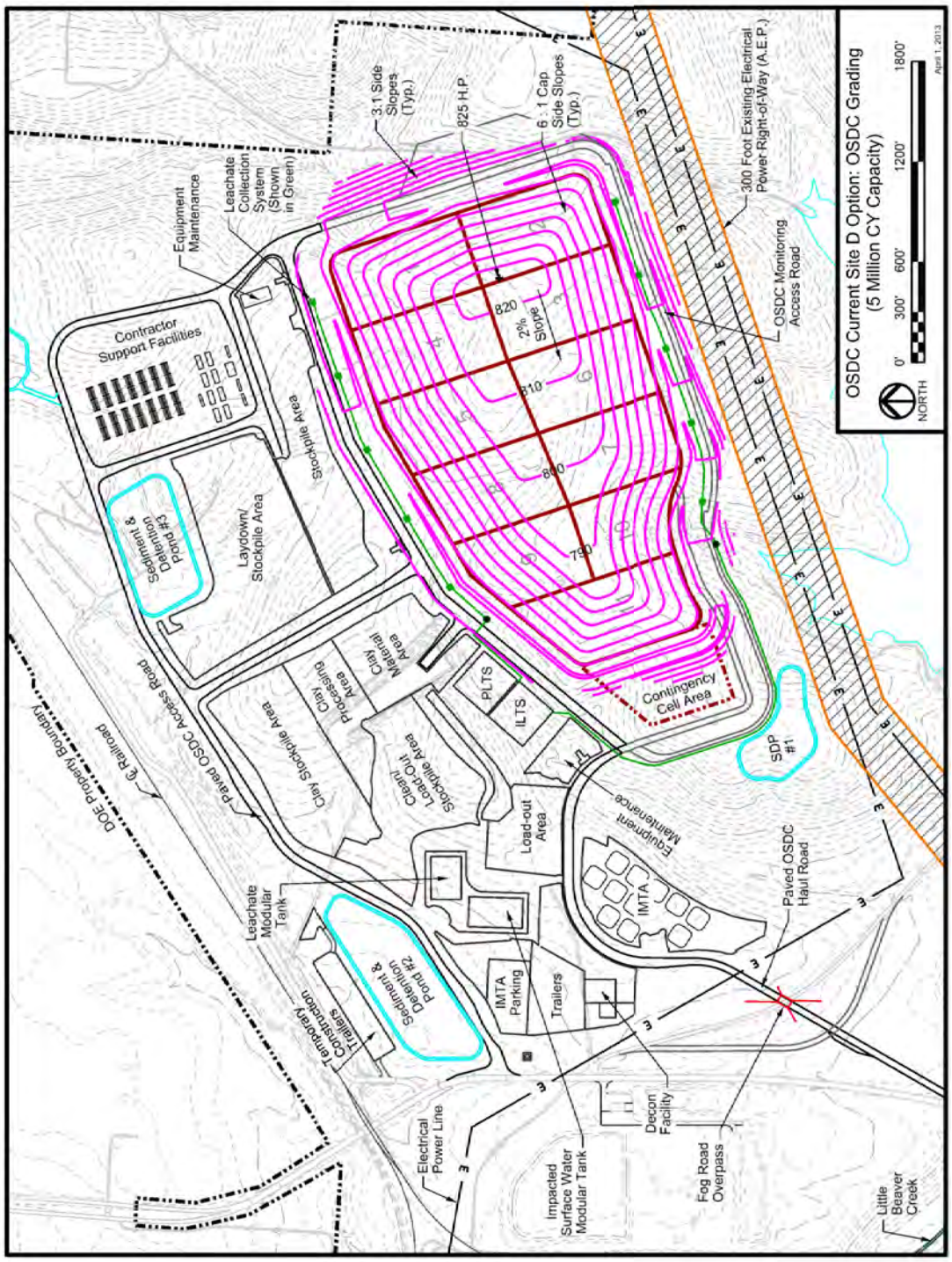

Figure J.5. OSDC 5 million cy Site D Layout

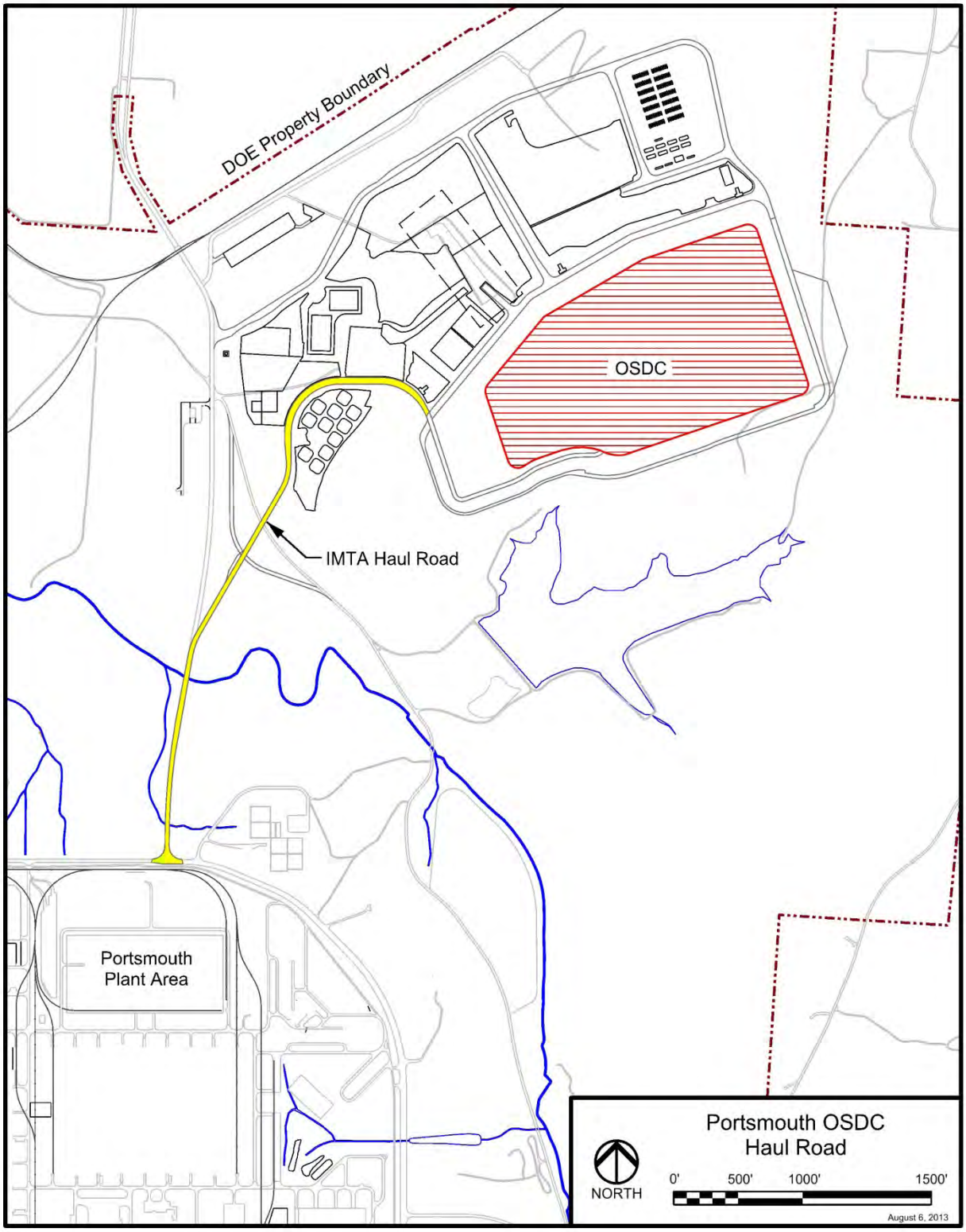

Figure J.6. OSDC Haul Road

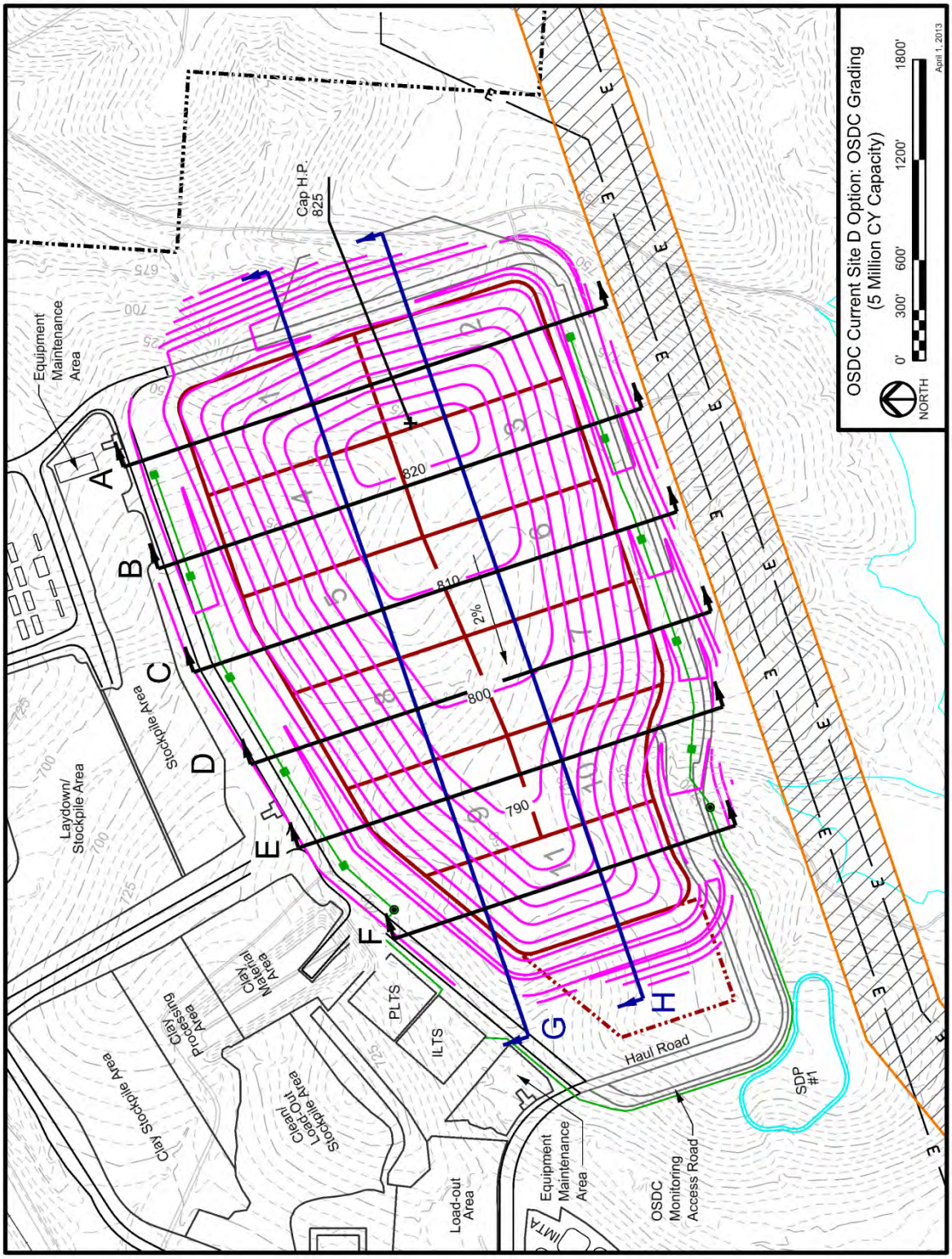

Figure J.7. OSDC 5 million cy Site D Cross-section Plan

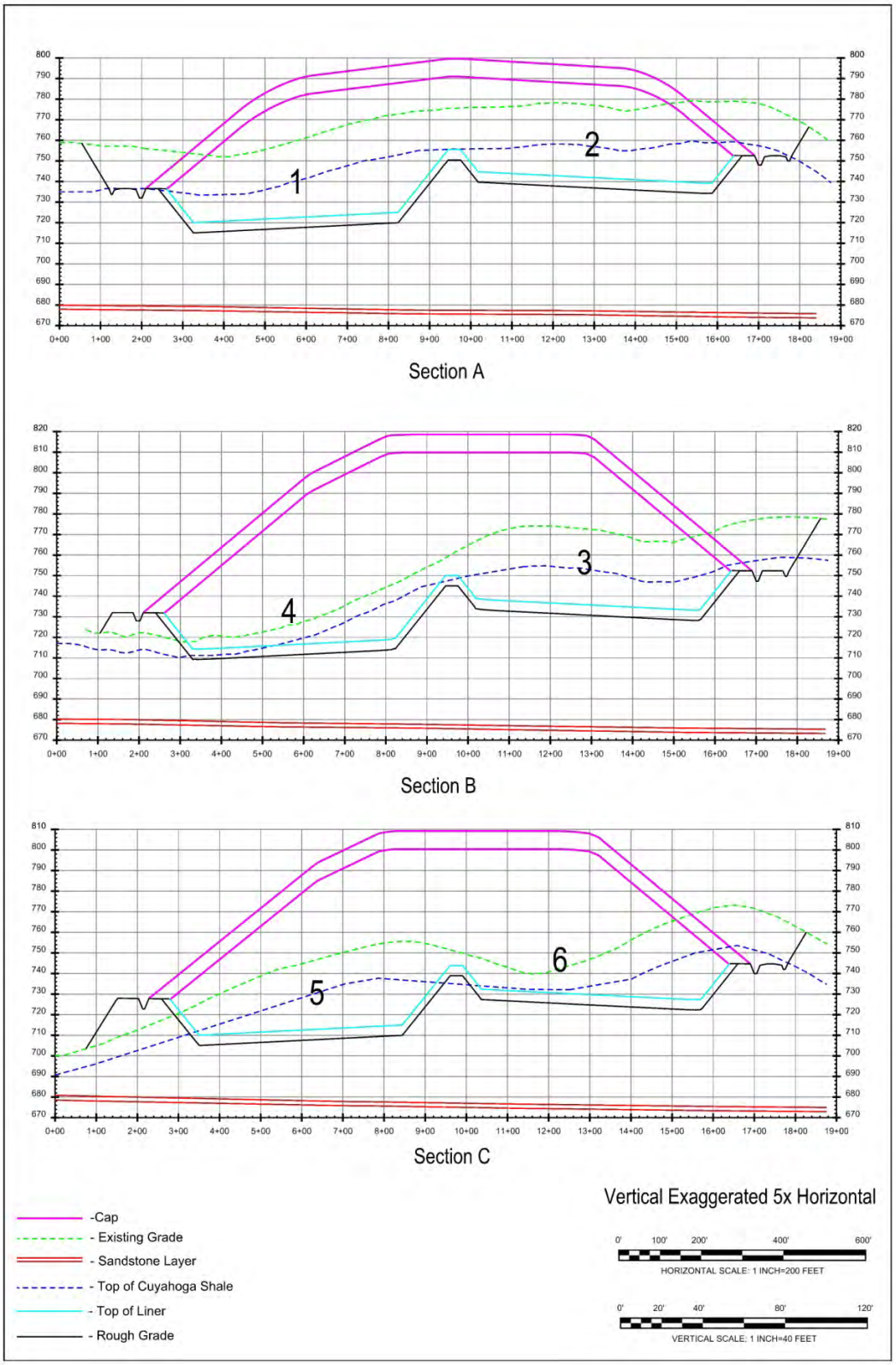

Figure J.8. OSDC 5 million cy Site D Cross Sections

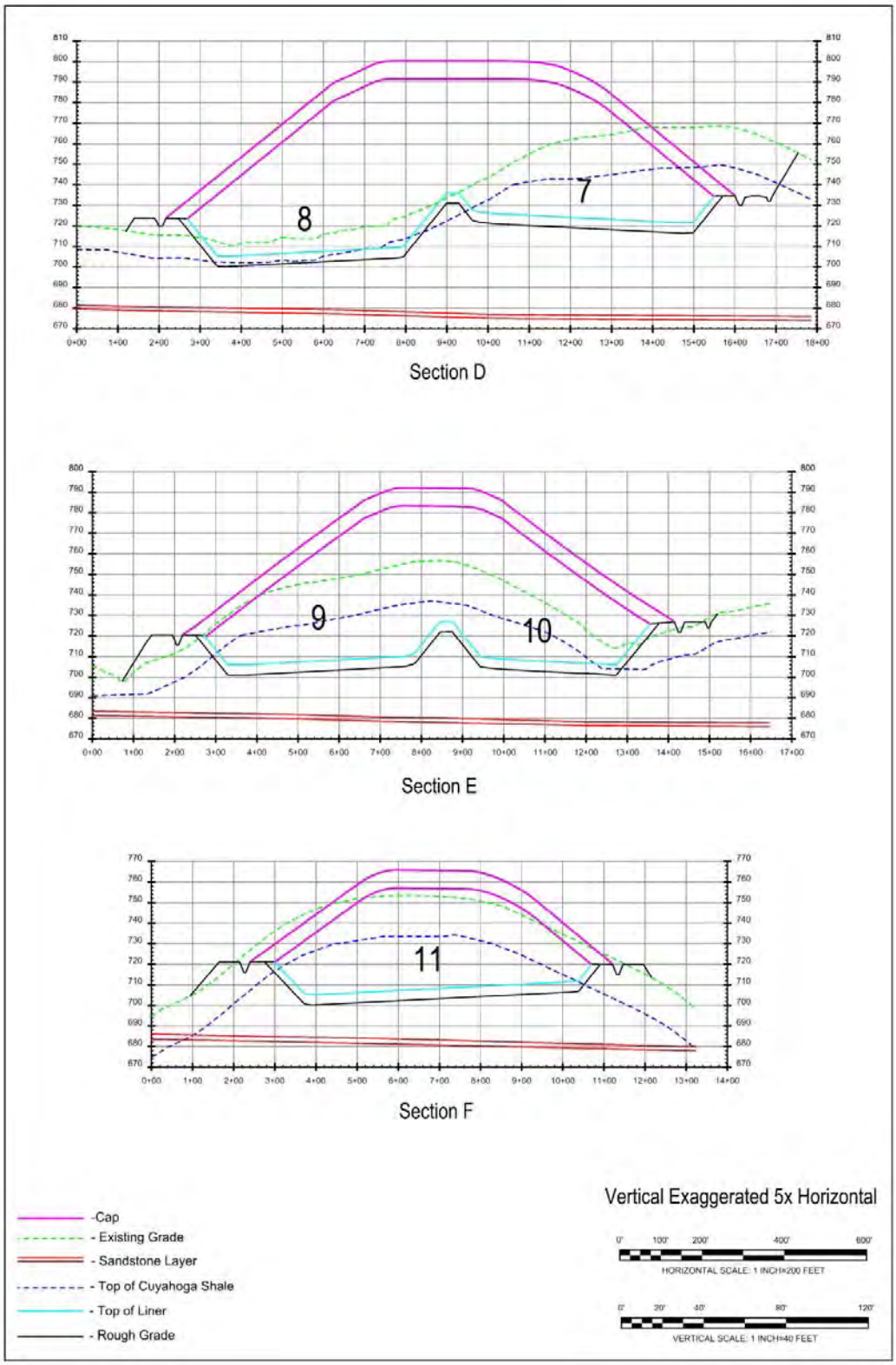

Figure J.8. OSDC 5 million cy Site D Cross Sections (continued)

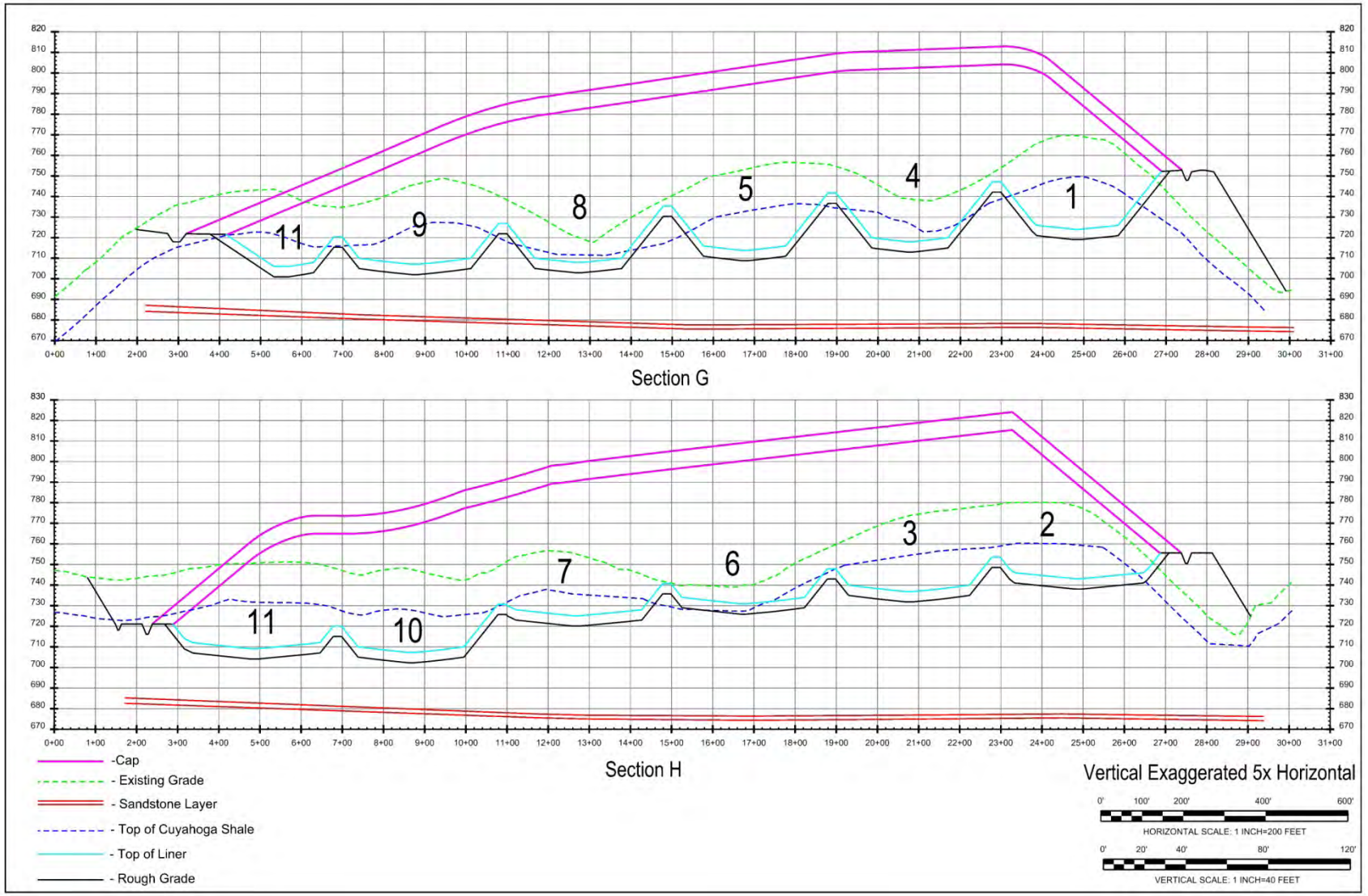

Figure J.8. OSDC 5 million cy Site D Cross Sections (continued)

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ACRONYMS

D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EC	engineering category
EPA	U.S. Environmental Protection Agency
FS	feasibility study
GHG	greenhouse gas
HELP	Hydrologic Evaluation of Landfill Performance
LLW	low-level (radioactive) waste
NDA	nondestructive assay
NNSS	Nevada National Security Site
OSDC	on-Site disposal cell
PGE	process gas equipment
PLTS	passive leachate treatment system
PORTS	Portsmouth Gaseous Diffusion Plant
RC	regulatory category
SRC	site-related contaminant
TCE	trichloroethene
WAC	waste acceptance criteria

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PREFACE

This appendix includes the methods used and results of three quantitative assessments, one to support evaluation of long-term effectiveness and two to support evaluation of short-term effectiveness of Alternatives 2 and 3. This appendix first discusses the potential impacts to surface water if a leachate collection and treatment system of a potential on-Site disposal cell that is part of Alternative 2 fails. It then presents the impacts of transportation accidents, based on the number of miles traveled transporting waste from and materials to the Portsmouth Gaseous Diffusion Plant, for both Alternatives 2 and 3 via truck and rail. Finally, it determines an estimate of the carbon emissions, based on total miles by truck or rail, from transporting waste and materials for each action alternative.

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K.1 ON-SITE DISPOSAL CELL PASSIVE LEACHATE TREATMENT SYSTEM FAILURE

K.1.1 INTRODUCTION

An analysis was conducted to predict the potential concentrations of site-related contaminants (SRCs) at the Portsmouth Gaseous Diffusion Plant (PORTS) in the surface water resulting from failure of the passive leachate treatment system (PLTS). This system would be part of the potential on-Site disposal cell (OSDC) located in Site D, which is the representative location for such a facility if Alternative 2 is selected (see Appendix D of this report). For this evaluation, the potential OSDC is assumed to be a 3.9 million cy configuration.

The PLTS would be installed after the 30-year post-operations period when leachate generation rates are expected to be minimal. This system is conceptualized to consist of in-situ treatment media installed within the ditches cut into the shale for the original leachate conveyance lines. As the leachate moves through the treatment media, constituents are adsorbed onto the treatment media prior to water being discharged from the end of the PLTS. This system would treat the small volume of leachate anticipated to be generated in the future after facility capping. This system would remain in place with minimal, if any, maintenance.

The SRCs considered in this analysis include technetium-99, uranium-234, uranium-235, uranium-238, and trichloroethene (TCE). Uranium isotopes, technetium-99, and TCE are included in this quantitative analysis regarding failure of the PLTS since these are the primary contaminants of concern from process knowledge and would make up significant contaminant mass in the material that might be placed in a potential OSDC both from decontamination and decommissioning (D&D) activities (regulatory category [RC]-1) and from fill that may be contaminated (RC-2, RC-3). While other constituents would be present in the waste, uranium isotopes, technetium-99, and TCE represent those most likely to be in leachate for which treatment media would be targeted.

The potential failure of the PLTS could result from either ineffectiveness of treatment media that is part of the system allowing untreated leachate to be released to the surface or leachate bypassing the treatment media because of collection and transmission system failure, such as clogging, with leachate being released to the surface. In both failure scenarios, untreated leachate flows overground and enters a nearby water body.

This analysis does not take into account source depletion and therefore may overestimate leachate concentrations that might emanate from the PLTS under a failure scenario. It should be noted that long-term monitoring of this system as part of the overall environmental monitoring program would serve to identify potential failure conditions. This would allow corrections to be made before such conditions become irreversible. This uncertainty, as well as the fact that other constituents are not included in this analysis, is discussed in the uncertainties section below.

K.1.2 CALCULATION METHODS

The analysis was conducted following the steps described below.

1) Pathway and assessment point

   The pathway is the treated leachate discharge from the PTLS via gravity flow to the nearest surface water body located downgradient from the potential OSDC at Site D. Based on the conceptual design, the treated leachate would be discharged to the unnamed intermittent stream on the north side

of PORTS, which drains into Little Beaver Creek. The assessment location for this analysis is a point in Little Beaver Creek, just west of the confluence of Little Beaver Creek and the northern unnamed drainage ditch. Figure K.1 shows the assessment point location. This location was selected because it is the closest surface water location that may receive effluent from the OSDC in Site D and because it is a location for which surface water flow data are available.

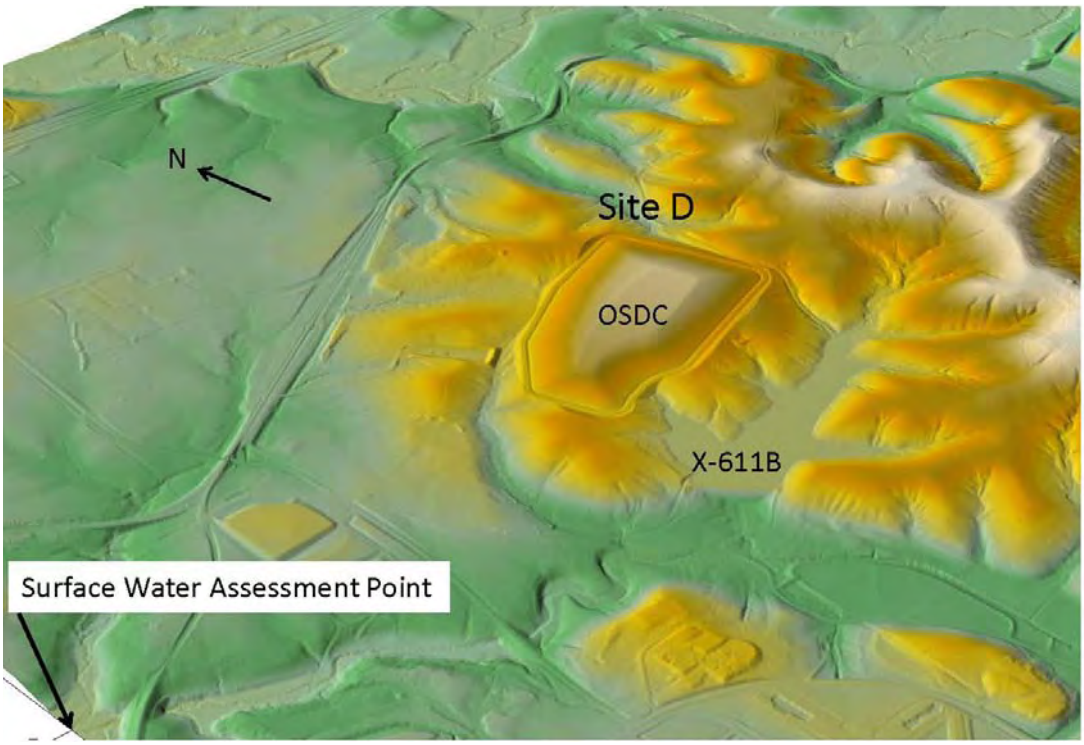

Figure K.1. Assessment Location

2) OSDC Source term determination

The source term for potential leachate emanating from a potential OSDC includes the contaminant activity (for radionuclides) or mass (for chemicals) within a potential OSDC. The concentrations of technetium-99 and uranium isotopes were calculated on the basis of total activity from nondestructive assay (NDA) measurements for converters in the X-326, X-330, and X-333 Process Buildings (uranium isotopes) and from process knowledge (technetium-99). The total activity in picocuries (pCi) is divided by the total waste mass to give an activity concentration (see Attachment K.1). For technetium-99 and uranium isotopes, a waste mass equivalent to a volume of approximately 112,000 cy of waste is assumed for disposal in a potential OSDC, which is the estimated volume of process gas equipment (PGE) (RC-1, engineering category [EC]-2) which contains the majority of the radiological contamination. The total curies from the NDA data is assumed to be dispersed throughout this volume, which is conservative since the PGE with the highest curie count would be disposed off Site. It should be noted that residual soil (RC-1, EC-1), and other non-D&D waste (RC-2, RC-4), as well as contaminated fill (RC-2, RC-3), may be disposed (see Section 4 for waste estimates) under Alternative 2. Technetium-99 and uranium isotope content is currently unknown in this additional waste volume, therefore no assumption is made regarding the level of radiological contamination in the balance of the waste volume (3.79 million cy) going to a potential OSDC.

However, this uncertainty is offset by the fact that the total curies within the PGE is assumed for the small volume, as discussed above. Table K.1 presents the calculation and results for technetium-99 and uranium isotopes waste source terms.

Table K.1. Calculation of Average Waste Concentrations in a Potential OSDC

Isotope	Total Activity (pCi)	Source
U-234	1.44×10^{13}	Source term from Attachment K.1, Page K.1-1
U-235	5.33×10^{11}	Source term from Attachment K.1, Page K.1-1
U-238	3.05×10^{12}	Source term from Attachment K.1, Page K.1-1
Tc-99	9.46×10^{13}	Source term from Attachment K.1, Page K.1-1
		Waste mass[1] 3.35×10^{11} g
Equation: Activity concentration = total activity (pCi)/waste mass (g)		

pCi/g of Waste			
U-234	**U-235**	**U-238**	**Tc-99**
42.99	1.59	9.10	282.4

[1]Only the mass of the waste is assumed for this calculation

For TCE, the average concentration from the five groundwater plumes known to be present at PORTS was used to calculate the concentration in soil based on the partition coefficient (K_d) relationship. The calculated average soil concentration for TCE is 1.38 mg/kg. Table K.2 presents the calculation of the TCE soil source term. This information is from previous investigations and represents a cross section of known TCE groundwater contamination present at PORTS. Using the TCE soil concentration, the resultant OSDC waste concentration for TCE was calculated by multiplying the TCE soil concentration by the ratio of the contaminated fill (RC-2, RC-3) volume (1.49 million cy for impacted soil beneath landfills) anticipated to have TCE present and the total OSDC volume (approximately 3.9 million cy). Thus, the average OSDC waste concentration for TCE is 0.53 mg/kg.

Table K.2. Calculation of Average Waste Concentration of TCE in a Potential OSDC

Area	C_w (µg/L)	K_d (mL/g)	C_s (mg/kg)
Calculated Values C_s (mg/kg) = C_w (µg/L) × K_d (mL/g)/1000 µg/mg			
X-749/X-120/PK Landfill Plume	150	0.124	0.0186
Quadrant I GW Investigation Area Plume	250	0.124	0.031
Quadrant II GW Investigation Area Plume	2,500	0.124	0.31
X-740 Waste Oil Handling Facility Plume	150	0.124	0.0186
Measured Value			
X-701B GW Plume (post-treatment)			6.5
Average concentration in fill			1.38

Source: DOE 2011a

K_d was calculated on the basis of the organic carbon partition coefficient (K_{oc}) and fraction of organic carbon (F_{oc}) relationship where a literature value for K_{oc} of 60.7 mL/g and the site-specific F_{oc} (DOE 2009) of 0.00204 were used.

C_W = concentration in water
C_S = concentration in soil
DOE = U.S. Department of Energy
GW = groundwater
PK = Peter Kiewit

3) Maximum leachate water flux rate

The maximum water flux rate from a potential OSDC was calculated on the basis of a worst-case infiltration rate through the cover system. The Hydrologic Evaluation of Landfill Performance (HELP) model was used to predict the infiltration rate through the degraded cover system (geosynthetic clay liner layer is no longer functional). The calculated infiltration rate is 1.5 in./year that is consistent with a reasonable maximum infiltration rate associated with the precipitation, topography and likely future hydraulic parameters of a cap.

The maximum water flux out of the leachate system was then estimated on the basis of maximum waste areal footprint and an infiltration rate of 0.0193 cf/s as shown in Table K.3. It is assumed that all water moving through the waste would flow out of the PLTS and ultimately to the nearby drainage ditch.

4) Surface water flow rate and surface water dilution factor

The surface water flow rate was determined by using the U.S. Geological Survey study conducted between 1990 and 1991 at Little Beaver Creek. The collected 15-minute interval data were used to determine the yearly flow rate change. The highest flow rate is 735 cf/s, and the lowest one is 0.65 cf/s. The current average flow rate is 6.07 cf/s for the data set (a total of 21,781 measurements). Much of this flow is related to discharges from the plant through National Pollutant Discharge Elimination System permitted discharge locations. However, after capping, these discharges are expected to be eliminated, thus reducing the flow conditions by approximately 1.38 cf/s. Therefore, for future flow conditions, the total estimated flow rate for all discharges into Little Beaver Creek is subtracted from the current flow rate to approximate a future condition creek flow rate of 4.69 cf/s. Table K.3 presents the input parameters and the calculation of the future condition flow rate. The average future surface water flow rate was used to estimate the surface water dilution factor. The surface water dilution factor is the ratio of water flux between the creek at the assessment point (4.69 cf/s) and the maximum water flux from the PLTS (0.0193 cf/s). The future condition surface water dilution factor (243.01) is shown in Table K.3.

Table K.3. Input and Calculation of Future Condition Flow Rate

Element	Unit	Value	Data Source
Width (W)	ft	1,600	Conceptual Design, see Section 8
Length (L)	ft	3,050	Conceptual Design, see Section 8
Infiltration Rate through Cover (IR)	in./year	1.5	HELP Model
Leachate Generated (L×W×IR)/12 in./ft	cf/year cf/s	610,000 0.0193	Estimated using HELP Model Calculated
Current Flow Rate @ Little Beaver Creek	cf/s	6.07	Based on USGS report
Outfall Discharge (total)[1]	cf/s	1.38	Calculated
Future Condition Flow Rate @ Little Beaver Creek	cf/s	4.69	Calculated by removing outfall discharge
Future Condition Surface Water Dilution Factor		243.01	Calculated without outfall discharges

[1]Using average flow rates from 2009 Q1-Q3 data.

HELP = Hydrologic Evaluation of Landfill Performance
USGS = U.S. Geological Survey

5) Maximum leachate concentration

The maximum leachate concentrations were calculated on the basis of equilibrium relationship (K_d) using the average activity concentrations or concentration from Step 2. The K_d values for technetium-99 and uranium isotopes were obtained from site-specific measurements. A lower value of 14.2 mL/g is used for the uranium isotopes, and a value of 3.79 mL/g is used for technetium-99. The K_d for TCE was calculated on the basis of the organic carbon partition coefficient (K_{oc}) and fraction of organic carbon (F_{oc}) relationship where the site-specific F_{oc} data were used. A literature value for K_{oc} (U.S. Department of Energy [DOE]-Risk Assessment Information System) was used. The K_d for TCE is calculated to be 0.124 mL/g. Table K.4 presents the maximum leachate concentrations for the SRCs arrived by dividing the average concentration in OSDC waste by the K_d value.

6) Concentration in surface water

The concentrations of contaminants in the surface water were then calculated using the dilution factor. The maximum leachate concentrations of SRCs from Step 5 are divided by the surface water dilution factor calculated in Step 4. Table K.4 presents the surface water concentrations for the SRCs.

Table K.4. Maximum Leachate and Surface Water Concentrations

	Tc-99	U-234	U-235	U-238	TCE
Average Concentration in OSDC Waste/Fill	8.11 pCi/g	1.23 pCi/g	0.046 pCi/g	0.26 pCi/g	0.53 mg/kg
K_d (mL/g)	3.79	14.2	14.2	14.2	0.124
Maximum Leachate Concentration	2,140 pCi/L	86.6 pCi/L	3.2 pCi/L	18.3 pCi/L	4.3 mg/L
Surface Water Concentration	8.81 pCi/L	0.36 pCi/L	0.013 pCi/L	0.075 pCi/L	17.7 µg/L
Risk-based Standard[1]	3,030pCi/L	118 pCi/L	120 pCi/L	130 pCi/L	410 µg/L

[1]Source for Tc-99, U-234, U-235, and U-238 - PORTS SL Calculator; for TCE - DOE 2011b, Type 2 SL

OSDC = on-Site disposal cell
SL = screening level
TCE = trichloroethene

K.1.3 RESULTS

According to this analysis, the concentrations of the SRCs modeled to be discharged from the inoperable PLTS at the assessment point in Little Beaver Creek are extremely low. The modeled concentrations are compared to risk-based surface water concentrations assuming a recreational receptor (teen) for a risk of 10^{-6} as follows:

- Uranium-234 – 118 pCi/L
- Uranium-235 – 120 pCi/L
- Uranium-238 – 130 pCi/L
- Technetium-99 – 3,030 pCi/L
- TCE – 410 mg/L.

These risk-based surface water concentrations are from the PORTS Screening Level Calculator (for radionuclides) (DOE 2012) or from Table 2 in *Methods for Conducting Human Health Risk Assessments and Risk Evaluations at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011b).

The modeled SRC surface water concentrations are well below their respective risk-based surface water concentrations. Note that this analysis does not take into account expected volatilization of TCE, which would result in an even lower concentration than that modeled in this analysis.

Based on the results of this analysis, potential failure of the PLTS with discharge of untreated leachate into surface water would not result in unacceptable impacts to human health.

K.1.4 UNCERTAINTIES

The analysis performed for a scenario in which the PLTS fails resulting in the release of untreated leachate from a potential OSDC at Site D to nearby surface water has uncertainties. First, the analysis is limited to uranium isotopes, technetium-99, and TCE. As previously stated, these represent constituents most likely to be present in leachate, due to their relatively low K_d values. While other constituents may be present, such constituents have higher K_d values than those associated with the constituents included in this analysis and are expected to have even less impact on surface water quality. Therefore this uncertainty does not have a large impact to the conclusions.

A larger source of uncertainty in this analysis is associated with the source terms for the uranium isotopes and technetium-99. As noted in Attachment K.1, the total activities of the uranium isotopes are calculated using NDA measurements. Measurements made by NDA can have significant uncertainty and the PORTS historical results can be biased high by a factor of 2 or more. However, as noted in the results presented, using the NDA measurements results in surface water concentrations that are well below the risk-based concentrations for protection of human health. Therefore, this uncertainty does not have a large impact to the results. Further, the total activity of technetium-99 is calculated assuming the mass of remaining source based on process knowledge. While the process knowledge regarding technetium-99 remaining in the PGE is reasonable, the activity could be underestimated. Process knowledge has been supported by a calculation of total mass of technetium-99 in the process equipment using the existing analytical data. This data is not yet considered representative of the process equipment and therefore was not used in this analysis, however, an estimation of total mass in the process equipment using this data is 5.5 kg. Other sources of information suggest the mass of technetium-99 could be as high as 35 kg. It should be noted that the source term calculations for uranium-234, uranium-235, uranium-238 and technetium-99 in a potential OSDC do not take into account the volume of uncontaminated soil fill (EC-1) that may be co-disposed with waste requiring fill (EC-2). Further, the additional waste mass associated with other waste that may be generated outside *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) and the Ohio Consent Decree (RC-4), as well as other soil waste generated under the Ohio Consent Decree (RC-2), is not considered in determining the waste source terms for uranium isotopes, technetium-99, and TCE. This additional mass would dilute the activity concentrations of these radionuclides, thus reducing the actual activity concentrations in the leachate. Finally, it is assumed that the PGE has 50 percent void space, thus the density is reduced by 50 percent. This assumption increases the activity concentration slightly as a result. Further reducing the waste density, if warranted, would increase the activity concentrations and thus increase the resultant concentrations in the surface water. However, because the surface water concentrations are well below the risk-based concentrations, this uncertainty has little impact to the results. These data uncertainties notwithstanding, this approach provides a reasonable estimate of the

source terms for leachate concentrations and resultant surface water concentrations, which are well below the risk-based concentrations.

The K_d values used for the constituents are a source of uncertainty in this analysis. While the values used for the uranium isotopes and technetium-99 are from laboratory analysis performed using various soil types from PORTS, they could be underestimated for actual waste materials. Therefore, the activity concentrations leached may be overestimated, resulting in concentrations in the stream to be estimated higher than they are. Conversely, a change to the chemistry within a potential OSDC during its lifecycle may lead to an increase in the K_d values assumed in this analysis over time. This uncertainty may result in a decrease in the potential release of contaminants from the waste mass and therefore a decrease in concentration/activity of contaminants in the leachate. However, these uncertainties have little impact to the results.

As noted in Table K.3, a prediction of the likely future flow condition in Little Beaver Creek is made after current discharges from the plant cease. While the prediction is based on actual measurements of the plant discharges and base flow of Little Beaver Creek, should the actual flow rate be lower than that predicted, the result would be higher stream concentrations of all constituents included in this analysis. Likewise, if the actual flow is higher, the resultant concentration would be lower. Because the resultant concentrations are orders of magnitude less than the risk-based concentrations, this uncertainty does not have a large impact to the results.

The source term for TCE has a large uncertainty, as the basis for the estimate is from concentrations of known groundwater plumes with the waste concentration back-calculated on the basis of the K_d for TCE. This calculation could underestimate the concentration of TCE in the waste placed in a potential OSDC. If the concentration calculated for this analysis is low by orders of magnitude (from that actually present), the resultant surface water concentration would still not exceed the risk-based concentration. Additionally, as previously stated, the analysis does not consider source depletion. TCE has a half-life through microbial degradation that ranges from approximately 9 years to 28 years, therefore concentrations expected in the waste would be lower, by as much as 50 - 75 percent lower, offsetting any underestimation. Further, as previously discussed, a change in the chemistry within a potential OSDC could lead to an increase to the K_d values for TCE and degradation products. This would result in a decrease in the potential mass released and thus a decrease in the concentrations of TCE and degradation products in the leachate. The uncertainty of the TCE source term is high but because there are both underestimating and overestimating uncertainties, the likely impact to the results of this analysis is low.

Given the uncertainties discussed above, the analysis of a potential failure of the PLTS is reasonable. To avoid this failure, significant effort during the engineering design of this system would be applied in selecting treatment media and in designing the long-term conveyance of the anticipated low volumes of leachate that would emanate from the closed OSDC. Further, to lessen the impact of a failure of the PLTS, periodic monitoring of the system, as part of the overall environmental monitoring program, would occur such that issues would be identified early and corrected as necessary.

K.2 TRANSPORTATION RISK ANALYSIS

K.2.1 INTRODUCTION

There is an inherent risk of accidents in transporting materials by various modes of transport via trucks along public roads and by commercial rail. The U.S. Department of Transportation (DOT) keeps track of accident rate statistics for vehicle traffic. Additionally, numerous studies have compiled statistics related

to rail transport. These statistical data are reported in the form of an injury rate per vehicle miles traveled and fatality rate per vehicle miles traveled for both large truck and rail transportation. This analysis supports the short-term effectiveness evaluation performed in the feasibility study (FS). Total miles for transport of waste from the D&D of PORTS for Alternatives 2 and 3 and for construction materials for facilities and infrastructure for Alternative 2 are estimated and then multiplied by the accident rates to arrive at the numbers of injuries and fatalities that may occur based on these miles. Only those miles associated with transportation off Site that interacts with the public are included in this analysis.

Calculation of transportation risk for the action alternatives requires analyzing shipments of waste, fill material, and construction materials, as well as considering mode of transportation (in other words, truck vs. rail), and miles to and from the destination. The following sections describe and quantify each element of the transportation risk for Alternative 2 and Alternative 3.

K.2.2 WASTE MATERIAL VOLUMES

Table K.5 presents all the waste forms (RC-1) and volumes assumed for each alternative. This table is built off of the table first introduced in Section 4.1, but it is expanded to include the disposition paths for each alternative as well as transported volumes that will be used in this analysis. The alternatives included in the FS, Alternative 2 (on-Site) and Alternative 3 (off-Site) disposal, consist of five major waste disposition assumptions/approaches driven primarily by the expected PORTS waste forms and volumes discussed and illustrated in Section 4.1. Each of these alternatives considers the DFF&O D&D waste volume (RC-1) using the following assumptions:

1) The PGE, assumed to be nearly all low-level (radioactive) waste (LLW), would be shipped off Site to the DOE Nevada National Security Site (NNSS) in Nevada near Mercury, Nevada or to a potential OSDC. Under Alternative 2 it is assumed that 53,000 in-place cy of PGE, primarily from the X-326 Building, would be shipped to NNSS with the remainder going to a potential OSDC. Under Alternative 3, 272,000 in-place cy of PGE would be shipped to NNSS.

2) Metal with a high probability for recycle and/or reuse would be stored on Site to wait processing. The volume estimate of 110,000 cy is the same for each alternative. This material is not included in the transportation risk calculations.

3) Although waste acceptance criteria (WAC) for the potential OSDC have not been fully developed, a waste disposition planning assumption is that approximately 30,000 cy of waste would exceed the OSDC WAC and thus would require off-Site disposal at a commercial disposal facility (Energy*Solutions* in Clive, Utah) for Alternative 2.

4) Solid waste and construction and demolition debris are assumed to be disposed locally at Pike Sanitation Landfill located in Pike County, Ohio. For Alternative 2 it is assumed that 38,800 cy of waste would be disposed at this industrial landfill while for Alternative 3, 240,000 cy are assumed to be disposed.

5) The balance of LLW and mixed LLW generated by DFF&O actions (RC-1) at PORTS would be shipped to a potential OSDC under the on-Site alternative or the Energy*Solutions* disposal facility in Clive, Utah, under the off-Site alternative. The volume to a potential OSDC in Alternative 2 is assumed to be 1,354,000 cy, while that disposed at Energy*Solutions* in Alternative 3 is assumed to be 845,000 cy.

Table K.5. Site-wide Waste Disposition Volumes

D&D Waste and OSDC Fill Description	In situ volume	Disposed Volume in OSDC in Alternative 2	Transported Off Site in Alternative 2[1]	Disposed Off Site in Alternative 2	Volume Transported Off Site in Alternative 3[1]	Disposed Off Site in Alternative 3
Residual Soil Removed with Buildings (RC-1, EC-1)	53,000 cy	53,000 cy	0	0	64,000 cy	53,000 cy
Other Building Waste (RC-1, EC-2)	1,032,000 cy	967,000 cy	82,000 cy (in situ 65,000 cy)	65,000 cy	1,214,000 cy	1,032,000 cy
PGE	272,000 cy	112,000 cy[2] (in situ 219,000 cy)	44,000 cy[2] (in situ 53,000 cy)	41,000 cy[2] (in situ 53,000 cy)	99,000 cy[2] (in situ 272,000 cy)	99,000 cy[2] (in situ 272,000 cy)
Targeted Recyclable Material	110,000 cy	0	Location unknown so not included in transportation calculations	110,000 cy recycled	Location unknown so not included in transportation calculations	110,000 cy recycled
Total D&D Waste and Recyclables (RC-1)	**1,467,000 cy**	**1,132,000 cy (in situ 1,239,000 cy)**	**NA**	**216,000 cy (in situ 228,000 cy)**	**NA**	**1,294,000 cy (in situ 1,467,000 cy)**
Non-D&D Landfill Waste Requiring Fill (RC-3, EC-2) (as a result of using area as OSDC fill source)	227,000 cy	223,000 cy	5,000 cy (in situ 4,000 cy)	4,000 cy	0	0
Total D&D and Fill Waste Requiring Fill (EC-2)	**NA**	**1,301,000 cy** (in situ 1,462,000 cy) (does not include 53,000 cy of residual soil)[3]	**NA**	**220,000 cy (in situ 232,000 cy)**	**NA**	**1,294,000 cy (in situ 1,467,000 cy)**
OSDC Fill Required to Achieve 2:1 ratio[4]	NA	2,602,000 cy	NA	NA	NA	NA
Total OSDC Minimum Capacity Required	NA	3,900,000 cy	NA	NA	NA	NA

[1]Transported volumes are typically greater for a waste stream than in situ volumes due to bulking that occurs during excavation or demolition. The material is typically compacted again once disposed.
[2]Much of the PGE is segmented, resulting in a volume reduction for transportation and disposal. Greater volume reduction is conducted for off-Site disposal to lower costs.
[3]Rounding does not allow for numbers to add exactly.
[4]From residual soil (RC-1, EC-1), groundwater plumes (RC-2, EC-1), landfills (RC-3, EC-1), and RCRA deferred units (RC-2, EC-1).

D&D = decontamination and decommissioning
EC = engineering category
NA = not applicable or not available
OSDC = on-Site disposal cell
PGE = process gas equipment
RC = regulatory category
RCRA = Resource Conservation and Recovery Act of 1976 (as amended)

Most waste would be shipped by truck to the potential OSDC under Alternative 2 or in bulk, by rail, to Energy*Solutions* under Alternative 3. Rail transportation of large quantities of waste is generally much less expensive and more efficient, avoiding many millions of potential truck miles from PORTS to Energy*Solutions*. However, mileage calculations and subsequent discussions of risk assume some truck transport to NNSS (which cannot receive waste by rail).

All the named "representative" facilities have sufficient disposal capacity to receive the projected waste volumes. Table K.6 summarizes the in-place volume and disposal location assumptions for Alternative 2 and Alternative 3.

Table K.6. Alternatives 2 and 3 Disposition Plans

	In-Place Waste Disposal Volumes by Destination (million cy)					
Alternative	**NNSS, Nevada**	**Pike Sanitation Landfill**	**Recycle/Reuse**	**Energy*Solutions*, Clive, Utah**	**OSDC**	**Totals**
2	0.053	0.039	0.11	0.030	1.35	1.59
3	0.27	0.24	0.11	0.845	NA	1.47

NA = not applicable
NNSS = Nevada National Security Site
OSDC = on-Site disposal cell

K.2.3 TRANSPORTATION MILES

The total truck or rail miles are then calculated assuming a certain volume shipped per truck or train. The miles for the various activities (disposal or obtaining materials) are summarized below. The in-place volumes that have been assumed in the FS for disposal have been modified to transported volumes. The factors used to modify in-place volumes to transported volumes vary by waste stream, based on mode of transport, shipment containers required for transport, and any limitations associated with the transport mode.

K.2.3.1 Transportation of PORTS Waste to Energy*Solutions*, Clive, Utah, by Rail

Table K.7 summarizes the total railcar miles to deliver waste from PORTS to the Energy*Solutions* facility, located approximately 80 miles west of Salt Lake City, Utah, by rail under Alternative 2 and Alternative 3. Under Alternative 2, 36,700 transported cy of waste are assumed to be greater than the expected OSDC WAC and thus require disposal at the Energy*Solutions* facility. Under Alternative 3, 966,600 transported cy of waste requires shipment and disposal at the Energy*Solutions* facility.

A key assumption is that an average of 70 cy of expanded volume of waste (including packaging space) would be transported by railcar. Likewise, 55 railcars are assumed to be transported as one train. The Energy*Solutions* facility is estimated to be 1,820 rail miles from PORTS. Because it is assumed that the railcars are to be dedicated to PORTS throughout the shipment campaigns, the railcar miles are doubled to account for the return trip (i.e., 3,640 miles). The metric used in this analysis for rail shipments is railcar miles, since the accident statistics are maintained in this manner.

Table K.7. Rail Shipments from PORTS to Energy*Solutions*, Clive, Utah

Alternative	Transported Volume (cy)[1]	Number of Railcars	Number of Railcar Miles (miles)[2]
2	36,700	515	1,875,000
3	966,600	13,715	49,923,000

[1]Transported volume is in-place volume expanded by varying amounts depending on the material and type of package
[2]Assumes 3,640 miles round trip

K.2.3.2 Transportation of Waste to Pike Sanitation Landfill (Alternatives 2 and 3)

Table K.8 summarizes the total waste volumes and truck miles to dispose of PORTS-generated waste at the Pike Sanitation Landfill in Pike County, Ohio, for Alternatives 2 and 3. This landfill only accepts industrial/solid waste and does not accept waste that must be managed for its radioactive or hazardous waste content. Under Alternative 2, 50,400 cy would be shipped and disposed, while under Alternative 3 312,000 cy would be shipped and disposed. Trucks are assumed to make a round trip of 15 miles.

Table K.8. Waste Volumes and Truck Miles to Pike Sanitation Landfill

Alternative	Transported Volume (cy)[1]	Number of Truck Trips[2]	Number of Truck Miles (miles)[3]
2	50,300	2,518	38,000
3	312,000	15,579	234,000

[1]Transported volume is in-place volume expanded by 30 percent
[2]Assumes 20 cy per truck
[3]Assumes 15 miles per round trip for each truck shipment

K.2.3.3 Transportation of PORTS Waste to the NNSS

Table K.9 summarizes the total truck miles to deliver PORTS waste to the NNSS disposal facility located approximately 90 miles northwest of Las Vegas, Nevada. Under Alternative 2, 44,000 cy of PGE waste is assumed to be shipped and disposed at NNSS via truck.

Under Alternative 3, 99,000 cy of PGE waste is assumed to be shipped to NNSS via truck. This volume assumes significant volume reduction from segmenting all PGE in the three process buildings (X-326, X-330, and X-333) at PORTS. Trucks traveling west are assumed to make a round trip of 4,400 miles.

Table K.9. Waste Volumes and Truck Miles for PORTS Waste Shipped to NNSS

Alternative	Transported Volume (cy)[1]	Number of Truck Trips	Number of Truck Miles (miles)[2]
2	44,000	4,969	21,863,600
3	99,000	9,727	42,798,800

[1]Transported volume is volume after segmentation
[2]Assumes 4,400 miles per round trip from PORTS to DOE NNSS disposal area

DOE = U.S. Department of Energy
PORTS = Portsmouth Gaseous Diffusion Plant
NNSS = Nevada National Security Site

K.2.3.4 Construction Materials for OSDC (Alternative 2)

Under Alternative 2, a variety of construction materials would be sent to PORTS from various vendors and/or sources. Table K.10 summarizes the total truck miles necessary to provide OSDC construction materials such as clay, liners, piping, fencing, etc., for a disposal facility with a 3.56 million cy capacity and associated infrastructure. The specific assumptions for the delivery of each material are presented in the footnotes below the table.

Table K.10. Waste Volumes and Truck Miles for Construction Materials (Alternative 2)

Gravel/Rock [1]		Leachate Piping[2]		Liners[3]		Fencing[4]		Total Miles
(cy)	(mi)	(lf)	(mi)	($yd^{2)}$	(mi)	(lf)	(mi)	(mi)
1,257,000	1,047,000	46,000	5,700	3,354,000	2,236,000	30,000	2,000	3,291,000

[1]Assumes 12 cy per truck, 10 miles round trip
[2]Assumes 20-ft sections of pipe, 40 pieces per shipment, 100 miles round trip
[3]Assumes liner material is 9 ft wide rolled in 25 yd sections, 4 75 sq yd rolls per truck, 200 miles round trip
[4]Assumes 8-ft-wide fence rolled into 100-ft sections, 8 bundles per truck, 50 miles round trip

For construction of a potential OSDC at Site D a significant volume of soil and bedrock would be excavated. This site preparation scope would not contribute to transportation risk because the trucks and equipment operate solely on Site. These materials would be staged within the OSDC work area for later use as fill.

K.2.3.5 Transportation Miles Summary

Table K.11 summarizes the truck and rail miles for primary transport segments associated with Alternatives 2 and 3.

Table K.11. Summary of Truck and Rail Miles for Each Primary Segment of Alternatives 2 and 3

Alternative	Construction Materials for Potential OSDC (miles)	Railcars to Clive, UT (miles)	Truck to Pike Sanitation Landfill (miles)	Truck to NNSS (miles)
2	3,291,000	1,875,000	38,000	21,864,000
3	NA	49,923,000	234,000	42,799,000

NA = not applicable
NNSS = Nevada National Security Site
OSDC = on-Site disposal cell

Table K.12 summarizes the total truck and rail miles for Alternatives 2 and 3. Alternative 3 has more truck miles because of the larger volume of PGE waste being shipped to NNSS. Similarly, the railcar mile totals under Alternative 3 are much greater than for Alternative 2 because of the large quantities of waste required to be shipped by rail to the representative commercial disposal facility in Clive, Utah.

Table K.12. Total Truck and Railcar Miles by Alternative

Alternative	Total Truck Miles	Total Railcar Miles
2	25,192,000	1,825,000
3	43,032,000	49,923,000

K.2.4 CALCULATION OF INJURIES AND FATALITIES ASSOCIATED WITH TRANSPORTATION OF MATERIALS AND WASTE

To calculate total risk (injury and fatality) from transporting materials and waste during implementation of the alternatives, the total miles traveled by a given mode of transportation is multiplied by the associated rate using the following equation:

Truck Miles Traveled or Railcar Miles × Risk Rate = Total Injuries/Fatalities

Table K.13 presents the injury and facility risk rates per mile traveled by trucks or railcars.

Table K.13. Transportation Risk Rates

Transportation Method	Western Route Injury Rate[1]	Western Route Fatality Rate[2]	Ohio Injury Rate[1]	Ohio Fatality Rate[2]
Large Truck[3]	3.71×10^{-7}	2.14×10^{-8}	1.72×10^{-7}	6.28×10^{-9}
Railcar[4]	5.60×10^{-8}	3.03×10^{-8}		

[1]Injuries per truck mile or injuries per railcar mile
[2]Fatalities per truck mile or fatalities per railcar mile
[3]Tables 6.38 and 6.39 in DOE 2002
[4]Tables 6.40 in DOE 2002

DOE = U.S. Department of Energy

A western truck route from Piketon, Ohio to NNSS near Mercury, Nevada is assumed to traverse the following states: Ohio, Indiana, Illinois, Missouri, Kansas, Colorado, Utah, and Nevada. Therefore, the injury and fatality rates for trucks for these states were used to calculate average rates for this truck route. Similarly, a western rail route from Piketon to Energy*Solutions* near Clive, Utah is assumed to traverse the following states: Ohio, Indiana, Illinois, Missouri, Kansas, Colorado, and Utah. Therefore, the injury and fatality rates for railcars for these states were used to calculate average rates for this rail route. Finally, for transportation assumed to occur solely within the state of Ohio, only the injury and fatality rates for Ohio were used in the calculations.

Risks were calculated by using the total truck miles and railcar miles from Table K.12. Table K.14 presents the total injuries and fatalities expected, based on total transportation miles and using the injury and fatality rates from Table K.13.

Table K.14. Transportation Risk Summary for Alternatives 2 and 3

Destination	Alternative 2	Alternative 3
Waste to Energy*Solutions*, Clive, UT: Rail	0.1	2.8
Waste to NNSS, Mercury, NV: Truck	8.1	15.9
Waste to Pike Sanitation Landfill, Piketon, OH: Truck	0.006	0.04
Construction Materials to OSDC: Truck	0.6	NA
Total Injuries	**8.8**	**18.7**
Waste to Energy*Solutions*, Clive, UT: Rail	0.06	1.5
Waste to NNSS, Mercury, NV: Truck	0.5	0.9
Waste to Pike Sanitation Landfill, Piketon, OH: Truck	0.0002	0.001
Construction Materials to OSDC: Truck	0.02	NA
Total Fatalities	**0.6**	**2.4**

NNSS = Nevada National Security Site
OSDC = on-Site disposal cell

As indicated by the total number of injuries and fatalities summed across the individual transportation segments, shipping waste off Site under Alternative 3 results in more injuries and fatalities than the on-Site waste disposal alternative (Alternative 2). Alternative 3 transportation of waste results in nearly 2 times more truck miles and 27 times more railcar miles than Alternative 2. Thus, the total expected injuries for Alternative 3 are 18.7 while the expected fatalities are 2.4 versus 8.8 and 0.6, respectively, for Alternative 2.

K.2.5 IMPACTS OF OFF-SITE DISPOSAL OF INCREASING WASTE VOLUMES

Increasing waste volumes to include material associated with Ohio Consent Decree (RC-2) actions or other waste generated would result in an increase in waste volume requiring off-Site disposal under Alternative 3, therefore increasing transportation risk. If the waste volumes increase by an in-place volume of 710,000 cy, the transported volume would have an increase of approximately 802,000 cy. Assuming this material is sent via rail for treatment and disposal at Energy*Solutions*, rail transportation risks would increase. Using the calculation method described above, total railcar miles under Alternative 3 would increase to 97,836,000. The resultant rail transportation risks would increase in rail injuries to 5.5 (versus 2.8) and increase in rail fatalities to 2.96 (versus 1.51) for net total injuries of 21.4 and net total fatalities of 3.9 for off-Site disposal.

K.3 GREENHOUSE GAS IMPACTS FROM TRANSPORTATION OF WASTE FROM PORTS

One of the major components of greenhouse gases (GHGs) comes from the combustion of fossil fuels. Carbon dioxide (CO_2) emissions account for 94 to 95 percent of the GHGs emitted by the transportation sector. The U.S. Environmental Protection Agency (EPA) uses CO_2 emission estimates as a representative indicator of all GHG emissions. GHG emissions are a function of energy consumed. According to EPA, 22.2 lb of CO_2 are generated for every gallon of diesel fuel burned (EPA 2005). The equation for determining GHG emissions is as follows:

$$EM = FC \times EF$$

where:

EM = Emissions of carbon dioxide (expressed as tons of carbon dioxide equivalents)
FC = Fuel (energy) consumed during transportation (gallons of diesel fuel)
EF = Emission conversion factor for diesel fuel

The total truck miles associated with Alternative 2 and Alternative 3, include both transportation of construction materials and waste from Table K.11. Additionally, the total miles for on-Site movement of waste from trucks shipping waste to a potential OSDC under Alternative 2 and from on-Site movement of waste to an on-Site rail siding for rail shipments under Alternatives 2 and 3 was included. Tables K.15 and K.16 summarize the miles calculated for the added on-Site waste shipments. Table K.17 presents the truck miles associated with bringing fill to a potential OSDC during operation.

Table K.15. Alternative 2 On-Site Waste Volumes and Related Truck Miles

In-Place Volume (cy)	Transported Volume (cy)[1]	Number of Truck Trips[2]	Number of Truck Miles (miles)[3]
1,354,000	1,563,400	93,400	374,000

[1]Transported volume is in-place volume expanded by 15 percent
[2]Assumes 16.74 cy per truck
[3]Assumes an average of 4 miles per round trip for each truck shipment

Table K.16. Intra-Site Truck Shipments of Waste to the PORTS Rail Siding

Alternative	Transported Volume (cy)[1]	Number of Truck Trips[2]	Number of Truck Miles (miles)[3]
2	36,700	1,668	6,700
3	966,600	96,660	387,000

[1]Transported volume is in-place volume expanded by various amounts depending on material and packaging
[2]Assumes 22 cy per truck
[3]Assumes an average of 4 miles per round trip from point of generation to the PORTS rail siding

PORTS = Portsmouth Gaseous Diffusion Plant

Table K.17. Alternative 2 On-PORTS Fill Volumes and Related Truck Miles

In-Place Volume (cy)	Transported Volume (cy)[1]	Number of Truck Trips[2]	Number of Truck Miles (miles)[3]
2,549,000	3,059,000	182,700	731,000

[1]Transported volume is in-place volume expanded by 20 percent
[2]Assumes 22 cy per truck
[3]Assumes an average of 4 miles per round trip for each truck shipment

To assess CO_2 emissions, the railcar miles need to be translated into train miles. The railcar miles are divided by 55 railcars per train. The GHG emissions are calculated by first dividing total miles by an average miles per gallon value estimated for the given transportation mode, then summing to give a total

diesel fuel consumption by alternative volume scenario. Table K.18 presents the total gallons of fuel expected to be used for truck transportation and rail transportation for each alternative.

Table K.18. Estimated Diesel Fuel Consumption by Transportation Mode

Alternative	Total Truck Miles	Truck Fuel Consumption[1] (gal)	Total Train[2] Miles	Train Fuel Consumption[3] (gal)	Total Diesel Fuel Consumption (gal)
2	26,303,000	4,871,000	33,000	6,500	4,877,500
3	43,419,000	8,040,600	906,000	180,000	8,220,400

[1]DOT 2008, Highway Statistics (1995-2008), Federal Highway Administration – 5.4 mpg
[2]Total railcar miles divided by the total number of railcars per train required for shipment of waste
[3]DOT 2009, Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors – 5.04 mpg

DOT = U.S. Department of Transportation

Next, the expected total GHG emissions associated with transportation aspects of the alternatives analyzed for the Site-wide waste disposition FS are calculated by dividing the total gallons of diesel fuel consumed by the CO_2 emission rate per gallon presented above. Table K.19 presents the CO_2 emissions for Alternatives 2 and 3.

Table K.19. CO_2 Emissions by Alternative

Alternative	Total Diesel Fuel Consumption (gal)	CO_2 Emissions (tons)
2	4,877,500	54,140
3	8,220,400	91,250

According to these results, Alternative 3 has a higher GHG impact as compared to Alternative 2. Specifically, Alternative 3 results in over 1.7 times more diesel fuel consumed and GHG emissions than Alternative 2.

K.4 REFERENCES

DOE 2012, Screening Level Calculator, Portsmouth Gaseous Diffusion Plant. U.S. Department of Energy, available at: http://www.pmcl.com/slcalculator/slcalculator.

DOE 2011a, *2010 Groundwater Monitoring Report for the Portsmouth Gaseous Diffusion Plant*, DOE/PPPO/03-0209&D1, U.S. Department of Energy, Piketon, OH, March.

DOE 2011b, *Methods for Conducting Human Health Risk Assessments and Risk Evaluations at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, DOE/PPPO/03-0127&D3, U.S. Department of Energy, October.

DOE 2009, Risk Assessment Information System (RAIS), U.S. Department of Energy, Oak Ridge Operations Office, available at http://rais.ornl.gov/.

DOE 2002, *A Resource Handbook on DOE Transportation Risk Assessment*, DOE/EM/NTP/HB-01, U.S. Department of Energy, National Transportation Program, July.

DOT 2009, *Comparative Evaluation of Rail and Truck Fuel Efficiency on Competitive Corridors*, Final Report, U.S. Department of Transportation, Federal Railroad Administration, Office of Policy and Communications, Washington, D.C., November.

DOT 2008, Highway Statistics (1995-2008), Annual Issues (Table VM-1), Federal Highway Administration, Washington, D.C., available at http://apps.bts.gov/cgi-bin/breadcrumbs/PrintVersion_redesign.cgi, accessed April 8, 2013.

EPA 2005, *Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel*, EPA420-F-05-001, U.S. Environmental Protection Agency, Office of Transportation and Air Quality, Washington, D.C, February.

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ATTACHMENT K.1: CALCULATION OF URANIUM AND TECHNETIUM ACTIVITY IN PROCESS GAS SYSTEM BUILDINGS

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Calculation of uranium and technetium activity in Process Gas Equipment (PGE).

Assumptions:

1. PGE contamination is in X-330, X-333, and X-326 converters.
2. All uranium is contained in PGE (conservative); actual percentage is likely between 85 and 95%.
3. In situ NDA measurements are conservative by a significant factor (perhaps as much as 100%).
4. X-333 converter in situ NDA is from neutron measurements and is very conservative. A correction factor (28) determined from neutron and gamma NDA measurements is used to adjust maximum U-235 measurements.

References:

NDA Data from "NDA - Spetnagel - Complete_cell_data_with_caretaker_051111" spreadsheet (X-333 Adjusted by factor of 28).
Barrier Weights from" Spetnagel - PORTS_PROCESS_MATERIAL_INVENTORY_040711" document.

Tc-99 Activity:
5.5 kg of Tc-99 equals 5,500 g x 1.72E+10 pCi/g = 9.46E+13 pCi.

Tc-99
specific activity = 1.72E+10 pCi/g

9.46E+13	**pCi**	
9.46E+12	**pCi**	**10% of total activity**

2,340 = # of X-326 Converters
1,100 = # of X-330 Converters
640 = # of X-333 Converters

	U-234	U-235	U-238
total activity (pCi)	**1.44E+13**	**5.33E+11**	**3.05E+12**
10% of total activity (pCi)	**1.44E+12**	**5.33E+10**	**3.05E+11**

Note:
In determining the number of grams or curies of natural uranium isotopes (U-234, U-235, and U-238), the quantities were derived from historical NDA measurements on the process equipment at PORTS. This involved using the documented U-235 to U-234 ratio, the documented cell uranium assay (U-235 percentage), and the maximum number of U-235 grams reported by NDA measurement. One adjustment was made to this data. Based on the ratio of NDA results in the X-330 converters between neutron and gamma NDA measurements, the neutron measurements for converters (only) in X-333 were adjusted to reflect this ratio, based on the determination that the converter gamma measurements in X-330 were more respresentative than the neutron measurements (see column labled "Max U235 Gms X-333 Adjusted"). Since gamma measurements were not performed in X-333, it was decided to use this adjustment factor. It should be noted that a similar bias likely exists for the X-333 compressors and coolers, but no relationship has been established to adjust the measurements for this equipment.

Convert 10% of total activity to grams = activity (pCi) ÷ specific activity (pCi/g)

	U-234	U-235	U-238	Total g of uranium
specific activity (pCi/g)=	**6.20E+09**	**2.10E+06**	**3.30E+05**	
g =	**232**	**25,381**	**924,242**	**949,855**

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Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-1	1	1	18-Mar-09	10.5	5.01E+08	2.21E+07	7.18E+06
X-326	25-1	1	2	18-Mar-09	7.5	3.58E+08	1.58E+07	5.13E+06
X-326	25-1	1	3	18-Mar-09	12	5.72E+08	2.52E+07	8.21E+06
X-326	25-1	1	4	18-Mar-09	4.5	2.15E+08	9.45E+06	3.08E+06
X-326	25-1	1	5	18-Mar-09	4.5	2.15E+08	9.45E+06	3.08E+06
X-326	25-1	1	6	18-Mar-09	4.5	2.15E+08	9.45E+06	3.08E+06
X-326	25-1	1	7	18-Mar-09	6	2.86E+08	1.26E+07	4.10E+06
X-326	25-1	1	8	18-Mar-09	4.5	2.15E+08	9.45E+06	3.08E+06
X-326	25-1	1	9	18-Mar-09	4.5	2.15E+08	9.45E+06	3.08E+06
X-326	25-1	1	10	18-Mar-09	3	1.43E+08	6.30E+06	2.05E+06
X-326	25-1	1	11	18-Mar-09	3	1.43E+08	6.30E+06	2.05E+06
X-326	25-1	1	12	18-Mar-09	6	2.86E+08	1.26E+07	4.10E+06
X-326	25-1	2	1	19-Feb-10	29	1.98E+09	6.09E+07	3.47E+07
X-326	25-1	2	2	19-Feb-10	9	6.13E+08	1.89E+07	1.08E+07
X-326	25-1	2	3	19-Feb-10	8	5.45E+08	1.68E+07	9.58E+06
X-326	25-1	2	4	19-Feb-10	8	5.45E+08	1.68E+07	9.58E+06
X-326	25-1	2	5	19-Feb-10	12	8.18E+08	2.52E+07	1.44E+07
X-326	25-1	2	6	19-Feb-10	9	6.13E+08	1.89E+07	1.08E+07
X-326	25-1	2	7	19-Feb-10	14	9.54E+08	2.94E+07	1.68E+07
X-326	25-1	2	8	19-Feb-10	14	9.54E+08	2.94E+07	1.68E+07
X-326	25-1	2	9	19-Feb-10	17	1.16E+09	3.57E+07	2.04E+07
X-326	25-1	2	10	19-Feb-10	27	1.84E+09	5.67E+07	3.23E+07
X-326	25-1	2	11	19-Feb-10	9	6.13E+08	1.89E+07	1.08E+07
X-326	25-1	2	12	19-Feb-10	9	6.13E+08	1.89E+07	1.08E+07
X-326	25-1	3	1	04-Oct-04	94.5	8.25E+09	1.98E+08	6.30E+07
X-326	25-1	3	2	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	3	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	4	04-Oct-04	219	1.91E+10	4.60E+08	1.46E+08
X-326	25-1	3	5	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	6	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	7	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	8	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	9	04-Oct-04	295.5	2.58E+10	6.21E+08	1.97E+08
X-326	25-1	3	10	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	11	04-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	3	12	04-Oct-04	109.5	9.56E+09	2.30E+08	7.30E+07
X-326	25-1	4	1	29-Jul-10	3	1.62E+08	6.30E+06	1.31E+06
X-326	25-1	4	2	29-Jul-10	5	2.70E+08	1.05E+07	2.19E+06
X-326	25-1	4	3	29-Jul-10	6	3.23E+08	1.26E+07	2.62E+06
X-326	25-1	4	4	29-Jul-10	3	1.62E+08	6.30E+06	1.31E+06
X-326	25-1	4	5	29-Jul-10	5	2.70E+08	1.05E+07	2.19E+06
X-326	25-1	4	6	29-Jul-10	6	3.23E+08	1.26E+07	2.62E+06
X-326	25-1	4	7	29-Jul-10	9	4.85E+08	1.89E+07	3.94E+06
X-326	25-1	4	8	29-Jul-10	6	3.23E+08	1.26E+07	2.62E+06
X-326	25-1	4	9	29-Jul-10	3	1.62E+08	6.30E+06	1.31E+06
X-326	25-1	4	10	29-Jul-10	5	2.70E+08	1.05E+07	2.19E+06
X-326	25-1	4	11	29-Jul-10	3	1.62E+08	6.30E+06	1.31E+06
X-326	25-1	4	12	29-Jul-10	5	2.70E+08	1.05E+07	2.19E+06
X-326	25-1	5	1	05-Oct-04	214.5	1.87E+10	4.50E+08	1.40E+08
X-326	25-1	5	2	05-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	5	3	05-Oct-04	37.5	3.27E+09	7.88E+07	2.44E+07
X-326	25-1	5	4	05-Oct-04	154.5	1.35E+10	3.24E+08	1.01E+08
X-326	25-1	5	5	05-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	5	6	05-Oct-04	273	2.38E+10	5.73E+08	1.78E+08
X-326	25-1	5	7	05-Oct-04	16.5	1.44E+09	3.47E+07	1.07E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-1	5	8	05-Oct-04	94.5	8.25E+09	1.98E+08	6.15E+07
X-326	25-1	5	9	05-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	5	10	05-Oct-04	291	2.54E+10	6.11E+08	1.89E+08
X-326	25-1	5	11	05-Oct-04	139.5	1.22E+10	2.93E+08	9.08E+07
X-326	25-1	5	12	05-Oct-04	6	5.24E+08	1.26E+07	3.90E+06
X-326	25-1	6	1	15-Jan-10	8	3.91E+08	1.68E+07	3.66E+06
X-326	25-1	6	2	15-Jan-10	6	2.93E+08	1.26E+07	2.75E+06
X-326	25-1	6	3	15-Jan-10	8	3.91E+08	1.68E+07	3.66E+06
X-326	25-1	6	4	15-Jan-10	5	2.44E+08	1.05E+07	2.29E+06
X-326	25-1	6	5	15-Jan-10	3	1.46E+08	6.30E+06	1.37E+06
X-326	25-1	6	6	15-Jan-10	6	2.93E+08	1.26E+07	2.75E+06
X-326	25-1	6	7	15-Jan-10	5	2.44E+08	1.05E+07	2.29E+06
X-326	25-1	6	8	15-Jan-10	5	2.44E+08	1.05E+07	2.29E+06
X-326	25-1	6	9	15-Jan-10	6	2.93E+08	1.26E+07	2.75E+06
X-326	25-1	6	10	15-Jan-10	6	2.93E+08	1.26E+07	2.75E+06
X-326	25-1	6	11	15-Jan-10	8	3.91E+08	1.68E+07	3.66E+06
X-326	25-1	6	12	15-Jan-10	11	5.37E+08	2.31E+07	5.03E+06
X-326	25-1	7	1	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	2	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	3	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	4	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	5	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	6	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	7	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	8	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	9	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	10	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	11	21-Sep-09	3	1.35E+08	6.30E+06	1.90E+06
X-326	25-1	7	12	21-Sep-09	5	2.25E+08	1.05E+07	3.17E+06
X-326	25-1	8	1	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	2	24-Jan-05	27	1.32E+09	5.67E+07	1.26E+07
X-326	25-1	8	3	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	4	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	5	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	6	24-Jan-05	141	6.88E+09	2.96E+08	6.60E+07
X-326	25-1	8	7	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	8	24-Jan-05	145.5	7.10E+09	3.06E+08	6.81E+07
X-326	25-1	8	9	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	10	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	8	11	24-Jan-05	247.5	1.21E+10	5.20E+08	1.16E+08
X-326	25-1	8	12	24-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	1	07-Oct-04	157.5	1.16E+10	3.31E+08	2.11E+08
X-326	25-1	9	2	07-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	3	07-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	4	07-Oct-04	40.5	2.99E+09	8.51E+07	5.41E+07
X-326	25-1	9	5	07-Oct-04	283.5	2.09E+10	5.95E+08	3.79E+08
X-326	25-1	9	6	07-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	7	07-Oct-04	4.5	3.32E+08	9.45E+06	6.02E+06
X-326	25-1	9	8	07-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	9	07-Oct-04	321	2.37E+10	6.74E+08	4.29E+08
X-326	25-1	9	10	07-Oct-04	127.5	9.41E+09	2.68E+08	1.70E+08
X-326	25-1	9	11	07-Oct-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	9	12	07-Oct-04	241.5	1.78E+10	5.07E+08	3.23E+08
X-326	25-1	10	1	03-Dec-09	5	1.99E+08	1.05E+07	2.39E+06
X-326	25-1	10	2	03-Dec-09	9	3.58E+08	1.89E+07	4.31E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-1	10	3	03-Dec-09	8	3.18E+08	1.68E+07	3.83E+06
X-326	25-1	10	4	03-Dec-09	3	1.19E+08	6.30E+06	1.44E+06
X-326	25-1	10	5	03-Dec-09	6	2.38E+08	1.26E+07	2.87E+06
X-326	25-1	10	6	03-Dec-09	8	3.18E+08	1.68E+07	3.83E+06
X-326	25-1	10	7	03-Dec-09	5	1.99E+08	1.05E+07	2.39E+06
X-326	25-1	10	8	03-Dec-09	6	2.38E+08	1.26E+07	2.87E+06
X-326	25-1	10	9	03-Dec-09	5	1.99E+08	1.05E+07	2.39E+06
X-326	25-1	10	10	03-Dec-09	8	3.18E+08	1.68E+07	3.83E+06
X-326	25-1	10	11	03-Dec-09	5	1.99E+08	1.05E+07	2.39E+06
X-326	25-1	10	12	03-Dec-09	6	2.38E+08	1.26E+07	2.87E+06
X-326	25-1	11	1	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	2	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	3	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	4	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	5	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	6	08-Oct-09	5	2.72E+08	1.05E+07	4.92E+06
X-326	25-1	11	7	08-Oct-09	5	2.72E+08	1.05E+07	4.92E+06
X-326	25-1	11	8	08-Oct-09	6	3.26E+08	1.26E+07	5.91E+06
X-326	25-1	11	9	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	10	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	11	08-Oct-09	3	1.63E+08	6.30E+06	2.95E+06
X-326	25-1	11	12	08-Oct-09	5	2.72E+08	1.05E+07	4.92E+06
X-326	25-1	12	1	11-Jan-05	63	4.65E+09	1.32E+08	8.54E+07
X-326	25-1	12	2	11-Jan-05	69	5.09E+09	1.45E+08	9.35E+07
X-326	25-1	12	3	11-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	12	4	11-Jan-05	208.5	1.54E+10	4.38E+08	2.83E+08
X-326	25-1	12	5	11-Jan-05	117	8.64E+09	2.46E+08	1.59E+08
X-326	25-1	12	6	11-Jan-05	30	2.21E+09	6.30E+07	4.07E+07
X-326	25-1	12	7	11-Jan-05	295.5	2.18E+10	6.21E+08	4.01E+08
X-326	25-1	12	8	11-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	12	9	11-Jan-05	142.5	1.05E+10	2.99E+08	1.93E+08
X-326	25-1	12	10	11-Jan-05	6	4.43E+08	1.26E+07	8.13E+06
X-326	25-1	12	11	11-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	12	12	11-Jan-05	133.5	9.85E+09	2.80E+08	1.81E+08
X-326	25-1	13	1	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	2	16-Mar-10	5	2.74E+08	1.05E+07	2.95E+06
X-326	25-1	13	3	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	4	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	5	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	6	16-Mar-10	8	4.39E+08	1.68E+07	4.72E+06
X-326	25-1	13	7	16-Mar-10	5	2.74E+08	1.05E+07	2.95E+06
X-326	25-1	13	8	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	9	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	10	16-Mar-10	6	3.29E+08	1.26E+07	3.54E+06
X-326	25-1	13	11	16-Mar-10	5	2.74E+08	1.05E+07	2.95E+06
X-326	25-1	13	12	16-Mar-10	8	4.39E+08	1.68E+07	4.72E+06
X-326	25-1	14	1	06-Jan-05	69	3.82E+09	1.45E+08	1.79E+07
X-326	25-1	14	2	06-Jan-05	100.5	5.56E+09	2.11E+08	2.61E+07
X-326	25-1	14	3	06-Jan-05	39	2.16E+09	8.19E+07	1.01E+07
X-326	25-1	14	4	06-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	14	5	06-Jan-05	4.5	2.49E+08	9.45E+06	1.17E+06
X-326	25-1	14	6	06-Jan-05	70.5	3.90E+09	1.48E+08	1.83E+07
X-326	25-1	14	7	06-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	14	8	06-Jan-05	94.5	5.23E+09	1.98E+08	2.45E+07
X-326	25-1	14	9	06-Jan-05	1.5	8.30E+07	3.15E+06	3.89E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-1	14	10	06-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	14	11	06-Jan-05	160.5	8.88E+09	3.37E+08	4.16E+07
X-326	25-1	14	12	06-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	15	1	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	2	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	3	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	4	18-Nov-09	5	2.82E+08	1.05E+07	2.88E+06
X-326	25-1	15	5	18-Nov-09	5	2.82E+08	1.05E+07	2.88E+06
X-326	25-1	15	6	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	7	18-Nov-09	5	2.82E+08	1.05E+07	2.88E+06
X-326	25-1	15	8	18-Nov-09	5	2.82E+08	1.05E+07	2.88E+06
X-326	25-1	15	9	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	10	18-Nov-09	5	2.82E+08	1.05E+07	2.88E+06
X-326	25-1	15	11	18-Nov-09	6	3.38E+08	1.26E+07	3.46E+06
X-326	25-1	15	12	18-Nov-09	8	4.51E+08	1.68E+07	4.61E+06
X-326	25-1	16	1	18-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	16	2	18-Jan-05	28.5	2.36E+09	5.99E+07	9.41E+06
X-326	25-1	16	3	18-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	16	4	18-Jan-05	205.5	1.70E+10	4.32E+08	6.78E+07
X-326	25-1	16	5	18-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	16	6	18-Jan-05	66	5.46E+09	1.39E+08	2.18E+07
X-326	25-1	16	7	18-Jan-05	175.5	1.45E+10	3.69E+08	5.79E+07
X-326	25-1	16	8	18-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	16	9	18-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	16	10	18-Jan-05	60	4.96E+09	1.26E+08	1.98E+07
X-326	25-1	16	11	18-Jan-05	12	9.92E+08	2.52E+07	3.96E+06
X-326	25-1	16	12	18-Jan-05	85.5	7.07E+09	1.80E+08	2.82E+07
X-326	25-1	17	1	08-Nov-04	180	1.01E+10	3.78E+08	1.01E+08
X-326	25-1	17	2	08-Nov-04	211.5	1.19E+10	4.44E+08	1.19E+08
X-326	25-1	17	3	08-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	17	4	08-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	17	5	08-Nov-04	432	2.43E+10	9.07E+08	2.43E+08
X-326	25-1	17	6	08-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	17	7	08-Nov-04	9	5.07E+08	1.89E+07	5.07E+06
X-326	25-1	17	8	08-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	17	9	08-Nov-04	130.5	7.36E+09	2.74E+08	7.35E+07
X-326	25-1	17	10	08-Nov-04	222	1.25E+10	4.66E+08	1.25E+08
X-326	25-1	17	11	08-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	17	12	08-Nov-04	64.5	3.64E+09	1.35E+08	3.63E+07
X-326	25-1	18	1	04-Jan-05	51	4.22E+09	1.07E+08	1.90E+07
X-326	25-1	18	2	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	3	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	4	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	5	04-Jan-05	138	1.14E+10	2.90E+08	5.14E+07
X-326	25-1	18	6	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	7	04-Jan-05	184.5	1.53E+10	3.87E+08	6.87E+07
X-326	25-1	18	8	04-Jan-05	123	1.02E+10	2.58E+08	4.58E+07
X-326	25-1	18	9	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	10	04-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	18	11	04-Jan-05	3	2.48E+08	6.30E+06	1.12E+06
X-326	25-1	18	12	04-Jan-05	192	1.59E+10	4.03E+08	7.14E+07
X-326	25-1	19	1	09-Nov-04	576	3.25E+10	1.21E+09	3.17E+08
X-326	25-1	19	2	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	3	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	4	09-Nov-04	175.5	9.89E+09	3.69E+08	9.65E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-1	19	5	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	6	09-Nov-04	208.5	1.18E+10	4.38E+08	1.15E+08
X-326	25-1	19	7	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	8	09-Nov-04	58.5	3.30E+09	1.23E+08	3.22E+07
X-326	25-1	19	9	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	10	09-Nov-04	60	3.38E+09	1.26E+08	3.30E+07
X-326	25-1	19	11	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	19	12	09-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	1	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	2	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	3	11-Nov-04	15	8.30E+08	3.15E+07	1.36E+07
X-326	25-1	20	4	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	5	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	6	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	7	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	8	11-Nov-04	27	1.49E+09	5.67E+07	2.45E+07
X-326	25-1	20	9	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	10	11-Nov-04	1.5	8.30E+07	3.15E+06	1.36E+06
X-326	25-1	20	11	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-1	20	12	11-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	1	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	2	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	3	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	4	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	5	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	6	08-Feb-05	214.5	1.46E+10	4.50E+08	8.94E+07
X-326	25-2	1	7	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	8	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	9	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	10	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	11	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	1	12	08-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	2	1	26-Feb-10	8	4.86E+08	1.68E+07	1.30E+06
X-326	25-2	2	2	26-Feb-10	6	3.65E+08	1.26E+07	9.75E+05
X-326	25-2	2	3	26-Feb-10	8	4.86E+08	1.68E+07	1.30E+06
X-326	25-2	2	4	26-Feb-10	6	3.65E+08	1.26E+07	9.75E+05
X-326	25-2	2	5	26-Feb-10	11	6.69E+08	2.31E+07	1.79E+06
X-326	25-2	2	6	26-Feb-10	9	5.47E+08	1.89E+07	1.46E+06
X-326	25-2	2	7	26-Feb-10	8	4.86E+08	1.68E+07	1.30E+06
X-326	25-2	2	8	26-Feb-10	11	6.69E+08	2.31E+07	1.79E+06
X-326	25-2	2	9	26-Feb-10	17	1.03E+09	3.57E+07	2.76E+06
X-326	25-2	2	10	26-Feb-10	9	5.47E+08	1.89E+07	1.46E+06
X-326	25-2	2	11	26-Feb-10	15	9.12E+08	3.15E+07	2.44E+06
X-326	25-2	2	12	26-Feb-10	12	7.29E+08	2.52E+07	1.95E+06
X-326	25-2	3	1	10-Feb-05	178.5	1.07E+10	3.75E+08	7.06E+07
X-326	25-2	3	2	10-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	3	3	10-Feb-05	658.5	3.96E+10	1.38E+09	2.60E+08
X-326	25-2	3	4	10-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	3	5	10-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	3	6	10-Feb-05	306	1.84E+10	6.43E+08	1.21E+08
X-326	25-2	3	7	10-Feb-05	82.5	4.97E+09	1.73E+08	3.26E+07
X-326	25-2	3	8	10-Feb-05	127.5	7.67E+09	2.68E+08	5.04E+07
X-326	25-2	3	9	10-Feb-05	439.5	2.65E+10	9.23E+08	1.74E+08
X-326	25-2	3	10	10-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	3	11	10-Feb-05	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-2	3	12	10-Feb-05	454.5	2.74E+10	9.54E+08	1.80E+08
X-326	25-2	4	1	09-Apr-10	9	4.89E+08	1.89E+07	1.54E+06
X-326	25-2	4	2	09-Apr-10	11	5.98E+08	2.31E+07	1.89E+06
X-326	25-2	4	3	09-Apr-10	8	4.35E+08	1.68E+07	1.37E+06
X-326	25-2	4	4	09-Apr-10	6	3.26E+08	1.26E+07	1.03E+06
X-326	25-2	4	5	09-Apr-10	8	4.35E+08	1.68E+07	1.37E+06
X-326	25-2	4	6	09-Apr-10	6	3.26E+08	1.26E+07	1.03E+06
X-326	25-2	4	7	09-Apr-10	6	3.26E+08	1.26E+07	1.03E+06
X-326	25-2	4	8	09-Apr-10	9	4.89E+08	1.89E+07	1.54E+06
X-326	25-2	4	9	09-Apr-10	11	5.98E+08	2.31E+07	1.89E+06
X-326	25-2	4	10	09-Apr-10	9	4.89E+08	1.89E+07	1.54E+06
X-326	25-2	4	11	09-Apr-10	11	5.98E+08	2.31E+07	1.89E+06
X-326	25-2	4	12	09-Apr-10	6	3.26E+08	1.26E+07	1.03E+06
X-326	25-2	5	1	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	2	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	3	14-Feb-05	7.5	3.66E+08	1.58E+07	2.84E+06
X-326	25-2	5	4	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	5	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	6	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	7	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	8	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	9	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	10	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	5	11	14-Feb-05	297	1.45E+10	6.24E+08	1.12E+08
X-326	25-2	5	12	14-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	6	1	29-Jan-10	5	2.50E+08	1.05E+07	9.04E+05
X-326	25-2	6	2	29-Jan-10	5	2.50E+08	1.05E+07	9.04E+05
X-326	25-2	6	3	29-Jan-10	14	7.00E+08	2.94E+07	2.53E+06
X-326	25-2	6	4	29-Jan-10	5	2.50E+08	1.05E+07	9.04E+05
X-326	25-2	6	5	29-Jan-10	3	1.50E+08	6.30E+06	5.43E+05
X-326	25-2	6	6	29-Jan-10	5	2.50E+08	1.05E+07	9.04E+05
X-326	25-2	6	7	29-Jan-10	6	3.00E+08	1.26E+07	1.09E+06
X-326	25-2	6	8	29-Jan-10	6	3.00E+08	1.26E+07	1.09E+06
X-326	25-2	6	9	29-Jan-10	8	4.00E+08	1.68E+07	1.45E+06
X-326	25-2	6	10	29-Jan-10	8	4.00E+08	1.68E+07	1.45E+06
X-326	25-2	6	11	29-Jan-10	8	4.00E+08	1.68E+07	1.45E+06
X-326	25-2	6	12	29-Jan-10	6	3.00E+08	1.26E+07	1.09E+06
X-326	25-2	7	1	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	2	15-Feb-05	240	1.31E+10	5.04E+08	8.65E+07
X-326	25-2	7	3	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	4	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	5	15-Feb-05	13.5	7.34E+08	2.84E+07	4.87E+06
X-326	25-2	7	6	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	7	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	8	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	9	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	10	15-Feb-05	402	2.19E+10	8.44E+08	1.45E+08
X-326	25-2	7	11	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	7	12	15-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	8	1	24-May-10	5	2.46E+08	1.05E+07	9.53E+05
X-326	25-2	8	2	24-May-10	5	2.46E+08	1.05E+07	9.53E+05
X-326	25-2	8	3	24-May-10	5	2.46E+08	1.05E+07	9.53E+05
X-326	25-2	8	4	24-May-10	5	2.46E+08	1.05E+07	9.53E+05
X-326	25-2	8	5	24-May-10	6	2.95E+08	1.26E+07	1.14E+06
X-326	25-2	8	6	24-May-10	6	2.95E+08	1.26E+07	1.14E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-2	8	7	24-May-10	5	2.46E+08	1.05E+07	9.53E+05
X-326	25-2	8	8	24-May-10	6	2.95E+08	1.26E+07	1.14E+06
X-326	25-2	8	9	24-May-10	6	2.95E+08	1.26E+07	1.14E+06
X-326	25-2	8	10	24-May-10	8	3.94E+08	1.68E+07	1.52E+06
X-326	25-2	8	11	24-May-10	11	5.41E+08	2.31E+07	2.10E+06
X-326	25-2	8	12	24-May-10	9	4.43E+08	1.89E+07	1.71E+06
X-326	25-2	9	1	30-Sep-10	5	2.72E+08	1.05E+07	1.72E+06
X-326	25-2	9	2	30-Sep-10	5	2.72E+08	1.05E+07	1.72E+06
X-326	25-2	9	3	30-Sep-10	8	4.35E+08	1.68E+07	2.75E+06
X-326	25-2	9	4	30-Sep-10	8	4.35E+08	1.68E+07	2.75E+06
X-326	25-2	9	5	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	9	6	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	9	7	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	9	8	30-Sep-10	11	5.98E+08	2.31E+07	3.78E+06
X-326	25-2	9	9	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	9	10	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	9	11	30-Sep-10	5	2.72E+08	1.05E+07	1.72E+06
X-326	25-2	9	12	30-Sep-10	6	3.26E+08	1.26E+07	2.06E+06
X-326	25-2	10	1	04-Jun-10	5	2.21E+08	1.05E+07	1.00E+06
X-326	25-2	10	2	04-Jun-10	5	2.21E+08	1.05E+07	1.00E+06
X-326	25-2	10	3	04-Jun-10	5	2.21E+08	1.05E+07	1.00E+06
X-326	25-2	10	4	04-Jun-10	3	1.33E+08	6.30E+06	6.02E+05
X-326	25-2	10	5	04-Jun-10	3	1.33E+08	6.30E+06	6.02E+05
X-326	25-2	10	6	04-Jun-10	5	2.21E+08	1.05E+07	1.00E+06
X-326	25-2	10	7	04-Jun-10	6	2.66E+08	1.26E+07	1.20E+06
X-326	25-2	10	8	04-Jun-10	8	3.54E+08	1.68E+07	1.60E+06
X-326	25-2	10	9	04-Jun-10	11	4.87E+08	2.31E+07	2.21E+06
X-326	25-2	10	10	04-Jun-10	8	3.54E+08	1.68E+07	1.60E+06
X-326	25-2	10	11	04-Jun-10	8	3.54E+08	1.68E+07	1.60E+06
X-326	25-2	10	12	04-Jun-10	8	3.54E+08	1.68E+07	1.60E+06
X-326	25-2	11	1	19-Mar-10	6	2.86E+08	1.26E+07	1.96E+06
X-326	25-2	11	2	19-Mar-10	8	3.82E+08	1.68E+07	2.62E+06
X-326	25-2	11	3	19-Mar-10	8	3.82E+08	1.68E+07	2.62E+06
X-326	25-2	11	4	19-Mar-10	5	2.38E+08	1.05E+07	1.64E+06
X-326	25-2	11	5	19-Mar-10	8	3.82E+08	1.68E+07	2.62E+06
X-326	25-2	11	6	19-Mar-10	11	5.25E+08	2.31E+07	3.60E+06
X-326	25-2	11	7	19-Mar-10	9	4.29E+08	1.89E+07	2.95E+06
X-326	25-2	11	8	19-Mar-10	5	2.38E+08	1.05E+07	1.64E+06
X-326	25-2	11	9	19-Mar-10	9	4.29E+08	1.89E+07	2.95E+06
X-326	25-2	11	10	19-Mar-10	6	2.86E+08	1.26E+07	1.96E+06
X-326	25-2	11	11	19-Mar-10	11	5.25E+08	2.31E+07	3.60E+06
X-326	25-2	11	12	19-Mar-10	8	3.82E+08	1.68E+07	2.62E+06
X-326	25-2	12	1	15-Jun-10	8	4.13E+08	1.68E+07	1.69E+06
X-326	25-2	12	2	15-Jun-10	6	3.10E+08	1.26E+07	1.27E+06
X-326	25-2	12	3	15-Jun-10	5	2.58E+08	1.05E+07	1.05E+06
X-326	25-2	12	4	15-Jun-10	9	4.65E+08	1.89E+07	1.90E+06
X-326	25-2	12	5	15-Jun-10	9	4.65E+08	1.89E+07	1.90E+06
X-326	25-2	12	6	15-Jun-10	6	3.10E+08	1.26E+07	1.27E+06
X-326	25-2	12	7	15-Jun-10	5	2.58E+08	1.05E+07	1.05E+06
X-326	25-2	12	8	15-Jun-10	6	3.10E+08	1.26E+07	1.27E+06
X-326	25-2	12	9	15-Jun-10	6	3.10E+08	1.26E+07	1.27E+06
X-326	25-2	12	10	15-Jun-10	6	3.10E+08	1.26E+07	1.27E+06
X-326	25-2	12	11	15-Jun-10	5	2.58E+08	1.05E+07	1.05E+06
X-326	25-2	12	12	15-Jun-10	5	2.58E+08	1.05E+07	1.05E+06
X-326	25-2	13	1	23-Apr-10	6	2.45E+08	1.26E+07	1.87E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-2	13	2	23-Apr-10	6	2.45E+08	1.26E+07	1.87E+06
X-326	25-2	13	3	23-Apr-10	5	2.04E+08	1.05E+07	1.56E+06
X-326	25-2	13	4	23-Apr-10	6	2.45E+08	1.26E+07	1.87E+06
X-326	25-2	13	5	23-Apr-10	8	3.26E+08	1.68E+07	2.50E+06
X-326	25-2	13	6	23-Apr-10	8	3.26E+08	1.68E+07	2.50E+06
X-326	25-2	13	7	23-Apr-10	4	1.63E+08	8.40E+06	1.25E+06
X-326	25-2	13	8	23-Apr-10	6	2.45E+08	1.26E+07	1.87E+06
X-326	25-2	13	9	23-Apr-10	9	3.67E+08	1.89E+07	2.81E+06
X-326	25-2	13	10	23-Apr-10	8	3.26E+08	1.68E+07	2.50E+06
X-326	25-2	13	11	23-Apr-10	6	2.45E+08	1.26E+07	1.87E+06
X-326	25-2	13	12	23-Apr-10	5	2.04E+08	1.05E+07	1.56E+06
X-326	25-2	14	1	15-Jul-04	166.5	1.20E+10	3.50E+08	3.69E+07
X-326	25-2	14	2	15-Jul-04	4.5	3.24E+08	9.45E+06	9.98E+05
X-326	25-2	14	3	15-Jul-04	216	1.56E+10	4.54E+08	4.79E+07
X-326	25-2	14	4	15-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	14	5	15-Jul-04	45	3.24E+09	9.45E+07	9.98E+06
X-326	25-2	14	6	15-Jul-04	79.5	5.73E+09	1.67E+08	1.76E+07
X-326	25-2	14	7	15-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	14	8	15-Jul-04	61.5	4.43E+09	1.29E+08	1.36E+07
X-326	25-2	14	9	15-Jul-04	235.5	1.70E+10	4.95E+08	5.22E+07
X-326	25-2	14	10	15-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	14	11	15-Jul-04	18	1.30E+09	3.78E+07	3.99E+06
X-326	25-2	14	12	15-Jul-04	207	1.49E+10	4.35E+08	4.59E+07
X-326	25-2	15	1	04-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	15	2	04-Mar-05	213	1.78E+10	4.47E+08	6.33E+07
X-326	25-2	15	3	04-Mar-05	48	4.02E+09	1.01E+08	1.43E+07
X-326	25-2	15	4	04-Mar-05	303	2.54E+10	6.36E+08	9.01E+07
X-326	25-2	15	5	04-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	15	6	04-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	15	7	04-Mar-05	114	9.55E+09	2.39E+08	3.39E+07
X-326	25-2	15	8	04-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	15	9	04-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	15	10	04-Mar-05	270	2.26E+10	5.67E+08	8.03E+07
X-326	25-2	15	11	04-Mar-05	18	1.51E+09	3.78E+07	5.35E+06
X-326	25-2	15	12	04-Mar-05	270	2.26E+10	5.67E+08	8.03E+07
X-326	25-2	16	1	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	2	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	3	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	4	11-Aug-10	5	2.98E+08	1.05E+07	1.17E+06
X-326	25-2	16	5	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	6	11-Aug-10	9	5.37E+08	1.89E+07	2.10E+06
X-326	25-2	16	7	11-Aug-10	9	5.37E+08	1.89E+07	2.10E+06
X-326	25-2	16	8	11-Aug-10	9	5.37E+08	1.89E+07	2.10E+06
X-326	25-2	16	9	11-Aug-10	12	7.15E+08	2.52E+07	2.80E+06
X-326	25-2	16	10	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	11	11-Aug-10	6	3.58E+08	1.26E+07	1.40E+06
X-326	25-2	16	12	11-Aug-10	11	6.56E+08	2.31E+07	2.56E+06
X-326	25-2	17	1	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	2	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	3	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	4	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	5	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	6	04-Nov-10	3	1.66E+08	6.30E+06	8.50E+05
X-326	25-2	17	7	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	8	04-Nov-10	8	4.43E+08	1.68E+07	2.27E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-2	17	9	04-Nov-10	6	3.32E+08	1.26E+07	1.70E+06
X-326	25-2	17	10	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	11	04-Nov-10	5	2.77E+08	1.05E+07	1.42E+06
X-326	25-2	17	12	04-Nov-10	11	6.09E+08	2.31E+07	3.12E+06
X-326	25-2	18	1	11-Sep-10	5	2.79E+08	1.05E+07	1.24E+06
X-326	25-2	18	2	11-Sep-10	5	2.79E+08	1.05E+07	1.24E+06
X-326	25-2	18	3	11-Sep-10	5	2.79E+08	1.05E+07	1.24E+06
X-326	25-2	18	4	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	5	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	6	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	7	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	8	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	9	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	18	10	11-Sep-10	8	4.47E+08	1.68E+07	1.99E+06
X-326	25-2	18	11	11-Sep-10	5	2.79E+08	1.05E+07	1.24E+06
X-326	25-2	18	12	11-Sep-10	3	1.68E+08	6.30E+06	7.47E+05
X-326	25-2	19	1	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	2	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	3	08-Mar-05	256.5	1.42E+10	5.39E+08	6.93E+07
X-326	25-2	19	4	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	5	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	6	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	7	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	8	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	9	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	10	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	11	08-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-2	19	12	08-Mar-05	601.5	3.33E+10	1.26E+09	1.62E+08
X-326	25-2	20	1	25-Jun-10	5	2.33E+08	1.05E+07	1.29E+06
X-326	25-2	20	2	25-Jun-10	6	2.80E+08	1.26E+07	1.54E+06
X-326	25-2	20	3	25-Jun-10	8	3.73E+08	1.68E+07	2.06E+06
X-326	25-2	20	4	25-Jun-10	5	2.33E+08	1.05E+07	1.29E+06
X-326	25-2	20	5	25-Jun-10	9	4.20E+08	1.89E+07	2.31E+06
X-326	25-2	20	6	25-Jun-10	11	5.13E+08	2.31E+07	2.83E+06
X-326	25-2	20	7	25-Jun-10	5	2.33E+08	1.05E+07	1.29E+06
X-326	25-2	20	8	25-Jun-10	5	2.33E+08	1.05E+07	1.29E+06
X-326	25-2	20	9	25-Jun-10	6	2.80E+08	1.26E+07	1.54E+06
X-326	25-2	20	10	25-Jun-10	8	3.73E+08	1.68E+07	2.06E+06
X-326	25-2	20	11	25-Jun-10	6	2.80E+08	1.26E+07	1.54E+06
X-326	25-2	20	12	25-Jun-10	11	5.13E+08	2.31E+07	2.83E+06
X-326	25-3	1	1	22-Apr-09	9	4.10E+08	1.89E+07	1.43E+06
X-326	25-3	1	2	22-Apr-09	9	4.10E+08	1.89E+07	1.43E+06
X-326	25-3	1	3	22-Apr-09	12	5.47E+08	2.52E+07	1.91E+06
X-326	25-3	1	4	22-Apr-09	9	4.10E+08	1.89E+07	1.43E+06
X-326	25-3	1	5	22-Apr-09	20	9.12E+08	4.20E+07	3.18E+06
X-326	25-3	1	6	22-Apr-09	15	6.84E+08	3.15E+07	2.38E+06
X-326	25-3	1	7	22-Apr-09	5	2.28E+08	1.05E+07	7.94E+05
X-326	25-3	1	8	22-Apr-09	8	3.65E+08	1.68E+07	1.27E+06
X-326	25-3	1	9	22-Apr-09	11	5.01E+08	2.31E+07	1.75E+06
X-326	25-3	1	10	22-Apr-09	8	3.65E+08	1.68E+07	1.27E+06
X-326	25-3	1	11	22-Apr-09	6	2.74E+08	1.26E+07	9.53E+05
X-326	25-3	1	12	22-Apr-09	8	3.65E+08	1.68E+07	1.27E+06
X-326	25-3	2	1	07-Jan-09	8	4.39E+08	1.68E+07	8.34E+05
X-326	25-3	2	2	07-Jan-09	9	4.94E+08	1.89E+07	9.38E+05
X-326	25-3	2	3	07-Jan-09	8	4.39E+08	1.68E+07	8.34E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-3	2	4	07-Jan-09	11	6.04E+08	2.31E+07	1.15E+06
X-326	25-3	2	5	07-Jan-09	5	2.74E+08	1.05E+07	5.21E+05
X-326	25-3	2	6	07-Jan-09	9	4.94E+08	1.89E+07	9.38E+05
X-326	25-3	2	7	07-Jan-09	6	3.29E+08	1.26E+07	6.25E+05
X-326	25-3	2	8	07-Jan-09	9	4.94E+08	1.89E+07	9.38E+05
X-326	25-3	2	9	07-Jan-09	8	4.39E+08	1.68E+07	8.34E+05
X-326	25-3	2	10	07-Jan-09	6	3.29E+08	1.26E+07	6.25E+05
X-326	25-3	2	11	07-Jan-09	8	4.39E+08	1.68E+07	8.34E+05
X-326	25-3	2	12	07-Jan-09	14	7.68E+08	2.94E+07	1.46E+06
X-326	25-3	3	1	26-Jun-09	9	6.07E+08	1.89E+07	1.40E+06
X-326	25-3	3	2	26-Jun-09	9	6.07E+08	1.89E+07	1.40E+06
X-326	25-3	3	3	26-Jun-09	8	5.39E+08	1.68E+07	1.25E+06
X-326	25-3	3	4	26-Jun-09	5	3.37E+08	1.05E+07	7.80E+05
X-326	25-3	3	5	26-Jun-09	6	4.04E+08	1.26E+07	9.36E+05
X-326	25-3	3	6	26-Jun-09	5	3.37E+08	1.05E+07	7.80E+05
X-326	25-3	3	7	26-Jun-09	6	4.04E+08	1.26E+07	9.36E+05
X-326	25-3	3	8	26-Jun-09	6	4.04E+08	1.26E+07	9.36E+05
X-326	25-3	3	9	26-Jun-09	9	6.07E+08	1.89E+07	1.40E+06
X-326	25-3	3	10	26-Jun-09	5	3.37E+08	1.05E+07	7.80E+05
X-326	25-3	3	11	26-Jun-09	15	1.01E+09	3.15E+07	2.34E+06
X-326	25-3	3	12	26-Jun-09	6	4.04E+08	1.26E+07	9.36E+05
X-326	25-3	4	1	16-Jan-09	6	4.53E+08	1.26E+07	6.39E+05
X-326	25-3	4	2	16-Jan-09	6	4.53E+08	1.26E+07	6.39E+05
X-326	25-3	4	3	16-Jan-09	7.5	5.66E+08	1.58E+07	7.99E+05
X-326	25-3	4	4	16-Jan-09	6	4.53E+08	1.26E+07	6.39E+05
X-326	25-3	4	5	16-Jan-09	12	9.05E+08	2.52E+07	1.28E+06
X-326	25-3	4	6	16-Jan-09	10.5	7.92E+08	2.21E+07	1.12E+06
X-326	25-3	4	7	16-Jan-09	12	9.05E+08	2.52E+07	1.28E+06
X-326	25-3	4	8	16-Jan-09	6	4.53E+08	1.26E+07	6.39E+05
X-326	25-3	4	9	16-Jan-09	7.5	5.66E+08	1.58E+07	7.99E+05
X-326	25-3	4	10	16-Jan-09	6	4.53E+08	1.26E+07	6.39E+05
X-326	25-3	4	11	16-Jan-09	9	6.79E+08	1.89E+07	9.59E+05
X-326	25-3	4	12	16-Jan-09	10.5	7.92E+08	2.21E+07	1.12E+06
X-326	25-3	5	1	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	2	25-Aug-09	6	3.00E+08	1.26E+07	9.17E+05
X-326	25-3	5	3	25-Aug-09	6	3.00E+08	1.26E+07	9.17E+05
X-326	25-3	5	4	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	5	25-Aug-09	6	3.00E+08	1.26E+07	9.17E+05
X-326	25-3	5	6	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	7	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	8	25-Aug-09	6	3.00E+08	1.26E+07	9.17E+05
X-326	25-3	5	9	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	10	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	11	25-Aug-09	5	2.50E+08	1.05E+07	7.64E+05
X-326	25-3	5	12	25-Aug-09	6	3.00E+08	1.26E+07	9.17E+05
X-326	25-3	6	1	09-Apr-09	7.5	5.00E+08	1.58E+07	8.21E+05
X-326	25-3	6	2	09-Apr-09	7.5	5.00E+08	1.58E+07	8.21E+05
X-326	25-3	6	3	09-Apr-09	9	6.00E+08	1.89E+07	9.85E+05
X-326	25-3	6	4	09-Apr-09	7.5	5.00E+08	1.58E+07	8.21E+05
X-326	25-3	6	5	09-Apr-09	6	4.00E+08	1.26E+07	6.56E+05
X-326	25-3	6	6	09-Apr-09	6	4.00E+08	1.26E+07	6.56E+05
X-326	25-3	6	7	09-Apr-09	6	4.00E+08	1.26E+07	6.56E+05
X-326	25-3	6	8	09-Apr-09	9	6.00E+08	1.89E+07	9.85E+05
X-326	25-3	6	9	09-Apr-09	9	6.00E+08	1.89E+07	9.85E+05
X-326	25-3	6	10	09-Apr-09	9	6.00E+08	1.89E+07	9.85E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-3	6	11	09-Apr-09	15	1.00E+09	3.15E+07	1.64E+06
X-326	25-3	6	12	09-Apr-09	7.5	5.00E+08	1.58E+07	8.21E+05
X-326	25-3	7	1	07-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	7	2	07-May-03	4.5	3.03E+08	9.45E+06	6.73E+05
X-326	25-3	7	3	07-May-03	66	4.45E+09	1.39E+08	9.88E+06
X-326	25-3	7	4	07-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	7	5	07-May-03	19.5	1.31E+09	4.10E+07	2.92E+06
X-326	25-3	7	6	07-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	7	7	07-May-03	139.5	9.40E+09	2.93E+08	2.09E+07
X-326	25-3	7	8	07-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	7	9	07-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	7	10	07-May-03	42	2.83E+09	8.82E+07	6.29E+06
X-326	25-3	7	11	07-May-03	3	2.02E+08	6.30E+06	4.49E+05
X-326	25-3	7	12	07-May-03	138	9.30E+09	2.90E+08	2.07E+07
X-326	25-3	8	1	16-Jun-09	8	5.51E+08	1.68E+07	8.97E+05
X-326	25-3	8	2	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	3	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	4	16-Jun-09	9	6.20E+08	1.89E+07	1.01E+06
X-326	25-3	8	5	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	6	16-Jun-09	5	3.44E+08	1.05E+07	5.60E+05
X-326	25-3	8	7	16-Jun-09	5	3.44E+08	1.05E+07	5.60E+05
X-326	25-3	8	8	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	9	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	10	16-Jun-09	6	4.13E+08	1.26E+07	6.72E+05
X-326	25-3	8	11	16-Jun-09	5	3.44E+08	1.05E+07	5.60E+05
X-326	25-3	8	12	16-Jun-09	5	3.44E+08	1.05E+07	5.60E+05
X-326	25-3	9	1	04-Aug-09	11	6.09E+08	2.31E+07	1.61E+06
X-326	25-3	9	2	04-Aug-09	12	6.64E+08	2.52E+07	1.76E+06
X-326	25-3	9	3	04-Aug-09	8	4.43E+08	1.68E+07	1.17E+06
X-326	25-3	9	4	04-Aug-09	6	3.32E+08	1.26E+07	8.79E+05
X-326	25-3	9	5	04-Aug-09	8	4.43E+08	1.68E+07	1.17E+06
X-326	25-3	9	6	04-Aug-09	8	4.43E+08	1.68E+07	1.17E+06
X-326	25-3	9	7	04-Aug-09	6	3.32E+08	1.26E+07	8.79E+05
X-326	25-3	9	8	04-Aug-09	6	3.32E+08	1.26E+07	8.79E+05
X-326	25-3	9	9	04-Aug-09	8	4.43E+08	1.68E+07	1.17E+06
X-326	25-3	9	10	04-Aug-09	6	3.32E+08	1.26E+07	8.79E+05
X-326	25-3	9	11	04-Aug-09	8	4.43E+08	1.68E+07	1.17E+06
X-326	25-3	9	12	04-Aug-09	9	4.98E+08	1.89E+07	1.32E+06
X-326	25-3	10	1	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	10	2	03-Nov-09	6	4.04E+08	1.26E+07	6.88E+05
X-326	25-3	10	3	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	10	4	03-Nov-09	6	4.04E+08	1.26E+07	6.88E+05
X-326	25-3	10	5	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	10	6	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	10	7	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	10	8	03-Nov-09	11	7.41E+08	2.31E+07	1.26E+06
X-326	25-3	10	9	03-Nov-09	9	6.07E+08	1.89E+07	1.03E+06
X-326	25-3	10	10	03-Nov-09	6	4.04E+08	1.26E+07	6.88E+05
X-326	25-3	10	11	03-Nov-09	6	4.04E+08	1.26E+07	6.88E+05
X-326	25-3	10	12	03-Nov-09	8	5.39E+08	1.68E+07	9.18E+05
X-326	25-3	11	1	23-Jan-04	3	1.71E+08	6.30E+06	4.30E+05
X-326	25-3	11	2	23-Jan-04	9	5.12E+08	1.89E+07	1.29E+06
X-326	25-3	11	3	23-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	11	4	23-Jan-04	186	1.06E+10	3.91E+08	2.67E+07
X-326	25-3	11	5	23-Jan-04	37.5	2.13E+09	7.88E+07	5.38E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-3	11	6	23-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	11	7	23-Jan-04	151.5	8.62E+09	3.18E+08	2.17E+07
X-326	25-3	11	8	23-Jan-04	58.5	3.33E+09	1.23E+08	8.39E+06
X-326	25-3	11	9	23-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	11	10	23-Jan-04	165	9.39E+09	3.47E+08	2.37E+07
X-326	25-3	11	11	23-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	11	12	23-Jan-04	109.5	6.23E+09	2.30E+08	1.57E+07
X-326	25-3	12	1	07-Jan-10	14	8.86E+08	2.94E+07	1.67E+06
X-326	25-3	12	2	07-Jan-10	15	9.49E+08	3.15E+07	1.78E+06
X-326	25-3	12	3	07-Jan-10	15	9.49E+08	3.15E+07	1.78E+06
X-326	25-3	12	4	07-Jan-10	18	1.14E+09	3.78E+07	2.14E+06
X-326	25-3	12	5	07-Jan-10	21	1.33E+09	4.41E+07	2.50E+06
X-326	25-3	12	6	07-Jan-10	26	1.64E+09	5.46E+07	3.09E+06
X-326	25-3	12	7	07-Jan-10	9	5.69E+08	1.89E+07	1.07E+06
X-326	25-3	12	8	07-Jan-10	14	8.86E+08	2.94E+07	1.67E+06
X-326	25-3	12	9	07-Jan-10	9	5.69E+08	1.89E+07	1.07E+06
X-326	25-3	12	10	07-Jan-10	9	5.69E+08	1.89E+07	1.07E+06
X-326	25-3	12	11	07-Jan-10	9	5.69E+08	1.89E+07	1.07E+06
X-326	25-3	12	12	07-Jan-10	8	5.06E+08	1.68E+07	9.52E+05
X-326	25-3	13	1	02-Jun-03	31.5	1.79E+09	6.62E+07	4.42E+06
X-326	25-3	13	2	02-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	13	3	02-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	13	4	02-Jun-03	52.5	2.99E+09	1.10E+08	7.37E+06
X-326	25-3	13	5	02-Jun-03	18	1.02E+09	3.78E+07	2.53E+06
X-326	25-3	13	6	02-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	13	7	02-Jun-03	63	3.58E+09	1.32E+08	8.85E+06
X-326	25-3	13	8	02-Jun-03	159	9.04E+09	3.34E+08	2.23E+07
X-326	25-3	13	9	02-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	13	10	02-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	13	11	02-Jun-03	90	5.12E+09	1.89E+08	1.26E+07
X-326	25-3	13	12	02-Jun-03	250.5	1.42E+10	5.26E+08	3.52E+07
X-326	25-3	14	1	02-Sep-09	9	3.15E+08	1.89E+07	1.94E+06
X-326	25-3	14	2	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	3	02-Sep-09	11	3.85E+08	2.31E+07	2.37E+06
X-326	25-3	14	4	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	5	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	6	02-Sep-09	9	3.15E+08	1.89E+07	1.94E+06
X-326	25-3	14	7	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	8	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	9	02-Sep-09	8	2.80E+08	1.68E+07	1.72E+06
X-326	25-3	14	10	02-Sep-09	6	2.10E+08	1.26E+07	1.29E+06
X-326	25-3	14	11	02-Sep-09	6	2.10E+08	1.26E+07	1.29E+06
X-326	25-3	14	12	02-Sep-09	12	4.20E+08	2.52E+07	2.58E+06
X-326	25-3	15	1	03-Jun-03	183	1.04E+10	3.84E+08	2.51E+07
X-326	25-3	15	2	03-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	15	3	03-Jun-03	261	1.48E+10	5.48E+08	3.59E+07
X-326	25-3	15	4	03-Jun-03	39	2.22E+09	8.19E+07	5.36E+06
X-326	25-3	15	5	03-Jun-03	318	1.81E+10	6.68E+08	4.37E+07
X-326	25-3	15	6	03-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	15	7	03-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	15	8	03-Jun-03	252	1.43E+10	5.29E+08	3.46E+07
X-326	25-3	15	9	03-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	15	10	03-Jun-03	322.5	1.83E+10	6.77E+08	4.43E+07
X-326	25-3	15	11	03-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	15	12	03-Jun-03	241.5	1.37E+10	5.07E+08	3.32E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-3	16	1	20-Nov-09	9	4.65E+08	1.89E+07	1.10E+06
X-326	25-3	16	2	20-Nov-09	8	4.13E+08	1.68E+07	9.81E+05
X-326	25-3	16	3	20-Nov-09	11	5.68E+08	2.31E+07	1.35E+06
X-326	25-3	16	4	20-Nov-09	23	1.19E+09	4.83E+07	2.82E+06
X-326	25-3	16	5	20-Nov-09	9	4.65E+08	1.89E+07	1.10E+06
X-326	25-3	16	6	20-Nov-09	9	4.65E+08	1.89E+07	1.10E+06
X-326	25-3	16	7	20-Nov-09	17	8.78E+08	3.57E+07	2.09E+06
X-326	25-3	16	8	20-Nov-09	18	9.30E+08	3.78E+07	2.21E+06
X-326	25-3	16	9	20-Nov-09	9	4.65E+08	1.89E+07	1.10E+06
X-326	25-3	16	10	20-Nov-09	8	4.13E+08	1.68E+07	9.81E+05
X-326	25-3	16	11	20-Nov-09	8	4.13E+08	1.68E+07	9.81E+05
X-326	25-3	16	12	20-Nov-09	9	4.65E+08	1.89E+07	1.10E+06
X-326	25-3	17	1	02-Oct-09	8	4.55E+08	1.68E+07	1.07E+06
X-326	25-3	17	2	02-Oct-09	11	6.26E+08	2.31E+07	1.48E+06
X-326	25-3	17	3	02-Oct-09	17	9.67E+08	3.57E+07	2.28E+06
X-326	25-3	17	4	02-Oct-09	9	5.12E+08	1.89E+07	1.21E+06
X-326	25-3	17	5	02-Oct-09	12	6.83E+08	2.52E+07	1.61E+06
X-326	25-3	17	6	02-Oct-09	15	8.53E+08	3.15E+07	2.01E+06
X-326	25-3	17	7	02-Oct-09	12	6.83E+08	2.52E+07	1.61E+06
X-326	25-3	17	8	02-Oct-09	15	8.53E+08	3.15E+07	2.01E+06
X-326	25-3	17	9	02-Oct-09	30	1.71E+09	6.30E+07	4.02E+06
X-326	25-3	17	10	02-Oct-09	32	1.82E+09	6.72E+07	4.29E+06
X-326	25-3	17	11	02-Oct-09	30	1.71E+09	6.30E+07	4.02E+06
X-326	25-3	17	12	02-Oct-09	33	1.88E+09	6.93E+07	4.43E+06
X-326	25-3	18	1	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	2	28-Jan-10	6	3.26E+08	1.26E+07	7.55E+05
X-326	25-3	18	3	28-Jan-10	11	5.98E+08	2.31E+07	1.38E+06
X-326	25-3	18	4	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	5	28-Jan-10	11	5.98E+08	2.31E+07	1.38E+06
X-326	25-3	18	6	28-Jan-10	11	5.98E+08	2.31E+07	1.38E+06
X-326	25-3	18	7	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	8	28-Jan-10	8	4.35E+08	1.68E+07	1.01E+06
X-326	25-3	18	9	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	10	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	11	28-Jan-10	9	4.89E+08	1.89E+07	1.13E+06
X-326	25-3	18	12	28-Jan-10	11	5.98E+08	2.31E+07	1.38E+06
X-326	25-3	19	1	28-Dec-09	9	4.73E+08	1.89E+07	1.18E+06
X-326	25-3	19	2	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	3	28-Dec-09	9	4.73E+08	1.89E+07	1.18E+06
X-326	25-3	19	4	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	5	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	6	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	7	28-Dec-09	6	3.15E+08	1.26E+07	7.89E+05
X-326	25-3	19	8	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	9	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	19	10	28-Dec-09	9	4.73E+08	1.89E+07	1.18E+06
X-326	25-3	19	11	28-Dec-09	9	4.73E+08	1.89E+07	1.18E+06
X-326	25-3	19	12	28-Dec-09	8	4.20E+08	1.68E+07	1.05E+06
X-326	25-3	20	1	09-Jun-03	67.5	3.67E+09	1.42E+08	8.68E+06
X-326	25-3	20	2	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	3	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	4	09-Jun-03	237	1.29E+10	4.98E+08	3.05E+07
X-326	25-3	20	5	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	6	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	7	09-Jun-03	220.5	1.20E+10	4.63E+08	2.84E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-3	20	8	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	9	09-Jun-03	103.5	5.63E+09	2.17E+08	1.33E+07
X-326	25-3	20	10	09-Jun-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-3	20	11	09-Jun-03	52.5	2.86E+09	1.10E+08	6.75E+06
X-326	25-3	20	12	09-Jun-03	153	8.32E+09	3.21E+08	1.97E+07
X-326	25-4	1	1	17-Nov-10	9	5.58E+08	1.89E+07	9.07E+05
X-326	25-4	1	2	17-Nov-10	14	8.68E+08	2.94E+07	1.41E+06
X-326	25-4	1	3	17-Nov-10	9	5.58E+08	1.89E+07	9.07E+05
X-326	25-4	1	4	17-Nov-10	9	5.58E+08	1.89E+07	9.07E+05
X-326	25-4	1	5	17-Nov-10	9	5.58E+08	1.89E+07	9.07E+05
X-326	25-4	1	6	17-Nov-10	14	8.68E+08	2.94E+07	1.41E+06
X-326	25-4	1	7	17-Nov-10	12	7.44E+08	2.52E+07	1.21E+06
X-326	25-4	1	8	17-Nov-10	14	8.68E+08	2.94E+07	1.41E+06
X-326	25-4	1	9	17-Nov-10	14	8.68E+08	2.94E+07	1.41E+06
X-326	25-4	1	10	17-Nov-10	15	9.30E+08	3.15E+07	1.51E+06
X-326	25-4	1	11	17-Nov-10	12	7.44E+08	2.52E+07	1.21E+06
X-326	25-4	1	12	17-Nov-10	12	7.44E+08	2.52E+07	1.21E+06
X-326	25-4	2	1	10-Oct-03	36	2.72E+09	7.56E+07	1.62E+06
X-326	25-4	2	2	10-Oct-03	163.5	1.24E+10	3.43E+08	7.36E+06
X-326	25-4	2	3	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	4	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	5	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	6	10-Oct-03	72	5.44E+09	1.51E+08	3.24E+06
X-326	25-4	2	7	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	8	10-Oct-03	174	1.32E+10	3.65E+08	7.83E+06
X-326	25-4	2	9	10-Oct-03	91.5	6.92E+09	1.92E+08	4.12E+06
X-326	25-4	2	10	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	11	10-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	2	12	10-Oct-03	63	4.76E+09	1.32E+08	2.84E+06
X-326	25-4	3	1	10-Apr-11	5	3.13E+08	1.05E+07	4.87E+05
X-326	25-4	3	2	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	3	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	4	10-Apr-11	9	5.64E+08	1.89E+07	8.77E+05
X-326	25-4	3	5	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	6	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	7	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	8	10-Apr-11	9	5.64E+08	1.89E+07	8.77E+05
X-326	25-4	3	9	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	10	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	11	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	3	12	10-Apr-11	6	3.76E+08	1.26E+07	5.85E+05
X-326	25-4	4	1	22-Mar-11	8	5.64E+08	1.68E+07	3.81E+05
X-326	25-4	4	2	22-Mar-11	8	5.64E+08	1.68E+07	3.81E+05
X-326	25-4	4	3	22-Mar-11	11	7.75E+08	2.31E+07	5.23E+05
X-326	25-4	4	4	22-Mar-11	6	4.23E+08	1.26E+07	2.85E+05
X-326	25-4	4	5	22-Mar-11	5	3.52E+08	1.05E+07	2.38E+05
X-326	25-4	4	6	22-Mar-11	8	5.64E+08	1.68E+07	3.81E+05
X-326	25-4	4	7	22-Mar-11	8	5.64E+08	1.68E+07	3.81E+05
X-326	25-4	4	8	22-Mar-11	11	7.75E+08	2.31E+07	5.23E+05
X-326	25-4	4	9	22-Mar-11	15	1.06E+09	3.15E+07	7.14E+05
X-326	25-4	4	10	22-Mar-11	9	6.34E+08	1.89E+07	4.28E+05
X-326	25-4	4	11	22-Mar-11	14	9.86E+08	2.94E+07	6.66E+05
X-326	25-4	4	12	22-Mar-11	8	5.64E+08	1.68E+07	3.81E+05
X-326	25-4	5	1	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	2	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-4	5	3	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	4	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	5	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	6	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	7	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	8	27-Jan-04	111	7.02E+09	2.33E+08	1.05E+07
X-326	25-4	5	9	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	10	27-Jan-04	282	1.78E+10	5.92E+08	2.66E+07
X-326	25-4	5	11	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	5	12	27-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	1	08-Oct-03	16.5	1.16E+09	3.47E+07	8.28E+05
X-326	25-4	6	2	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	3	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	4	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	5	08-Oct-03	127.5	8.98E+09	2.68E+08	6.40E+06
X-326	25-4	6	6	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	7	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	8	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	9	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	10	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	11	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	6	12	08-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	7	1	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	2	11-Mar-11	9	5.69E+08	1.89E+07	8.18E+05
X-326	25-4	7	3	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	4	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	5	11-Mar-11	15	9.49E+08	3.15E+07	1.36E+06
X-326	25-4	7	6	11-Mar-11	107	6.77E+09	2.25E+08	9.73E+06
X-326	25-4	7	7	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	8	11-Mar-11	9	5.69E+08	1.89E+07	8.18E+05
X-326	25-4	7	9	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	10	11-Mar-11	8	5.06E+08	1.68E+07	7.27E+05
X-326	25-4	7	11	11-Mar-11	12	7.59E+08	2.52E+07	1.09E+06
X-326	25-4	7	12	11-Mar-11	12	7.59E+08	2.52E+07	1.09E+06
X-326	25-4	8	1	24-Sep-10	5	3.44E+08	1.05E+07	2.69E+05
X-326	25-4	8	2	24-Sep-10	5	3.44E+08	1.05E+07	2.69E+05
X-326	25-4	8	3	24-Sep-10	8	5.51E+08	1.68E+07	4.30E+05
X-326	25-4	8	4	24-Sep-10	6	4.13E+08	1.26E+07	3.22E+05
X-326	25-4	8	5	24-Sep-10	6	4.13E+08	1.26E+07	3.22E+05
X-326	25-4	8	6	24-Sep-10	5	3.44E+08	1.05E+07	2.69E+05
X-326	25-4	8	7	24-Sep-10	6	4.13E+08	1.26E+07	3.22E+05
X-326	25-4	8	8	24-Sep-10	5	3.44E+08	1.05E+07	2.69E+05
X-326	25-4	8	9	24-Sep-10	8	5.51E+08	1.68E+07	4.30E+05
X-326	25-4	8	10	24-Sep-10	6	4.13E+08	1.26E+07	3.22E+05
X-326	25-4	8	11	24-Sep-10	6	4.13E+08	1.26E+07	3.22E+05
X-326	25-4	8	12	24-Sep-10	8	5.51E+08	1.68E+07	4.30E+05
X-326	25-4	9	1	28-Aug-10	8	5.06E+08	1.68E+07	7.02E+05
X-326	25-4	9	2	28-Aug-10	5	3.16E+08	1.05E+07	4.39E+05
X-326	25-4	9	3	28-Aug-10	6	3.80E+08	1.26E+07	5.26E+05
X-326	25-4	9	4	28-Aug-10	6	3.80E+08	1.26E+07	5.26E+05
X-326	25-4	9	5	28-Aug-10	8	5.06E+08	1.68E+07	7.02E+05
X-326	25-4	9	6	28-Aug-10	9	5.69E+08	1.89E+07	7.89E+05
X-326	25-4	9	7	28-Aug-10	9	5.69E+08	1.89E+07	7.89E+05
X-326	25-4	9	8	28-Aug-10	8	5.06E+08	1.68E+07	7.02E+05
X-326	25-4	9	9	28-Aug-10	6	3.80E+08	1.26E+07	5.26E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-4	9	10	28-Aug-10	5	3.16E+08	1.05E+07	4.39E+05
X-326	25-4	9	11	28-Aug-10	5	3.16E+08	1.05E+07	4.39E+05
X-326	25-4	9	12	28-Aug-10	5	3.16E+08	1.05E+07	4.39E+05
X-326	25-4	10	1	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	2	06-Oct-03	234	1.65E+10	4.91E+08	1.30E+07
X-326	25-4	10	3	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	4	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	5	06-Oct-03	6	4.23E+08	1.26E+07	3.33E+05
X-326	25-4	10	6	06-Oct-03	205.5	1.45E+10	4.32E+08	1.14E+07
X-326	25-4	10	7	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	8	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	9	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	10	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	11	06-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	10	12	06-Oct-03	114	8.03E+09	2.39E+08	6.33E+06
X-326	25-4	11	1	15-Jul-10	8	4.96E+08	1.68E+07	6.77E+05
X-326	25-4	11	2	15-Jul-10	9	5.58E+08	1.89E+07	7.61E+05
X-326	25-4	11	3	15-Jul-10	6	3.72E+08	1.26E+07	5.07E+05
X-326	25-4	11	4	15-Jul-10	8	4.96E+08	1.68E+07	6.77E+05
X-326	25-4	11	5	15-Jul-10	14	8.68E+08	2.94E+07	1.18E+06
X-326	25-4	11	6	15-Jul-10	9	5.58E+08	1.89E+07	7.61E+05
X-326	25-4	11	7	15-Jul-10	8	4.96E+08	1.68E+07	6.77E+05
X-326	25-4	11	8	15-Jul-10	9	5.58E+08	1.89E+07	7.61E+05
X-326	25-4	11	9	15-Jul-10	6	3.72E+08	1.26E+07	5.07E+05
X-326	25-4	11	10	15-Jul-10	6	3.72E+08	1.26E+07	5.07E+05
X-326	25-4	11	11	15-Jul-10	8	4.96E+08	1.68E+07	6.77E+05
X-326	25-4	11	12	15-Jul-10	9	5.58E+08	1.89E+07	7.61E+05
X-326	25-4	12	1	02-Oct-03	228	1.52E+10	4.79E+08	1.33E+07
X-326	25-4	12	2	02-Oct-03	73.5	4.90E+09	1.54E+08	4.28E+06
X-326	25-4	12	3	02-Oct-03	21	1.40E+09	4.41E+07	1.22E+06
X-326	25-4	12	4	02-Oct-03	393	2.62E+10	8.25E+08	2.29E+07
X-326	25-4	12	5	02-Oct-03	97.5	6.50E+09	2.05E+08	5.68E+06
X-326	25-4	12	6	02-Oct-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	12	7	02-Oct-03	289.5	1.93E+10	6.08E+08	1.69E+07
X-326	25-4	12	8	02-Oct-03	39	2.60E+09	8.19E+07	2.27E+06
X-326	25-4	12	9	02-Oct-03	259.5	1.73E+10	5.45E+08	1.51E+07
X-326	25-4	12	10	02-Oct-03	148.5	9.90E+09	3.12E+08	8.65E+06
X-326	25-4	12	11	02-Oct-03	40.5	2.70E+09	8.51E+07	2.36E+06
X-326	25-4	12	12	02-Oct-03	354	2.36E+10	7.43E+08	2.06E+07
X-326	25-4	13	1	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	2	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	3	11-Aug-10	11	5.25E+08	2.31E+07	8.96E+05
X-326	25-4	13	4	11-Aug-10	6	2.86E+08	1.26E+07	4.89E+05
X-326	25-4	13	5	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	6	11-Aug-10	9	4.29E+08	1.89E+07	7.33E+05
X-326	25-4	13	7	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	8	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	9	11-Aug-10	9	4.29E+08	1.89E+07	7.33E+05
X-326	25-4	13	10	11-Aug-10	6	2.86E+08	1.26E+07	4.89E+05
X-326	25-4	13	11	11-Aug-10	8	3.82E+08	1.68E+07	6.52E+05
X-326	25-4	13	12	11-Aug-10	9	4.29E+08	1.89E+07	7.33E+05
X-326	25-4	14	1	10-Sep-03	73.5	5.77E+09	1.54E+08	4.48E+06
X-326	25-4	14	2	10-Sep-03	187.5	1.47E+10	3.94E+08	1.14E+07
X-326	25-4	14	3	10-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	14	4	10-Sep-03	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-4	14	5	10-Sep-03	93	7.30E+09	1.95E+08	5.67E+06
X-326	25-4	14	6	10-Sep-03	286.5	2.25E+10	6.02E+08	1.75E+07
X-326	25-4	14	7	10-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	14	8	10-Sep-03	72	5.65E+09	1.51E+08	4.39E+06
X-326	25-4	14	9	10-Sep-03	189	1.48E+10	3.97E+08	1.15E+07
X-326	25-4	14	10	10-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	14	11	10-Sep-03	136.5	1.07E+10	2.87E+08	8.33E+06
X-326	25-4	14	12	10-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	15	1	11-Sep-10	6	3.88E+08	1.26E+07	4.64E+05
X-326	25-4	15	2	11-Sep-10	6	3.88E+08	1.26E+07	4.64E+05
X-326	25-4	15	3	11-Sep-10	8	5.17E+08	1.68E+07	6.19E+05
X-326	25-4	15	4	11-Sep-10	6	3.88E+08	1.26E+07	4.64E+05
X-326	25-4	15	5	11-Sep-10	9	5.81E+08	1.89E+07	6.97E+05
X-326	25-4	15	6	11-Sep-10	8	5.17E+08	1.68E+07	6.19E+05
X-326	25-4	15	7	11-Sep-10	6	3.88E+08	1.26E+07	4.64E+05
X-326	25-4	15	8	11-Sep-10	8	5.17E+08	1.68E+07	6.19E+05
X-326	25-4	15	9	11-Sep-10	9	5.81E+08	1.89E+07	6.97E+05
X-326	25-4	15	10	11-Sep-10	9	5.81E+08	1.89E+07	6.97E+05
X-326	25-4	15	11	11-Sep-10	11	7.10E+08	2.31E+07	8.51E+05
X-326	25-4	15	12	11-Sep-10	23	1.49E+09	4.83E+07	1.78E+06
X-326	25-4	16	1	09-Sep-03	4.5	4.29E+08	9.45E+06	2.87E+05
X-326	25-4	16	2	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	3	09-Sep-03	57	5.44E+09	1.20E+08	3.64E+06
X-326	25-4	16	4	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	5	09-Sep-03	127.5	1.22E+10	2.68E+08	8.13E+06
X-326	25-4	16	6	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	7	09-Sep-03	132	1.26E+10	2.77E+08	8.42E+06
X-326	25-4	16	8	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	9	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	10	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	16	11	09-Sep-03	240	2.29E+10	5.04E+08	1.53E+07
X-326	25-4	16	12	09-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	1	18-Feb-04	97.5	6.30E+09	2.05E+08	7.35E+06
X-326	25-4	17	2	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	3	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	4	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	5	18-Feb-04	267	1.72E+10	5.61E+08	2.01E+07
X-326	25-4	17	6	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	7	18-Feb-04	124.5	8.04E+09	2.61E+08	9.39E+06
X-326	25-4	17	8	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	9	18-Feb-04	199.5	1.29E+10	4.19E+08	1.50E+07
X-326	25-4	17	10	18-Feb-04	43.5	2.81E+09	9.14E+07	3.28E+06
X-326	25-4	17	11	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	17	12	18-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	18	1	08-Sep-03	25.5	1.52E+09	5.36E+07	1.70E+06
X-326	25-4	18	2	08-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	18	3	26-Aug-04	51	3.04E+09	1.07E+08	3.40E+06
X-326	25-4	18	4	08-Sep-03	100.5	5.99E+09	2.11E+08	6.70E+06
X-326	25-4	18	5	08-Sep-03	295.5	1.76E+10	6.21E+08	1.97E+07
X-326	25-4	18	6	08-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	18	7	08-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	18	8	08-Sep-03	136.5	8.14E+09	2.87E+08	9.10E+06
X-326	25-4	18	9	08-Sep-03	265.5	1.58E+10	5.58E+08	1.77E+07
X-326	25-4	18	10	08-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	18	11	08-Sep-03	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-4	18	12	08-Sep-03	244.5	1.46E+10	5.13E+08	1.63E+07
X-326	25-4	19	1	04-Sep-03	4.5	2.91E+08	9.45E+06	3.26E+05
X-326	25-4	19	2	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	3	04-Sep-03	282	1.82E+10	5.92E+08	2.04E+07
X-326	25-4	19	4	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	5	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	6	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	7	04-Sep-03	76.5	4.94E+09	1.61E+08	5.54E+06
X-326	25-4	19	8	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	9	04-Sep-03	133.5	8.62E+09	2.80E+08	9.67E+06
X-326	25-4	19	10	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	11	04-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	19	12	04-Sep-03	27	1.74E+09	5.67E+07	1.96E+06
X-326	25-4	20	1	05-Sep-03	15	9.39E+08	3.15E+07	1.04E+06
X-326	25-4	20	2	05-Sep-03	253.5	1.59E+10	5.32E+08	1.76E+07
X-326	25-4	20	3	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	4	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	5	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	6	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	7	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	8	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	9	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	10	05-Sep-03	67.5	4.23E+09	1.42E+08	4.69E+06
X-326	25-4	20	11	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-4	20	12	05-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	1	1	22-Mar-11	17	1.23E+09	3.57E+07	7.40E+05
X-326	25-5	1	2	22-Mar-11	14	1.01E+09	2.94E+07	6.09E+05
X-326	25-5	1	3	22-Mar-11	32	2.31E+09	6.72E+07	1.39E+06
X-326	25-5	1	4	22-Mar-11	24	1.73E+09	5.04E+07	1.04E+06
X-326	25-5	1	5	22-Mar-11	27	1.95E+09	5.67E+07	1.17E+06
X-326	25-5	1	6	22-Mar-11	38	2.74E+09	7.98E+07	1.65E+06
X-326	25-5	1	7	22-Mar-11	8	5.77E+08	1.68E+07	3.48E+05
X-326	25-5	1	8	22-Mar-11	6	4.33E+08	1.26E+07	2.61E+05
X-326	25-5	1	9	22-Mar-11	6	4.33E+08	1.26E+07	2.61E+05
X-326	25-5	1	10	22-Mar-11	5	3.60E+08	1.05E+07	2.18E+05
X-326	25-5	1	11	22-Mar-11	6	4.33E+08	1.26E+07	2.61E+05
X-326	25-5	1	12	22-Mar-11	8	5.77E+08	1.68E+07	3.48E+05
X-326	25-5	2	1	26-Mar-10	9	6.58E+08	1.89E+07	1.56E+05
X-326	25-5	2	2	26-Mar-10	9	6.58E+08	1.89E+07	1.56E+05
X-326	25-5	2	3	26-Mar-10	12	8.77E+08	2.52E+07	2.08E+05
X-326	25-5	2	4	26-Mar-10	9	6.58E+08	1.89E+07	1.56E+05
X-326	25-5	2	5	26-Mar-10	9	6.58E+08	1.89E+07	1.56E+05
X-326	25-5	2	6	26-Mar-10	14	1.02E+09	2.94E+07	2.43E+05
X-326	25-5	2	7	26-Mar-10	14	1.02E+09	2.94E+07	2.43E+05
X-326	25-5	2	8	26-Mar-10	11	8.04E+08	2.31E+07	1.91E+05
X-326	25-5	2	9	26-Mar-10	14	1.02E+09	2.94E+07	2.43E+05
X-326	25-5	2	10	26-Mar-10	11	8.04E+08	2.31E+07	1.91E+05
X-326	25-5	2	11	26-Mar-10	23	1.68E+09	4.83E+07	3.99E+05
X-326	25-5	2	12	26-Mar-10	48	3.51E+09	1.01E+08	8.34E+05
X-326	25-5	3	1	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	2	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	3	14-Jul-10	8	4.96E+08	1.68E+07	3.36E+05
X-326	25-5	3	4	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	5	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	6	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-5	3	7	14-Jul-10	5	3.10E+08	1.05E+07	2.10E+05
X-326	25-5	3	8	14-Jul-10	5	3.10E+08	1.05E+07	2.10E+05
X-326	25-5	3	9	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	10	14-Jul-10	5	3.10E+08	1.05E+07	2.10E+05
X-326	25-5	3	11	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	3	12	14-Jul-10	6	3.72E+08	1.26E+07	2.52E+05
X-326	25-5	4	1	23-Jul-10	8	6.99E+08	1.68E+07	1.39E+05
X-326	25-5	4	2	23-Jul-10	8	6.99E+08	1.68E+07	1.39E+05
X-326	25-5	4	3	23-Jul-10	12	1.05E+09	2.52E+07	2.08E+05
X-326	25-5	4	4	23-Jul-10	8	6.99E+08	1.68E+07	1.39E+05
X-326	25-5	4	5	23-Jul-10	11	9.61E+08	2.31E+07	1.91E+05
X-326	25-5	4	6	23-Jul-10	12	1.05E+09	2.52E+07	2.08E+05
X-326	25-5	4	7	23-Jul-10	6	5.24E+08	1.26E+07	1.04E+05
X-326	25-5	4	8	23-Jul-10	6	5.24E+08	1.26E+07	1.04E+05
X-326	25-5	4	9	23-Jul-10	6	5.24E+08	1.26E+07	1.04E+05
X-326	25-5	4	10	23-Jul-10	6	5.24E+08	1.26E+07	1.04E+05
X-326	25-5	4	11	23-Jul-10	8	6.99E+08	1.68E+07	1.39E+05
X-326	25-5	4	12	23-Jul-10	6	5.24E+08	1.26E+07	1.04E+05
X-326	25-5	5	1	30-Nov-10	8	5.84E+08	1.68E+07	3.23E+05
X-326	25-5	5	2	30-Nov-10	8	5.84E+08	1.68E+07	3.23E+05
X-326	25-5	5	3	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	4	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	5	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	6	30-Nov-10	12	8.75E+08	2.52E+07	4.84E+05
X-326	25-5	5	7	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	8	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	9	30-Nov-10	12	8.75E+08	2.52E+07	4.84E+05
X-326	25-5	5	10	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	11	30-Nov-10	9	6.56E+08	1.89E+07	3.63E+05
X-326	25-5	5	12	30-Nov-10	8	5.84E+08	1.68E+07	3.23E+05
X-326	25-5	6	1	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	2	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	3	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	4	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	5	12-Jan-04	84	4.73E+09	1.76E+08	4.16E+07
X-326	25-5	6	6	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	7	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	8	12-Jan-04	121.5	6.85E+09	2.55E+08	6.01E+07
X-326	25-5	6	9	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	10	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	6	11	12-Jan-04	225	1.27E+10	4.73E+08	1.11E+08
X-326	25-5	6	12	12-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	1	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	2	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	3	10-Nov-03	6	4.48E+08	1.26E+07	2.35E+05
X-326	25-5	7	4	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	5	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	6	30-Aug-04	20	1.49E+09	4.20E+07	7.83E+05
X-326	25-5	7	7	10-Nov-03	6	4.48E+08	1.26E+07	2.35E+05
X-326	25-5	7	8	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	9	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	10	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	7	11	30-Aug-04	98	7.32E+09	2.06E+08	3.83E+06
X-326	25-5	7	12	10-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	1	06-Jan-04	111	7.48E+09	2.33E+08	2.36E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-5	8	2	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	3	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	4	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	5	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	6	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	7	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	8	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	9	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	10	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	11	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	8	12	06-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	9	1	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	2	06-Oct-10	2	1.28E+08	4.20E+06	7.54E+04
X-326	25-5	9	3	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	4	06-Oct-10	2	1.28E+08	4.20E+06	7.54E+04
X-326	25-5	9	5	06-Oct-10	2	1.28E+08	4.20E+06	7.54E+04
X-326	25-5	9	6	06-Oct-10	2	1.28E+08	4.20E+06	7.54E+04
X-326	25-5	9	7	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	8	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	9	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	10	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	11	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	9	12	06-Oct-10	3	1.92E+08	6.30E+06	1.13E+05
X-326	25-5	10	1	02-Jan-04	286.5	2.19E+10	6.02E+08	2.10E+08
X-326	25-5	10	2	02-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	10	3	02-Jan-04	156	1.19E+10	3.28E+08	1.15E+08
X-326	25-5	10	4	02-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	10	5	02-Jan-04	102	7.81E+09	2.14E+08	7.49E+07
X-326	25-5	10	6	02-Jan-04	21	1.61E+09	4.41E+07	1.54E+07
X-326	25-5	10	7	02-Jan-04	153	1.17E+10	3.21E+08	1.12E+08
X-326	25-5	10	8	02-Jan-04	40.5	3.10E+09	8.51E+07	2.97E+07
X-326	25-5	10	9	02-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	10	10	02-Jan-04	226.5	1.73E+10	4.76E+08	1.66E+08
X-326	25-5	10	11	02-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	10	12	02-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	11	1	16-Jul-10	6	4.65E+08	1.26E+07	2.18E+05
X-326	25-5	11	2	16-Jul-10	6	4.65E+08	1.26E+07	2.18E+05
X-326	25-5	11	3	16-Jul-10	9	6.98E+08	1.89E+07	3.26E+05
X-326	25-5	11	4	16-Jul-10	5	3.88E+08	1.05E+07	1.81E+05
X-326	25-5	11	5	16-Jul-10	5	3.88E+08	1.05E+07	1.81E+05
X-326	25-5	11	6	16-Jul-10	8	6.20E+08	1.68E+07	2.90E+05
X-326	25-5	11	7	16-Jul-10	9	6.98E+08	1.89E+07	3.26E+05
X-326	25-5	11	8	16-Jul-10	11	8.53E+08	2.31E+07	3.99E+05
X-326	25-5	11	9	16-Jul-10	17	1.32E+09	3.57E+07	6.16E+05
X-326	25-5	11	10	16-Jul-10	8	6.20E+08	1.68E+07	2.90E+05
X-326	25-5	11	11	16-Jul-10	8	6.20E+08	1.68E+07	2.90E+05
X-326	25-5	11	12	16-Jul-10	11	8.53E+08	2.31E+07	3.99E+05
X-326	25-5	12	1	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	12	2	20-May-10	6	4.54E+08	1.26E+07	2.20E+05
X-326	25-5	12	3	20-May-10	9	6.80E+08	1.89E+07	3.30E+05
X-326	25-5	12	4	20-May-10	9	6.80E+08	1.89E+07	3.30E+05
X-326	25-5	12	5	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	12	6	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	12	7	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	12	8	20-May-10	9	6.80E+08	1.89E+07	3.30E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-5	12	9	20-May-10	9	6.80E+08	1.89E+07	3.30E+05
X-326	25-5	12	10	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	12	11	20-May-10	9	6.80E+08	1.89E+07	3.30E+05
X-326	25-5	12	12	20-May-10	8	6.05E+08	1.68E+07	2.93E+05
X-326	25-5	13	1	13-Nov-03	30	2.48E+09	6.30E+07	1.04E+06
X-326	25-5	13	2	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	3	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	4	13-Nov-03	136.5	1.13E+10	2.87E+08	4.73E+06
X-326	25-5	13	5	13-Nov-03	445.5	3.68E+10	9.36E+08	1.54E+07
X-326	25-5	13	6	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	7	13-Nov-03	252	2.08E+10	5.29E+08	8.73E+06
X-326	25-5	13	8	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	9	13-Nov-03	142.5	1.18E+10	2.99E+08	4.94E+06
X-326	25-5	13	10	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	11	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	13	12	13-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	1	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	2	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	3	08-Dec-03	70.5	4.12E+09	1.48E+08	1.97E+06
X-326	25-5	14	4	08-Dec-03	327	1.91E+10	6.87E+08	9.13E+06
X-326	25-5	14	5	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	6	27-Aug-04	17	9.94E+08	3.57E+07	6.86E+05
X-326	25-5	14	7	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	8	08-Dec-03	280.5	1.64E+10	5.89E+08	7.83E+06
X-326	25-5	14	9	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	10	08-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	14	11	08-Dec-03	6	3.51E+08	1.26E+07	1.68E+05
X-326	25-5	14	12	08-Dec-03	265.5	1.55E+10	5.58E+08	7.41E+06
X-326	25-5	15	1	14-Nov-03	25.5	1.49E+09	5.36E+07	8.53E+05
X-326	25-5	15	2	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	3	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	4	14-Nov-03	52.5	3.07E+09	1.10E+08	1.76E+06
X-326	25-5	15	5	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	6	14-Nov-03	468	2.74E+10	9.83E+08	1.56E+07
X-326	25-5	15	7	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	8	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	9	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	10	14-Nov-03	282	1.65E+10	5.92E+08	9.43E+06
X-326	25-5	15	11	14-Nov-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	15	12	14-Nov-03	156	9.12E+09	3.28E+08	5.22E+06
X-326	25-5	16	1	05-Dec-03	300	2.21E+10	6.30E+08	3.82E+08
X-326	25-5	16	2	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	3	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	4	05-Dec-03	345	2.55E+10	7.25E+08	4.39E+08
X-326	25-5	16	5	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	6	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	7	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	8	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	9	05-Dec-03	102	7.53E+09	2.14E+08	1.30E+08
X-326	25-5	16	10	05-Dec-03	271.5	2.00E+10	5.70E+08	3.45E+08
X-326	25-5	16	11	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	16	12	05-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	17	1	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05
X-326	25-5	17	2	08-Nov-10	9	7.06E+08	1.89E+07	2.87E+05
X-326	25-5	17	3	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-5	17	4	08-Nov-10	9	7.06E+08	1.89E+07	2.87E+05
X-326	25-5	17	5	08-Nov-10	6	4.71E+08	1.26E+07	1.91E+05
X-326	25-5	17	6	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05
X-326	25-5	17	7	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05
X-326	25-5	17	8	08-Nov-10	11	8.63E+08	2.31E+07	3.50E+05
X-326	25-5	17	9	08-Nov-10	9	7.06E+08	1.89E+07	2.87E+05
X-326	25-5	17	10	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05
X-326	25-5	17	11	08-Nov-10	8	6.28E+08	1.68E+07	2.55E+05
X-326	25-5	17	12	08-Nov-10	9	7.06E+08	1.89E+07	2.87E+05
X-326	25-5	18	1	20-Jan-11	5	3.88E+08	1.05E+07	1.63E+05
X-326	25-5	18	2	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	3	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	4	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	5	20-Jan-11	8	6.20E+08	1.68E+07	2.61E+05
X-326	25-5	18	6	20-Jan-11	9	6.98E+08	1.89E+07	2.94E+05
X-326	25-5	18	7	20-Jan-11	8	6.20E+08	1.68E+07	2.61E+05
X-326	25-5	18	8	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	9	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	10	20-Jan-11	6	4.65E+08	1.26E+07	1.96E+05
X-326	25-5	18	11	20-Jan-11	8	6.20E+08	1.68E+07	2.61E+05
X-326	25-5	18	12	20-Jan-11	8	6.20E+08	1.68E+07	2.61E+05
X-326	25-5	19	1	02-Dec-03	42	3.30E+09	8.82E+07	1.29E+06
X-326	25-5	19	2	02-Dec-03	153	1.20E+10	3.21E+08	4.69E+06
X-326	25-5	19	3	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	4	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	5	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	6	02-Dec-03	154.5	1.21E+10	3.24E+08	4.74E+06
X-326	25-5	19	7	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	8	02-Dec-03	244.5	1.92E+10	5.13E+08	7.50E+06
X-326	25-5	19	9	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	10	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	11	02-Dec-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-5	19	12	02-Dec-03	273	2.14E+10	5.73E+08	8.37E+06
X-326	25-5	20	1	24-Jan-11	11	8.74E+08	2.31E+07	3.22E+05
X-326	25-5	20	2	24-Jan-11	12	9.54E+08	2.52E+07	3.51E+05
X-326	25-5	20	3	24-Jan-11	11	8.74E+08	2.31E+07	3.22E+05
X-326	25-5	20	4	24-Jan-11	14	1.11E+09	2.94E+07	4.10E+05
X-326	25-5	20	5	24-Jan-11	14	1.11E+09	2.94E+07	4.10E+05
X-326	25-5	20	6	24-Jan-11	12	9.54E+08	2.52E+07	3.51E+05
X-326	25-5	20	7	24-Jan-11	12	9.54E+08	2.52E+07	3.51E+05
X-326	25-5	20	8	24-Jan-11	11	8.74E+08	2.31E+07	3.22E+05
X-326	25-5	20	9	24-Jan-11	14	1.11E+09	2.94E+07	4.10E+05
X-326	25-5	20	10	24-Jan-11	11	8.74E+08	2.31E+07	3.22E+05
X-326	25-5	20	11	24-Jan-11	14	1.11E+09	2.94E+07	4.10E+05
X-326	25-5	20	12	24-Jan-11	9	7.15E+08	1.89E+07	2.64E+05
X-326	25-6	1	1	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	2	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	3	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	4	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	5	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	6	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	7	21-Jan-04	150	8.45E+09	3.15E+08	8.21E+07
X-326	25-6	1	8	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	9	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	10	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-6	1	11	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	1	12	21-Jan-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	2	1	06-Apr-04	93	7.79E+09	1.95E+08	2.89E+07
X-326	25-6	2	2	06-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	2	3	06-Apr-04	34.5	2.89E+09	7.25E+07	1.07E+07
X-326	25-6	2	4	06-Apr-04	231	1.94E+10	4.85E+08	7.18E+07
X-326	25-6	2	5	06-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	2	6	06-Apr-04	66	5.53E+09	1.39E+08	2.05E+07
X-326	25-6	2	7	06-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	2	8	06-Apr-04	286.5	2.40E+10	6.02E+08	8.90E+07
X-326	25-6	2	9	06-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	2	10	06-Apr-04	79.5	6.66E+09	1.67E+08	2.47E+07
X-326	25-6	2	11	06-Apr-04	312	2.61E+10	6.55E+08	9.70E+07
X-326	25-6	2	12	06-Apr-04	22.5	1.89E+09	4.73E+07	6.99E+06
X-326	25-6	3	1	31-Mar-09	10.5	8.04E+08	2.21E+07	3.11E+06
X-326	25-6	3	2	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	3	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	4	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	5	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	6	31-Mar-09	9	6.89E+08	1.89E+07	2.67E+06
X-326	25-6	3	7	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	8	31-Mar-09	10.5	8.04E+08	2.21E+07	3.11E+06
X-326	25-6	3	9	31-Mar-09	9	6.89E+08	1.89E+07	2.67E+06
X-326	25-6	3	10	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	3	11	31-Mar-09	4.5	3.44E+08	9.45E+06	1.33E+06
X-326	25-6	3	12	31-Mar-09	6	4.59E+08	1.26E+07	1.78E+06
X-326	25-6	4	1	11-Feb-09	6	6.27E+08	1.26E+07	1.46E+06
X-326	25-6	4	2	11-Feb-09	5	5.23E+08	1.05E+07	1.22E+06
X-326	25-6	4	3	11-Feb-09	8	8.36E+08	1.68E+07	1.95E+06
X-326	25-6	4	4	11-Feb-09	5	5.23E+08	1.05E+07	1.22E+06
X-326	25-6	4	5	11-Feb-09	6	6.27E+08	1.26E+07	1.46E+06
X-326	25-6	4	6	11-Feb-09	8	8.36E+08	1.68E+07	1.95E+06
X-326	25-6	4	7	11-Feb-09	6	6.27E+08	1.26E+07	1.46E+06
X-326	25-6	4	8	11-Feb-09	11	1.15E+09	2.31E+07	2.68E+06
X-326	25-6	4	9	11-Feb-09	6	6.27E+08	1.26E+07	1.46E+06
X-326	25-6	4	10	11-Feb-09	8	8.36E+08	1.68E+07	1.95E+06
X-326	25-6	4	11	11-Feb-09	8	8.36E+08	1.68E+07	1.95E+06
X-326	25-6	4	12	11-Feb-09	11	1.15E+09	2.31E+07	2.68E+06
X-326	25-6	5	1	03-Feb-04	13.5	1.03E+09	2.84E+07	1.02E+07
X-326	25-6	5	2	03-Feb-04	181.5	1.39E+10	3.81E+08	1.38E+08
X-326	25-6	5	3	03-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	5	4	03-Feb-04	69	5.28E+09	1.45E+08	5.24E+07
X-326	25-6	5	5	03-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	5	6	03-Feb-04	145.5	1.11E+10	3.06E+08	1.10E+08
X-326	25-6	5	7	03-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	5	8	03-Feb-04	139.5	1.07E+10	2.93E+08	1.06E+08
X-326	25-6	5	9	03-Feb-04	249	1.91E+10	5.23E+08	1.89E+08
X-326	25-6	5	10	03-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	5	11	03-Feb-04	145.5	1.11E+10	3.06E+08	1.10E+08
X-326	25-6	5	12	03-Feb-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	6	1	02-Feb-09	9	7.35E+08	1.89E+07	9.19E+04
X-326	25-6	6	2	02-Feb-09	7.5	6.13E+08	1.58E+07	7.65E+04
X-326	25-6	6	3	02-Feb-09	9	7.35E+08	1.89E+07	9.19E+04
X-326	25-6	6	4	02-Feb-09	6	4.90E+08	1.26E+07	6.12E+04
X-326	25-6	6	5	02-Feb-09	6	4.90E+08	1.26E+07	6.12E+04

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-6	6	6	02-Feb-09	7.5	6.13E+08	1.58E+07	7.65E+04
X-326	25-6	6	7	02-Feb-09	9	7.35E+08	1.89E+07	9.19E+04
X-326	25-6	6	8	02-Feb-09	6	4.90E+08	1.26E+07	6.12E+04
X-326	25-6	6	9	02-Feb-09	9	7.35E+08	1.89E+07	9.19E+04
X-326	25-6	6	10	02-Feb-09	13.5	1.10E+09	2.84E+07	1.38E+05
X-326	25-6	6	11	02-Feb-09	7.5	6.13E+08	1.58E+07	7.65E+04
X-326	25-6	6	12	02-Feb-09	7.5	6.13E+08	1.58E+07	7.65E+04
X-326	25-6	7	1	28-Jul-09	3	2.07E+08	6.30E+06	6.60E+05
X-326	25-6	7	2	28-Jul-09	5	3.44E+08	1.05E+07	1.10E+06
X-326	25-6	7	3	28-Jul-09	8	5.51E+08	1.68E+07	1.76E+06
X-326	25-6	7	4	28-Jul-09	11	7.58E+08	2.31E+07	2.42E+06
X-326	25-6	7	5	28-Jul-09	6	4.13E+08	1.26E+07	1.32E+06
X-326	25-6	7	6	28-Jul-09	6	4.13E+08	1.26E+07	1.32E+06
X-326	25-6	7	7	28-Jul-09	6	4.13E+08	1.26E+07	1.32E+06
X-326	25-6	7	8	28-Jul-09	5	3.44E+08	1.05E+07	1.10E+06
X-326	25-6	7	9	28-Jul-09	5	3.44E+08	1.05E+07	1.10E+06
X-326	25-6	7	10	28-Jul-09	5	3.44E+08	1.05E+07	1.10E+06
X-326	25-6	7	11	28-Jul-09	5	3.44E+08	1.05E+07	1.10E+06
X-326	25-6	7	12	28-Jul-09	6	4.13E+08	1.26E+07	1.32E+06
X-326	25-6	8	1	24-Sep-09	11	8.74E+08	2.31E+07	3.22E+06
X-326	25-6	8	2	24-Sep-09	6	4.77E+08	1.26E+07	1.76E+06
X-326	25-6	8	3	24-Sep-09	8	6.36E+08	1.68E+07	2.34E+06
X-326	25-6	8	4	24-Sep-09	11	8.74E+08	2.31E+07	3.22E+06
X-326	25-6	8	5	24-Sep-09	8	6.36E+08	1.68E+07	2.34E+06
X-326	25-6	8	6	24-Sep-09	6	4.77E+08	1.26E+07	1.76E+06
X-326	25-6	8	7	24-Sep-09	5	3.97E+08	1.05E+07	1.46E+06
X-326	25-6	8	8	24-Sep-09	6	4.77E+08	1.26E+07	1.76E+06
X-326	25-6	8	9	24-Sep-09	5	3.97E+08	1.05E+07	1.46E+06
X-326	25-6	8	10	24-Sep-09	6	4.77E+08	1.26E+07	1.76E+06
X-326	25-6	8	11	24-Sep-09	6	4.77E+08	1.26E+07	1.76E+06
X-326	25-6	8	12	24-Sep-09	8	6.36E+08	1.68E+07	2.34E+06
X-326	25-6	9	1	18-Oct-09	6	5.24E+08	1.26E+07	3.84E+06
X-326	25-6	9	2	18-Oct-09	8	6.99E+08	1.68E+07	5.12E+06
X-326	25-6	9	3	18-Oct-09	8	6.99E+08	1.68E+07	5.12E+06
X-326	25-6	9	4	18-Oct-09	8	6.99E+08	1.68E+07	5.12E+06
X-326	25-6	9	5	18-Oct-09	9	7.86E+08	1.89E+07	5.77E+06
X-326	25-6	9	6	18-Oct-09	6	5.24E+08	1.26E+07	3.84E+06
X-326	25-6	9	7	18-Oct-09	8	6.99E+08	1.68E+07	5.12E+06
X-326	25-6	9	8	18-Oct-09	8	6.99E+08	1.68E+07	5.12E+06
X-326	25-6	9	9	18-Oct-09	9	7.86E+08	1.89E+07	5.77E+06
X-326	25-6	9	10	18-Oct-09	9	7.86E+08	1.89E+07	5.77E+06
X-326	25-6	9	11	18-Oct-09	12	1.05E+09	2.52E+07	7.69E+06
X-326	25-6	9	12	18-Oct-09	6	5.24E+08	1.26E+07	3.84E+06
X-326	25-6	10	1	03-Jun-09	8	7.19E+08	1.68E+07	2.86E+06
X-326	25-6	10	2	03-Jun-09	8	7.19E+08	1.68E+07	2.86E+06
X-326	25-6	10	3	03-Jun-09	8	7.19E+08	1.68E+07	2.86E+06
X-326	25-6	10	4	03-Jun-09	5	4.49E+08	1.05E+07	1.79E+06
X-326	25-6	10	5	03-Jun-09	6	5.39E+08	1.26E+07	2.15E+06
X-326	25-6	10	6	03-Jun-09	8	7.19E+08	1.68E+07	2.86E+06
X-326	25-6	10	7	03-Jun-09	6	5.39E+08	1.26E+07	2.15E+06
X-326	25-6	10	8	03-Jun-09	6	5.39E+08	1.26E+07	2.15E+06
X-326	25-6	10	9	03-Jun-09	5	4.49E+08	1.05E+07	1.79E+06
X-326	25-6	10	10	03-Jun-09	5	4.49E+08	1.05E+07	1.79E+06
X-326	25-6	10	11	03-Jun-09	5	4.49E+08	1.05E+07	1.79E+06
X-326	25-6	10	12	03-Jun-09	6	5.39E+08	1.26E+07	2.15E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-6	11	1	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	2	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	3	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	4	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	5	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	6	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	7	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	8	01-Oct-10	5	4.43E+08	1.05E+07	5.10E+04
X-326	25-6	11	9	01-Oct-10	6	5.31E+08	1.26E+07	6.12E+04
X-326	25-6	11	10	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	11	01-Oct-10	3	2.66E+08	6.30E+06	3.06E+04
X-326	25-6	11	12	01-Oct-10	5	4.43E+08	1.05E+07	5.10E+04
X-326	25-6	12	1	03-Nov-09	8	8.00E+08	1.68E+07	3.31E+06
X-326	25-6	12	2	03-Nov-09	6	6.00E+08	1.26E+07	2.48E+06
X-326	25-6	12	3	03-Nov-09	8	8.00E+08	1.68E+07	3.31E+06
X-326	25-6	12	4	03-Nov-09	6	6.00E+08	1.26E+07	2.48E+06
X-326	25-6	12	5	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	12	6	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	12	7	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	12	8	03-Nov-09	12	1.20E+09	2.52E+07	4.96E+06
X-326	25-6	12	9	03-Nov-09	12	1.20E+09	2.52E+07	4.96E+06
X-326	25-6	12	10	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	12	11	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	12	12	03-Nov-09	9	9.00E+08	1.89E+07	3.72E+06
X-326	25-6	13	1	10-Dec-09	6	4.96E+08	1.26E+07	1.98E+06
X-326	25-6	13	2	10-Dec-09	8	6.61E+08	1.68E+07	2.64E+06
X-326	25-6	13	3	10-Dec-09	6	4.96E+08	1.26E+07	1.98E+06
X-326	25-6	13	4	10-Dec-09	9	7.44E+08	1.89E+07	2.97E+06
X-326	25-6	13	5	10-Dec-09	9	7.44E+08	1.89E+07	2.97E+06
X-326	25-6	13	6	10-Dec-09	6	4.96E+08	1.26E+07	1.98E+06
X-326	25-6	13	7	10-Dec-09	11	9.09E+08	2.31E+07	3.63E+06
X-326	25-6	13	8	10-Dec-09	17	1.41E+09	3.57E+07	5.61E+06
X-326	25-6	13	9	10-Dec-09	9	7.44E+08	1.89E+07	2.97E+06
X-326	25-6	13	10	10-Dec-09	8	6.61E+08	1.68E+07	2.64E+06
X-326	25-6	13	11	10-Dec-09	18	1.49E+09	3.78E+07	5.94E+06
X-326	25-6	13	12	10-Dec-09	12	9.92E+08	2.52E+07	3.96E+06
X-326	25-6	14	1	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	2	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	3	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	4	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	5	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	6	05-Mar-04	148.5	2.00E+10	3.12E+08	1.46E+06
X-326	25-6	14	7	05-Mar-04	21	2.83E+09	4.41E+07	2.07E+05
X-326	25-6	14	8	05-Mar-04	66	8.90E+09	1.39E+08	6.50E+05
X-326	25-6	14	9	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	10	05-Mar-04	199.5	2.69E+10	4.19E+08	1.97E+06
X-326	25-6	14	11	05-Mar-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	14	12	05-Mar-04	81	1.09E+10	1.70E+08	7.98E+05
X-326	25-6	15	1	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	2	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	3	12-Feb-10	12	9.42E+08	2.52E+07	1.56E+05
X-326	25-6	15	4	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	5	12-Feb-10	12	9.42E+08	2.52E+07	1.56E+05
X-326	25-6	15	6	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	7	12-Feb-10	8	6.28E+08	1.68E+07	1.04E+05

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-6	15	8	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	9	12-Feb-10	9	7.06E+08	1.89E+07	1.17E+05
X-326	25-6	15	10	12-Feb-10	8	6.28E+08	1.68E+07	1.04E+05
X-326	25-6	15	11	12-Feb-10	11	8.63E+08	2.31E+07	1.43E+05
X-326	25-6	15	12	12-Feb-10	14	1.10E+09	2.94E+07	1.82E+05
X-326	25-6	16	1	18-Aug-09	6	6.41E+08	1.26E+07	9.36E+05
X-326	25-6	16	2	18-Aug-09	8	8.55E+08	1.68E+07	1.25E+06
X-326	25-6	16	3	18-Aug-09	8	8.55E+08	1.68E+07	1.25E+06
X-326	25-6	16	4	18-Aug-09	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	16	5	18-Aug-09	6	6.41E+08	1.26E+07	9.36E+05
X-326	25-6	16	6	18-Aug-09	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	16	7	18-Aug-09	9	9.62E+08	1.89E+07	1.40E+06
X-326	25-6	16	8	18-Aug-09	15	1.60E+09	3.15E+07	2.34E+06
X-326	25-6	16	9	18-Aug-09	14	1.50E+09	2.94E+07	2.18E+06
X-326	25-6	16	10	18-Aug-09	6	6.41E+08	1.26E+07	9.36E+05
X-326	25-6	16	11	18-Aug-09	6	6.41E+08	1.26E+07	9.36E+05
X-326	25-6	16	12	18-Aug-09	6	6.41E+08	1.26E+07	9.36E+05
X-326	25-6	17	1	09-Apr-10	8	6.70E+08	1.68E+07	2.42E+06
X-326	25-6	17	2	09-Apr-10	5	4.19E+08	1.05E+07	1.51E+06
X-326	25-6	17	3	09-Apr-10	8	6.70E+08	1.68E+07	2.42E+06
X-326	25-6	17	4	09-Apr-10	6	5.03E+08	1.26E+07	1.81E+06
X-326	25-6	17	5	09-Apr-10	9	7.54E+08	1.89E+07	2.72E+06
X-326	25-6	17	6	09-Apr-10	8	6.70E+08	1.68E+07	2.42E+06
X-326	25-6	17	7	09-Apr-10	8	6.70E+08	1.68E+07	2.42E+06
X-326	25-6	17	8	09-Apr-10	8	6.70E+08	1.68E+07	2.42E+06
X-326	25-6	17	9	09-Apr-10	14	1.17E+09	2.94E+07	4.23E+06
X-326	25-6	17	10	09-Apr-10	6	5.03E+08	1.26E+07	1.81E+06
X-326	25-6	17	11	09-Apr-10	12	1.01E+09	2.52E+07	3.63E+06
X-326	25-6	17	12	09-Apr-10	9	7.54E+08	1.89E+07	2.72E+06
X-326	25-6	18	1	18-Dec-09	11	8.86E+08	2.31E+07	1.20E+05
X-326	25-6	18	2	18-Dec-09	12	9.66E+08	2.52E+07	1.31E+05
X-326	25-6	18	3	18-Dec-09	17	1.37E+09	3.57E+07	1.85E+05
X-326	25-6	18	4	18-Dec-09	9	7.25E+08	1.89E+07	9.82E+04
X-326	25-6	18	5	18-Dec-09	8	6.44E+08	1.68E+07	8.73E+04
X-326	25-6	18	6	18-Dec-09	9	7.25E+08	1.89E+07	9.82E+04
X-326	25-6	18	7	18-Dec-09	9	7.25E+08	1.89E+07	9.82E+04
X-326	25-6	18	8	18-Dec-09	6	4.83E+08	1.26E+07	6.55E+04
X-326	25-6	18	9	18-Dec-09	8	6.44E+08	1.68E+07	8.73E+04
X-326	25-6	18	10	18-Dec-09	8	6.44E+08	1.68E+07	8.73E+04
X-326	25-6	18	11	18-Dec-09	6	4.83E+08	1.26E+07	6.55E+04
X-326	25-6	18	12	18-Dec-09	9	7.25E+08	1.89E+07	9.82E+04
X-326	25-6	19	1	20-Jan-10	6	5.72E+08	1.26E+07	1.95E+06
X-326	25-6	19	2	20-Jan-10	8	7.63E+08	1.68E+07	2.60E+06
X-326	25-6	19	3	20-Jan-10	8	7.63E+08	1.68E+07	2.60E+06
X-326	25-6	19	4	20-Jan-10	11	1.05E+09	2.31E+07	3.57E+06
X-326	25-6	19	5	20-Jan-10	12	1.14E+09	2.52E+07	3.90E+06
X-326	25-6	19	6	20-Jan-10	11	1.05E+09	2.31E+07	3.57E+06
X-326	25-6	19	7	20-Jan-10	8	7.63E+08	1.68E+07	2.60E+06
X-326	25-6	19	8	20-Jan-10	9	8.58E+08	1.89E+07	2.92E+06
X-326	25-6	19	9	20-Jan-10	18	1.72E+09	3.78E+07	5.85E+06
X-326	25-6	19	10	20-Jan-10	9	8.58E+08	1.89E+07	2.92E+06
X-326	25-6	19	11	20-Jan-10	11	1.05E+09	2.31E+07	3.57E+06
X-326	25-6	19	12	20-Jan-10	11	1.05E+09	2.31E+07	3.57E+06
X-326	25-6	20	1	28-Jun-10	8	4.96E+08	1.68E+07	1.10E+05
X-326	25-6	20	2	28-Jun-10	6	3.72E+08	1.26E+07	8.25E+04

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-6	20	3	28-Jun-10	5	3.10E+08	1.05E+07	6.88E+04
X-326	25-6	20	4	28-Jun-10	3	1.86E+08	6.30E+06	4.13E+04
X-326	25-6	20	5	28-Jun-10	5	3.10E+08	1.05E+07	6.88E+04
X-326	25-6	20	6	28-Jun-10	4	2.48E+08	8.40E+06	5.50E+04
X-326	25-6	20	7	28-Jun-10	6	3.72E+08	1.26E+07	8.25E+04
X-326	25-6	20	8	28-Jun-10	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-6	20	9	28-Jun-10	8	4.96E+08	1.68E+07	1.10E+05
X-326	25-6	20	10	28-Jun-10	6	3.72E+08	1.26E+07	8.25E+04
X-326	25-6	20	11	28-Jun-10	5	3.10E+08	1.05E+07	6.88E+04
X-326	25-6	20	12	28-Jun-10	9	5.58E+08	1.89E+07	1.24E+05
X-326	25-7	1	1	18-Sep-03	309	2.46E+10	6.49E+08	1.73E+09
X-326	25-7	1	2	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	3	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	4	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	5	18-Sep-03	240	1.91E+10	5.04E+08	1.34E+09
X-326	25-7	1	6	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	7	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	8	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	9	18-Sep-03	394.5	3.14E+10	8.28E+08	2.21E+09
X-326	25-7	1	10	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	11	18-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	1	12	18-Sep-03	78	6.20E+09	1.64E+08	4.36E+08
X-326	25-7	2	1	29-Jun-98	4615.5	2.89E+11	9.69E+09	3.11E+07
X-326	25-7	2	2	13-Dec-04	51	3.19E+09	1.07E+08	1.39E+08
X-326	25-7	2	3	29-Jun-98	115.5	7.23E+09	2.43E+08	7.78E+05
X-326	25-7	2	4	29-Jun-98	438	2.74E+10	9.20E+08	2.95E+06
X-326	25-7	2	5	29-Jun-98	34.5	2.16E+09	7.25E+07	2.32E+05
X-326	25-7	2	6	29-Jun-98	121.5	7.61E+09	2.55E+08	8.18E+05
X-326	25-7	3	1	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	2	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	3	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	4	25-Aug-03	7.5	5.96E+08	1.58E+07	4.20E+07
X-326	25-7	3	5	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	6	25-Aug-03	214.5	1.71E+10	4.50E+08	1.20E+09
X-326	25-7	3	7	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	8	25-Aug-03	427.5	3.40E+10	8.98E+08	2.39E+09
X-326	25-7	3	9	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	10	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	11	25-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	3	12	25-Aug-03	124.5	9.90E+09	2.61E+08	6.97E+08
X-326	25-7	4	1	28-Mar-03	327	2.60E+10	6.87E+08	1.80E+09
X-326	25-7	4	2	28-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	4	3	28-Mar-03	13.5	1.07E+09	2.84E+07	7.41E+07
X-326	25-7	4	4	28-Mar-03	259.5	2.06E+10	5.45E+08	1.42E+09
X-326	25-7	4	5	28-Mar-03	15	1.19E+09	3.15E+07	8.24E+07
X-326	25-7	4	6	28-Mar-03	465	3.70E+10	9.77E+08	2.55E+09
X-326	25-7	5	1	22-Aug-03	192	1.07E+10	4.03E+08	1.04E+09
X-326	25-7	5	2	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	3	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	4	22-Aug-03	375	2.09E+10	7.88E+08	2.03E+09
X-326	25-7	5	5	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	6	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	7	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	8	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	9	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-7	5	10	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	11	22-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	5	12	22-Aug-03	94.5	5.28E+09	1.98E+08	5.12E+08
X-326	25-7	6	1	30-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	6	2	30-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	6	3	30-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	6	4	30-Mar-03	22.5	1.16E+09	4.73E+07	1.21E+08
X-326	25-7	6	5	30-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	6	6	30-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	1	10-Aug-03	387	3.00E+10	8.13E+08	2.03E+09
X-326	25-7	7	2	10-Aug-03	6	4.65E+08	1.26E+07	3.15E+07
X-326	25-7	7	3	10-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	4	10-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	5	10-Aug-03	343.5	2.66E+10	7.21E+08	1.80E+09
X-326	25-7	7	6	10-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	7	10-Aug-03	144	1.12E+10	3.02E+08	7.55E+08
X-326	25-7	7	8	10-Aug-03	468	3.63E+10	9.83E+08	2.45E+09
X-326	25-7	7	9	10-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	10	10-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	7	11	10-Aug-03	340.5	2.64E+10	7.15E+08	1.79E+09
X-326	25-7	7	12	10-Aug-03	69	5.35E+09	1.45E+08	3.62E+08
X-326	25-7	8	1	29-Mar-03	22.5	1.74E+09	4.73E+07	1.19E+08
X-326	25-7	8	2	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	8	3	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	8	4	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	8	5	29-Mar-03	1.5	1.16E+08	3.15E+06	7.94E+06
X-326	25-7	8	6	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	9	1	18-Aug-03	273	2.60E+10	5.73E+08	1.39E+09
X-326	25-7	9	2	18-Aug-03	79.5	7.58E+09	1.67E+08	4.05E+08
X-326	25-7	9	3	18-Aug-03	310.5	2.96E+10	6.52E+08	1.58E+09
X-326	25-7	9	4	18-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	9	5	18-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	9	6	18-Aug-03	463.5	4.42E+10	9.73E+08	2.36E+09
X-326	25-7	9	7	18-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	9	8	18-Aug-03	67.5	6.44E+09	1.42E+08	3.43E+08
X-326	25-7	9	9	18-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	9	10	18-Aug-03	106.5	1.02E+10	2.24E+08	5.42E+08
X-326	25-7	9	11	18-Aug-03	454.5	4.34E+10	9.54E+08	2.31E+09
X-326	25-7	9	12	18-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	1	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	2	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	3	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	4	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	5	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	10	6	29-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	11	1	05-Mar-10	11	1.16E+09	2.31E+07	7.41E+04
X-326	25-7	11	2	05-Mar-10	11	1.16E+09	2.31E+07	7.41E+04
X-326	25-7	11	3	05-Mar-10	12	1.26E+09	2.52E+07	8.08E+04
X-326	25-7	11	4	05-Mar-10	17	1.79E+09	3.57E+07	1.14E+05
X-326	25-7	11	5	05-Mar-10	11	1.16E+09	2.31E+07	7.41E+04
X-326	25-7	11	6	05-Mar-10	9	9.46E+08	1.89E+07	6.06E+04
X-326	25-7	11	7	05-Mar-10	17	1.79E+09	3.57E+07	1.14E+05
X-326	25-7	11	8	05-Mar-10	12	1.26E+09	2.52E+07	8.08E+04
X-326	25-7	11	9	05-Mar-10	15	1.58E+09	3.15E+07	1.01E+05
X-326	25-7	11	10	05-Mar-10	14	1.47E+09	2.94E+07	9.43E+04

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-7	11	11	05-Mar-10	8	8.41E+08	1.68E+07	5.39E+04
X-326	25-7	11	12	05-Mar-10	9	9.46E+08	1.89E+07	6.06E+04
X-326	25-7	12	1	06-Sep-03	256.5	2.74E+10	5.39E+08	1.14E+09
X-326	25-7	12	2	06-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	12	3	06-Sep-03	264	2.82E+10	5.54E+08	1.18E+09
X-326	25-7	12	4	06-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	12	5	06-Sep-03	306	3.27E+10	6.43E+08	1.36E+09
X-326	25-7	12	6	06-Sep-03	154.5	1.65E+10	3.24E+08	6.89E+08
X-326	25-7	13	1	27-Aug-10	9	9.30E+08	1.89E+07	6.06E+04
X-326	25-7	13	2	27-Aug-10	6	6.20E+08	1.26E+07	4.04E+04
X-326	25-7	13	3	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	4	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	5	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	6	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	7	27-Aug-10	2	2.07E+08	4.20E+06	1.35E+04
X-326	25-7	13	8	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	9	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	10	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	13	11	27-Aug-10	2	2.07E+08	4.20E+06	1.35E+04
X-326	25-7	13	12	27-Aug-10	3	3.10E+08	6.30E+06	2.02E+04
X-326	25-7	14	1	06-Sep-03	82.5	8.82E+09	1.73E+08	3.74E+08
X-326	25-7	14	2	06-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	14	3	06-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	14	4	06-Sep-03	145.5	1.56E+10	3.06E+08	6.59E+08
X-326	25-7	14	5	06-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	14	6	06-Sep-03	6	6.41E+08	1.26E+07	2.72E+07
X-326	25-7	15	1	19-Aug-03	342	3.66E+10	7.18E+08	1.68E+09
X-326	25-7	15	2	19-Aug-03	112.5	1.20E+10	2.36E+08	5.53E+08
X-326	25-7	15	3	19-Aug-03	54	5.77E+09	1.13E+08	2.65E+08
X-326	25-7	15	4	19-Aug-03	444	4.75E+10	9.32E+08	2.18E+09
X-326	25-7	15	5	19-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	15	6	19-Aug-03	235.5	2.52E+10	4.95E+08	1.16E+09
X-326	25-7	15	7	19-Aug-03	9	9.62E+08	1.89E+07	4.42E+07
X-326	25-7	15	8	19-Aug-03	327	3.50E+10	6.87E+08	1.61E+09
X-326	25-7	15	9	19-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	15	10	19-Aug-03	463.5	4.95E+10	9.73E+08	2.28E+09
X-326	25-7	15	11	19-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	15	12	19-Aug-03	319.5	3.42E+10	6.71E+08	1.57E+09
X-326	25-7	16	1	10-Jan-08	144	8.04E+09	3.02E+08	8.32E+08
X-326	25-7	16	2	18-Sep-04	180	1.01E+10	3.78E+08	1.21E+06
X-326	25-7	16	3	26-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	16	4	18-Jan-08	55.5	3.10E+09	1.17E+08	3.21E+08
X-326	25-7	16	5	26-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	16	6	26-Jun-98	28.5	1.59E+09	5.99E+07	1.92E+05
X-326	25-7	17	1	16-Jun-98	246	1.54E+10	5.17E+08	1.66E+06
X-326	25-7	17	2	16-Jun-98	435	2.72E+10	9.14E+08	2.93E+06
X-326	25-7	17	3	16-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	17	4	16-Jun-98	360	2.25E+10	7.56E+08	2.42E+06
X-326	25-7	17	5	16-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	17	6	16-Jun-98	105	6.58E+09	2.21E+08	7.07E+05
X-326	25-7	17	7	16-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	17	8	16-Jun-98	295.5	1.85E+10	6.21E+08	1.99E+06
X-326	25-7	17	9	16-Jun-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	17	10	16-Jun-98	147	9.21E+09	3.09E+08	9.90E+05
X-326	25-7	17	11	16-Jun-98	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	25-7	17	12	16-Jun-98	190.5	1.19E+10	4.00E+08	1.28E+06
X-326	25-7	18	1	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	18	2	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	18	3	07-Sep-03	10.5	1.12E+09	2.21E+07	4.83E+07
X-326	25-7	18	4	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	18	5	07-Sep-03	6	6.41E+08	1.26E+07	2.76E+07
X-326	25-7	18	6	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	1	20-Aug-03	199.5	2.13E+10	4.19E+08	9.49E+08
X-326	25-7	19	2	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	3	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	4	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	5	20-Aug-03	6	6.41E+08	1.26E+07	2.85E+07
X-326	25-7	19	6	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	7	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	8	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	9	20-Aug-03	148.5	1.59E+10	3.12E+08	7.06E+08
X-326	25-7	19	10	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	11	20-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	19	12	20-Aug-03	13.5	1.44E+09	2.84E+07	6.42E+07
X-326	25-7	20	1	07-Sep-03	421.5	4.51E+10	8.85E+08	1.97E+09
X-326	25-7	20	2	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	20	3	07-Sep-03	295.5	3.16E+10	6.21E+08	1.38E+09
X-326	25-7	20	4	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	20	5	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	25-7	20	6	07-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	1	10-May-03	226.5	1.54E+10	4.76E+08	1.24E+09
X-326	27-1	1	2	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	3	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	4	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	5	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	6	10-May-03	184.5	1.26E+10	3.87E+08	1.01E+09
X-326	27-1	1	7	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	8	30-Jun-04	62	4.22E+09	1.30E+08	3.40E+08
X-326	27-1	1	9	10-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	1	10	30-Jun-04	42	2.86E+09	8.82E+07	2.30E+08
X-326	27-1	1	11	10-May-03	298.5	2.03E+10	6.27E+08	1.64E+09
X-326	27-1	1	12	30-Jun-04	27	1.84E+09	5.67E+07	1.48E+08
X-326	27-1	2	1	22-Oct-02	75	5.28E+09	1.58E+08	5.51E+08
X-326	27-1	2	2	22-Oct-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	2	3	22-Oct-02	280.5	1.98E+10	5.89E+08	2.06E+09
X-326	27-1	2	4	22-Oct-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	2	5	22-Oct-02	378	2.66E+10	7.94E+08	2.78E+09
X-326	27-1	2	6	22-Oct-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	2	7	22-Oct-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	2	8	22-Oct-02	288	2.03E+10	6.05E+08	2.12E+09
X-326	27-1	2	9	30-Jun-04	17	1.20E+09	3.57E+07	5.38E+07
X-326	27-1	2	10	22-Oct-02	394.5	2.78E+10	8.28E+08	2.90E+09
X-326	27-1	2	11	22-Oct-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	2	12	30-Jun-04	45	3.17E+09	9.45E+07	1.42E+08
X-326	27-1	3	1	29-Jul-06	14	7.00E+08	2.94E+07	1.66E+08
X-326	27-1	3	2	29-Jul-06	17	8.50E+08	3.57E+07	2.02E+08
X-326	27-1	3	3	29-Jul-06	33	1.65E+09	6.93E+07	3.92E+08
X-326	27-1	3	4	29-Jul-06	27	1.35E+09	5.67E+07	3.21E+08
X-326	27-1	3	5	29-Jul-06	20	1.00E+09	4.20E+07	2.38E+08
X-326	27-1	3	6	29-Jul-06	42	2.10E+09	8.82E+07	4.99E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-1	3	7	29-Jul-06	24	1.20E+09	5.04E+07	2.85E+08
X-326	27-1	3	8	29-Jul-06	21	1.05E+09	4.41E+07	2.50E+08
X-326	27-1	3	9	29-Jul-06	20	1.00E+09	4.20E+07	2.38E+08
X-326	27-1	3	10	29-Jul-06	24	1.20E+09	5.04E+07	2.85E+08
X-326	27-1	3	11	29-Jul-06	18	9.00E+08	3.78E+07	2.14E+08
X-326	27-1	3	12	29-Jul-06	24	1.20E+09	5.04E+07	2.85E+08
X-326	27-1	4	1	11-May-03	147	1.04E+10	3.09E+08	9.22E+08
X-326	27-1	4	2	11-May-03	267	1.88E+10	5.61E+08	1.67E+09
X-326	27-1	4	3	11-May-03	18	1.27E+09	3.78E+07	1.13E+08
X-326	27-1	4	4	11-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	4	5	11-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	4	6	11-May-03	33	2.33E+09	6.93E+07	2.07E+08
X-326	27-1	4	7	11-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	4	8	11-May-03	246	1.73E+10	5.17E+08	1.54E+09
X-326	27-1	4	9	11-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	4	10	11-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	4	11	11-May-03	241.5	1.70E+10	5.07E+08	1.51E+09
X-326	27-1	4	12	11-May-03	427.5	3.01E+10	8.98E+08	2.68E+09
X-326	27-1	5	1	25-Jul-01	268.5	1.89E+10	5.64E+08	1.97E+09
X-326	27-1	5	2	25-Jul-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	5	3	25-Jul-01	159	1.12E+10	3.34E+08	1.17E+09
X-326	27-1	5	4	25-Jul-01	469.5	3.31E+10	9.86E+08	3.45E+09
X-326	27-1	5	5	25-Jul-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	5	6	25-Jul-01	351	2.47E+10	7.37E+08	2.58E+09
X-326	27-1	5	7	25-Jul-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	5	8	25-Jul-01	96	6.76E+09	2.02E+08	7.05E+08
X-326	27-1	5	9	25-Jul-01	661.5	4.66E+10	1.39E+09	4.86E+09
X-326	27-1	5	10	25-Jul-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	5	11	25-Jul-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	5	12	25-Jul-01	358.5	2.53E+10	7.53E+08	2.63E+09
X-326	27-1	6	1	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	2	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	3	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	4	07-May-04	217.5	1.26E+10	4.57E+08	5.02E+08
X-326	27-1	6	5	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	6	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	7	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	8	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	9	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	10	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	6	11	07-May-04	357	2.07E+10	7.50E+08	8.25E+08
X-326	27-1	6	12	07-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	1	30-Jul-03	123	6.75E+09	2.58E+08	9.06E+08
X-326	27-1	7	2	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	3	30-Jul-03	292.5	1.60E+10	6.14E+08	2.15E+09
X-326	27-1	7	4	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	5	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	6	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	7	30-Jul-03	214.5	1.18E+10	4.50E+08	1.58E+09
X-326	27-1	7	8	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	9	30-Jul-03	457.5	2.51E+10	9.61E+08	3.37E+09
X-326	27-1	7	10	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	7	11	30-Jul-03	301.5	1.65E+10	6.33E+08	2.22E+09
X-326	27-1	7	12	30-Jul-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	1	05-May-04	471	2.68E+10	9.89E+08	1.11E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-1	8	2	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	3	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	4	05-May-04	457.5	2.60E+10	9.61E+08	1.08E+09
X-326	27-1	8	5	05-May-04	54	3.07E+09	1.13E+08	1.28E+08
X-326	27-1	8	6	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	7	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	8	05-May-04	27	1.54E+09	5.67E+07	6.38E+07
X-326	27-1	8	9	05-May-04	402	2.29E+10	8.44E+08	9.50E+08
X-326	27-1	8	10	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	11	05-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	8	12	05-May-04	21	1.19E+09	4.41E+07	4.96E+07
X-326	27-1	9	1	07-Apr-04	207	2.21E+10	4.35E+08	9.08E+08
X-326	27-1	9	2	07-Apr-04	9	9.62E+08	1.89E+07	3.95E+07
X-326	27-1	9	3	07-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	9	4	07-Apr-04	63	6.73E+09	1.32E+08	2.76E+08
X-326	27-1	9	5	07-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	9	6	07-Apr-04	186	1.99E+10	3.91E+08	8.15E+08
X-326	27-1	9	7	07-Apr-04	294	3.14E+10	6.17E+08	1.29E+09
X-326	27-1	9	8	07-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	9	9	07-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	9	10	07-Apr-04	63	6.73E+09	1.32E+08	2.76E+08
X-326	27-1	9	11	07-Apr-04	478.5	5.12E+10	1.00E+09	2.10E+09
X-326	27-1	9	12	07-Apr-04	75	8.02E+09	1.58E+08	3.29E+08
X-326	27-1	10	1	26-Aug-03	3	2.11E+08	6.30E+06	1.94E+07
X-326	27-1	10	2	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	3	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	4	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	5	26-Aug-03	127.5	8.98E+09	2.68E+08	8.25E+08
X-326	27-1	10	6	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	7	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	8	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	9	26-Aug-03	21	1.48E+09	4.41E+07	1.36E+08
X-326	27-1	10	10	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	10	11	26-Aug-03	13.5	9.51E+08	2.84E+07	8.74E+07
X-326	27-1	10	12	26-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	1	28-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	2	28-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	3	28-Aug-03	76.5	5.39E+09	1.61E+08	5.45E+08
X-326	27-1	11	4	28-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	5	28-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	6	28-Aug-03	213	1.50E+10	4.47E+08	1.52E+09
X-326	27-1	11	7	28-Aug-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	11	8	28-Aug-03	304.5	2.15E+10	6.39E+08	2.17E+09
X-326	27-1	11	9	28-Aug-03	55.5	3.91E+09	1.17E+08	3.95E+08
X-326	27-1	11	10	28-Aug-03	72	5.07E+09	1.51E+08	5.13E+08
X-326	27-1	11	11	28-Aug-03	238.5	1.68E+10	5.01E+08	1.70E+09
X-326	27-1	11	12	28-Aug-03	82.5	5.81E+09	1.73E+08	5.87E+08
X-326	27-1	12	1	05-Feb-10	26	1.48E+09	5.46E+07	6.41E+07
X-326	27-1	12	2	05-Feb-10	12	6.83E+08	2.52E+07	2.96E+07
X-326	27-1	12	3	05-Feb-10	9	5.12E+08	1.89E+07	2.22E+07
X-326	27-1	12	4	05-Feb-10	9	5.12E+08	1.89E+07	2.22E+07
X-326	27-1	12	5	05-Feb-10	9	5.12E+08	1.89E+07	2.22E+07
X-326	27-1	12	6	05-Feb-10	8	4.55E+08	1.68E+07	1.97E+07
X-326	27-1	12	7	05-Feb-10	8	4.55E+08	1.68E+07	1.97E+07
X-326	27-1	12	8	05-Feb-10	11	6.26E+08	2.31E+07	2.71E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-1	12	9	05-Feb-10	8	4.55E+08	1.68E+07	1.97E+07
X-326	27-1	12	10	05-Feb-10	8	4.55E+08	1.68E+07	1.97E+07
X-326	27-1	12	11	05-Feb-10	8	4.55E+08	1.68E+07	1.97E+07
X-326	27-1	12	12	05-Feb-10	9	5.12E+08	1.89E+07	2.22E+07
X-326	27-1	13	1	08-Apr-04	25.5	1.42E+09	5.36E+07	7.75E+07
X-326	27-1	13	2	08-Apr-04	121.5	6.79E+09	2.55E+08	3.69E+08
X-326	27-1	13	3	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	4	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	5	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	6	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	7	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	8	08-Apr-04	99	5.53E+09	2.08E+08	3.01E+08
X-326	27-1	13	9	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	10	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	11	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	13	12	08-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	1	17-Feb-05	340.5	2.40E+10	7.15E+08	2.28E+09
X-326	27-1	14	2	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	3	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	4	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	5	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	6	17-Feb-05	1336.5	9.42E+10	2.81E+09	8.94E+09
X-326	27-1	14	7	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	8	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	9	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	10	17-Feb-05	85.5	6.02E+09	1.80E+08	5.72E+08
X-326	27-1	14	11	17-Feb-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	14	12	17-Feb-05	298.5	2.10E+10	6.27E+08	2.00E+09
X-326	27-1	15	1	17-May-03	129	9.09E+09	2.71E+08	8.91E+08
X-326	27-1	15	2	17-May-03	213	1.50E+10	4.47E+08	1.47E+09
X-326	27-1	15	3	17-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	15	4	17-May-03	201	1.42E+10	4.22E+08	1.39E+09
X-326	27-1	15	5	17-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	15	6	17-May-03	54	3.80E+09	1.13E+08	3.73E+08
X-326	27-1	15	7	17-May-03	339	2.39E+10	7.12E+08	2.34E+09
X-326	27-1	15	8	17-May-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	15	9	17-May-03	247.5	1.74E+10	5.20E+08	1.71E+09
X-326	27-1	15	10	17-May-03	18	1.27E+09	3.78E+07	1.24E+08
X-326	27-1	15	11	17-May-03	51	3.59E+09	1.07E+08	3.52E+08
X-326	27-1	15	12	17-May-03	310.5	2.19E+10	6.52E+08	2.14E+09
X-326	27-1	16	1	22-Jun-04	60	3.48E+09	1.26E+08	1.56E+08
X-326	27-1	16	2	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	3	22-Jun-04	189	1.10E+10	3.97E+08	4.92E+08
X-326	27-1	16	4	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	5	22-Jun-04	213	1.23E+10	4.47E+08	5.55E+08
X-326	27-1	16	6	22-Jun-04	7.5	4.35E+08	1.58E+07	1.95E+07
X-326	27-1	16	7	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	8	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	9	22-Jun-04	106.5	6.17E+09	2.24E+08	2.77E+08
X-326	27-1	16	10	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	11	22-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	16	12	31-Jan-08	15	8.69E+08	3.15E+07	7.62E+07
X-326	27-1	17	1	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	2	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	3	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-1	17	4	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	5	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	6	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	7	12-Apr-04	159	8.88E+09	3.34E+08	4.59E+08
X-326	27-1	17	8	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	9	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	10	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	11	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	17	12	12-Apr-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	18	1	10-Dec-97	102	6.39E+09	2.14E+08	2.72E+08
X-326	27-1	18	2	10-Dec-97	168	1.05E+10	3.53E+08	4.49E+08
X-326	27-1	18	3	10-Dec-97	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	18	4	10-Dec-97	12	7.52E+08	2.52E+07	3.20E+07
X-326	27-1	18	5	10-Dec-97	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	18	6	10-Dec-97	150	9.39E+09	3.15E+08	4.01E+08
X-326	27-1	18	7	10-Dec-97	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	18	8	10-Dec-97	49.5	3.10E+09	1.04E+08	1.32E+08
X-326	27-1	18	9	10-Dec-97	73.5	4.60E+09	1.54E+08	1.96E+08
X-326	27-1	18	10	10-Dec-97	1.5	9.39E+07	3.15E+06	4.01E+06
X-326	27-1	18	11	10-Dec-97	139.5	8.74E+09	2.93E+08	3.72E+08
X-326	27-1	18	12	10-Dec-97	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	19	1	15-Oct-10	6	3.44E+08	1.26E+07	1.69E+07
X-326	27-1	19	2	15-Oct-10	6	3.44E+08	1.26E+07	1.69E+07
X-326	27-1	19	3	15-Oct-10	17	9.76E+08	3.57E+07	4.78E+07
X-326	27-1	19	4	15-Oct-10	33	1.89E+09	6.93E+07	9.28E+07
X-326	27-1	19	5	15-Oct-10	14	8.04E+08	2.94E+07	3.94E+07
X-326	27-1	19	6	15-Oct-10	12	6.89E+08	2.52E+07	3.38E+07
X-326	27-1	19	7	15-Oct-10	8	4.59E+08	1.68E+07	2.25E+07
X-326	27-1	19	8	15-Oct-10	6	3.44E+08	1.26E+07	1.69E+07
X-326	27-1	19	9	15-Oct-10	12	6.89E+08	2.52E+07	3.38E+07
X-326	27-1	19	10	15-Oct-10	8	4.59E+08	1.68E+07	2.25E+07
X-326	27-1	19	11	15-Oct-10	8	4.59E+08	1.68E+07	2.25E+07
X-326	27-1	19	12	15-Oct-10	9	5.17E+08	1.89E+07	2.53E+07
X-326	27-1	20	1	04-May-04	109.5	1.17E+10	2.30E+08	4.76E+08
X-326	27-1	20	2	04-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	20	3	04-May-04	147	1.57E+10	3.09E+08	6.40E+08
X-326	27-1	20	4	04-May-04	16.5	1.76E+09	3.47E+07	7.18E+07
X-326	27-1	20	5	04-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	20	6	04-May-04	162	1.73E+10	3.40E+08	7.05E+08
X-326	27-1	20	7	04-May-04	274.5	2.93E+10	5.76E+08	1.19E+09
X-326	27-1	20	8	04-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	20	9	04-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	20	10	04-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-1	20	11	04-May-04	171	1.83E+10	3.59E+08	7.44E+08
X-326	27-1	20	12	04-May-04	33	3.53E+09	6.93E+07	1.44E+08
X-326	27-2	1	1	13-Jun-01	315	2.22E+10	6.62E+08	2.31E+09
X-326	27-2	1	2	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	3	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	4	13-Jun-01	211.5	1.49E+10	4.44E+08	1.55E+09
X-326	27-2	1	5	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	6	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	7	13-Jun-01	9	6.34E+08	1.89E+07	6.61E+07
X-326	27-2	1	8	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	9	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	10	13-Jun-01	10.5	7.40E+08	2.21E+07	7.71E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-2	1	11	13-Jun-01	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	1	12	13-Jun-01	255	1.80E+10	5.36E+08	1.87E+09
X-326	27-2	2	1	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	2	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	3	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	4	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	5	26-Jan-05	324	1.91E+10	6.80E+08	4.87E+08
X-326	27-2	2	6	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	7	26-Jan-05	354	2.09E+10	7.43E+08	5.32E+08
X-326	27-2	2	8	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	9	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	10	26-Jan-05	16.5	9.74E+08	3.47E+07	2.48E+07
X-326	27-2	2	11	26-Jan-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	2	12	26-Jan-05	52.5	3.10E+09	1.10E+08	7.89E+07
X-326	27-2	3	1	10-May-04	22.5	1.32E+09	4.73E+07	4.76E+07
X-326	27-2	3	2	10-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	3	3	10-May-04	130.5	7.63E+09	2.74E+08	2.76E+08
X-326	27-2	3	4	10-May-04	63	3.68E+09	1.32E+08	1.33E+08
X-326	27-2	3	5	10-May-04	474	2.77E+10	9.95E+08	1.00E+09
X-326	27-2	3	6	10-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	3	7	10-May-04	316.5	1.85E+10	6.65E+08	6.69E+08
X-326	27-2	3	8	10-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	3	9	10-May-04	292.5	1.71E+10	6.14E+08	6.18E+08
X-326	27-2	3	10	10-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	3	11	10-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	3	12	10-May-04	321	1.88E+10	6.74E+08	6.79E+08
X-326	27-2	4	1	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	2	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	3	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	4	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	5	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	6	21-Jun-04	217.5	1.28E+10	4.57E+08	3.33E+08
X-326	27-2	4	7	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	8	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	9	21-Jun-04	243	1.43E+10	5.10E+08	3.72E+08
X-326	27-2	4	10	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	11	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	4	12	21-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	1	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	2	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	3	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	4	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	5	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	6	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	7	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	8	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	9	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	10	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	11	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	5	12	11-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	1	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	2	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	3	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	4	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	5	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-2	6	6	18-Jun-04	48	2.83E+09	1.01E+08	7.47E+07
X-326	27-2	6	7	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	8	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	9	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	10	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	6	11	18-Jun-04	66	3.90E+09	1.39E+08	1.03E+08
X-326	27-2	6	12	18-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	7	1	17-Jul-09	11	6.43E+08	2.31E+07	2.23E+07
X-326	27-2	7	2	17-Jul-09	6	3.51E+08	1.26E+07	1.22E+07
X-326	27-2	7	3	17-Jul-09	12	7.02E+08	2.52E+07	2.43E+07
X-326	27-2	7	4	17-Jul-09	6	3.51E+08	1.26E+07	1.22E+07
X-326	27-2	7	5	17-Jul-09	8	4.68E+08	1.68E+07	1.62E+07
X-326	27-2	7	6	17-Jul-09	9	5.26E+08	1.89E+07	1.82E+07
X-326	27-2	7	7	17-Jul-09	5	2.92E+08	1.05E+07	1.01E+07
X-326	27-2	7	8	17-Jul-09	8	4.68E+08	1.68E+07	1.62E+07
X-326	27-2	7	9	17-Jul-09	6	3.51E+08	1.26E+07	1.22E+07
X-326	27-2	7	10	17-Jul-09	6	3.51E+08	1.26E+07	1.22E+07
X-326	27-2	7	11	17-Jul-09	6	3.51E+08	1.26E+07	1.22E+07
X-326	27-2	7	12	17-Jul-09	9	5.26E+08	1.89E+07	1.82E+07
X-326	27-2	8	1	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	2	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	3	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	4	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	5	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	6	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	7	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	8	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	9	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	10	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	8	11	23-Jul-04	215	1.09E+10	4.52E+08	4.92E+08
X-326	27-2	8	12	07-Jan-98	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	1	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	2	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	3	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	4	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	5	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	6	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	7	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	8	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	9	9	12-May-04	69	4.00E+09	1.45E+08	1.75E+08
X-326	27-2	9	10	12-May-04	4.5	2.61E+08	9.45E+06	1.14E+07
X-326	27-2	9	11	12-May-04	700.5	4.06E+10	1.47E+09	1.78E+09
X-326	27-2	9	12	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	10	1	10-Mar-09	6	3.54E+08	1.26E+07	2.31E+07
X-326	27-2	10	2	10-Mar-09	4.5	2.66E+08	9.45E+06	1.73E+07
X-326	27-2	10	3	10-Mar-09	4.5	2.66E+08	9.45E+06	1.73E+07
X-326	27-2	10	4	10-Mar-09	7.5	4.43E+08	1.58E+07	2.89E+07
X-326	27-2	10	5	10-Mar-09	4.5	2.66E+08	9.45E+06	1.73E+07
X-326	27-2	10	6	10-Mar-09	3	1.77E+08	6.30E+06	1.15E+07
X-326	27-2	10	7	10-Mar-09	3	1.77E+08	6.30E+06	1.15E+07
X-326	27-2	10	8	10-Mar-09	3	1.77E+08	6.30E+06	1.15E+07
X-326	27-2	10	9	10-Mar-09	6	3.54E+08	1.26E+07	2.31E+07
X-326	27-2	10	10	10-Mar-09	4.5	2.66E+08	9.45E+06	1.73E+07
X-326	27-2	10	11	10-Mar-09	3	1.77E+08	6.30E+06	1.15E+07
X-326	27-2	10	12	10-Mar-09	3	1.77E+08	6.30E+06	1.15E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-2	11	1	12-Sep-03	126	7.04E+09	2.65E+08	5.13E+08
X-326	27-2	11	2	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	3	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	4	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	5	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	6	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	7	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	8	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	9	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	11	10	12-Sep-03	168	9.38E+09	3.53E+08	6.84E+08
X-326	27-2	11	11	12-Sep-03	15	8.38E+08	3.15E+07	6.11E+07
X-326	27-2	11	12	12-Sep-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	12	1	19-May-09	6	2.84E+08	1.26E+07	5.82E+06
X-326	27-2	12	2	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	3	19-May-09	5	2.37E+08	1.05E+07	4.85E+06
X-326	27-2	12	4	19-May-09	4	1.89E+08	8.40E+06	3.88E+06
X-326	27-2	12	5	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	6	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	7	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	8	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	9	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	10	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	11	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	12	12	19-May-09	3	1.42E+08	6.30E+06	2.91E+06
X-326	27-2	13	1	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	2	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	3	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	4	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	5	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	6	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	7	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	8	12-May-04	159	9.39E+09	3.34E+08	3.03E+08
X-326	27-2	13	9	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	10	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	11	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	13	12	12-May-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	1	16-Jun-04	36	1.76E+09	7.56E+07	5.97E+07
X-326	27-2	14	2	16-Jun-04	484.5	2.37E+10	1.02E+09	8.03E+08
X-326	27-2	14	3	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	4	16-Jun-04	534	2.61E+10	1.12E+09	8.85E+08
X-326	27-2	14	5	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	6	16-Jun-04	222	1.08E+10	4.66E+08	3.68E+08
X-326	27-2	14	7	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	8	16-Jun-04	393	1.92E+10	8.25E+08	6.52E+08
X-326	27-2	14	9	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	10	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	11	16-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	14	12	16-Jun-04	151.5	7.40E+09	3.18E+08	2.51E+08
X-326	27-2	15	1	23-May-02	147	7.60E+09	3.09E+08	7.63E+08
X-326	27-2	15	2	23-May-02	250.5	1.29E+10	5.26E+08	1.30E+09
X-326	27-2	15	3	23-May-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	15	4	23-May-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	15	5	23-May-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	15	6	23-May-02	27	1.40E+09	5.67E+07	1.40E+08
X-326	27-2	15	7	23-May-02	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-2	15	8	23-May-02	226.5	1.17E+10	4.76E+08	1.18E+09
X-326	27-2	15	9	23-May-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	15	10	23-May-02	7.5	3.88E+08	1.58E+07	3.89E+07
X-326	27-2	15	11	23-May-02	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	15	12	23-May-02	163.5	8.45E+09	3.43E+08	8.48E+08
X-326	27-2	16	1	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	2	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	3	14-Jun-04	151.5	8.24E+09	3.18E+08	2.57E+08
X-326	27-2	16	4	14-Jun-04	6	3.26E+08	1.26E+07	1.02E+07
X-326	27-2	16	5	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	6	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	7	14-Jun-04	211.5	1.15E+10	4.44E+08	3.58E+08
X-326	27-2	16	8	14-Jun-04	28.5	1.55E+09	5.99E+07	4.83E+07
X-326	27-2	16	9	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	10	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	16	11	14-Jun-04	132	7.18E+09	2.77E+08	2.24E+08
X-326	27-2	16	12	14-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	1	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	2	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	3	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	4	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	5	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	6	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	7	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	8	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	9	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	10	02-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	17	11	02-Jun-04	90	4.26E+09	1.89E+08	1.64E+08
X-326	27-2	17	12	02-Jun-04	70.5	3.34E+09	1.48E+08	1.29E+08
X-326	27-2	18	1	22-Mar-03	115.5	9.18E+09	2.43E+08	6.46E+08
X-326	27-2	18	2	22-Mar-03	235.5	1.87E+10	4.95E+08	1.32E+09
X-326	27-2	18	3	22-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	18	4	22-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	18	5	22-Mar-03	199.5	1.59E+10	4.19E+08	1.12E+09
X-326	27-2	18	6	22-Mar-03	46.5	3.70E+09	9.77E+07	2.60E+08
X-326	27-2	18	7	22-Mar-03	130.5	1.04E+10	2.74E+08	7.30E+08
X-326	27-2	18	8	22-Mar-03	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	18	9	22-Mar-03	322.5	2.56E+10	6.77E+08	1.80E+09
X-326	27-2	18	10	22-Mar-03	15	1.19E+09	3.15E+07	8.39E+07
X-326	27-2	18	11	22-Mar-03	88.5	7.03E+09	1.86E+08	4.95E+08
X-326	27-2	18	12	22-Mar-03	183	1.45E+10	3.84E+08	1.02E+09
X-326	27-2	19	1	09-Jun-04	130.5	7.04E+09	2.74E+08	2.35E+08
X-326	27-2	19	2	09-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	19	3	09-Jun-04	225	1.21E+10	4.73E+08	4.05E+08
X-326	27-2	19	4	09-Jun-04	54	2.91E+09	1.13E+08	9.71E+07
X-326	27-2	19	5	09-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	19	6	09-Jun-04	594	3.20E+10	1.25E+09	1.07E+09
X-326	27-2	19	7	09-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	19	8	09-Jun-04	87	4.69E+09	1.83E+08	1.57E+08
X-326	27-2	19	9	09-Jun-04	217.5	1.17E+10	4.57E+08	3.91E+08
X-326	27-2	19	10	09-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	19	11	09-Jun-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	19	12	09-Jun-04	537	2.90E+10	1.13E+09	9.66E+08
X-326	27-2	20	1	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	2	10-Aug-09	4	2.23E+08	8.40E+06	1.74E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-2	20	3	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	4	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	5	10-Aug-09	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-2	20	6	10-Aug-09	4	2.23E+08	8.40E+06	1.74E+07
X-326	27-2	20	7	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	8	10-Aug-09	2	1.12E+08	4.20E+06	8.68E+06
X-326	27-2	20	9	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	10	10-Aug-09	2	1.12E+08	4.20E+06	8.68E+06
X-326	27-2	20	11	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-2	20	12	10-Aug-09	3	1.68E+08	6.30E+06	1.30E+07
X-326	27-3	1	1	01-Jul-04	195	1.15E+10	4.10E+08	3.95E+08
X-326	27-3	1	2	01-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	1	3	01-Jul-04	183	1.08E+10	3.84E+08	3.71E+08
X-326	27-3	1	4	01-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	1	5	01-Jul-04	154.5	9.12E+09	3.24E+08	3.13E+08
X-326	27-3	1	6	31-Jul-04	9	5.31E+08	1.89E+07	1.29E+07
X-326	27-3	1	7	01-Jul-04	345	2.04E+10	7.25E+08	6.99E+08
X-326	27-3	1	8	01-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	1	9	01-Jul-04	127.5	7.53E+09	2.68E+08	2.58E+08
X-326	27-3	1	10	01-Jul-04	255	1.51E+10	5.36E+08	5.17E+08
X-326	27-3	1	11	01-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	1	12	01-Jul-04	328.5	1.94E+10	6.90E+08	6.66E+08
X-326	27-3	2	1	16-Sep-04	306	1.92E+10	6.43E+08	8.17E+08
X-326	27-3	2	2	16-Sep-04	13.5	8.45E+08	2.84E+07	3.60E+07
X-326	27-3	2	3	16-Sep-04	286.5	1.79E+10	6.02E+08	7.65E+08
X-326	27-3	2	4	16-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	2	5	16-Sep-04	150	9.39E+09	3.15E+08	4.01E+08
X-326	27-3	2	6	16-Sep-04	352.5	2.21E+10	7.40E+08	9.41E+08
X-326	27-3	2	7	16-Sep-04	19.5	1.22E+09	4.10E+07	5.21E+07
X-326	27-3	2	8	16-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	2	9	16-Sep-04	481.5	3.02E+10	1.01E+09	1.29E+09
X-326	27-3	2	10	16-Sep-04	39	2.44E+09	8.19E+07	1.04E+08
X-326	27-3	2	11	16-Sep-04	6	3.76E+08	1.26E+07	1.60E+07
X-326	27-3	2	12	16-Sep-04	195	1.22E+10	4.10E+08	5.21E+08
X-326	27-3	3	1	08-Jul-04	40.5	2.64E+09	8.51E+07	5.77E+07
X-326	27-3	3	2	08-Jul-04	66	4.31E+09	1.39E+08	9.41E+07
X-326	27-3	3	3	08-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	3	4	08-Jul-04	160.5	1.05E+10	3.37E+08	2.29E+08
X-326	27-3	3	5	08-Jul-04	21	1.37E+09	4.41E+07	2.99E+07
X-326	27-3	3	6	08-Jul-04	25.5	1.66E+09	5.36E+07	3.63E+07
X-326	27-3	3	7	08-Jul-04	99	6.46E+09	2.08E+08	1.41E+08
X-326	27-3	3	8	08-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	3	9	24-Jul-04	38	2.48E+09	7.98E+07	5.42E+07
X-326	27-3	3	10	08-Jul-04	354	2.31E+10	7.43E+08	5.05E+08
X-326	27-3	3	11	08-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	3	12	08-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	4	1	10-Nov-09	9	5.26E+08	1.89E+07	6.52E+06
X-326	27-3	4	2	10-Nov-09	6	3.51E+08	1.26E+07	4.35E+06
X-326	27-3	4	3	10-Nov-09	8	4.68E+08	1.68E+07	5.79E+06
X-326	27-3	4	4	10-Nov-09	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	4	5	10-Nov-09	5	2.92E+08	1.05E+07	3.62E+06
X-326	27-3	4	6	10-Nov-09	9	5.26E+08	1.89E+07	6.52E+06
X-326	27-3	4	7	10-Nov-09	8	4.68E+08	1.68E+07	5.79E+06
X-326	27-3	4	8	10-Nov-09	6	3.51E+08	1.26E+07	4.35E+06
X-326	27-3	4	9	10-Nov-09	8	4.68E+08	1.68E+07	5.79E+06

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-3	4	10	10-Nov-09	6	3.51E+08	1.26E+07	4.35E+06
X-326	27-3	4	11	10-Nov-09	5	2.92E+08	1.05E+07	3.62E+06
X-326	27-3	4	12	10-Nov-09	9	5.26E+08	1.89E+07	6.52E+06
X-326	27-3	5	1	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	2	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	3	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	4	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	5	12-Nov-04	7.5	5.54E+08	1.58E+07	9.84E+06
X-326	27-3	5	6	12-Nov-04	234	1.73E+10	4.91E+08	3.07E+08
X-326	27-3	5	7	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	8	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	9	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	10	12-Nov-04	154.5	1.14E+10	3.24E+08	2.03E+08
X-326	27-3	5	11	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	5	12	12-Nov-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	1	14-Sep-04	58.5	4.48E+09	1.23E+08	4.38E+07
X-326	27-3	6	2	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	3	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	4	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	5	14-Sep-04	337.5	2.58E+10	7.09E+08	2.53E+08
X-326	27-3	6	6	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	7	14-Sep-04	171	1.31E+10	3.59E+08	1.28E+08
X-326	27-3	6	8	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	9	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	10	14-Sep-04	66	5.05E+09	1.39E+08	4.94E+07
X-326	27-3	6	11	14-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	6	12	14-Sep-04	90	6.89E+09	1.89E+08	6.74E+07
X-326	27-3	7	1	12-Jul-04	91.5	5.56E+09	1.92E+08	1.15E+08
X-326	27-3	7	2	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	3	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	4	12-Jul-04	175.5	1.07E+10	3.69E+08	2.21E+08
X-326	27-3	7	5	12-Jul-04	168	1.02E+10	3.53E+08	2.11E+08
X-326	27-3	7	6	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	7	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	8	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	9	12-Jul-04	4.5	2.74E+08	9.45E+06	5.65E+06
X-326	27-3	7	10	12-Jul-04	127.5	7.75E+09	2.68E+08	1.60E+08
X-326	27-3	7	11	12-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	7	12	12-Jul-04	31.5	1.91E+09	6.62E+07	3.96E+07
X-326	27-3	8	1	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	2	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	3	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	4	12-Sep-04	219	1.33E+10	4.60E+08	2.75E+08
X-326	27-3	8	5	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	6	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	7	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	8	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	9	12-Sep-04	208.5	1.27E+10	4.38E+08	2.62E+08
X-326	27-3	8	10	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	11	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	8	12	12-Sep-04	298.5	1.81E+10	6.27E+08	3.75E+08
X-326	27-3	9	1	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	2	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	3	13-Jul-04	304.5	1.89E+10	6.39E+08	3.67E+08
X-326	27-3	9	4	13-Jul-04	52.5	3.26E+09	1.10E+08	6.33E+07

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-3	9	5	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	6	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	7	13-Jul-04	16.5	1.02E+09	3.47E+07	1.99E+07
X-326	27-3	9	8	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	9	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	10	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	9	11	13-Jul-04	213	1.32E+10	4.47E+08	2.57E+08
X-326	27-3	9	12	13-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	10	1	12-Sep-04	1.5	1.15E+08	3.15E+06	1.20E+06
X-326	27-3	10	2	12-Sep-04	156	1.19E+10	3.28E+08	1.25E+08
X-326	27-3	10	3	12-Sep-04	280.5	2.15E+10	5.89E+08	2.24E+08
X-326	27-3	10	4	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	10	5	12-Sep-04	121.5	9.30E+09	2.55E+08	9.72E+07
X-326	27-3	10	6	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	10	7	12-Sep-04	297	2.27E+10	6.24E+08	2.38E+08
X-326	27-3	10	8	12-Sep-04	187.5	1.44E+10	3.94E+08	1.50E+08
X-326	27-3	10	9	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	10	10	12-Sep-04	340.5	2.61E+10	7.15E+08	2.72E+08
X-326	27-3	10	11	12-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	10	12	12-Sep-04	180	1.38E+10	3.78E+08	1.44E+08
X-326	27-3	11	1	14-Jul-04	63	4.29E+09	1.32E+08	7.16E+07
X-326	27-3	11	2	14-Jul-04	304.5	2.07E+10	6.39E+08	3.46E+08
X-326	27-3	11	3	14-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	11	4	14-Jul-04	150	1.02E+10	3.15E+08	1.71E+08
X-326	27-3	11	5	14-Jul-04	361.5	2.46E+10	7.59E+08	4.11E+08
X-326	27-3	11	6	14-Jul-04	126	8.58E+09	2.65E+08	1.43E+08
X-326	27-3	11	7	14-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	11	8	14-Jul-04	76.5	5.21E+09	1.61E+08	8.70E+07
X-326	27-3	11	9	14-Jul-04	426	2.90E+10	8.95E+08	4.84E+08
X-326	27-3	11	10	14-Jul-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	11	11	14-Jul-04	225	1.53E+10	4.73E+08	2.56E+08
X-326	27-3	11	12	14-Jul-04	115.5	7.87E+09	2.43E+08	1.31E+08
X-326	27-3	12	1	25-May-10	9	5.31E+08	1.89E+07	7.45E+06
X-326	27-3	12	2	25-May-10	5	2.95E+08	1.05E+07	4.14E+06
X-326	27-3	12	3	25-May-10	5	2.95E+08	1.05E+07	4.14E+06
X-326	27-3	12	4	25-May-10	5	2.95E+08	1.05E+07	4.14E+06
X-326	27-3	12	5	25-May-10	3	1.77E+08	6.30E+06	2.48E+06
X-326	27-3	12	6	25-May-10	6	3.54E+08	1.26E+07	4.97E+06
X-326	27-3	12	7	25-May-10	3	1.77E+08	6.30E+06	2.48E+06
X-326	27-3	12	8	25-May-10	5	2.95E+08	1.05E+07	4.14E+06
X-326	27-3	12	9	25-May-10	5	2.95E+08	1.05E+07	4.14E+06
X-326	27-3	12	10	25-May-10	8	4.72E+08	1.68E+07	6.62E+06
X-326	27-3	12	11	25-May-10	8	4.72E+08	1.68E+07	6.62E+06
X-326	27-3	12	12	25-May-10	6	3.54E+08	1.26E+07	4.97E+06
X-326	27-3	13	1	02-Aug-04	60	4.09E+09	1.26E+08	6.67E+07
X-326	27-3	13	2	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	3	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	4	02-Aug-04	360	2.45E+10	7.56E+08	4.00E+08
X-326	27-3	13	5	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	6	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	7	02-Aug-04	211.5	1.44E+10	4.44E+08	2.35E+08
X-326	27-3	13	8	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	9	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	13	10	02-Aug-04	211.5	1.44E+10	4.44E+08	2.35E+08
X-326	27-3	13	11	02-Aug-04	345	2.35E+10	7.25E+08	3.83E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-3	13	12	02-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	14	1	09-Sep-04	417	2.31E+10	8.76E+08	3.57E+08
X-326	27-3	14	2	09-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	14	3	09-Sep-04	592.5	3.28E+10	1.24E+09	5.08E+08
X-326	27-3	14	4	09-Sep-04	168	9.30E+09	3.53E+08	1.44E+08
X-326	27-3	14	5	09-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	14	6	09-Sep-04	445.5	2.47E+10	9.36E+08	3.82E+08
X-326	27-3	14	7	09-Sep-04	172.5	9.55E+09	3.62E+08	1.48E+08
X-326	27-3	14	8	09-Sep-04	30	1.66E+09	6.30E+07	2.57E+07
X-326	27-3	14	9	09-Sep-04	381	2.11E+10	8.00E+08	3.27E+08
X-326	27-3	14	10	09-Sep-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	14	11	09-Sep-04	366	2.03E+10	7.69E+08	3.14E+08
X-326	27-3	14	12	09-Sep-04	66	3.65E+09	1.39E+08	5.66E+07
X-326	27-3	15	1	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	2	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	3	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	4	03-Aug-04	37.5	2.55E+09	7.88E+07	4.01E+07
X-326	27-3	15	5	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	6	03-Aug-04	1.5	1.02E+08	3.15E+06	1.60E+06
X-326	27-3	15	7	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	8	03-Aug-04	49.5	3.37E+09	1.04E+08	5.29E+07
X-326	27-3	15	9	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	10	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	11	03-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	15	12	03-Aug-04	6	4.09E+08	1.26E+07	6.41E+06
X-326	27-3	16	1	11-Aug-04	154.5	8.55E+09	3.24E+08	1.38E+08
X-326	27-3	16	2	11-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	16	3	11-Aug-04	25.5	1.41E+09	5.36E+07	2.28E+07
X-326	27-3	16	4	11-Aug-04	219	1.21E+10	4.60E+08	1.95E+08
X-326	27-3	16	5	11-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	16	6	11-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	16	7	11-Aug-04	228	1.26E+10	4.79E+08	2.03E+08
X-326	27-3	16	8	11-Aug-04	16.5	9.13E+08	3.47E+07	1.47E+07
X-326	27-3	16	9	11-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	16	10	11-Aug-04	280.5	1.55E+10	5.89E+08	2.50E+08
X-326	27-3	16	11	11-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	16	12	11-Aug-04	123	6.81E+09	2.58E+08	1.10E+08
X-326	27-3	17	1	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	17	2	11-Mar-05	237	1.29E+10	4.98E+08	2.44E+08
X-326	27-3	17	3	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	17	4	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	17	5	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	17	6	11-Mar-05	16.5	8.97E+08	3.47E+07	1.70E+07
X-326	27-3	17	7	11-Mar-05	114	6.20E+09	2.39E+08	1.17E+08
X-326	27-3	17	8	11-Mar-05	337.5	1.84E+10	7.09E+08	3.47E+08
X-326	27-3	17	9	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	17	10	11-Mar-05	60	3.26E+09	1.26E+08	6.17E+07
X-326	27-3	17	11	11-Mar-05	225	1.22E+10	4.73E+08	2.31E+08
X-326	27-3	17	12	11-Mar-05	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	18	1	10-Aug-04	51	2.82E+09	1.07E+08	4.69E+07
X-326	27-3	18	2	10-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	18	3	10-Aug-04	153	8.47E+09	3.21E+08	1.41E+08
X-326	27-3	18	4	10-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	18	5	10-Aug-04	255	1.41E+10	5.36E+08	2.35E+08
X-326	27-3	18	6	10-Aug-04	0	0.00E+00	0.00E+00	0.00E+00

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-326	27-3	18	7	10-Aug-04	76.5	4.23E+09	1.61E+08	7.04E+07
X-326	27-3	18	8	10-Aug-04	301.5	1.67E+10	6.33E+08	2.77E+08
X-326	27-3	18	9	10-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	18	10	10-Aug-04	228	1.26E+10	4.79E+08	2.10E+08
X-326	27-3	18	11	10-Aug-04	91.5	5.07E+09	1.92E+08	8.42E+07
X-326	27-3	18	12	10-Aug-04	192	1.06E+10	4.03E+08	1.77E+08
X-326	27-3	19	1	05-Aug-04	498	2.34E+10	1.05E+09	5.15E+08
X-326	27-3	19	2	05-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	19	3	31-Jan-08	148.5	6.98E+09	3.12E+08	1.53E+08
X-326	27-3	19	4	31-Jan-05	155	7.28E+09	3.26E+08	1.60E+08
X-326	27-3	19	5	05-Aug-04	1.5	7.05E+07	3.15E+06	1.55E+06
X-326	27-3	19	6	05-Aug-04	385.5	1.81E+10	8.10E+08	3.98E+08
X-326	27-3	19	7	05-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	19	8	05-Aug-04	256.5	1.20E+10	5.39E+08	2.65E+08
X-326	27-3	19	9	05-Aug-04	91.5	4.30E+09	1.92E+08	9.46E+07
X-326	27-3	19	10	05-Aug-04	324	1.52E+10	6.80E+08	3.35E+08
X-326	27-3	19	11	05-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	19	12	05-Aug-04	43.5	2.04E+09	9.14E+07	4.50E+07
X-326	27-3	20	1	06-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	20	2	06-Aug-04	247.5	1.37E+10	5.20E+08	2.36E+08
X-326	27-3	20	3	06-Aug-04	372	2.06E+10	7.81E+08	3.55E+08
X-326	27-3	20	4	06-Aug-04	12	6.64E+08	2.52E+07	1.14E+07
X-326	27-3	20	5	06-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	20	6	06-Aug-04	172.5	9.55E+09	3.62E+08	1.65E+08
X-326	27-3	20	7	06-Aug-04	367.5	2.03E+10	7.72E+08	3.51E+08
X-326	27-3	20	8	06-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	20	9	06-Aug-04	106.5	5.90E+09	2.24E+08	1.02E+08
X-326	27-3	20	10	06-Aug-04	139.5	7.72E+09	2.93E+08	1.33E+08
X-326	27-3	20	11	06-Aug-04	0	0.00E+00	0.00E+00	0.00E+00
X-326	27-3	20	12	06-Aug-04	165	9.13E+09	3.47E+08	1.57E+08
X-330	29-1	1	1	26-Jan-05	137	4.14E+09	2.88E+08	1.13E+10
X-330	29-1	1	2	26-Jan-05	4	1.21E+08	8.40E+06	3.29E+08
X-330	29-1	1	3	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	4	26-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	1	5	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	6	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	7	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	8	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	9	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	1	10	26-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	2	1	09-Feb-05	204	6.17E+09	4.28E+08	1.76E+10
X-330	29-1	2	2	09-Feb-05	257	7.77E+09	5.40E+08	2.22E+10
X-330	29-1	2	3	09-Feb-05	91	2.75E+09	1.91E+08	7.87E+09
X-330	29-1	2	4	09-Feb-05	297	8.98E+09	6.24E+08	2.57E+10
X-330	29-1	2	5	09-Feb-05	38	1.15E+09	7.98E+07	3.29E+09
X-330	29-1	2	6	09-Feb-05	108	3.27E+09	2.27E+08	9.34E+09
X-330	29-1	2	7	09-Feb-05	345	1.04E+10	7.25E+08	2.98E+10
X-330	29-1	2	8	09-Feb-05	149	4.51E+09	3.13E+08	1.29E+10
X-330	29-1	2	9	09-Feb-05	276	8.35E+09	5.80E+08	2.39E+10
X-330	29-1	2	10	09-Feb-05	210	6.35E+09	4.41E+08	1.82E+10
X-330	29-1	3	1	27-Jan-05	12	3.63E+08	2.52E+07	9.86E+08
X-330	29-1	3	2	27-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	3	3	27-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	3	4	27-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	3	5	27-Jan-05	4	1.21E+08	8.40E+06	3.29E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-1	3	6	27-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	3	7	27-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	3	8	27-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	3	9	27-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	3	10	27-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	4	1	08-Feb-05	125	3.78E+09	2.63E+08	1.25E+10
X-330	29-1	4	2	08-Feb-05	161	4.87E+09	3.38E+08	1.60E+10
X-330	29-1	4	3	08-Feb-05	65	1.97E+09	1.37E+08	6.48E+09
X-330	29-1	4	4	08-Feb-05	74	2.24E+09	1.55E+08	7.38E+09
X-330	29-1	4	5	08-Feb-05	75	2.27E+09	1.58E+08	7.48E+09
X-330	29-1	4	6	08-Feb-05	39	1.18E+09	8.19E+07	3.89E+09
X-330	29-1	4	7	08-Feb-05	135	4.08E+09	2.84E+08	1.35E+10
X-330	29-1	4	8	08-Feb-05	69	2.09E+09	1.45E+08	6.88E+09
X-330	29-1	4	9	08-Feb-05	80	2.42E+09	1.68E+08	7.97E+09
X-330	29-1	4	10	08-Feb-05	99	2.99E+09	2.08E+08	9.87E+09
X-330	29-1	5	1	28-Jan-05	8	2.42E+08	1.68E+07	6.57E+08
X-330	29-1	5	2	28-Jan-05	8	2.42E+08	1.68E+07	6.57E+08
X-330	29-1	5	3	28-Jan-05	11	3.33E+08	2.31E+07	9.04E+08
X-330	29-1	5	4	28-Jan-05	8	2.42E+08	1.68E+07	6.57E+08
X-330	29-1	5	5	28-Jan-05	16	4.84E+08	3.36E+07	1.31E+09
X-330	29-1	5	6	28-Jan-05	9	2.72E+08	1.89E+07	7.40E+08
X-330	29-1	5	7	28-Jan-05	9	2.72E+08	1.89E+07	7.40E+08
X-330	29-1	5	8	28-Jan-05	7	2.12E+08	1.47E+07	5.75E+08
X-330	29-1	5	9	28-Jan-05	9	2.72E+08	1.89E+07	7.40E+08
X-330	29-1	5	10	28-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	6	1	07-Feb-05	102	3.08E+09	2.14E+08	9.06E+09
X-330	29-1	6	2	07-Feb-05	71	2.15E+09	1.49E+08	6.31E+09
X-330	29-1	6	3	07-Feb-05	33	9.98E+08	6.93E+07	2.93E+09
X-330	29-1	6	4	07-Feb-05	22	6.65E+08	4.62E+07	1.95E+09
X-330	29-1	6	5	07-Feb-05	36	1.09E+09	7.56E+07	3.20E+09
X-330	29-1	6	6	07-Feb-05	98	2.96E+09	2.06E+08	8.71E+09
X-330	29-1	6	7	07-Feb-05	131	3.96E+09	2.75E+08	1.16E+10
X-330	29-1	6	8	07-Feb-05	104	3.15E+09	2.18E+08	9.24E+09
X-330	29-1	6	9	07-Feb-05	107	3.24E+09	2.25E+08	9.51E+09
X-330	29-1	6	10	07-Feb-05	19	5.75E+08	3.99E+07	1.69E+09
X-330	29-1	7	1	31-Jan-05	4	1.21E+08	8.40E+06	3.29E+08
X-330	29-1	7	2	31-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	7	3	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	4	31-Jan-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	7	5	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	6	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	7	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	8	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	9	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	7	10	31-Jan-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	8	1	03-Feb-05	84	2.54E+09	1.76E+08	9.87E+09
X-330	29-1	8	2	03-Feb-05	192	5.81E+09	4.03E+08	2.26E+10
X-330	29-1	8	3	03-Feb-05	137	4.14E+09	2.88E+08	1.61E+10
X-330	29-1	8	4	03-Feb-05	62	1.88E+09	1.30E+08	7.29E+09
X-330	29-1	8	5	03-Feb-05	113	3.42E+09	2.37E+08	1.33E+10
X-330	29-1	8	6	03-Feb-05	98	2.96E+09	2.06E+08	1.15E+10
X-330	29-1	8	7	03-Feb-05	131	3.96E+09	2.75E+08	1.54E+10
X-330	29-1	8	8	03-Feb-05	50	1.51E+09	1.05E+08	5.88E+09
X-330	29-1	8	9	03-Feb-05	78	2.36E+09	1.64E+08	9.17E+09
X-330	29-1	8	10	03-Feb-05	96	2.90E+09	2.02E+08	1.13E+10

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-1	9	1	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	2	01-Feb-05	4	1.21E+08	8.40E+06	3.29E+08
X-330	29-1	9	3	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	4	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	5	01-Feb-05	6	1.81E+08	1.26E+07	4.93E+08
X-330	29-1	9	6	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	7	01-Feb-05	4	1.21E+08	8.40E+06	3.29E+08
X-330	29-1	9	8	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	9	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	9	10	01-Feb-05	5	1.51E+08	1.05E+07	4.11E+08
X-330	29-1	10	1	02-Feb-05	5	1.51E+08	1.05E+07	4.98E+08
X-330	29-1	10	2	02-Feb-05	123	3.72E+09	2.58E+08	1.23E+10
X-330	29-1	10	3	02-Feb-05	131	3.96E+09	2.75E+08	1.31E+10
X-330	29-1	10	4	02-Feb-05	50	1.51E+09	1.05E+08	4.98E+09
X-330	29-1	10	5	02-Feb-05	18	5.44E+08	3.78E+07	1.79E+09
X-330	29-1	10	6	02-Feb-05	38	1.15E+09	7.98E+07	3.79E+09
X-330	29-1	10	7	02-Feb-05	73	2.21E+09	1.53E+08	7.28E+09
X-330	29-1	10	8	02-Feb-05	198	5.99E+09	4.16E+08	1.97E+10
X-330	29-1	10	9	02-Feb-05	15	4.54E+08	3.15E+07	1.50E+09
X-330	29-1	10	10	02-Feb-05	4	1.21E+08	8.40E+06	3.99E+08
X-330	29-2	1	1	29-Oct-04	273	1.34E+10	5.73E+08	3.37E+09
X-330	29-2	1	2	29-Oct-04	239	1.18E+10	5.02E+08	2.95E+09
X-330	29-2	1	3	29-Oct-04	240	1.18E+10	5.04E+08	2.97E+09
X-330	29-2	1	4	29-Oct-04	113	5.56E+09	2.37E+08	1.40E+09
X-330	29-2	1	5	29-Oct-04	201	9.89E+09	4.22E+08	2.48E+09
X-330	29-2	1	6	29-Oct-04	220	1.08E+10	4.62E+08	2.72E+09
X-330	29-2	1	7	29-Oct-04	119	5.86E+09	2.50E+08	1.47E+09
X-330	29-2	1	8	29-Oct-04	623	3.07E+10	1.31E+09	7.70E+09
X-330	29-2	1	9	29-Oct-04	105	5.17E+09	2.21E+08	1.30E+09
X-330	29-2	1	10	29-Oct-04	177	8.71E+09	3.72E+08	2.19E+09
X-330	29-2	2	1	18-Oct-04	26	1.30E+09	5.46E+07	2.97E+08
X-330	29-2	2	2	18-Oct-04	18	9.00E+08	3.78E+07	2.05E+08
X-330	29-2	2	3	18-Oct-04	34	1.70E+09	7.14E+07	3.88E+08
X-330	29-2	2	4	18-Oct-04	32	1.60E+09	6.72E+07	3.65E+08
X-330	29-2	2	5	18-Oct-04	47	2.35E+09	9.87E+07	5.36E+08
X-330	29-2	2	6	18-Oct-04	29	1.45E+09	6.09E+07	3.31E+08
X-330	29-2	2	7	18-Oct-04	35	1.75E+09	7.35E+07	3.99E+08
X-330	29-2	2	8	18-Oct-04	40	2.00E+09	8.40E+07	4.57E+08
X-330	29-2	2	9	18-Oct-04	59	2.95E+09	1.24E+08	6.73E+08
X-330	29-2	2	10	18-Oct-04	237	1.19E+10	4.98E+08	2.71E+09
X-330	29-2	3	1	28-Oct-04	212	1.13E+10	4.45E+08	1.81E+09
X-330	29-2	3	2	28-Oct-04	192	1.03E+10	4.03E+08	1.64E+09
X-330	29-2	3	3	28-Oct-04	65	3.47E+09	1.37E+08	5.54E+08
X-330	29-2	3	4	28-Oct-04	180	9.62E+09	3.78E+08	1.53E+09
X-330	29-2	3	5	28-Oct-04	123	6.57E+09	2.58E+08	1.05E+09
X-330	29-2	3	6	28-Oct-04	218	1.17E+10	4.58E+08	1.86E+09
X-330	29-2	3	7	28-Oct-04	126	6.73E+09	2.65E+08	1.07E+09
X-330	29-2	3	8	28-Oct-04	143	7.64E+09	3.00E+08	1.22E+09
X-330	29-2	3	9	28-Oct-04	392	2.10E+10	8.23E+08	3.34E+09
X-330	29-2	3	10	28-Oct-04	110	5.88E+09	2.31E+08	9.37E+08
X-330	29-2	4	1	19-Oct-04	41	2.15E+09	8.61E+07	3.82E+08
X-330	29-2	4	2	19-Oct-04	39	2.05E+09	8.19E+07	3.63E+08
X-330	29-2	4	3	19-Oct-04	35	1.84E+09	7.35E+07	3.26E+08
X-330	29-2	4	4	19-Oct-04	57	2.99E+09	1.20E+08	5.31E+08
X-330	29-2	4	5	19-Oct-04	48	2.52E+09	1.01E+08	4.47E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-2	4	6	19-Oct-04	21	1.10E+09	4.41E+07	1.96E+08
X-330	29-2	4	7	19-Oct-04	381	2.00E+10	8.00E+08	3.55E+09
X-330	29-2	4	8	19-Oct-04	236	1.24E+10	4.96E+08	2.20E+09
X-330	29-2	4	9	19-Oct-04	152	7.99E+09	3.19E+08	1.42E+09
X-330	29-2	4	10	19-Oct-04	21	1.10E+09	4.41E+07	1.96E+08
X-330	29-2	5	1	27-Oct-04	249	1.23E+10	5.23E+08	3.08E+09
X-330	29-2	5	2	27-Oct-04	242	1.19E+10	5.08E+08	2.99E+09
X-330	29-2	5	3	27-Oct-04	165	8.12E+09	3.47E+08	2.04E+09
X-330	29-2	5	4	27-Oct-04	55	2.71E+09	1.16E+08	6.80E+08
X-330	29-2	5	5	27-Oct-04	377	1.86E+10	7.92E+08	4.66E+09
X-330	29-2	5	6	27-Oct-04	1043	5.13E+10	2.19E+09	1.29E+10
X-330	29-2	5	7	27-Oct-04	146	7.18E+09	3.07E+08	1.80E+09
X-330	29-2	5	8	27-Oct-04	158	7.77E+09	3.32E+08	1.95E+09
X-330	29-2	5	9	27-Oct-04	50	2.46E+09	1.05E+08	6.18E+08
X-330	29-2	5	10	27-Oct-04	182	8.96E+09	3.82E+08	2.25E+09
X-330	29-2	6	1	20-Oct-04	804	4.26E+10	1.69E+09	7.00E+09
X-330	29-2	6	2	20-Oct-04	54	2.86E+09	1.13E+08	4.70E+08
X-330	29-2	6	3	20-Oct-04	104	5.51E+09	2.18E+08	9.06E+08
X-330	29-2	6	4	02-Mar-08	66	3.50E+09	1.39E+08	5.67E+08
X-330	29-2	6	5	20-Oct-04	531	2.81E+10	1.12E+09	4.63E+09
X-330	29-2	6	6	20-Oct-04	33	1.75E+09	6.93E+07	2.87E+08
X-330	29-2	6	7	20-Oct-04	173	9.17E+09	3.63E+08	1.51E+09
X-330	29-2	6	8	20-Oct-04	332	1.76E+10	6.97E+08	2.89E+09
X-330	29-2	6	9	20-Oct-04	63	3.34E+09	1.32E+08	5.49E+08
X-330	29-2	6	10	20-Oct-04	45	2.38E+09	9.45E+07	3.92E+08
X-330	29-2	7	1	26-Oct-04	980	4.94E+10	2.06E+09	1.13E+10
X-330	29-2	7	2	26-Oct-04	68	3.43E+09	1.43E+08	7.82E+08
X-330	29-2	7	3	26-Oct-04	62	3.13E+09	1.30E+08	7.13E+08
X-330	29-2	7	4	26-Oct-04	160	8.07E+09	3.36E+08	1.84E+09
X-330	29-2	7	5	26-Oct-04	264	1.33E+10	5.54E+08	3.04E+09
X-330	29-2	7	6	26-Oct-04	81	4.08E+09	1.70E+08	9.31E+08
X-330	29-2	7	7	26-Oct-04	584	2.94E+10	1.23E+09	6.71E+09
X-330	29-2	7	8	26-Oct-04	45	2.27E+09	9.45E+07	5.17E+08
X-330	29-2	7	9	26-Oct-04	39	1.97E+09	8.19E+07	4.48E+08
X-330	29-2	7	10	26-Oct-04	140	7.06E+09	2.94E+08	1.61E+09
X-330	29-2	8	1	21-Oct-04	135	6.86E+09	2.84E+08	1.50E+09
X-330	29-2	8	2	21-Oct-04	149	7.57E+09	3.13E+08	1.66E+09
X-330	29-2	8	3	21-Oct-04	59	3.00E+09	1.24E+08	6.57E+08
X-330	29-2	8	4	21-Oct-04	259	1.32E+10	5.44E+08	2.88E+09
X-330	29-2	8	5	21-Oct-04	1040	5.29E+10	2.18E+09	1.16E+10
X-330	29-2	8	6	21-Oct-04	104	5.29E+09	2.18E+08	1.16E+09
X-330	29-2	8	7	21-Oct-04	167	8.49E+09	3.51E+08	1.86E+09
X-330	29-2	8	8	21-Oct-04	81	4.12E+09	1.70E+08	9.01E+08
X-330	29-2	8	9	21-Oct-04	449	2.28E+10	9.43E+08	5.00E+09
X-330	29-2	8	10	21-Oct-04	600	3.05E+10	1.26E+09	6.68E+09
X-330	29-2	9	1	25-Oct-04	666	3.36E+10	1.40E+09	7.52E+09
X-330	29-2	9	2	25-Oct-04	1125	5.67E+10	2.36E+09	1.27E+10
X-330	29-2	9	3	24-Oct-07	177	8.92E+09	3.72E+08	2.03E+09
X-330	29-2	9	4	25-Oct-04	146	7.36E+09	3.07E+08	1.65E+09
X-330	29-2	9	5	25-Oct-04	135	6.80E+09	2.84E+08	1.52E+09
X-330	29-2	9	6	25-Oct-04	101	5.09E+09	2.12E+08	1.14E+09
X-330	29-2	9	7	24-Oct-07	243	1.22E+10	5.10E+08	2.78E+09
X-330	29-2	9	8	25-Oct-04	1152	5.81E+10	2.42E+09	1.30E+10
X-330	29-2	9	9	25-Oct-04	168	8.47E+09	3.53E+08	1.90E+09
X-330	29-2	9	10	25-Oct-04	90	4.54E+09	1.89E+08	1.02E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-2	10	1	22-Oct-04	464	2.27E+10	9.74E+08	5.97E+09
X-330	29-2	10	2	22-Oct-04	245	1.20E+10	5.15E+08	3.15E+09
X-330	29-2	10	3	22-Oct-04	789	3.85E+10	1.66E+09	1.02E+10
X-330	29-2	10	4	22-Oct-04	261	1.27E+10	5.48E+08	3.36E+09
X-330	29-2	10	5	22-Oct-04	77	3.76E+09	1.62E+08	9.91E+08
X-330	29-2	10	6	22-Oct-04	81	3.95E+09	1.70E+08	1.04E+09
X-330	29-2	10	7	22-Oct-04	840	4.10E+10	1.76E+09	1.08E+10
X-330	29-2	10	8	22-Oct-04	64	3.12E+09	1.34E+08	8.24E+08
X-330	29-2	10	9	22-Oct-04	484	2.36E+10	1.02E+09	6.23E+09
X-330	29-2	10	10	22-Oct-04	141	6.88E+09	2.96E+08	1.81E+09
X-330	29-3	1	1	01-Oct-04	361	1.85E+10	7.58E+08	3.74E+09
X-330	29-3	1	2	01-Oct-04	98	5.02E+09	2.06E+08	1.01E+09
X-330	29-3	1	3	01-Oct-04	264	1.35E+10	5.54E+08	2.73E+09
X-330	29-3	1	4	01-Oct-04	87	4.46E+09	1.83E+08	9.00E+08
X-330	29-3	1	5	01-Oct-04	68	3.48E+09	1.43E+08	7.04E+08
X-330	29-3	1	6	01-Oct-04	95	4.87E+09	2.00E+08	9.83E+08
X-330	29-3	1	7	01-Oct-04	167	8.56E+09	3.51E+08	1.73E+09
X-330	29-3	1	8	01-Oct-04	35	1.79E+09	7.35E+07	3.62E+08
X-330	29-3	1	9	01-Oct-04	591	3.03E+10	1.24E+09	6.12E+09
X-330	29-3	1	10	01-Oct-04	26	1.33E+09	5.46E+07	2.69E+08
X-330	29-3	2	1	20-Sep-04	75	4.15E+09	1.58E+08	5.13E+08
X-330	29-3	2	2	20-Sep-04	54	2.99E+09	1.13E+08	3.70E+08
X-330	29-3	2	3	20-Sep-04	122	6.75E+09	2.56E+08	8.35E+08
X-330	29-3	2	4	20-Sep-04	158	8.75E+09	3.32E+08	1.08E+09
X-330	29-3	2	5	20-Sep-04	128	7.09E+09	2.69E+08	8.76E+08
X-330	29-3	2	6	20-Sep-04	90	4.98E+09	1.89E+08	6.16E+08
X-330	29-3	2	7	20-Sep-04	50	2.77E+09	1.05E+08	3.42E+08
X-330	29-3	2	8	20-Sep-04	117	6.48E+09	2.46E+08	8.01E+08
X-330	29-3	2	9	20-Sep-04	150	8.30E+09	3.15E+08	1.03E+09
X-330	29-3	2	10	20-Sep-04	513	2.84E+10	1.08E+09	3.51E+09
X-330	29-3	3	1	30-Sep-04	219	1.23E+10	4.60E+08	1.31E+09
X-330	29-3	3	2	30-Sep-04	659	3.71E+10	1.38E+09	3.93E+09
X-330	29-3	3	3	30-Sep-04	62	3.49E+09	1.30E+08	3.70E+08
X-330	29-3	3	4	30-Sep-04	22	1.24E+09	4.62E+07	1.31E+08
X-330	29-3	3	5	02-Jan-08	656	3.70E+10	1.38E+09	3.91E+09
X-330	29-3	3	6	30-Sep-04	15	8.45E+08	3.15E+07	8.95E+07
X-330	29-3	3	7	30-Sep-04	245	1.38E+10	5.15E+08	1.46E+09
X-330	29-3	3	8	30-Sep-04	65	3.66E+09	1.37E+08	3.88E+08
X-330	29-3	3	9	30-Sep-04	29	1.63E+09	6.09E+07	1.73E+08
X-330	29-3	3	10	30-Sep-04	62	3.49E+09	1.30E+08	3.70E+08
X-330	29-3	4	1	21-Sep-04	89	4.41E+09	1.87E+08	1.07E+09
X-330	29-3	4	2	21-Sep-04	69	3.42E+09	1.45E+08	8.30E+08
X-330	29-3	4	3	21-Sep-04	56	2.78E+09	1.18E+08	6.74E+08
X-330	29-3	4	4	21-Sep-04	42	2.08E+09	8.82E+07	5.05E+08
X-330	29-3	4	5	21-Sep-04	75	3.72E+09	1.58E+08	9.02E+08
X-330	29-3	4	6	21-Sep-04	66	3.27E+09	1.39E+08	7.94E+08
X-330	29-3	4	7	21-Sep-04	81	4.02E+09	1.70E+08	9.74E+08
X-330	29-3	4	8	21-Sep-04	95	4.71E+09	2.00E+08	1.14E+09
X-330	29-3	4	9	21-Sep-04	225	1.12E+10	4.73E+08	2.71E+09
X-330	29-3	4	10	21-Sep-04	633	3.14E+10	1.33E+09	7.61E+09
X-330	29-3	5	1	29-Sep-04	56	2.80E+09	1.18E+08	6.61E+08
X-330	29-3	5	2	29-Sep-04	33	1.65E+09	6.93E+07	3.89E+08
X-330	29-3	5	3	29-Sep-04	68	3.40E+09	1.43E+08	8.03E+08
X-330	29-3	5	4	29-Sep-04	38	1.90E+09	7.98E+07	4.48E+08
X-330	29-3	5	5	29-Sep-04	50	2.50E+09	1.05E+08	5.90E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-3	5	6	29-Sep-04	69	3.45E+09	1.45E+08	8.14E+08
X-330	29-3	5	7	29-Sep-04	63	3.15E+09	1.32E+08	7.44E+08
X-330	29-3	5	8	29-Sep-04	248	1.24E+10	5.21E+08	2.93E+09
X-330	29-3	5	9	29-Sep-04	435	2.18E+10	9.14E+08	5.13E+09
X-330	29-3	5	10	29-Sep-04	111	5.55E+09	2.33E+08	1.31E+09
X-330	29-3	6	1	22-Sep-04	314	1.65E+10	6.59E+08	2.88E+09
X-330	29-3	6	2	22-Sep-04	99	5.20E+09	2.08E+08	9.09E+08
X-330	29-3	6	3	22-Sep-04	38	2.00E+09	7.98E+07	3.49E+08
X-330	29-3	6	4	22-Sep-04	47	2.47E+09	9.87E+07	4.31E+08
X-330	29-3	6	5	22-Sep-04	60	3.15E+09	1.26E+08	5.51E+08
X-330	29-3	6	6	22-Sep-04	23	1.21E+09	4.83E+07	2.11E+08
X-330	29-3	6	7	22-Sep-04	47	2.47E+09	9.87E+07	4.31E+08
X-330	29-3	6	8	22-Sep-04	38	2.00E+09	7.98E+07	3.49E+08
X-330	29-3	6	9	22-Sep-04	65	3.42E+09	1.37E+08	5.97E+08
X-330	29-3	6	10	22-Sep-04	45	2.36E+09	9.45E+07	4.13E+08
X-330	29-3	7	1	28-Sep-04	69	3.40E+09	1.45E+08	8.74E+08
X-330	29-3	7	2	28-Sep-04	468	2.30E+10	9.83E+08	5.93E+09
X-330	29-3	7	3	28-Sep-04	39	1.92E+09	8.19E+07	4.94E+08
X-330	29-3	7	4	28-Sep-04	584	2.87E+10	1.23E+09	7.39E+09
X-330	29-3	7	5	28-Sep-04	273	1.34E+10	5.73E+08	3.46E+09
X-330	29-3	7	6	28-Sep-04	54	2.66E+09	1.13E+08	6.84E+08
X-330	29-3	7	7	28-Sep-04	47	2.31E+09	9.87E+07	5.95E+08
X-330	29-3	7	8	28-Sep-04	93	4.58E+09	1.95E+08	1.18E+09
X-330	29-3	7	9	28-Sep-04	51	2.51E+09	1.07E+08	6.46E+08
X-330	29-3	7	10	28-Sep-04	53	2.61E+09	1.11E+08	6.71E+08
X-330	29-3	8	1	23-Sep-04	40	2.08E+09	8.40E+07	3.93E+08
X-330	29-3	8	2	23-Sep-04	36	1.88E+09	7.56E+07	3.54E+08
X-330	29-3	8	3	23-Sep-04	34	1.77E+09	7.14E+07	3.34E+08
X-330	29-3	8	4	23-Sep-04	96	5.00E+09	2.02E+08	9.43E+08
X-330	29-3	8	5	23-Sep-04	71	3.70E+09	1.49E+08	6.97E+08
X-330	29-3	8	6	23-Sep-04	28	1.46E+09	5.88E+07	2.75E+08
X-330	29-3	8	7	23-Sep-04	51	2.66E+09	1.07E+08	5.01E+08
X-330	29-3	8	8	23-Sep-04	78	4.06E+09	1.64E+08	7.66E+08
X-330	29-3	8	9	23-Sep-04	62	3.23E+09	1.30E+08	6.09E+08
X-330	29-3	8	10	23-Sep-04	77	4.01E+09	1.62E+08	7.56E+08
X-330	29-3	9	1	27-Sep-04	48	2.36E+09	1.01E+08	5.93E+08
X-330	29-3	9	2	27-Sep-04	55	2.71E+09	1.16E+08	6.80E+08
X-330	29-3	9	3	27-Sep-04	44	2.17E+09	9.24E+07	5.44E+08
X-330	29-3	9	4	27-Sep-04	22	1.08E+09	4.62E+07	2.72E+08
X-330	29-3	9	5	27-Sep-04	37	1.82E+09	7.77E+07	4.57E+08
X-330	29-3	9	6	27-Sep-04	68	3.35E+09	1.43E+08	8.41E+08
X-330	29-3	9	7	27-Sep-04	29	1.43E+09	6.09E+07	3.59E+08
X-330	29-3	9	8	27-Sep-04	24	1.18E+09	5.04E+07	2.97E+08
X-330	29-3	9	9	27-Sep-04	21	1.03E+09	4.41E+07	2.60E+08
X-330	29-3	9	10	27-Sep-04	38	1.87E+09	7.98E+07	4.70E+08
X-330	29-3	10	1	24-Sep-04	122	6.69E+09	2.56E+08	8.73E+08
X-330	29-3	10	2	24-Sep-04	80	4.39E+09	1.68E+08	5.72E+08
X-330	29-3	10	3	24-Sep-04	80	4.39E+09	1.68E+08	5.72E+08
X-330	29-3	10	4	24-Sep-04	117	6.42E+09	2.46E+08	8.37E+08
X-330	29-3	10	5	24-Sep-04	212	1.16E+10	4.45E+08	1.52E+09
X-330	29-3	10	6	24-Sep-04	456	2.50E+10	9.58E+08	3.26E+09
X-330	29-3	10	7	24-Sep-04	114	6.25E+09	2.39E+08	8.15E+08
X-330	29-3	10	8	24-Sep-04	98	5.38E+09	2.06E+08	7.01E+08
X-330	29-3	10	9	24-Sep-04	132	7.24E+09	2.77E+08	9.44E+08
X-330	29-3	10	10	24-Sep-04	131	7.19E+09	2.75E+08	9.37E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-4	1	1	14-Sep-04	143	7.33E+09	3.00E+08	1.52E+09
X-330	29-4	1	2	14-Sep-04	107	5.48E+09	2.25E+08	1.13E+09
X-330	29-4	1	3	14-Sep-04	182	9.33E+09	3.82E+08	1.93E+09
X-330	29-4	1	4	14-Sep-04	1196	6.13E+10	2.51E+09	1.27E+10
X-330	29-4	1	5	14-Sep-04	197	1.01E+10	4.14E+08	2.09E+09
X-330	29-4	1	6	14-Sep-04	140	7.17E+09	2.94E+08	1.48E+09
X-330	29-4	1	7	14-Sep-04	98	5.02E+09	2.06E+08	1.04E+09
X-330	29-4	1	8	14-Sep-04	95	4.87E+09	2.00E+08	1.01E+09
X-330	29-4	1	9	14-Sep-04	104	5.33E+09	2.18E+08	1.10E+09
X-330	29-4	1	10	14-Sep-04	345	1.77E+10	7.25E+08	3.66E+09
X-330	29-4	2	1	04-Sep-04	695	3.65E+10	1.46E+09	6.52E+09
X-330	29-4	2	2	04-Sep-04	101	5.31E+09	2.12E+08	9.47E+08
X-330	29-4	2	3	04-Sep-04	47	2.47E+09	9.87E+07	4.41E+08
X-330	29-4	2	4	04-Sep-04	15	7.88E+08	3.15E+07	1.41E+08
X-330	29-4	2	5	04-Sep-04	14	7.36E+08	2.94E+07	1.31E+08
X-330	29-4	2	6	04-Sep-04	66	3.47E+09	1.39E+08	6.19E+08
X-330	29-4	2	7	04-Sep-04	135	7.09E+09	2.84E+08	1.27E+09
X-330	29-4	2	8	04-Sep-04	51	2.68E+09	1.07E+08	4.78E+08
X-330	29-4	2	9	04-Sep-04	545	2.86E+10	1.14E+09	5.11E+09
X-330	29-4	2	10	04-Sep-04	140	7.36E+09	2.94E+08	1.31E+09
X-330	29-4	3	1	16-Sep-04	329	1.70E+10	6.91E+08	3.36E+09
X-330	29-4	3	2	16-Sep-04	135	6.98E+09	2.84E+08	1.38E+09
X-330	29-4	3	3	16-Sep-04	252	1.30E+10	5.29E+08	2.57E+09
X-330	29-4	3	4	16-Sep-04	200	1.03E+10	4.20E+08	2.04E+09
X-330	29-4	3	5	16-Sep-04	180	9.30E+09	3.78E+08	1.84E+09
X-330	29-4	3	6	16-Sep-04	107	5.53E+09	2.25E+08	1.09E+09
X-330	29-4	3	7	16-Sep-04	288	1.49E+10	6.05E+08	2.94E+09
X-330	29-4	3	8	16-Sep-04	183	9.46E+09	3.84E+08	1.87E+09
X-330	29-4	3	9	16-Sep-04	129	6.67E+09	2.71E+08	1.32E+09
X-330	29-4	3	10	16-Sep-04	233	1.20E+10	4.89E+08	2.38E+09
X-330	29-4	4	1	05-Jan-05	5	2.65E+08	1.05E+07	4.42E+07
X-330	29-4	4	2	05-Jan-05	6	3.18E+08	1.26E+07	5.30E+07
X-330	29-4	4	3	05-Jan-05	9	4.77E+08	1.89E+07	7.95E+07
X-330	29-4	4	4	05-Jan-05	6	3.18E+08	1.26E+07	5.30E+07
X-330	29-4	4	5	05-Jan-05	8	4.24E+08	1.68E+07	7.07E+07
X-330	29-4	4	6	15-Sep-05	456	2.42E+10	9.58E+08	4.03E+09
X-330	29-4	4	7	05-Jan-05	151	8.00E+09	3.17E+08	1.33E+09
X-330	29-4	4	8	05-Jan-05	11	5.83E+08	2.31E+07	9.72E+07
X-330	29-4	4	9	05-Jan-05	8	4.24E+08	1.68E+07	7.07E+07
X-330	29-4	4	10	05-Jan-05	8	4.24E+08	1.68E+07	7.07E+07
X-330	29-4	5	1	15-Sep-04	429	2.37E+10	9.01E+08	2.94E+09
X-330	29-4	5	2	15-Sep-04	657	3.64E+10	1.38E+09	4.51E+09
X-330	29-4	5	3	08-Sep-08	855	4.73E+10	1.80E+09	6.60E+09
X-330	29-4	5	4	15-Sep-04	504	2.79E+10	1.06E+09	3.46E+09
X-330	29-4	5	5	15-Sep-04	593	3.28E+10	1.25E+09	4.07E+09
X-330	29-4	5	6	15-Sep-04	543	3.01E+10	1.14E+09	3.72E+09
X-330	29-4	5	7	15-Sep-04	362	2.00E+10	7.60E+08	2.48E+09
X-330	29-4	5	8	08-Sep-08	261	1.44E+10	5.48E+08	2.01E+09
X-330	29-4	5	9	15-Sep-04	644	3.57E+10	1.35E+09	4.42E+09
X-330	29-4	5	10	15-Sep-04	699	3.87E+10	1.47E+09	4.79E+09
X-330	29-4	6	1	07-Sep-04	86	4.60E+09	1.81E+08	7.20E+08
X-330	29-4	6	2	07-Sep-04	17	9.09E+08	3.57E+07	1.42E+08
X-330	29-4	6	3	07-Sep-04	107	5.72E+09	2.25E+08	8.96E+08
X-330	29-4	6	4	07-Sep-04	21	1.12E+09	4.41E+07	1.76E+08
X-330	29-4	6	5	07-Sep-04	141	7.54E+09	2.96E+08	1.18E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-4	6	6	07-Sep-04	23	1.23E+09	4.83E+07	1.93E+08
X-330	29-4	6	7	07-Sep-04	20	1.07E+09	4.20E+07	1.68E+08
X-330	29-4	6	8	07-Sep-04	21	1.12E+09	4.41E+07	1.76E+08
X-330	29-4	6	9	07-Sep-04	99	5.29E+09	2.08E+08	8.29E+08
X-330	29-4	6	10	07-Sep-04	33	1.76E+09	6.93E+07	2.76E+08
X-330	29-4	7	1	14-Sep-04	101	5.26E+09	2.12E+08	9.89E+08
X-330	29-4	7	2	14-Sep-04	74	3.86E+09	1.55E+08	7.25E+08
X-330	29-4	7	3	14-Sep-04	131	6.83E+09	2.75E+08	1.28E+09
X-330	29-4	7	4	14-Sep-04	126	6.56E+09	2.65E+08	1.23E+09
X-330	29-4	7	5	14-Sep-04	36	1.88E+09	7.56E+07	3.53E+08
X-330	29-4	7	6	14-Sep-04	99	5.16E+09	2.08E+08	9.69E+08
X-330	29-4	7	7	14-Sep-04	150	7.82E+09	3.15E+08	1.47E+09
X-330	29-4	7	8	14-Sep-04	390	2.03E+10	8.19E+08	3.82E+09
X-330	29-4	7	9	14-Sep-04	987	5.14E+10	2.07E+09	9.67E+09
X-330	29-4	7	10	14-Sep-04	456	2.38E+10	9.58E+08	4.47E+09
X-330	29-4	8	1	08-Sep-04	785	4.16E+10	1.65E+09	6.80E+09
X-330	29-4	8	2	08-May-08	16.5	8.82E+08	3.47E+07	1.42E+08
X-330	29-4	8	3	08-May-08	16.5	8.82E+08	3.47E+07	1.42E+08
X-330	29-4	8	4	08-Sep-04	962	5.10E+10	2.02E+09	8.33E+09
X-330	29-4	8	5	08-May-08	39	2.08E+09	8.19E+07	3.35E+08
X-330	29-4	8	6	08-Sep-04	974	5.16E+10	2.05E+09	8.44E+09
X-330	29-4	8	7	08-Sep-04	391	2.07E+10	8.21E+08	3.39E+09
X-330	29-4	8	8	08-Sep-04	709	3.76E+10	1.49E+09	6.14E+09
X-330	29-4	8	9	08-Sep-04	602	3.19E+10	1.26E+09	5.21E+09
X-330	29-4	8	10	08-Sep-04	1027	5.44E+10	2.16E+09	8.90E+09
X-330	29-4	9	1	13-Sep-04	23	1.21E+09	4.83E+07	2.12E+08
X-330	29-4	9	2	13-Sep-04	35	1.84E+09	7.35E+07	3.23E+08
X-330	29-4	9	3	13-Sep-04	29	1.52E+09	6.09E+07	2.68E+08
X-330	29-4	9	4	13-Sep-04	35	1.84E+09	7.35E+07	3.23E+08
X-330	29-4	9	5	13-Sep-04	24	1.26E+09	5.04E+07	2.22E+08
X-330	29-4	9	6	13-Sep-04	32	1.68E+09	6.72E+07	2.96E+08
X-330	29-4	9	7	13-Sep-04	15	7.88E+08	3.15E+07	1.39E+08
X-330	29-4	9	8	13-Sep-04	48	2.52E+09	1.01E+08	4.43E+08
X-330	29-4	9	9	30-Jun-08	750	3.94E+10	1.58E+09	6.82E+09
X-330	29-4	9	10	13-Sep-04	111	5.83E+09	2.33E+08	1.03E+09
X-330	29-4	10	1	09-Sep-04	59	3.36E+09	1.24E+08	5.27E+08
X-330	29-4	10	2	09-Sep-04	635	3.61E+10	1.33E+09	5.68E+09
X-330	29-4	10	3	09-Sep-04	126	7.17E+09	2.65E+08	1.13E+09
X-330	29-4	10	4	09-Sep-04	153	8.70E+09	3.21E+08	1.37E+09
X-330	29-4	10	5	09-Sep-04	80	4.55E+09	1.68E+08	7.15E+08
X-330	29-4	10	6	09-Sep-04	557	3.17E+10	1.17E+09	4.98E+09
X-330	29-4	10	7	09-Sep-04	20	1.14E+09	4.20E+07	1.79E+08
X-330	29-4	10	8	09-Sep-04	143	8.13E+09	3.00E+08	1.28E+09
X-330	29-4	10	9	09-Sep-04	209	1.19E+10	4.39E+08	1.87E+09
X-330	29-4	10	10	09-Sep-04	378	2.15E+10	7.94E+08	3.38E+09
X-330	29-5	1	1	02-Sep-04	14	7.82E+08	2.94E+07	8.51E+07
X-330	29-5	1	2	02-Sep-04	23	1.28E+09	4.83E+07	1.40E+08
X-330	29-5	1	3	02-Sep-04	13	7.26E+08	2.73E+07	7.90E+07
X-330	29-5	1	4	02-Sep-04	7	3.91E+08	1.47E+07	4.25E+07
X-330	29-5	1	5	02-Sep-04	94	5.25E+09	1.97E+08	5.71E+08
X-330	29-5	1	6	02-Sep-04	10	5.59E+08	2.10E+07	6.08E+07
X-330	29-5	1	7	02-Sep-04	144	8.04E+09	3.02E+08	8.75E+08
X-330	29-5	1	8	02-Sep-04	9	5.03E+08	1.89E+07	5.47E+07
X-330	29-5	1	9	02-Sep-04	11	6.14E+08	2.31E+07	6.69E+07
X-330	29-5	1	10	02-Sep-04	21	1.17E+09	4.41E+07	1.28E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-5	2	1	13-Jun-06	21	1.18E+09	4.41E+07	1.24E+08
X-330	29-5	2	2	23-Aug-04	11	6.20E+08	2.31E+07	6.51E+07
X-330	29-5	2	3	23-Aug-04	10	5.64E+08	2.10E+07	5.92E+07
X-330	29-5	2	4	23-Aug-04	10	5.64E+08	2.10E+07	5.92E+07
X-330	29-5	2	5	23-Aug-04	8	4.51E+08	1.68E+07	4.74E+07
X-330	29-5	2	6	23-Aug-04	8	4.51E+08	1.68E+07	4.74E+07
X-330	29-5	2	7	23-Aug-04	9	5.07E+08	1.89E+07	5.33E+07
X-330	29-5	2	8	23-Aug-04	8	4.51E+08	1.68E+07	4.74E+07
X-330	29-5	2	9	23-Aug-04	8	4.51E+08	1.68E+07	4.74E+07
X-330	29-5	2	10	23-Aug-04	14	7.89E+08	2.94E+07	8.29E+07
X-330	29-5	3	1	01-Sep-04	897	4.92E+10	1.88E+09	6.51E+09
X-330	29-5	3	2	01-Sep-04	113	6.20E+09	2.37E+08	8.20E+08
X-330	29-5	3	3	01-Sep-04	236	1.29E+10	4.96E+08	1.71E+09
X-330	29-5	3	4	01-Sep-04	192	1.05E+10	4.03E+08	1.39E+09
X-330	29-5	3	5	01-Sep-04	213	1.17E+10	4.47E+08	1.55E+09
X-330	29-5	3	6	16-Jun-08	0	0.00E+00	0.00E+00	0.00E+00
X-330	29-5	3	7	01-Sep-04	332	1.82E+10	6.97E+08	2.41E+09
X-330	29-5	3	8	01-Sep-04	117	6.42E+09	2.46E+08	8.49E+08
X-330	29-5	3	9	01-Sep-04	66	3.62E+09	1.39E+08	4.79E+08
X-330	29-5	3	10	01-Sep-04	96	5.27E+09	2.02E+08	6.97E+08
X-330	29-5	4	1	24-Aug-04	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	4	2	24-Aug-04	17	9.50E+08	3.57E+07	1.05E+08
X-330	29-5	4	3	24-Aug-04	26	1.45E+09	5.46E+07	1.61E+08
X-330	29-5	4	4	24-Aug-04	11	6.14E+08	2.31E+07	6.83E+07
X-330	29-5	4	5	24-Aug-04	21	1.17E+09	4.41E+07	1.30E+08
X-330	29-5	4	6	24-Aug-04	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	4	7	24-Aug-04	27	1.51E+09	5.67E+07	1.68E+08
X-330	29-5	4	8	24-Aug-04	8	4.47E+08	1.68E+07	4.96E+07
X-330	29-5	4	9	24-Aug-04	15	8.38E+08	3.15E+07	9.31E+07
X-330	29-5	4	10	24-Aug-04	12	6.70E+08	2.52E+07	7.45E+07
X-330	29-5	5	1	31-Aug-04	29	1.55E+09	6.09E+07	2.50E+08
X-330	29-5	5	2	31-Aug-04	83	4.44E+09	1.74E+08	7.15E+08
X-330	29-5	5	3	31-Aug-04	23	1.23E+09	4.83E+07	1.98E+08
X-330	29-5	5	4	31-Aug-04	56	2.99E+09	1.18E+08	4.82E+08
X-330	29-5	5	5	31-Aug-04	50	2.67E+09	1.05E+08	4.31E+08
X-330	29-5	5	6	31-Aug-04	54	2.89E+09	1.13E+08	4.65E+08
X-330	29-5	5	7	31-Aug-04	105	5.61E+09	2.21E+08	9.04E+08
X-330	29-5	5	8	31-Aug-04	40	2.14E+09	8.40E+07	3.45E+08
X-330	29-5	5	9	31-Aug-04	26	1.39E+09	5.46E+07	2.24E+08
X-330	29-5	5	10	31-Aug-04	17	9.09E+08	3.57E+07	1.46E+08
X-330	29-5	6	1	25-Aug-04	35	1.95E+09	7.35E+07	2.20E+08
X-330	29-5	6	2	25-Aug-04	42	2.35E+09	8.82E+07	2.64E+08
X-330	29-5	6	3	25-Aug-04	44	2.46E+09	9.24E+07	2.77E+08
X-330	29-5	6	4	25-Aug-04	10	5.59E+08	2.10E+07	6.30E+07
X-330	29-5	6	5	25-Aug-04	48	2.68E+09	1.01E+08	3.02E+08
X-330	29-5	6	6	25-Aug-04	21	1.17E+09	4.41E+07	1.32E+08
X-330	29-5	6	7	25-Aug-04	6	3.35E+08	1.26E+07	3.78E+07
X-330	29-5	6	8	25-Aug-04	17	9.50E+08	3.57E+07	1.07E+08
X-330	29-5	6	9	25-Aug-04	11	6.14E+08	2.31E+07	6.93E+07
X-330	29-5	6	10	25-Aug-04	11	6.14E+08	2.31E+07	6.93E+07
X-330	29-5	7	1	30-Aug-04	213	1.13E+10	4.47E+08	1.90E+09
X-330	29-5	7	2	30-Aug-04	13	6.89E+08	2.73E+07	1.16E+08
X-330	29-5	7	3	30-Aug-04	22	1.17E+09	4.62E+07	1.96E+08
X-330	29-5	7	4	30-Aug-04	14	7.42E+08	2.94E+07	1.25E+08
X-330	29-5	7	5	30-Aug-04	18	9.54E+08	3.78E+07	1.60E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-5	7	6	30-Aug-04	20	1.06E+09	4.20E+07	1.78E+08
X-330	29-5	7	7	30-Aug-04	22	1.17E+09	4.62E+07	1.96E+08
X-330	29-5	7	8	30-Aug-04	108	5.72E+09	2.27E+08	9.63E+08
X-330	29-5	7	9	30-Aug-04	12	6.36E+08	2.52E+07	1.07E+08
X-330	29-5	7	10	30-Aug-04	30	1.59E+09	6.30E+07	2.67E+08
X-330	29-5	8	1	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	8	2	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	8	3	17-Jan-05	8	4.47E+08	1.68E+07	4.96E+07
X-330	29-5	8	4	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	8	5	17-Jan-05	6	3.35E+08	1.26E+07	3.72E+07
X-330	29-5	8	6	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	8	7	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	8	8	12-Aug-06	147	8.21E+09	3.09E+08	9.12E+08
X-330	29-5	8	9	17-Jan-05	12	6.70E+08	2.52E+07	7.45E+07
X-330	29-5	8	10	17-Jan-05	9	5.03E+08	1.89E+07	5.58E+07
X-330	29-5	9	1	27-Aug-04	260	1.44E+10	5.46E+08	1.71E+09
X-330	29-5	9	2	27-Aug-04	159	8.80E+09	3.34E+08	1.05E+09
X-330	29-5	9	3	27-Aug-04	185	1.02E+10	3.89E+08	1.22E+09
X-330	29-5	9	4	27-Aug-04	269	1.49E+10	5.65E+08	1.77E+09
X-330	29-5	9	5	27-Aug-04	164	9.08E+09	3.44E+08	1.08E+09
X-330	29-5	9	6	27-Aug-04	186	1.03E+10	3.91E+08	1.22E+09
X-330	29-5	9	7	27-Aug-04	266	1.47E+10	5.59E+08	1.75E+09
X-330	29-5	9	8	27-Aug-04	206	1.14E+10	4.33E+08	1.35E+09
X-330	29-5	9	9	27-Aug-04	209	1.16E+10	4.39E+08	1.37E+09
X-330	29-5	9	10	27-Aug-04	176	9.74E+09	3.70E+08	1.16E+09
X-330	29-5	10	1	26-Aug-04	62	3.43E+09	1.30E+08	3.99E+08
X-330	29-5	10	2	26-Aug-04	54	2.99E+09	1.13E+08	3.47E+08
X-330	29-5	10	3	26-Aug-04	83	4.59E+09	1.74E+08	5.34E+08
X-330	29-5	10	4	26-Aug-04	47	2.60E+09	9.87E+07	3.02E+08
X-330	29-5	10	5	26-Aug-04	23	1.27E+09	4.83E+07	1.48E+08
X-330	29-5	10	6	26-Aug-04	36	1.99E+09	7.56E+07	2.32E+08
X-330	29-5	10	7	26-Aug-04	86	4.76E+09	1.81E+08	5.53E+08
X-330	29-5	10	8	26-Aug-04	38	2.10E+09	7.98E+07	2.44E+08
X-330	29-5	10	9	26-Aug-04	21	1.16E+09	4.41E+07	1.35E+08
X-330	29-5	10	10	26-Aug-04	17	9.41E+08	3.57E+07	1.09E+08
X-330	29-6	1	1	16-Aug-04	35	1.95E+09	7.35E+07	1.61E+08
X-330	29-6	1	2	16-Aug-04	41	2.29E+09	8.61E+07	1.88E+08
X-330	29-6	1	3	16-Aug-04	59	3.30E+09	1.24E+08	2.71E+08
X-330	29-6	1	4	16-Aug-04	48	2.68E+09	1.01E+08	2.21E+08
X-330	29-6	1	5	16-Aug-04	110	6.14E+09	2.31E+08	5.05E+08
X-330	29-6	1	6	16-Aug-04	80	4.47E+09	1.68E+08	3.68E+08
X-330	29-6	1	7	16-Aug-04	480	2.68E+10	1.01E+09	2.21E+09
X-330	29-6	1	8	16-Aug-04	629	3.51E+10	1.32E+09	2.89E+09
X-330	29-6	1	9	16-Aug-04	57	3.18E+09	1.20E+08	2.62E+08
X-330	29-6	1	10	16-Aug-04	50	2.79E+09	1.05E+08	2.30E+08
X-330	29-6	2	1	03-Aug-04	24	1.35E+09	5.04E+07	9.77E+07
X-330	29-6	2	2	03-Aug-04	42	2.37E+09	8.82E+07	1.71E+08
X-330	29-6	2	3	03-Aug-04	35	1.97E+09	7.35E+07	1.42E+08
X-330	29-6	2	4	03-Aug-04	27	1.52E+09	5.67E+07	1.10E+08
X-330	29-6	2	5	03-Aug-04	41	2.31E+09	8.61E+07	1.67E+08
X-330	29-6	2	6	03-Aug-04	81	4.57E+09	1.70E+08	3.30E+08
X-330	29-6	2	7	03-Aug-04	36	2.03E+09	7.56E+07	1.47E+08
X-330	29-6	2	8	03-Aug-04	185	1.04E+10	3.89E+08	7.53E+08
X-330	29-6	2	9	03-Aug-04	47	2.65E+09	9.87E+07	1.91E+08
X-330	29-6	2	10	03-Aug-04	125	7.05E+09	2.63E+08	5.09E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-6	3	1	14-Aug-04	77	4.34E+09	1.62E+08	2.85E+08
X-330	29-6	3	2	14-Aug-04	13	7.33E+08	2.73E+07	4.81E+07
X-330	29-6	3	3	14-Aug-04	12	6.76E+08	2.52E+07	4.44E+07
X-330	29-6	3	4	14-Aug-04	17	9.58E+08	3.57E+07	6.29E+07
X-330	29-6	3	5	14-Aug-04	8	4.51E+08	1.68E+07	2.96E+07
X-330	29-6	3	6	14-Aug-04	6	3.38E+08	1.26E+07	2.22E+07
X-330	29-6	3	7	14-Aug-04	14	7.89E+08	2.94E+07	5.18E+07
X-330	29-6	3	8	14-Aug-04	11	6.20E+08	2.31E+07	4.07E+07
X-330	29-6	3	9	14-Aug-04	14	7.89E+08	2.94E+07	5.18E+07
X-330	29-6	3	10	14-Aug-04	11	6.20E+08	2.31E+07	4.07E+07
X-330	29-6	4	1	09-Aug-04	20	9.84E+08	4.20E+07	2.53E+08
X-330	29-6	4	2	09-Aug-04	27	1.33E+09	5.67E+07	3.42E+08
X-330	29-6	4	3	09-Aug-04	17	8.37E+08	3.57E+07	2.15E+08
X-330	29-6	4	4	09-Aug-04	11	5.41E+08	2.31E+07	1.39E+08
X-330	29-6	4	5	09-Aug-04	17	8.37E+08	3.57E+07	2.15E+08
X-330	29-6	4	6	09-Aug-04	14	6.89E+08	2.94E+07	1.77E+08
X-330	29-6	4	7	09-Aug-04	17	8.37E+08	3.57E+07	2.15E+08
X-330	29-6	4	8	09-Aug-04	17	8.37E+08	3.57E+07	2.15E+08
X-330	29-6	4	9	09-Aug-04	22	1.08E+09	4.62E+07	2.79E+08
X-330	29-6	4	10	09-Aug-04	19	9.35E+08	3.99E+07	2.41E+08
X-330	29-6	5	1	01-Oct-06	450	2.45E+10	9.45E+08	3.47E+09
X-330	29-6	5	2	13-Aug-04	13	7.07E+08	2.73E+07	1.00E+08
X-330	29-6	5	3	13-Aug-04	39	2.12E+09	8.19E+07	3.01E+08
X-330	29-6	5	4	13-Aug-04	17	9.25E+08	3.57E+07	1.31E+08
X-330	29-6	5	5	13-Aug-04	11	5.98E+08	2.31E+07	8.49E+07
X-330	29-6	5	6	13-Aug-04	26	1.41E+09	5.46E+07	2.01E+08
X-330	29-6	5	7	13-Aug-04	10	5.44E+08	2.10E+07	7.72E+07
X-330	29-6	5	8	13-Aug-04	18	9.79E+08	3.78E+07	1.39E+08
X-330	29-6	5	9	13-Aug-04	21	1.14E+09	4.41E+07	1.62E+08
X-330	29-6	5	10	13-Aug-04	30	1.63E+09	6.30E+07	2.32E+08
X-330	29-6	6	1	10-Aug-04	33	1.86E+09	6.93E+07	1.37E+08
X-330	29-6	6	2	10-Aug-04	50	2.82E+09	1.05E+08	2.07E+08
X-330	29-6	6	3	10-Aug-04	39	2.20E+09	8.19E+07	1.62E+08
X-330	29-6	6	4	10-Aug-04	30	1.69E+09	6.30E+07	1.24E+08
X-330	29-6	6	5	10-Aug-04	42	2.37E+09	8.82E+07	1.74E+08
X-330	29-6	6	6	10-Aug-04	27	1.52E+09	5.67E+07	1.12E+08
X-330	29-6	6	7	10-Aug-04	177	9.98E+09	3.72E+08	7.34E+08
X-330	29-6	6	8	06-Mar-07	24	1.35E+09	5.04E+07	9.91E+07
X-330	29-6	6	9	10-Aug-04	24	1.35E+09	5.04E+07	9.95E+07
X-330	29-6	6	10	10-Aug-04	161	9.07E+09	3.38E+08	6.68E+08
X-330	29-6	7	1	13-Aug-04	17	9.09E+08	3.57E+07	1.42E+08
X-330	29-6	7	2	13-Aug-04	17	9.09E+08	3.57E+07	1.42E+08
X-330	29-6	7	3	13-Aug-04	14	7.48E+08	2.94E+07	1.17E+08
X-330	29-6	7	4	13-Aug-04	14	7.48E+08	2.94E+07	1.17E+08
X-330	29-6	7	5	13-Aug-04	8	4.28E+08	1.68E+07	6.70E+07
X-330	29-6	7	6	13-Aug-04	20	1.07E+09	4.20E+07	1.68E+08
X-330	29-6	7	7	13-Aug-04	35	1.87E+09	7.35E+07	2.93E+08
X-330	29-6	7	8	13-Aug-04	27	1.44E+09	5.67E+07	2.26E+08
X-330	29-6	7	9	13-Aug-04	66	3.53E+09	1.39E+08	5.53E+08
X-330	29-6	7	10	13-Aug-04	452	2.42E+10	9.49E+08	3.79E+09
X-330	29-6	8	1	10-Aug-04	23	1.15E+09	4.83E+07	2.74E+08
X-330	29-6	8	2	10-Aug-04	12	6.00E+08	2.52E+07	1.43E+08
X-330	29-6	8	3	10-Aug-04	33	1.65E+09	6.93E+07	3.92E+08
X-330	29-6	8	4	10-Aug-04	12	6.00E+08	2.52E+07	1.43E+08
X-330	29-6	8	5	10-Aug-04	35	1.75E+09	7.35E+07	4.16E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	29-6	8	6	10-Aug-04	30	1.50E+09	6.30E+07	3.57E+08
X-330	29-6	8	7	10-Aug-04	20	1.00E+09	4.20E+07	2.38E+08
X-330	29-6	8	8	10-Aug-04	18	9.00E+08	3.78E+07	2.14E+08
X-330	29-6	8	9	10-Aug-04	17	8.50E+08	3.57E+07	2.02E+08
X-330	29-6	8	10	03-Mar-05	241	1.35E+10	5.06E+08	1.51E+09
X-330	29-6	9	1	11-Aug-04	83	4.64E+09	1.74E+08	3.80E+08
X-330	29-6	9	2	11-Aug-04	35	1.95E+09	7.35E+07	1.60E+08
X-330	29-6	9	3	11-Aug-04	36	2.01E+09	7.56E+07	1.65E+08
X-330	29-6	9	4	11-Aug-04	45	2.51E+09	9.45E+07	2.06E+08
X-330	29-6	9	5	11-Aug-04	66	3.69E+09	1.39E+08	3.02E+08
X-330	29-6	9	6	11-Aug-04	38	2.12E+09	7.98E+07	1.74E+08
X-330	29-6	9	7	11-Aug-04	51	2.85E+09	1.07E+08	2.33E+08
X-330	29-6	9	8	11-Aug-04	26	1.45E+09	5.46E+07	1.19E+08
X-330	29-6	9	9	11-Aug-04	65	3.63E+09	1.37E+08	2.97E+08
X-330	29-6	9	10	11-Aug-04	74	4.13E+09	1.55E+08	3.38E+08
X-330	29-6	10	1	11-Dec-06	474	2.67E+10	9.95E+08	1.75E+09
X-330	29-6	10	2	11-Aug-04	18	1.01E+09	3.78E+07	6.65E+07
X-330	29-6	10	3	11-Aug-04	69	3.89E+09	1.45E+08	2.55E+08
X-330	29-6	10	4	11-Aug-04	74	4.17E+09	1.55E+08	2.73E+08
X-330	29-6	10	5	11-Aug-04	227	1.28E+10	4.77E+08	8.39E+08
X-330	29-6	10	6	11-Aug-04	137	7.72E+09	2.88E+08	5.06E+08
X-330	29-6	10	7	11-Aug-04	32	1.80E+09	6.72E+07	1.18E+08
X-330	29-6	10	8	11-Aug-04	26	1.47E+09	5.46E+07	9.61E+07
X-330	29-6	10	9	11-Aug-04	26	1.47E+09	5.46E+07	9.61E+07
X-330	29-6	10	10	11-Aug-04	23	1.30E+09	4.83E+07	8.50E+07
X-330	31-1	1	1	18-Jan-05	18	5.44E+08	3.78E+07	1.74E+09
X-330	31-1	1	2	18-Jan-05	14	4.23E+08	2.94E+07	1.35E+09
X-330	31-1	1	3	18-Jan-05	15	4.54E+08	3.15E+07	1.45E+09
X-330	31-1	1	4	18-Jan-05	15	4.54E+08	3.15E+07	1.45E+09
X-330	31-1	1	5	18-Jan-05	15	4.54E+08	3.15E+07	1.45E+09
X-330	31-1	1	6	18-Jan-05	23	6.96E+08	4.83E+07	2.22E+09
X-330	31-1	1	7	18-Jan-05	41	1.24E+09	8.61E+07	3.97E+09
X-330	31-1	1	8	18-Jan-05	21	6.35E+08	4.41E+07	2.03E+09
X-330	31-1	1	9	18-Jan-05	21	6.35E+08	4.41E+07	2.03E+09
X-330	31-1	1	10	18-Jan-05	15	4.54E+08	3.15E+07	1.45E+09
X-330	31-1	2	1	11-Jan-05	11	3.33E+08	2.31E+07	9.04E+08
X-330	31-1	2	2	11-Jan-05	10	3.02E+08	2.10E+07	8.22E+08
X-330	31-1	2	3	11-Jan-05	10	3.02E+08	2.10E+07	8.22E+08
X-330	31-1	2	4	11-Jan-05	8	2.42E+08	1.68E+07	6.57E+08
X-330	31-1	2	5	11-Jan-05	12	3.63E+08	2.52E+07	9.86E+08
X-330	31-1	2	6	11-Jan-05	10	3.02E+08	2.10E+07	8.22E+08
X-330	31-1	2	7	11-Jan-05	11	3.33E+08	2.31E+07	9.04E+08
X-330	31-1	2	8	11-Jan-05	9	2.72E+08	1.89E+07	7.40E+08
X-330	31-1	2	9	11-Jan-05	10	3.02E+08	2.10E+07	8.22E+08
X-330	31-1	2	10	11-Jan-05	8	2.42E+08	1.68E+07	6.57E+08
X-330	31-1	3	1	24-Jan-05	18	5.44E+08	3.78E+07	1.48E+09
X-330	31-1	3	2	24-Jan-05	14	4.23E+08	2.94E+07	1.15E+09
X-330	31-1	3	3	24-Jan-05	45	1.36E+09	9.45E+07	3.70E+09
X-330	31-1	3	4	24-Jan-05	41	1.24E+09	8.61E+07	3.37E+09
X-330	31-1	3	5	24-Jan-05	44	1.33E+09	9.24E+07	3.62E+09
X-330	31-1	3	6	24-Jan-05	11	3.33E+08	2.31E+07	9.04E+08
X-330	31-1	3	7	24-Jan-05	9	2.72E+08	1.89E+07	7.40E+08
X-330	31-1	3	8	24-Jan-05	24	7.26E+08	5.04E+07	1.97E+09
X-330	31-1	3	9	24-Jan-05	4	1.21E+08	8.40E+06	3.29E+08
X-330	31-1	3	10	24-Jan-05	10	3.02E+08	2.10E+07	8.22E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-1	4	1	12-Jan-05	14	4.23E+08	2.94E+07	1.18E+09
X-330	31-1	4	2	12-Jan-05	12	3.63E+08	2.52E+07	1.01E+09
X-330	31-1	4	3	12-Jan-05	14	4.23E+08	2.94E+07	1.18E+09
X-330	31-1	4	4	12-Jan-05	12	3.63E+08	2.52E+07	1.01E+09
X-330	31-1	4	5	12-Jan-05	12	3.63E+08	2.52E+07	1.01E+09
X-330	31-1	4	6	12-Jan-05	17	5.14E+08	3.57E+07	1.43E+09
X-330	31-1	4	7	12-Jan-05	24	7.26E+08	5.04E+07	2.02E+09
X-330	31-1	4	8	12-Jan-05	14	4.23E+08	2.94E+07	1.18E+09
X-330	31-1	4	9	12-Jan-05	13	3.93E+08	2.73E+07	1.10E+09
X-330	31-1	4	10	12-Jan-05	11	3.33E+08	2.31E+07	9.27E+08
X-330	31-1	5	1	20-Jan-05	24	7.26E+08	5.04E+07	1.55E+09
X-330	31-1	5	2	20-Jan-05	14	4.23E+08	2.94E+07	9.01E+08
X-330	31-1	5	3	20-Jan-05	14	4.23E+08	2.94E+07	9.01E+08
X-330	31-1	5	4	20-Jan-05	20	6.05E+08	4.20E+07	1.29E+09
X-330	31-1	5	5	20-Jan-05	21	6.35E+08	4.41E+07	1.35E+09
X-330	31-1	5	6	20-Jan-05	68	2.06E+09	1.43E+08	4.38E+09
X-330	31-1	5	7	20-Jan-05	33	9.98E+08	6.93E+07	2.12E+09
X-330	31-1	5	8	20-Jan-05	15	4.54E+08	3.15E+07	9.66E+08
X-330	31-1	5	9	20-Jan-05	15	4.54E+08	3.15E+07	9.66E+08
X-330	31-1	5	10	20-Jan-05	14	4.23E+08	2.94E+07	9.01E+08
X-330	31-1	6	1	13-Jan-05	25	7.56E+08	5.25E+07	1.39E+09
X-330	31-1	6	2	13-Jan-05	63	1.91E+09	1.32E+08	3.50E+09
X-330	31-1	6	3	13-Jan-05	20	6.05E+08	4.20E+07	1.11E+09
X-330	31-1	6	4	13-Jan-05	14	4.23E+08	2.94E+07	7.78E+08
X-330	31-1	6	5	13-Jan-05	9	2.72E+08	1.89E+07	5.00E+08
X-330	31-1	6	6	13-Jan-05	20	6.05E+08	4.20E+07	1.11E+09
X-330	31-1	6	7	13-Jan-05	31	9.38E+08	6.51E+07	1.72E+09
X-330	31-1	6	8	13-Jan-05	20	6.05E+08	4.20E+07	1.11E+09
X-330	31-1	6	9	13-Jan-05	17	5.14E+08	3.57E+07	9.45E+08
X-330	31-1	6	10	13-Jan-05	16	4.84E+08	3.36E+07	8.90E+08
X-330	31-1	7	1	19-Jan-05	23	6.96E+08	4.83E+07	2.16E+09
X-330	31-1	7	2	19-Jan-05	11	3.33E+08	2.31E+07	1.03E+09
X-330	31-1	7	3	19-Jan-05	11	3.33E+08	2.31E+07	1.03E+09
X-330	31-1	7	4	19-Jan-05	14	4.23E+08	2.94E+07	1.32E+09
X-330	31-1	7	5	19-Jan-05	11	3.33E+08	2.31E+07	1.03E+09
X-330	31-1	7	6	19-Jan-05	27	8.17E+08	5.67E+07	2.54E+09
X-330	31-1	7	7	19-Jan-05	30	9.07E+08	6.30E+07	2.82E+09
X-330	31-1	7	8	19-Jan-05	42	1.27E+09	8.82E+07	3.95E+09
X-330	31-1	7	9	19-Jan-05	27	8.17E+08	5.67E+07	2.54E+09
X-330	31-1	7	10	19-Jan-05	86	2.60E+09	1.81E+08	8.08E+09
X-330	31-1	8	1	14-Jan-05	16	4.84E+08	3.36E+07	1.38E+09
X-330	31-1	8	2	14-Jan-05	15	4.54E+08	3.15E+07	1.30E+09
X-330	31-1	8	3	14-Jan-05	18	5.44E+08	3.78E+07	1.56E+09
X-330	31-1	8	4	14-Jan-05	15	4.54E+08	3.15E+07	1.30E+09
X-330	31-1	8	5	14-Jan-05	17	5.14E+08	3.57E+07	1.47E+09
X-330	31-1	8	6	14-Jan-05	14	4.23E+08	2.94E+07	1.21E+09
X-330	31-1	8	7	14-Jan-05	12	3.63E+08	2.52E+07	1.04E+09
X-330	31-1	8	8	14-Jan-05	20	6.05E+08	4.20E+07	1.73E+09
X-330	31-1	8	9	14-Jan-05	14	4.23E+08	2.94E+07	1.21E+09
X-330	31-1	8	10	14-Jan-05	21	6.35E+08	4.41E+07	1.82E+09
X-330	31-1	9	1	18-Jan-05	39	1.18E+09	8.19E+07	3.56E+09
X-330	31-1	9	2	18-Jan-05	13	3.93E+08	2.73E+07	1.19E+09
X-330	31-1	9	3	18-Jan-05	13	3.93E+08	2.73E+07	1.19E+09
X-330	31-1	9	4	18-Jan-05	12	3.63E+08	2.52E+07	1.10E+09
X-330	31-1	9	5	18-Jan-05	12	3.63E+08	2.52E+07	1.10E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-1	9	6	18-Jan-05	15	4.54E+08	3.15E+07	1.37E+09
X-330	31-1	9	7	18-Jan-05	13	3.93E+08	2.73E+07	1.19E+09
X-330	31-1	9	8	18-Jan-05	17	5.14E+08	3.57E+07	1.55E+09
X-330	31-1	9	9	18-Jan-05	17	5.14E+08	3.57E+07	1.55E+09
X-330	31-1	9	10	18-Jan-05	21	6.35E+08	4.41E+07	1.92E+09
X-330	31-1	10	1	01-Aug-04	24	7.26E+08	5.04E+07	2.13E+09
X-330	31-1	10	2	01-Aug-04	12	3.63E+08	2.52E+07	1.07E+09
X-330	31-1	10	3	01-Aug-04	23	6.96E+08	4.83E+07	2.04E+09
X-330	31-1	10	4	01-Aug-04	17	5.14E+08	3.57E+07	1.51E+09
X-330	31-1	10	5	01-Aug-04	18	5.44E+08	3.78E+07	1.60E+09
X-330	31-1	10	6	01-Aug-04	14	4.23E+08	2.94E+07	1.24E+09
X-330	31-1	10	7	01-Aug-04	23	6.96E+08	4.83E+07	2.04E+09
X-330	31-1	10	8	01-Aug-04	14	4.23E+08	2.94E+07	1.24E+09
X-330	31-1	10	9	01-Aug-04	18	5.44E+08	3.78E+07	1.60E+09
X-330	31-1	10	10	01-Aug-04	16	4.84E+08	3.36E+07	1.42E+09
X-330	31-2	1	1	14-Feb-05	9	2.72E+08	1.89E+07	7.59E+08
X-330	31-2	1	2	14-Feb-05	9	2.72E+08	1.89E+07	7.59E+08
X-330	31-2	1	3	14-Feb-05	11	3.33E+08	2.31E+07	9.27E+08
X-330	31-2	1	4	14-Feb-05	15	4.54E+08	3.15E+07	1.26E+09
X-330	31-2	1	5	14-Feb-05	8	2.42E+08	1.68E+07	6.74E+08
X-330	31-2	1	6	10-Jan-05	24	7.26E+08	5.04E+07	2.02E+09
X-330	31-2	1	7	14-Feb-05	23	6.96E+08	4.83E+07	1.94E+09
X-330	31-2	1	8	14-Feb-05	11	3.33E+08	2.31E+07	9.27E+08
X-330	31-2	1	9	14-Feb-05	9	2.72E+08	1.89E+07	7.59E+08
X-330	31-2	1	10	14-Feb-05	9	2.72E+08	1.89E+07	7.59E+08
X-330	31-2	2	1	20-Dec-04	76	2.30E+09	1.60E+08	4.15E+09
X-330	31-2	2	2	20-Dec-04	26	7.86E+08	5.46E+07	1.42E+09
X-330	31-2	2	3	20-Dec-04	33	9.98E+08	6.93E+07	1.80E+09
X-330	31-2	2	4	20-Dec-04	20	6.05E+08	4.20E+07	1.09E+09
X-330	31-2	2	5	20-Dec-04	12	3.63E+08	2.52E+07	6.56E+08
X-330	31-2	2	6	20-Dec-04	4	1.21E+08	8.40E+06	2.19E+08
X-330	31-2	2	7	20-Dec-04	4	1.21E+08	8.40E+06	2.19E+08
X-330	31-2	2	8	20-Dec-04	20	6.05E+08	4.20E+07	1.09E+09
X-330	31-2	2	9	20-Dec-04	24	7.26E+08	5.04E+07	1.31E+09
X-330	31-2	2	10	20-Dec-04	5	1.51E+08	1.05E+07	2.73E+08
X-330	31-2	3	1	07-Jan-05	4	1.22E+08	8.40E+06	3.46E+08
X-330	31-2	3	2	07-Jan-05	4	1.22E+08	8.40E+06	3.46E+08
X-330	31-2	3	3	07-Jan-05	4	1.22E+08	8.40E+06	3.46E+08
X-330	31-2	3	4	07-Jan-05	3	9.16E+07	6.30E+06	2.60E+08
X-330	31-2	3	5	07-Jan-05	4	1.22E+08	8.40E+06	3.46E+08
X-330	31-2	3	6	07-Jan-05	8	2.44E+08	1.68E+07	6.92E+08
X-330	31-2	3	7	07-Jan-05	9	2.75E+08	1.89E+07	7.79E+08
X-330	31-2	3	8	07-Jan-05	6	1.83E+08	1.26E+07	5.19E+08
X-330	31-2	3	9	07-Jan-05	6	1.83E+08	1.26E+07	5.19E+08
X-330	31-2	3	10	07-Jan-05	15	4.58E+08	3.15E+07	1.30E+09
X-330	31-2	4	1	21-Dec-04	20	7.13E+08	4.20E+07	7.43E+08
X-330	31-2	4	2	21-Dec-04	18	6.41E+08	3.78E+07	6.69E+08
X-330	31-2	4	3	21-Dec-04	17	6.06E+08	3.57E+07	6.32E+08
X-330	31-2	4	4	21-Dec-04	23	8.20E+08	4.83E+07	8.55E+08
X-330	31-2	4	5	21-Dec-04	20	7.13E+08	4.20E+07	7.43E+08
X-330	31-2	4	6	21-Dec-04	15	5.34E+08	3.15E+07	5.58E+08
X-330	31-2	4	7	21-Dec-04	17	6.06E+08	3.57E+07	6.32E+08
X-330	31-2	4	8	21-Dec-04	14	4.99E+08	2.94E+07	5.20E+08
X-330	31-2	4	9	21-Dec-04	15	5.34E+08	3.15E+07	5.58E+08
X-330	31-2	4	10	21-Dec-04	14	4.99E+08	2.94E+07	5.20E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-2	5	1	06-Jan-05	24	7.26E+08	5.04E+07	1.88E+09
X-330	31-2	5	2	06-Jan-05	28	8.47E+08	5.88E+07	2.19E+09
X-330	31-2	5	3	06-Jan-05	58	1.75E+09	1.22E+08	4.54E+09
X-330	31-2	5	4	06-Jan-05	43	1.30E+09	9.03E+07	3.36E+09
X-330	31-2	5	5	06-Jan-05	23	6.96E+08	4.83E+07	1.80E+09
X-330	31-2	5	6	06-Jan-05	27	8.17E+08	5.67E+07	2.11E+09
X-330	31-2	5	7	06-Jan-05	24	7.26E+08	5.04E+07	1.88E+09
X-330	31-2	5	8	06-Jan-05	23	6.96E+08	4.83E+07	1.80E+09
X-330	31-2	5	9	06-Jan-05	33	9.98E+08	6.93E+07	2.58E+09
X-330	31-2	5	10	06-Jan-05	24	7.26E+08	5.04E+07	1.88E+09
X-330	31-2	6	1	22-Dec-04	19	5.80E+08	3.99E+07	1.45E+09
X-330	31-2	6	2	22-Dec-04	20	6.11E+08	4.20E+07	1.53E+09
X-330	31-2	6	3	22-Dec-04	22	6.72E+08	4.62E+07	1.68E+09
X-330	31-2	6	4	22-Dec-04	18	5.50E+08	3.78E+07	1.38E+09
X-330	31-2	6	5	22-Dec-04	20	6.11E+08	4.20E+07	1.53E+09
X-330	31-2	6	6	22-Dec-04	21	6.41E+08	4.41E+07	1.60E+09
X-330	31-2	6	7	22-Dec-04	9	2.75E+08	1.89E+07	6.88E+08
X-330	31-2	6	8	22-Dec-04	11	3.36E+08	2.31E+07	8.41E+08
X-330	31-2	6	9	22-Dec-04	12	3.67E+08	2.52E+07	9.17E+08
X-330	31-2	6	10	22-Dec-04	15	4.58E+08	3.15E+07	1.15E+09
X-330	31-2	7	1	03-Jan-05	31	9.42E+08	6.51E+07	2.37E+09
X-330	31-2	7	2	03-Jan-05	31	9.42E+08	6.51E+07	2.37E+09
X-330	31-2	7	3	03-Jan-05	30	9.12E+08	6.30E+07	2.29E+09
X-330	31-2	7	4	03-Jan-05	32	9.73E+08	6.72E+07	2.45E+09
X-330	31-2	7	5	03-Jan-05	28	8.51E+08	5.88E+07	2.14E+09
X-330	31-2	7	6	03-Jan-05	32	9.73E+08	6.72E+07	2.45E+09
X-330	31-2	7	7	03-Jan-05	35	1.06E+09	7.35E+07	2.67E+09
X-330	31-2	7	8	03-Jan-05	34	1.03E+09	7.14E+07	2.60E+09
X-330	31-2	7	9	03-Jan-05	34	1.03E+09	7.14E+07	2.60E+09
X-330	31-2	7	10	03-Jan-05	34	1.03E+09	7.14E+07	2.60E+09
X-330	31-2	8	1	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	8	2	27-Dec-04	25	7.60E+08	5.25E+07	1.83E+09
X-330	31-2	8	3	27-Dec-04	24	7.29E+08	5.04E+07	1.75E+09
X-330	31-2	8	4	27-Dec-04	29	8.81E+08	6.09E+07	2.12E+09
X-330	31-2	8	5	27-Dec-04	23	6.99E+08	4.83E+07	1.68E+09
X-330	31-2	8	6	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	8	7	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	8	8	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	8	9	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	8	10	27-Dec-04	22	6.69E+08	4.62E+07	1.61E+09
X-330	31-2	9	1	29-Dec-04	31	1.09E+09	6.51E+07	1.15E+09
X-330	31-2	9	2	29-Dec-04	32	1.12E+09	6.72E+07	1.19E+09
X-330	31-2	9	3	29-Dec-04	31	1.09E+09	6.51E+07	1.15E+09
X-330	31-2	9	4	29-Dec-04	32	1.12E+09	6.72E+07	1.19E+09
X-330	31-2	9	5	29-Dec-04	31	1.09E+09	6.51E+07	1.15E+09
X-330	31-2	9	6	29-Dec-04	35	1.23E+09	7.35E+07	1.30E+09
X-330	31-2	9	7	29-Dec-04	37	1.30E+09	7.77E+07	1.38E+09
X-330	31-2	9	8	29-Dec-04	37	1.30E+09	7.77E+07	1.38E+09
X-330	31-2	9	9	29-Dec-04	37	1.30E+09	7.77E+07	1.38E+09
X-330	31-2	9	10	29-Dec-04	36	1.26E+09	7.56E+07	1.34E+09
X-330	31-2	10	1	28-Dec-04	9	2.76E+08	1.89E+07	4.92E+08
X-330	31-2	10	2	28-Dec-04	8	2.46E+08	1.68E+07	4.37E+08
X-330	31-2	10	3	28-Dec-04	14	4.30E+08	2.94E+07	7.65E+08
X-330	31-2	10	4	28-Dec-04	8	2.46E+08	1.68E+07	4.37E+08
X-330	31-2	10	5	28-Dec-04	9	2.76E+08	1.89E+07	4.92E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-2	10	6	28-Dec-04	26	7.98E+08	5.46E+07	1.42E+09
X-330	31-2	10	7	28-Dec-04	23	7.06E+08	4.83E+07	1.26E+09
X-330	31-2	10	8	28-Dec-04	32	9.82E+08	6.72E+07	1.75E+09
X-330	31-2	10	9	28-Dec-04	31	9.51E+08	6.51E+07	1.69E+09
X-330	31-2	10	10	28-Dec-04	30	9.21E+08	6.30E+07	1.64E+09
X-330	31-3	1	1	16-Dec-04	44	2.22E+09	9.24E+07	7.11E+08
X-330	31-3	1	2	16-Dec-04	18	9.07E+08	3.78E+07	2.91E+08
X-330	31-3	1	3	16-Dec-04	21	1.06E+09	4.41E+07	3.40E+08
X-330	31-3	1	4	16-Dec-04	33	1.66E+09	6.93E+07	5.34E+08
X-330	31-3	1	5	16-Dec-04	44	2.22E+09	9.24E+07	7.11E+08
X-330	31-3	1	6	16-Dec-04	29	1.46E+09	6.09E+07	4.69E+08
X-330	31-3	1	7	16-Dec-04	25	1.26E+09	5.25E+07	4.04E+08
X-330	31-3	1	8	16-Dec-04	33	1.66E+09	6.93E+07	5.34E+08
X-330	31-3	1	9	16-Dec-04	50	2.52E+09	1.05E+08	8.09E+08
X-330	31-3	1	10	16-Dec-04	26	1.31E+09	5.46E+07	4.20E+08
X-330	31-3	2	1	06-Dec-04	41	1.91E+09	8.61E+07	6.46E+08
X-330	31-3	2	2	06-Dec-04	44	2.05E+09	9.24E+07	6.94E+08
X-330	31-3	2	3	06-Dec-04	30	1.40E+09	6.30E+07	4.73E+08
X-330	31-3	2	4	06-Dec-04	29	1.35E+09	6.09E+07	4.57E+08
X-330	31-3	2	5	06-Dec-04	30	1.40E+09	6.30E+07	4.73E+08
X-330	31-3	2	6	06-Dec-04	30	1.40E+09	6.30E+07	4.73E+08
X-330	31-3	2	7	06-Dec-04	27	1.26E+09	5.67E+07	4.26E+08
X-330	31-3	2	8	06-Dec-04	27	1.26E+09	5.67E+07	4.26E+08
X-330	31-3	2	9	06-Dec-04	39	1.82E+09	8.19E+07	6.15E+08
X-330	31-3	2	10	06-Dec-04	23	1.07E+09	4.83E+07	3.63E+08
X-330	31-3	3	1	15-Dec-04	34	1.53E+09	7.14E+07	5.92E+08
X-330	31-3	3	2	15-Dec-04	35	1.57E+09	7.35E+07	6.09E+08
X-330	31-3	3	3	15-Dec-04	25	1.12E+09	5.25E+07	4.35E+08
X-330	31-3	3	4	15-Dec-04	31	1.39E+09	6.51E+07	5.40E+08
X-330	31-3	3	5	15-Dec-04	59	2.65E+09	1.24E+08	1.03E+09
X-330	31-3	3	6	15-Dec-04	32	1.44E+09	6.72E+07	5.57E+08
X-330	31-3	3	7	15-Dec-04	40	1.80E+09	8.40E+07	6.96E+08
X-330	31-3	3	8	15-Dec-04	35	1.57E+09	7.35E+07	6.09E+08
X-330	31-3	3	9	15-Dec-04	35	1.57E+09	7.35E+07	6.09E+08
X-330	31-3	3	10	15-Dec-04	37	1.66E+09	7.77E+07	6.44E+08
X-330	31-3	4	1	07-Dec-04	62	2.89E+09	1.30E+08	9.54E+08
X-330	31-3	4	2	07-Dec-04	50	2.33E+09	1.05E+08	7.69E+08
X-330	31-3	4	3	07-Dec-04	26	1.21E+09	5.46E+07	4.00E+08
X-330	31-3	4	4	07-Dec-04	38	1.77E+09	7.98E+07	5.85E+08
X-330	31-3	4	5	07-Dec-04	35	1.63E+09	7.35E+07	5.38E+08
X-330	31-3	4	6	07-Dec-04	35	1.63E+09	7.35E+07	5.38E+08
X-330	31-3	4	7	07-Dec-04	36	1.68E+09	7.56E+07	5.54E+08
X-330	31-3	4	8	07-Dec-04	47	2.19E+09	9.87E+07	7.23E+08
X-330	31-3	4	9	07-Dec-04	30	1.40E+09	6.30E+07	4.62E+08
X-330	31-3	4	10	07-Dec-04	33	1.54E+09	6.93E+07	5.08E+08
X-330	31-3	5	1	14-Dec-04	38	1.71E+09	7.98E+07	6.65E+08
X-330	31-3	5	2	14-Dec-04	29	1.30E+09	6.09E+07	5.08E+08
X-330	31-3	5	3	14-Dec-04	36	1.62E+09	7.56E+07	6.30E+08
X-330	31-3	5	4	14-Dec-04	35	1.57E+09	7.35E+07	6.13E+08
X-330	31-3	5	5	14-Dec-04	35	1.57E+09	7.35E+07	6.13E+08
X-330	31-3	5	6	14-Dec-04	36	1.62E+09	7.56E+07	6.30E+08
X-330	31-3	5	7	14-Dec-04	28	1.26E+09	5.88E+07	4.90E+08
X-330	31-3	5	8	14-Dec-04	36	1.62E+09	7.56E+07	6.30E+08
X-330	31-3	5	9	14-Dec-04	29	1.30E+09	6.09E+07	5.08E+08
X-330	31-3	5	10	14-Dec-04	36	1.62E+09	7.56E+07	6.30E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-3	6	1	20-Apr-05	24	1.11E+09	5.04E+07	3.88E+08
X-330	31-3	6	2	20-Apr-05	26	1.20E+09	5.46E+07	4.20E+08
X-330	31-3	6	3	20-Apr-05	26	1.20E+09	5.46E+07	4.20E+08
X-330	31-3	6	4	20-Apr-05	25	1.16E+09	5.25E+07	4.04E+08
X-330	31-3	6	5	20-Apr-05	27	1.25E+09	5.67E+07	4.37E+08
X-330	31-3	6	6	20-Apr-05	55	2.54E+09	1.16E+08	8.89E+08
X-330	31-3	6	7	10-Oct-08	1456.5	6.74E+10	3.06E+09	2.36E+10
X-330	31-3	6	8	20-Apr-05	159	7.36E+09	3.34E+08	2.57E+09
X-330	31-3	6	9	20-Apr-05	68	3.15E+09	1.43E+08	1.10E+09
X-330	31-3	6	10	20-Apr-05	25	1.16E+09	5.25E+07	4.04E+08
X-330	31-3	7	1	13-Dec-04	31	1.40E+09	6.51E+07	5.17E+08
X-330	31-3	7	2	13-Dec-04	41	1.86E+09	8.61E+07	6.84E+08
X-330	31-3	7	3	13-Dec-04	119	5.39E+09	2.50E+08	1.98E+09
X-330	31-3	7	4	13-Dec-04	48	2.17E+09	1.01E+08	8.01E+08
X-330	31-3	7	5	13-Dec-04	235	1.06E+10	4.94E+08	3.92E+09
X-330	31-3	7	6	13-Dec-04	120	5.43E+09	2.52E+08	2.00E+09
X-330	31-3	7	7	13-Dec-04	45	2.04E+09	9.45E+07	7.51E+08
X-330	31-3	7	8	13-Dec-04	31	1.40E+09	6.51E+07	5.17E+08
X-330	31-3	7	9	13-Dec-04	39	1.76E+09	8.19E+07	6.51E+08
X-330	31-3	7	10	13-Dec-04	39	1.76E+09	8.19E+07	6.51E+08
X-330	31-3	8	1	09-Dec-04	34	1.55E+09	7.14E+07	5.64E+08
X-330	31-3	8	2	09-Dec-04	30	1.37E+09	6.30E+07	4.98E+08
X-330	31-3	8	3	09-Dec-04	30	1.37E+09	6.30E+07	4.98E+08
X-330	31-3	8	4	09-Dec-04	32	1.46E+09	6.72E+07	5.31E+08
X-330	31-3	8	5	09-Dec-04	42	1.91E+09	8.82E+07	6.97E+08
X-330	31-3	8	6	09-Dec-04	32	1.46E+09	6.72E+07	5.31E+08
X-330	31-3	8	7	09-Dec-04	31	1.41E+09	6.51E+07	5.14E+08
X-330	31-3	8	8	09-Dec-04	28	1.28E+09	5.88E+07	4.65E+08
X-330	31-3	8	9	09-Dec-04	30	1.37E+09	6.30E+07	4.98E+08
X-330	31-3	8	10	09-Dec-04	33	1.50E+09	6.93E+07	5.48E+08
X-330	31-3	9	1	10-Dec-04	29	1.47E+09	6.09E+07	4.76E+08
X-330	31-3	9	2	10-Dec-04	30	1.52E+09	6.30E+07	4.93E+08
X-330	31-3	9	3	10-Dec-04	31	1.58E+09	6.51E+07	5.09E+08
X-330	31-3	9	4	10-Dec-04	37	1.88E+09	7.77E+07	6.08E+08
X-330	31-3	9	5	10-Dec-04	29	1.47E+09	6.09E+07	4.76E+08
X-330	31-3	9	6	10-Dec-04	33	1.68E+09	6.93E+07	5.42E+08
X-330	31-3	9	7	10-Dec-04	34	1.73E+09	7.14E+07	5.58E+08
X-330	31-3	9	8	10-Dec-04	48	2.44E+09	1.01E+08	7.88E+08
X-330	31-3	9	9	10-Dec-04	35	1.78E+09	7.35E+07	5.75E+08
X-330	31-3	9	10	10-Dec-04	32	1.63E+09	6.72E+07	5.25E+08
X-330	31-3	10	1	11-Feb-05	41	1.79E+09	8.61E+07	7.64E+08
X-330	31-3	10	2	11-Feb-05	53	2.31E+09	1.11E+08	9.88E+08
X-330	31-3	10	3	11-Feb-05	58	2.53E+09	1.22E+08	1.08E+09
X-330	31-3	10	4	11-Feb-05	67	2.93E+09	1.41E+08	1.25E+09
X-330	31-3	10	5	11-Feb-05	53	2.31E+09	1.11E+08	9.88E+08
X-330	31-3	10	6	11-Feb-05	50	2.18E+09	1.05E+08	9.32E+08
X-330	31-3	10	7	11-Feb-05	59	2.58E+09	1.24E+08	1.10E+09
X-330	31-3	10	8	11-Feb-05	216	9.43E+09	4.54E+08	4.03E+09
X-330	31-3	10	9	11-Feb-05	521	2.27E+10	1.09E+09	9.71E+09
X-330	31-3	10	10	11-Feb-05	7484	3.27E+11	1.57E+10	1.39E+11
X-330	31-4	1	1	03-Dec-04	45	2.10E+09	9.45E+07	6.92E+08
X-330	31-4	1	2	03-Dec-04	28	1.31E+09	5.88E+07	4.31E+08
X-330	31-4	1	3	03-Dec-04	37	1.72E+09	7.77E+07	5.69E+08
X-330	31-4	1	4	03-Dec-04	36	1.68E+09	7.56E+07	5.54E+08
X-330	31-4	1	5	03-Dec-04	29	1.35E+09	6.09E+07	4.46E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-4	1	6	03-Dec-04	33	1.54E+09	6.93E+07	5.08E+08
X-330	31-4	1	7	03-Dec-04	47	2.19E+09	9.87E+07	7.23E+08
X-330	31-4	1	8	03-Dec-04	27	1.26E+09	5.67E+07	4.15E+08
X-330	31-4	1	9	03-Dec-04	34	1.58E+09	7.14E+07	5.23E+08
X-330	31-4	1	10	03-Dec-04	299	1.39E+10	6.28E+08	4.60E+09
X-330	31-4	2	1	15-Nov-04	41	1.82E+09	8.61E+07	7.34E+08
X-330	31-4	2	2	15-Nov-04	39	1.73E+09	8.19E+07	6.98E+08
X-330	31-4	2	3	15-Nov-04	33	1.46E+09	6.93E+07	5.91E+08
X-330	31-4	2	4	15-Nov-04	26	1.15E+09	5.46E+07	4.65E+08
X-330	31-4	2	5	15-Nov-04	29	1.28E+09	6.09E+07	5.19E+08
X-330	31-4	2	6	15-Nov-04	38	1.68E+09	7.98E+07	6.80E+08
X-330	31-4	2	7	15-Nov-04	26	1.15E+09	5.46E+07	4.65E+08
X-330	31-4	2	8	15-Nov-04	45	1.99E+09	9.45E+07	8.06E+08
X-330	31-4	2	9	15-Nov-04	200	8.86E+09	4.20E+08	3.58E+09
X-330	31-4	2	10	30-Jun-07	23	1.02E+09	4.83E+07	3.00E+08
X-330	31-4	3	1	02-Dec-04	91	4.74E+09	1.91E+08	1.81E+09
X-330	31-4	3	2	02-Dec-04	51	2.66E+09	1.07E+08	1.02E+09
X-330	31-4	3	3	02-Dec-04	30	1.56E+09	6.30E+07	5.97E+08
X-330	31-4	3	4	02-Dec-04	43	2.24E+09	9.03E+07	8.56E+08
X-330	31-4	3	5	02-Dec-04	31	1.62E+09	6.51E+07	6.17E+08
X-330	31-4	3	6	02-Dec-04	35	1.82E+09	7.35E+07	6.97E+08
X-330	31-4	3	7	02-Dec-04	57	2.97E+09	1.20E+08	1.14E+09
X-330	31-4	3	8	02-Dec-04	29	1.51E+09	6.09E+07	5.78E+08
X-330	31-4	3	9	02-Dec-04	27	1.41E+09	5.67E+07	5.38E+08
X-330	31-4	3	10	02-Dec-04	45	2.34E+09	9.45E+07	8.96E+08
X-330	31-4	4	1	16-Nov-04	52	2.80E+09	1.09E+08	8.58E+08
X-330	31-4	4	2	16-Nov-04	27	1.46E+09	5.67E+07	4.46E+08
X-330	31-4	4	3	16-Nov-04	36	1.94E+09	7.56E+07	5.94E+08
X-330	31-4	4	4	16-Nov-04	33	1.78E+09	6.93E+07	5.45E+08
X-330	31-4	4	5	16-Nov-04	27	1.46E+09	5.67E+07	4.46E+08
X-330	31-4	4	6	16-Nov-04	53	2.86E+09	1.11E+08	8.75E+08
X-330	31-4	4	7	16-Nov-04	45	2.43E+09	9.45E+07	7.43E+08
X-330	31-4	4	8	16-Nov-04	47	2.53E+09	9.87E+07	7.76E+08
X-330	31-4	4	9	16-Nov-04	38	2.05E+09	7.98E+07	6.27E+08
X-330	31-4	4	10	16-Nov-04	36	1.94E+09	7.56E+07	5.94E+08
X-330	31-4	5	1	01-Dec-04	40	1.80E+09	8.40E+07	7.00E+08
X-330	31-4	5	2	01-Dec-04	69	3.10E+09	1.45E+08	1.21E+09
X-330	31-4	5	3	01-Dec-04	55	2.47E+09	1.16E+08	9.63E+08
X-330	31-4	5	4	01-Dec-04	53	2.38E+09	1.11E+08	9.28E+08
X-330	31-4	5	5	01-Dec-04	59	2.65E+09	1.24E+08	1.03E+09
X-330	31-4	5	6	01-Dec-04	39	1.75E+09	8.19E+07	6.83E+08
X-330	31-4	5	7	01-Dec-04	47	2.11E+09	9.87E+07	8.23E+08
X-330	31-4	5	8	01-Dec-04	41	1.84E+09	8.61E+07	7.18E+08
X-330	31-4	5	9	01-Dec-04	59	2.65E+09	1.24E+08	1.03E+09
X-330	31-4	5	10	01-Dec-04	34	1.53E+09	7.14E+07	5.95E+08
X-330	31-4	6	1	17-Nov-04	57	2.62E+09	1.20E+08	9.31E+08
X-330	31-4	6	2	17-Nov-04	30	1.38E+09	6.30E+07	4.90E+08
X-330	31-4	6	3	17-Nov-04	68	3.12E+09	1.43E+08	1.11E+09
X-330	31-4	6	4	17-Nov-04	39	1.79E+09	8.19E+07	6.37E+08
X-330	31-4	6	5	17-Nov-04	38	1.75E+09	7.98E+07	6.21E+08
X-330	31-4	6	6	17-Nov-04	44	2.02E+09	9.24E+07	7.19E+08
X-330	31-4	6	7	17-Nov-04	54	2.48E+09	1.13E+08	8.82E+08
X-330	31-4	6	8	17-Nov-04	30	1.38E+09	6.30E+07	4.90E+08
X-330	31-4	6	9	17-Nov-04	33	1.52E+09	6.93E+07	5.39E+08
X-330	31-4	6	10	17-Nov-04	27	1.24E+09	5.67E+07	4.41E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-4	7	1	30-Nov-04	102	4.72E+09	2.14E+08	1.65E+09
X-330	31-4	7	2	30-Nov-04	78	3.61E+09	1.64E+08	1.26E+09
X-330	31-4	7	3	30-Nov-04	97	4.49E+09	2.04E+08	1.57E+09
X-330	31-4	7	4	30-Nov-04	78	3.61E+09	1.64E+08	1.26E+09
X-330	31-4	7	5	30-Nov-04	63	2.91E+09	1.32E+08	1.02E+09
X-330	31-4	7	6	30-Nov-04	45	2.08E+09	9.45E+07	7.28E+08
X-330	31-4	7	7	30-Nov-04	45	2.08E+09	9.45E+07	7.28E+08
X-330	31-4	7	8	30-Nov-04	47	2.17E+09	9.87E+07	7.60E+08
X-330	31-4	7	9	30-Nov-04	52	2.41E+09	1.09E+08	8.41E+08
X-330	31-4	7	10	30-Nov-04	83	3.84E+09	1.74E+08	1.34E+09
X-330	31-4	8	1	18-Nov-04	45	2.16E+09	9.45E+07	6.36E+08
X-330	31-4	8	2	18-Nov-04	66	3.17E+09	1.39E+08	9.33E+08
X-330	31-4	8	3	18-Nov-04	41	1.97E+09	8.61E+07	5.80E+08
X-330	31-4	8	4	18-Nov-04	47	2.26E+09	9.87E+07	6.65E+08
X-330	31-4	8	5	18-Nov-04	52	2.50E+09	1.09E+08	7.35E+08
X-330	31-4	8	6	18-Nov-04	49	2.36E+09	1.03E+08	6.93E+08
X-330	31-4	8	7	18-Nov-04	46	2.21E+09	9.66E+07	6.51E+08
X-330	31-4	8	8	18-Nov-04	51	2.45E+09	1.07E+08	7.21E+08
X-330	31-4	8	9	18-Nov-04	54	2.60E+09	1.13E+08	7.64E+08
X-330	31-4	8	10	18-Nov-04	27	1.30E+09	5.67E+07	3.82E+08
X-330	31-4	9	1	29-Nov-04	70	3.42E+09	1.47E+08	8.90E+08
X-330	31-4	9	2	29-Nov-04	42	2.05E+09	8.82E+07	5.34E+08
X-330	31-4	9	3	29-Nov-04	51	2.49E+09	1.07E+08	6.48E+08
X-330	31-4	9	4	29-Nov-04	50	2.44E+09	1.05E+08	6.36E+08
X-330	31-4	9	5	29-Nov-04	43	2.10E+09	9.03E+07	5.47E+08
X-330	31-4	9	6	29-Nov-04	38	1.86E+09	7.98E+07	4.83E+08
X-330	31-4	9	7	29-Nov-04	41	2.00E+09	8.61E+07	5.21E+08
X-330	31-4	9	8	29-Nov-04	51	2.49E+09	1.07E+08	6.48E+08
X-330	31-4	9	9	29-Nov-04	65	3.17E+09	1.37E+08	8.26E+08
X-330	31-4	9	10	29-Nov-04	58	2.83E+09	1.22E+08	7.37E+08
X-330	31-4	10	1	19-Nov-04	39	1.85E+09	8.19E+07	5.67E+08
X-330	31-4	10	2	19-Nov-04	37	1.75E+09	7.77E+07	5.38E+08
X-330	31-4	10	3	19-Nov-04	40	1.89E+09	8.40E+07	5.81E+08
X-330	31-4	10	4	19-Nov-04	91	4.31E+09	1.91E+08	1.32E+09
X-330	31-4	10	5	19-Nov-04	39	1.85E+09	8.19E+07	5.67E+08
X-330	31-4	10	6	19-Nov-04	35	1.66E+09	7.35E+07	5.09E+08
X-330	31-4	10	7	19-Nov-04	48	2.27E+09	1.01E+08	6.98E+08
X-330	31-4	10	8	19-Nov-04	35	1.66E+09	7.35E+07	5.09E+08
X-330	31-4	10	9	19-Nov-04	39	1.85E+09	8.19E+07	5.67E+08
X-330	31-4	10	10	19-Nov-04	41	1.94E+09	8.61E+07	5.96E+08
X-330	31-5	1	1	12-Nov-04	44	2.18E+09	9.24E+07	5.29E+08
X-330	31-5	1	2	12-Nov-04	54	2.68E+09	1.13E+08	6.50E+08
X-330	31-5	1	3	12-Nov-04	29	1.44E+09	6.09E+07	3.49E+08
X-330	31-5	1	4	12-Nov-04	47	2.33E+09	9.87E+07	5.65E+08
X-330	31-5	1	5	12-Nov-04	30	1.49E+09	6.30E+07	3.61E+08
X-330	31-5	1	6	12-Nov-04	42	2.08E+09	8.82E+07	5.05E+08
X-330	31-5	1	7	12-Nov-04	80	3.97E+09	1.68E+08	9.62E+08
X-330	31-5	1	8	12-Nov-04	41	2.03E+09	8.61E+07	4.93E+08
X-330	31-5	1	9	12-Nov-04	27	1.34E+09	5.67E+07	3.25E+08
X-330	31-5	1	10	12-Nov-04	125	6.20E+09	2.63E+08	1.50E+09
X-330	31-5	2	1	01-Nov-04	74	3.73E+09	1.55E+08	8.48E+08
X-330	31-5	2	2	01-Nov-04	32	1.61E+09	6.72E+07	3.67E+08
X-330	31-5	2	3	01-Nov-04	27	1.36E+09	5.67E+07	3.09E+08
X-330	31-5	2	4	01-Nov-04	24	1.21E+09	5.04E+07	2.75E+08
X-330	31-5	2	5	01-Nov-04	24	1.21E+09	5.04E+07	2.75E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-5	2	6	01-Nov-04	78	3.93E+09	1.64E+08	8.94E+08
X-330	31-5	2	7	01-Nov-04	63	3.18E+09	1.32E+08	7.22E+08
X-330	31-5	2	8	01-Nov-04	503	2.54E+10	1.06E+09	5.76E+09
X-330	31-5	2	9	01-Nov-04	110	5.54E+09	2.31E+08	1.26E+09
X-330	31-5	2	10	01-Nov-04	197	9.93E+09	4.14E+08	2.26E+09
X-330	31-5	3	1	11-Nov-04	25	1.23E+09	5.25E+07	3.09E+08
X-330	31-5	3	2	11-Nov-04	40	1.97E+09	8.40E+07	4.94E+08
X-330	31-5	3	3	11-Nov-04	47	2.31E+09	9.87E+07	5.81E+08
X-330	31-5	3	4	11-Nov-04	29	1.43E+09	6.09E+07	3.59E+08
X-330	31-5	3	5	11-Nov-04	42	2.07E+09	8.82E+07	5.19E+08
X-330	31-5	3	6	11-Nov-04	30	1.48E+09	6.30E+07	3.71E+08
X-330	31-5	3	7	11-Nov-04	33	1.62E+09	6.93E+07	4.08E+08
X-330	31-5	3	8	11-Nov-04	30	1.48E+09	6.30E+07	3.71E+08
X-330	31-5	3	9	11-Nov-04	38	1.87E+09	7.98E+07	4.70E+08
X-330	31-5	3	10	11-Nov-04	41	2.02E+09	8.61E+07	5.07E+08
X-330	31-5	4	1	02-Nov-04	81	4.02E+09	1.70E+08	9.71E+08
X-330	31-5	4	2	02-Nov-04	46	2.28E+09	9.66E+07	5.51E+08
X-330	31-5	4	3	02-Nov-04	114	5.65E+09	2.39E+08	1.37E+09
X-330	31-5	4	4	02-Nov-04	22	1.09E+09	4.62E+07	2.64E+08
X-330	31-5	4	5	02-Nov-04	75	3.72E+09	1.58E+08	8.99E+08
X-330	31-5	4	6	02-Nov-04	29	1.44E+09	6.09E+07	3.48E+08
X-330	31-5	4	7	02-Nov-04	56	2.78E+09	1.18E+08	6.71E+08
X-330	31-5	4	8	02-Nov-04	24	1.19E+09	5.04E+07	2.88E+08
X-330	31-5	4	9	02-Nov-04	76	3.77E+09	1.60E+08	9.11E+08
X-330	31-5	4	10	02-Nov-04	38	1.88E+09	7.98E+07	4.55E+08
X-330	31-5	5	1	10-Nov-04	41	1.94E+09	8.61E+07	6.01E+08
X-330	31-5	5	2	10-Nov-04	51	2.41E+09	1.07E+08	7.48E+08
X-330	31-5	5	3	10-Nov-04	32	1.51E+09	6.72E+07	4.69E+08
X-330	31-5	5	4	10-Nov-04	25	1.18E+09	5.25E+07	3.67E+08
X-330	31-5	5	5	10-Nov-04	26	1.23E+09	5.46E+07	3.81E+08
X-330	31-5	5	6	10-Nov-04	45	2.13E+09	9.45E+07	6.60E+08
X-330	31-5	5	7	10-Nov-04	34	1.61E+09	7.14E+07	4.99E+08
X-330	31-5	5	8	10-Nov-04	44	2.08E+09	9.24E+07	6.45E+08
X-330	31-5	5	9	10-Nov-04	36	1.70E+09	7.56E+07	5.28E+08
X-330	31-5	5	10	10-Nov-04	62	2.93E+09	1.30E+08	9.10E+08
X-330	31-5	6	1	03-Nov-04	28	1.43E+09	5.88E+07	2.99E+08
X-330	31-5	6	2	03-Nov-04	27	1.38E+09	5.67E+07	2.88E+08
X-330	31-5	6	3	03-Nov-04	27	1.38E+09	5.67E+07	2.88E+08
X-330	31-5	6	4	03-Nov-04	26	1.33E+09	5.46E+07	2.77E+08
X-330	31-5	6	5	03-Nov-04	21	1.08E+09	4.41E+07	2.24E+08
X-330	31-5	6	6	03-Nov-04	24	1.23E+09	5.04E+07	2.56E+08
X-330	31-5	6	7	03-Nov-04	26	1.33E+09	5.46E+07	2.77E+08
X-330	31-5	6	8	03-Nov-04	44	2.25E+09	9.24E+07	4.69E+08
X-330	31-5	6	9	03-Nov-04	28	1.43E+09	5.88E+07	2.99E+08
X-330	31-5	6	10	03-Nov-04	26	1.33E+09	5.46E+07	2.77E+08
X-330	31-5	7	1	09-Nov-04	45	2.31E+09	9.45E+07	5.86E+08
X-330	31-5	7	2	09-Nov-04	27	1.38E+09	5.67E+07	3.52E+08
X-330	31-5	7	3	09-Nov-04	33	1.69E+09	6.93E+07	4.30E+08
X-330	31-5	7	4	09-Nov-04	28	1.43E+09	5.88E+07	3.65E+08
X-330	31-5	7	5	09-Nov-04	29	1.49E+09	6.09E+07	3.78E+08
X-330	31-5	7	6	09-Nov-04	37	1.90E+09	7.77E+07	4.82E+08
X-330	31-5	7	7	09-Nov-04	28	1.43E+09	5.88E+07	3.65E+08
X-330	31-5	7	8	09-Nov-04	27	1.38E+09	5.67E+07	3.52E+08
X-330	31-5	7	9	09-Nov-04	34	1.74E+09	7.14E+07	4.43E+08
X-330	31-5	7	10	09-Nov-04	56	2.87E+09	1.18E+08	7.30E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-330	31-5	8	1	04-Nov-04	40	1.98E+09	8.40E+07	4.85E+08
X-330	31-5	8	2	04-Nov-04	27	1.34E+09	5.67E+07	3.27E+08
X-330	31-5	8	3	04-Nov-04	29	1.44E+09	6.09E+07	3.52E+08
X-330	31-5	8	4	04-Nov-04	46	2.28E+09	9.66E+07	5.58E+08
X-330	31-5	8	5	04-Nov-04	28	1.39E+09	5.88E+07	3.39E+08
X-330	31-5	8	6	04-Nov-04	28	1.39E+09	5.88E+07	3.39E+08
X-330	31-5	8	7	04-Nov-04	31	1.54E+09	6.51E+07	3.76E+08
X-330	31-5	8	8	04-Nov-04	27	1.34E+09	5.67E+07	3.27E+08
X-330	31-5	8	9	04-Nov-04	29	1.44E+09	6.09E+07	3.52E+08
X-330	31-5	8	10	04-Nov-04	25	1.24E+09	5.25E+07	3.03E+08
X-330	31-5	9	1	08-Nov-04	32	1.57E+09	6.72E+07	3.99E+08
X-330	31-5	9	2	08-Nov-04	41	2.02E+09	8.61E+07	5.11E+08
X-330	31-5	9	3	08-Nov-04	28	1.38E+09	5.88E+07	3.49E+08
X-330	31-5	9	4	08-Nov-04	36	1.77E+09	7.56E+07	4.49E+08
X-330	31-5	9	5	08-Nov-04	28	1.38E+09	5.88E+07	3.49E+08
X-330	31-5	9	6	08-Nov-04	44	2.17E+09	9.24E+07	5.48E+08
X-330	31-5	9	7	08-Nov-04	62	3.05E+09	1.30E+08	7.73E+08
X-330	31-5	9	8	08-Nov-04	242	1.19E+10	5.08E+08	3.02E+09
X-330	31-5	9	9	08-Nov-04	65	3.20E+09	1.37E+08	8.10E+08
X-330	31-5	9	10	08-Nov-04	39	1.92E+09	8.19E+07	4.86E+08
X-330	31-5	10	1	05-Nov-04	28	1.38E+09	5.88E+07	3.55E+08
X-330	31-5	10	2	05-Nov-04	37	1.82E+09	7.77E+07	4.68E+08
X-330	31-5	10	3	05-Nov-04	37	1.82E+09	7.77E+07	4.68E+08
X-330	31-5	10	4	05-Nov-04	125	6.15E+09	2.63E+08	1.58E+09
X-330	31-5	10	5	05-Nov-04	35	1.72E+09	7.35E+07	4.43E+08
X-330	31-5	10	6	05-Nov-04	94	4.63E+09	1.97E+08	1.19E+09
X-330	31-5	10	7	05-Nov-04	29	1.43E+09	6.09E+07	3.67E+08
X-330	31-5	10	8	05-Nov-04	95	4.67E+09	2.00E+08	1.20E+09
X-330	31-5	10	9	05-Nov-04	27	1.33E+09	5.67E+07	3.42E+08
X-330	31-5	10	10	05-Nov-04	43	2.12E+09	9.03E+07	5.44E+08
X-333	33-1	1	1	16-Apr-09	38	1.15E+09	7.98E+07	2.15E+09
X-333	33-1	1	2	16-Apr-09	34	1.03E+09	7.14E+07	1.92E+09
X-333	33-1	1	3	16-Apr-09	37	1.12E+09	7.77E+07	2.09E+09
X-333	33-1	1	4	16-Apr-09	35	1.06E+09	7.35E+07	1.98E+09
X-333	33-1	1	5	16-Apr-09	36	1.09E+09	7.56E+07	2.04E+09
X-333	33-1	1	6	16-Apr-09	34	1.03E+09	7.14E+07	1.92E+09
X-333	33-1	1	7	16-Apr-09	34	1.03E+09	7.14E+07	1.92E+09
X-333	33-1	1	8	16-Apr-09	31	9.38E+08	6.51E+07	1.75E+09
X-333	33-1	2	1	16-Apr-09	27	8.17E+08	5.67E+07	1.53E+09
X-333	33-1	2	2	16-Apr-09	24	7.26E+08	5.04E+07	1.36E+09
X-333	33-1	2	3	16-Apr-09	24	7.26E+08	5.04E+07	1.36E+09
X-333	33-1	2	4	16-Apr-09	27	8.17E+08	5.67E+07	1.53E+09
X-333	33-1	2	5	16-Apr-09	28	8.47E+08	5.88E+07	1.58E+09
X-333	33-1	2	6	16-Apr-09	22	6.65E+08	4.62E+07	1.24E+09
X-333	33-1	2	7	16-Apr-09	30	9.07E+08	6.30E+07	1.70E+09
X-333	33-1	2	8	16-Apr-09	31	9.38E+08	6.51E+07	1.75E+09
X-333	33-1	3	1	16-Apr-09	37	1.12E+09	7.77E+07	2.34E+09
X-333	33-1	3	2	16-Apr-09	38	1.15E+09	7.98E+07	2.40E+09
X-333	33-1	3	3	16-Apr-09	36	1.09E+09	7.56E+07	2.27E+09
X-333	33-1	3	4	16-Apr-09	34	1.03E+09	7.14E+07	2.15E+09
X-333	33-1	3	5	16-Apr-09	48	1.45E+09	1.01E+08	3.03E+09
X-333	33-1	3	6	16-Apr-09	40	1.21E+09	8.40E+07	2.53E+09
X-333	33-1	3	7	16-Apr-09	39	1.18E+09	8.19E+07	2.46E+09
X-333	33-1	3	8	16-Apr-09	38	1.15E+09	7.98E+07	2.40E+09
X-333	33-1	4	1	16-Apr-09	22	6.65E+08	4.62E+07	1.29E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-1	4	2	16-Apr-09	13	3.93E+08	2.73E+07	7.62E+08
X-333	33-1	4	3	16-Apr-09	19	5.75E+08	3.99E+07	1.11E+09
X-333	33-1	4	4	16-Apr-09	17	5.14E+08	3.57E+07	9.96E+08
X-333	33-1	4	5	16-Apr-09	21	6.35E+08	4.41E+07	1.23E+09
X-333	33-1	4	6	16-Apr-09	17	5.14E+08	3.57E+07	9.96E+08
X-333	33-1	4	7	16-Apr-09	15	4.54E+08	3.15E+07	8.79E+08
X-333	33-1	4	8	16-Apr-09	16	4.84E+08	3.36E+07	9.38E+08
X-333	33-1	5	1	16-Apr-09	34	1.03E+09	7.14E+07	2.23E+09
X-333	33-1	5	2	16-Apr-09	36	1.09E+09	7.56E+07	2.36E+09
X-333	33-1	5	3	16-Apr-09	36	1.09E+09	7.56E+07	2.36E+09
X-333	33-1	5	4	16-Apr-09	35	1.06E+09	7.35E+07	2.30E+09
X-333	33-1	5	5	16-Apr-09	36	1.09E+09	7.56E+07	2.36E+09
X-333	33-1	5	6	16-Apr-09	35	1.06E+09	7.35E+07	2.30E+09
X-333	33-1	5	7	16-Apr-09	36	1.09E+09	7.56E+07	2.36E+09
X-333	33-1	5	8	16-Apr-09	29	8.77E+08	6.09E+07	1.90E+09
X-333	33-1	6	1	16-Apr-09	45	1.48E+09	9.45E+07	2.05E+09
X-333	33-1	6	2	16-Apr-09	43	1.41E+09	9.03E+07	1.96E+09
X-333	33-1	6	3	16-Apr-09	54	1.77E+09	1.13E+08	2.46E+09
X-333	33-1	6	4	16-Apr-09	46	1.51E+09	9.66E+07	2.09E+09
X-333	33-1	6	5	16-Apr-09	55	1.80E+09	1.16E+08	2.50E+09
X-333	33-1	6	6	16-Apr-09	47	1.54E+09	9.87E+07	2.14E+09
X-333	33-1	6	7	16-Apr-09	48	1.57E+09	1.01E+08	2.18E+09
X-333	33-1	6	8	16-Apr-09	49	1.61E+09	1.03E+08	2.23E+09
X-333	33-1	7	1	16-Apr-09	33	1.01E+09	6.93E+07	1.83E+09
X-333	33-1	7	2	16-Apr-09	29	8.86E+08	6.09E+07	1.61E+09
X-333	33-1	7	3	16-Apr-09	30	9.16E+08	6.30E+07	1.67E+09
X-333	33-1	7	4	16-Apr-09	32	9.77E+08	6.72E+07	1.78E+09
X-333	33-1	7	5	16-Apr-09	35	1.07E+09	7.35E+07	1.95E+09
X-333	33-1	7	6	16-Apr-09	36	1.10E+09	7.56E+07	2.00E+09
X-333	33-1	7	7	16-Apr-09	33	1.01E+09	6.93E+07	1.83E+09
X-333	33-1	7	8	16-Apr-09	34	1.04E+09	7.14E+07	1.89E+09
X-333	33-1	8	1	16-Apr-09	29	8.77E+08	6.09E+07	1.76E+09
X-333	33-1	8	2	16-Apr-09	26	7.86E+08	5.46E+07	1.58E+09
X-333	33-1	8	3	16-Apr-09	28	8.47E+08	5.88E+07	1.70E+09
X-333	33-1	8	4	16-Apr-09	30	9.07E+08	6.30E+07	1.82E+09
X-333	33-1	8	5	16-Apr-09	30	9.07E+08	6.30E+07	1.82E+09
X-333	33-1	8	6	16-Apr-09	28	8.47E+08	5.88E+07	1.70E+09
X-333	33-1	8	7	16-Apr-09	25	7.56E+08	5.25E+07	1.52E+09
X-333	33-1	8	8	16-Apr-09	26	7.86E+08	5.46E+07	1.58E+09
X-333	33-1	9	1	16-Apr-09	23	6.96E+08	4.83E+07	1.45E+09
X-333	33-1	9	2	16-Apr-09	22	6.65E+08	4.62E+07	1.39E+09
X-333	33-1	9	3	16-Apr-09	27	8.17E+08	5.67E+07	1.70E+09
X-333	33-1	9	4	16-Apr-09	21	6.35E+08	4.41E+07	1.33E+09
X-333	33-1	9	5	16-Apr-09	26	7.86E+08	5.46E+07	1.64E+09
X-333	33-1	9	6	16-Apr-09	27	8.17E+08	5.67E+07	1.70E+09
X-333	33-1	9	7	16-Apr-09	20	6.05E+08	4.20E+07	1.26E+09
X-333	33-1	9	8	16-Apr-09	22	6.65E+08	4.62E+07	1.39E+09
X-333	33-1	10	1	16-Apr-09	21	6.35E+08	4.41E+07	1.30E+09
X-333	33-1	10	2	16-Apr-09	18	5.44E+08	3.78E+07	1.11E+09
X-333	33-1	10	3	16-Apr-09	19	5.75E+08	3.99E+07	1.18E+09
X-333	33-1	10	4	16-Apr-09	21	6.35E+08	4.41E+07	1.30E+09
X-333	33-1	10	5	16-Apr-09	16	4.84E+08	3.36E+07	9.91E+08
X-333	33-1	10	6	16-Apr-09	18	5.44E+08	3.78E+07	1.11E+09
X-333	33-1	10	7	16-Apr-09	18	5.44E+08	3.78E+07	1.11E+09
X-333	33-1	10	8	16-Apr-09	19	5.75E+08	3.99E+07	1.18E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-2	1	1	16-Apr-09	32	1.04E+09	6.72E+07	1.54E+09
X-333	33-2	1	2	16-Apr-09	26	8.44E+08	5.46E+07	1.25E+09
X-333	33-2	1	3	16-Apr-09	32	1.04E+09	6.72E+07	1.54E+09
X-333	33-2	1	4	16-Apr-09	26	8.44E+08	5.46E+07	1.25E+09
X-333	33-2	1	5	16-Apr-09	35	1.14E+09	7.35E+07	1.69E+09
X-333	33-2	1	6	16-Apr-09	26	8.44E+08	5.46E+07	1.25E+09
X-333	33-2	1	7	16-Apr-09	29	9.41E+08	6.09E+07	1.40E+09
X-333	33-2	1	8	16-Apr-09	27	8.76E+08	5.67E+07	1.30E+09
X-333	33-2	2	1	16-Apr-09	30	9.07E+08	6.30E+07	1.40E+09
X-333	33-2	2	2	16-Apr-09	31	9.38E+08	6.51E+07	1.45E+09
X-333	33-2	2	3	16-Apr-09	29	8.77E+08	6.09E+07	1.36E+09
X-333	33-2	2	4	16-Apr-09	30	9.07E+08	6.30E+07	1.40E+09
X-333	33-2	2	5	16-Apr-09	31	9.38E+08	6.51E+07	1.45E+09
X-333	33-2	2	6	16-Apr-09	26	7.86E+08	5.46E+07	1.22E+09
X-333	33-2	2	7	16-Apr-09	31	9.38E+08	6.51E+07	1.45E+09
X-333	33-2	2	8	16-Apr-09	26	7.86E+08	5.46E+07	1.22E+09
X-333	33-2	3	1	16-Apr-09	57	1.72E+09	1.20E+08	3.12E+09
X-333	33-2	3	2	16-Apr-09	33	9.98E+08	6.93E+07	1.80E+09
X-333	33-2	3	3	16-Apr-09	36	1.09E+09	7.56E+07	1.97E+09
X-333	33-2	3	4	16-Apr-09	38	1.15E+09	7.98E+07	2.08E+09
X-333	33-2	3	5	16-Apr-09	37	1.12E+09	7.77E+07	2.02E+09
X-333	33-2	3	6	16-Apr-09	38	1.15E+09	7.98E+07	2.08E+09
X-333	33-2	3	7	16-Apr-09	29	8.77E+08	6.09E+07	1.59E+09
X-333	33-2	3	8	16-Apr-09	44	1.33E+09	9.24E+07	2.41E+09
X-333	33-2	4	1	16-Apr-09	24	8.65E+08	5.04E+07	7.46E+08
X-333	33-2	4	2	16-Apr-09	25	9.01E+08	5.25E+07	7.77E+08
X-333	33-2	4	3	16-Apr-09	31	1.12E+09	6.51E+07	9.64E+08
X-333	33-2	4	4	16-Apr-09	26	9.37E+08	5.46E+07	8.09E+08
X-333	33-2	4	5	16-Apr-09	26	9.37E+08	5.46E+07	8.09E+08
X-333	33-2	4	6	16-Apr-09	29	1.05E+09	6.09E+07	9.02E+08
X-333	33-2	4	7	16-Apr-09	27	9.73E+08	5.67E+07	8.40E+08
X-333	33-2	4	8	16-Apr-09	23	8.29E+08	4.83E+07	7.15E+08
X-333	33-2	5	1	16-Apr-09	57	2.01E+09	1.20E+08	2.14E+09
X-333	33-2	5	2	16-Apr-09	62	2.18E+09	1.30E+08	2.33E+09
X-333	33-2	5	3	16-Apr-09	56	1.97E+09	1.18E+08	2.11E+09
X-333	33-2	5	4	16-Apr-09	62	2.18E+09	1.30E+08	2.33E+09
X-333	33-2	5	5	16-Apr-09	39	1.37E+09	8.19E+07	1.47E+09
X-333	33-2	5	6	16-Apr-09	47	1.66E+09	9.87E+07	1.77E+09
X-333	33-2	5	7	16-Apr-09	39	1.37E+09	8.19E+07	1.47E+09
X-333	33-2	5	8	16-Apr-09	44	1.55E+09	9.24E+07	1.65E+09
X-333	33-2	6	1	16-Apr-09	43	1.40E+09	9.03E+07	1.98E+09
X-333	33-2	6	2	16-Apr-09	49	1.59E+09	1.03E+08	2.26E+09
X-333	33-2	6	3	16-Apr-09	49	1.59E+09	1.03E+08	2.26E+09
X-333	33-2	6	4	16-Apr-09	27	8.76E+08	5.67E+07	1.25E+09
X-333	33-2	6	5	16-Apr-09	36	1.17E+09	7.56E+07	1.66E+09
X-333	33-2	6	6	16-Apr-09	33	1.07E+09	6.93E+07	1.52E+09
X-333	33-2	6	7	16-Apr-09	30	9.74E+08	6.30E+07	1.38E+09
X-333	33-2	6	8	16-Apr-09	31	1.01E+09	6.51E+07	1.43E+09
X-333	33-2	7	1	16-Apr-09	39	1.28E+09	8.19E+07	1.75E+09
X-333	33-2	7	2	16-Apr-09	32	1.05E+09	6.72E+07	1.44E+09
X-333	33-2	7	3	16-Apr-09	39	1.28E+09	8.19E+07	1.75E+09
X-333	33-2	7	4	16-Apr-09	37	1.21E+09	7.77E+07	1.66E+09
X-333	33-2	7	5	16-Apr-09	35	1.15E+09	7.35E+07	1.57E+09
X-333	33-2	7	6	16-Apr-09	40	1.31E+09	8.40E+07	1.80E+09
X-333	33-2	7	7	16-Apr-09	37	1.21E+09	7.77E+07	1.66E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-2	7	8	16-Apr-09	30	9.84E+08	6.30E+07	1.35E+09
X-333	33-2	8	1	16-Apr-09	39	1.34E+09	8.19E+07	1.62E+09
X-333	33-2	8	2	16-Apr-09	28	9.59E+08	5.88E+07	1.16E+09
X-333	33-2	8	3	16-Apr-09	34	1.16E+09	7.14E+07	1.41E+09
X-333	33-2	8	4	16-Apr-09	32	1.10E+09	6.72E+07	1.33E+09
X-333	33-2	8	5	16-Apr-09	31	1.06E+09	6.51E+07	1.28E+09
X-333	33-2	8	6	16-Apr-09	38	1.30E+09	7.98E+07	1.57E+09
X-333	33-2	8	7	16-Apr-09	33	1.13E+09	6.93E+07	1.37E+09
X-333	33-2	8	8	16-Apr-09	38	1.30E+09	7.98E+07	1.57E+09
X-333	33-2	9	1	16-Apr-09	31	1.06E+09	6.51E+07	1.32E+09
X-333	33-2	9	2	16-Apr-09	31	1.06E+09	6.51E+07	1.32E+09
X-333	33-2	9	3	16-Apr-09	34	1.16E+09	7.14E+07	1.45E+09
X-333	33-2	9	4	16-Apr-09	26	8.86E+08	5.46E+07	1.11E+09
X-333	33-2	9	5	16-Apr-09	33	1.12E+09	6.93E+07	1.40E+09
X-333	33-2	9	6	16-Apr-09	30	1.02E+09	6.30E+07	1.28E+09
X-333	33-2	9	7	16-Apr-09	30	1.02E+09	6.30E+07	1.28E+09
X-333	33-2	9	8	16-Apr-09	29	9.88E+08	6.09E+07	1.23E+09
X-333	33-2	10	1	16-Apr-09	25	9.17E+08	5.25E+07	8.60E+08
X-333	33-2	10	2	16-Apr-09	29	1.06E+09	6.09E+07	9.98E+08
X-333	33-2	10	3	16-Apr-09	29	1.06E+09	6.09E+07	9.98E+08
X-333	33-2	10	4	16-Apr-09	27	9.91E+08	5.67E+07	9.29E+08
X-333	33-2	10	5	16-Apr-09	42	1.54E+09	8.82E+07	1.45E+09
X-333	33-2	10	6	16-Apr-09	33	1.21E+09	6.93E+07	1.14E+09
X-333	33-2	10	7	16-Apr-09	31	1.14E+09	6.51E+07	1.07E+09
X-333	33-2	10	8	16-Apr-09	32	1.17E+09	6.72E+07	1.10E+09
X-333	33-3	1	1	16-Apr-09	31	1.11E+09	6.51E+07	9.73E+08
X-333	33-3	1	2	16-Apr-09	31	1.11E+09	6.51E+07	9.73E+08
X-333	33-3	1	3	16-Apr-09	34	1.22E+09	7.14E+07	1.07E+09
X-333	33-3	1	4	16-Apr-09	34	1.22E+09	7.14E+07	1.07E+09
X-333	33-3	1	5	16-Apr-09	37	1.33E+09	7.77E+07	1.16E+09
X-333	33-3	1	6	16-Apr-09	39	1.40E+09	8.19E+07	1.22E+09
X-333	33-3	1	7	16-Apr-09	36	1.29E+09	7.56E+07	1.13E+09
X-333	33-3	1	8	16-Apr-09	24	8.60E+08	5.04E+07	7.54E+08
X-333	33-3	2	1	16-Apr-09	29	1.02E+09	6.09E+07	1.09E+09
X-333	33-3	2	2	16-Apr-09	30	1.06E+09	6.30E+07	1.13E+09
X-333	33-3	2	3	16-Apr-09	35	1.23E+09	7.35E+07	1.32E+09
X-333	33-3	2	4	16-Apr-09	36	1.27E+09	7.56E+07	1.35E+09
X-333	33-3	2	5	16-Apr-09	37	1.30E+09	7.77E+07	1.39E+09
X-333	33-3	2	6	16-Apr-09	31	1.09E+09	6.51E+07	1.17E+09
X-333	33-3	2	7	16-Apr-09	39	1.37E+09	8.19E+07	1.47E+09
X-333	33-3	2	8	16-Apr-09	44	1.55E+09	9.24E+07	1.65E+09
X-333	33-3	3	1	16-Apr-09	41	1.51E+09	8.61E+07	1.38E+09
X-333	33-3	3	2	16-Apr-09	33	1.22E+09	6.93E+07	1.11E+09
X-333	33-3	3	3	16-Apr-09	42	1.55E+09	8.82E+07	1.42E+09
X-333	33-3	3	4	16-Apr-09	41	1.51E+09	8.61E+07	1.38E+09
X-333	33-3	3	5	16-Apr-09	41	1.51E+09	8.61E+07	1.38E+09
X-333	33-3	3	6	16-Apr-09	45	1.66E+09	9.45E+07	1.52E+09
X-333	33-3	3	7	16-Apr-09	50	1.85E+09	1.05E+08	1.68E+09
X-333	33-3	3	8	16-Apr-09	46	1.70E+09	9.66E+07	1.55E+09
X-333	33-3	4	1	16-Apr-09	44	1.63E+09	9.24E+07	1.95E+09
X-333	33-3	4	2	16-Apr-09	42	1.56E+09	8.82E+07	1.86E+09
X-333	33-3	4	3	16-Apr-09	43	1.60E+09	9.03E+07	1.90E+09
X-333	33-3	4	4	16-Apr-09	47	1.74E+09	9.87E+07	2.08E+09
X-333	33-3	4	5	16-Apr-09	41	1.52E+09	8.61E+07	1.81E+09
X-333	33-3	4	6	16-Apr-09	53	1.97E+09	1.11E+08	2.35E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-3	4	7	16-Apr-09	47	1.74E+09	9.87E+07	2.08E+09
X-333	33-3	4	8	16-Apr-09	44	1.63E+09	9.24E+07	1.95E+09
X-333	33-3	5	1	16-Apr-09	38	1.39E+09	7.98E+07	1.17E+09
X-333	33-3	5	2	16-Apr-09	39	1.43E+09	8.19E+07	1.20E+09
X-333	33-3	5	3	16-Apr-09	40	1.47E+09	8.40E+07	1.23E+09
X-333	33-3	5	4	16-Apr-09	42	1.54E+09	8.82E+07	1.29E+09
X-333	33-3	5	5	16-Apr-09	38	1.39E+09	7.98E+07	1.17E+09
X-333	33-3	5	6	16-Apr-09	42	1.54E+09	8.82E+07	1.29E+09
X-333	33-3	5	7	16-Apr-09	39	1.43E+09	8.19E+07	1.20E+09
X-333	33-3	5	8	16-Apr-09	34	1.25E+09	7.14E+07	1.05E+09
X-333	33-3	6	1	16-Apr-09	53	1.92E+09	1.11E+08	1.86E+09
X-333	33-3	6	2	16-Apr-09	54	1.96E+09	1.13E+08	1.90E+09
X-333	33-3	6	3	16-Apr-09	45	1.63E+09	9.45E+07	1.58E+09
X-333	33-3	6	4	16-Apr-09	51	1.85E+09	1.07E+08	1.79E+09
X-333	33-3	6	5	16-Apr-09	49	1.78E+09	1.03E+08	1.72E+09
X-333	33-3	6	6	16-Apr-09	41	1.49E+09	8.61E+07	1.44E+09
X-333	33-3	6	7	16-Apr-09	43	1.56E+09	9.03E+07	1.51E+09
X-333	33-3	6	8	16-Apr-09	45	1.63E+09	9.45E+07	1.58E+09
X-333	33-3	7	1	16-Apr-09	37	1.37E+09	7.77E+07	1.13E+09
X-333	33-3	7	2	16-Apr-09	33	1.22E+09	6.93E+07	1.01E+09
X-333	33-3	7	3	16-Apr-09	35	1.29E+09	7.35E+07	1.07E+09
X-333	33-3	7	4	16-Apr-09	38	1.40E+09	7.98E+07	1.16E+09
X-333	33-3	7	5	16-Apr-09	38	1.40E+09	7.98E+07	1.16E+09
X-333	33-3	7	6	16-Apr-09	38	1.40E+09	7.98E+07	1.16E+09
X-333	33-3	7	7	16-Apr-09	39	1.44E+09	8.19E+07	1.19E+09
X-333	33-3	7	8	16-Apr-09	30	1.11E+09	6.30E+07	9.15E+08
X-333	33-3	8	1	16-Apr-09	48	1.73E+09	1.01E+08	1.72E+09
X-333	33-3	8	2	16-Apr-09	46	1.66E+09	9.66E+07	1.65E+09
X-333	33-3	8	3	16-Apr-09	44	1.59E+09	9.24E+07	1.58E+09
X-333	33-3	8	4	16-Apr-09	46	1.66E+09	9.66E+07	1.65E+09
X-333	33-3	8	5	16-Apr-09	42	1.51E+09	8.82E+07	1.51E+09
X-333	33-3	8	6	16-Apr-09	47	1.69E+09	9.87E+07	1.69E+09
X-333	33-3	8	7	16-Apr-09	49	1.77E+09	1.03E+08	1.76E+09
X-333	33-3	8	8	16-Apr-09	37	1.33E+09	7.77E+07	1.33E+09
X-333	33-3	9	1	16-Apr-09	25	8.76E+08	5.25E+07	9.62E+08
X-333	33-3	9	2	16-Apr-09	33	1.16E+09	6.93E+07	1.27E+09
X-333	33-3	9	3	16-Apr-09	31	1.09E+09	6.51E+07	1.19E+09
X-333	33-3	9	4	16-Apr-09	32	1.12E+09	6.72E+07	1.23E+09
X-333	33-3	9	5	16-Apr-09	32	1.12E+09	6.72E+07	1.23E+09
X-333	33-3	9	6	16-Apr-09	33	1.16E+09	6.93E+07	1.27E+09
X-333	33-3	9	7	16-Apr-09	28	9.81E+08	5.88E+07	1.08E+09
X-333	33-3	9	8	16-Apr-09	31	1.09E+09	6.51E+07	1.19E+09
X-333	33-3	10	1	16-Apr-09	27	8.58E+08	5.67E+07	1.36E+09
X-333	33-3	10	2	16-Apr-09	40	1.27E+09	8.40E+07	2.02E+09
X-333	33-3	10	3	16-Apr-09	40	1.27E+09	8.40E+07	2.02E+09
X-333	33-3	10	4	16-Apr-09	37	1.18E+09	7.77E+07	1.87E+09
X-333	33-3	10	5	16-Apr-09	51	1.62E+09	1.07E+08	2.57E+09
X-333	33-3	10	6	16-Apr-09	27	8.58E+08	5.67E+07	1.36E+09
X-333	33-3	10	7	16-Apr-09	36	1.14E+09	7.56E+07	1.82E+09
X-333	33-3	10	8	16-Apr-09	34	1.08E+09	7.14E+07	1.71E+09
X-333	33-4	1	1	16-Apr-09	53	2.16E+09	1.11E+08	1.25E+09
X-333	33-4	1	2	16-Apr-09	54	2.20E+09	1.13E+08	1.27E+09
X-333	33-4	1	3	16-Apr-09	52	2.12E+09	1.09E+08	1.23E+09
X-333	33-4	1	4	16-Apr-09	48	1.96E+09	1.01E+08	1.13E+09
X-333	33-4	1	5	16-Apr-09	41	1.67E+09	8.61E+07	9.67E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-4	1	6	16-Apr-09	49	2.00E+09	1.03E+08	1.16E+09
X-333	33-4	1	7	16-Apr-09	47	1.92E+09	9.87E+07	1.11E+09
X-333	33-4	1	8	16-Apr-09	48	1.96E+09	1.01E+08	1.13E+09
X-333	33-4	2	1	16-Apr-09	66	2.51E+09	1.39E+08	1.84E+09
X-333	33-4	2	2	16-Apr-09	58	2.21E+09	1.22E+08	1.62E+09
X-333	33-4	2	3	16-Apr-09	69	2.62E+09	1.45E+08	1.92E+09
X-333	33-4	2	4	16-Apr-09	73	2.78E+09	1.53E+08	2.03E+09
X-333	33-4	2	5	16-Apr-09	79	3.00E+09	1.66E+08	2.20E+09
X-333	33-4	2	6	16-Apr-09	84	3.20E+09	1.76E+08	2.34E+09
X-333	33-4	2	7	16-Apr-09	98	3.73E+09	2.06E+08	2.73E+09
X-333	33-4	2	8	16-Apr-09	127	4.83E+09	2.67E+08	3.54E+09
X-333	33-4	3	1	16-Apr-09	123	4.62E+09	2.58E+08	3.49E+09
X-333	33-4	3	2	16-Apr-09	88	3.31E+09	1.85E+08	2.50E+09
X-333	33-4	3	3	16-Apr-09	77	2.89E+09	1.62E+08	2.18E+09
X-333	33-4	3	4	16-Apr-09	77	2.89E+09	1.62E+08	2.18E+09
X-333	33-4	3	5	16-Apr-09	67	2.52E+09	1.41E+08	1.90E+09
X-333	33-4	3	6	16-Apr-09	69	2.59E+09	1.45E+08	1.96E+09
X-333	33-4	3	7	16-Apr-09	65	2.44E+09	1.37E+08	1.84E+09
X-333	33-4	3	8	16-Apr-09	64	2.40E+09	1.34E+08	1.82E+09
X-333	33-4	4	1	16-Apr-09	33	1.28E+09	6.93E+07	8.60E+08
X-333	33-4	4	2	16-Apr-09	32	1.24E+09	6.72E+07	8.34E+08
X-333	33-4	4	3	16-Apr-09	27	1.05E+09	5.67E+07	7.04E+08
X-333	33-4	4	4	16-Apr-09	37	1.43E+09	7.77E+07	9.65E+08
X-333	33-4	4	5	16-Apr-09	39	1.51E+09	8.19E+07	1.02E+09
X-333	33-4	4	6	16-Apr-09	28	1.09E+09	5.88E+07	7.30E+08
X-333	33-4	4	7	16-Apr-09	35	1.36E+09	7.35E+07	9.12E+08
X-333	33-4	4	8	16-Apr-09	26	1.01E+09	5.46E+07	6.78E+08
X-333	33-4	5	1	16-Apr-09	46	1.84E+09	9.66E+07	1.16E+09
X-333	33-4	5	2	16-Apr-09	44	1.76E+09	9.24E+07	1.11E+09
X-333	33-4	5	3	16-Apr-09	48	1.92E+09	1.01E+08	1.21E+09
X-333	33-4	5	4	16-Apr-09	48	1.92E+09	1.01E+08	1.21E+09
X-333	33-4	5	5	16-Apr-09	55	2.20E+09	1.16E+08	1.39E+09
X-333	33-4	5	6	16-Apr-09	51	2.04E+09	1.07E+08	1.29E+09
X-333	33-4	5	7	16-Apr-09	56	2.24E+09	1.18E+08	1.41E+09
X-333	33-4	5	8	16-Apr-09	49	1.96E+09	1.03E+08	1.24E+09
X-333	33-4	6	1	16-Apr-09	52	1.87E+09	1.09E+08	1.62E+09
X-333	33-4	6	2	16-Apr-09	55	1.98E+09	1.16E+08	1.71E+09
X-333	33-4	6	3	16-Apr-09	64	2.31E+09	1.34E+08	1.99E+09
X-333	33-4	6	4	16-Apr-09	74	2.67E+09	1.55E+08	2.30E+09
X-333	33-4	6	5	16-Apr-09	67	2.42E+09	1.41E+08	2.08E+09
X-333	33-4	6	6	16-Apr-09	69	2.49E+09	1.45E+08	2.15E+09
X-333	33-4	6	7	16-Apr-09	83	2.99E+09	1.74E+08	2.58E+09
X-333	33-4	6	8	16-Apr-09	109	3.93E+09	2.29E+08	3.39E+09
X-333	33-4	7	1	16-Apr-09	30	1.06E+09	6.30E+07	1.14E+09
X-333	33-4	7	2	16-Apr-09	23	8.10E+08	4.83E+07	8.75E+08
X-333	33-4	7	3	16-Apr-09	25	8.81E+08	5.25E+07	9.51E+08
X-333	33-4	7	4	16-Apr-09	22	7.75E+08	4.62E+07	8.37E+08
X-333	33-4	7	5	16-Apr-09	22	7.75E+08	4.62E+07	8.37E+08
X-333	33-4	7	6	16-Apr-09	25	8.81E+08	5.25E+07	9.51E+08
X-333	33-4	7	7	16-Apr-09	27	9.51E+08	5.67E+07	1.03E+09
X-333	33-4	7	8	16-Apr-09	16	5.64E+08	3.36E+07	6.09E+08
X-333	33-4	8	1	16-Apr-09	73	3.33E+09	1.53E+08	2.23E+09
X-333	33-4	8	2	16-Apr-09	41	1.87E+09	8.61E+07	1.25E+09
X-333	33-4	8	3	16-Apr-09	37	1.69E+09	7.77E+07	1.13E+09
X-333	33-4	8	4	16-Apr-09	36	1.64E+09	7.56E+07	1.10E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-4	8	5	16-Apr-09	31	1.41E+09	6.51E+07	9.46E+08
X-333	33-4	8	6	16-Apr-09	29	1.32E+09	6.09E+07	8.85E+08
X-333	33-4	8	7	16-Apr-09	24	1.09E+09	5.04E+07	7.32E+08
X-333	33-4	8	8	16-Apr-09	25	1.14E+09	5.25E+07	7.63E+08
X-333	33-4	9	1	16-Apr-09	32	1.22E+09	6.72E+07	8.69E+08
X-333	33-4	9	2	16-Apr-09	34	1.30E+09	7.14E+07	9.24E+08
X-333	33-4	9	3	16-Apr-09	42	1.61E+09	8.82E+07	1.14E+09
X-333	33-4	9	4	16-Apr-09	41	1.57E+09	8.61E+07	1.11E+09
X-333	33-4	9	5	16-Apr-09	45	1.72E+09	9.45E+07	1.22E+09
X-333	33-4	9	6	16-Apr-09	38	1.45E+09	7.98E+07	1.03E+09
X-333	33-4	9	7	16-Apr-09	47	1.80E+09	9.87E+07	1.28E+09
X-333	33-4	9	8	16-Apr-09	36	1.38E+09	7.56E+07	9.78E+08
X-333	33-4	10	1	16-Apr-09	50	1.93E+09	1.05E+08	1.32E+09
X-333	33-4	10	2	16-Apr-09	60	2.31E+09	1.26E+08	1.59E+09
X-333	33-4	10	3	16-Apr-09	57	2.20E+09	1.20E+08	1.51E+09
X-333	33-4	10	4	16-Apr-09	54	2.08E+09	1.13E+08	1.43E+09
X-333	33-4	10	5	16-Apr-09	71	2.73E+09	1.49E+08	1.88E+09
X-333	33-4	10	6	16-Apr-09	70	2.70E+09	1.47E+08	1.85E+09
X-333	33-4	10	7	16-Apr-09	85	3.27E+09	1.79E+08	2.25E+09
X-333	33-4	10	8	16-Apr-09	98	3.77E+09	2.06E+08	2.60E+09
X-333	33-5	1	1	16-Apr-09	168	6.72E+09	3.53E+08	4.24E+09
X-333	33-5	1	2	16-Apr-09	121	4.84E+09	2.54E+08	3.06E+09
X-333	33-5	1	3	16-Apr-09	116	4.64E+09	2.44E+08	2.93E+09
X-333	33-5	1	4	16-Apr-09	123	4.92E+09	2.58E+08	3.11E+09
X-333	33-5	1	5	16-Apr-09	97	3.88E+09	2.04E+08	2.45E+09
X-333	33-5	1	6	16-Apr-09	97	3.88E+09	2.04E+08	2.45E+09
X-333	33-5	1	7	16-Apr-09	86	3.44E+09	1.81E+08	2.17E+09
X-333	33-5	1	8	16-Apr-09	95	3.80E+09	2.00E+08	2.40E+09
X-333	33-5	2	1	16-Apr-09	59	2.67E+09	1.24E+08	9.95E+08
X-333	33-5	2	2	16-Apr-09	58	2.62E+09	1.22E+08	9.78E+08
X-333	33-5	2	3	16-Apr-09	61	2.76E+09	1.28E+08	1.03E+09
X-333	33-5	2	4	16-Apr-09	54	2.44E+09	1.13E+08	9.10E+08
X-333	33-5	2	5	16-Apr-09	59	2.67E+09	1.24E+08	9.95E+08
X-333	33-5	2	6	16-Apr-09	54	2.44E+09	1.13E+08	9.10E+08
X-333	33-5	2	7	16-Apr-09	48	2.17E+09	1.01E+08	8.09E+08
X-333	33-5	2	8	16-Apr-09	47	2.13E+09	9.87E+07	7.92E+08
X-333	33-5	3	1	16-Apr-09	62	2.36E+09	1.30E+08	1.73E+09
X-333	33-5	3	2	16-Apr-09	55	2.09E+09	1.16E+08	1.53E+09
X-333	33-5	3	3	16-Apr-09	68	2.59E+09	1.43E+08	1.90E+09
X-333	33-5	3	4	16-Apr-09	73	2.78E+09	1.53E+08	2.03E+09
X-333	33-5	3	5	16-Apr-09	79	3.00E+09	1.66E+08	2.20E+09
X-333	33-5	3	6	16-Apr-09	85	3.23E+09	1.79E+08	2.37E+09
X-333	33-5	3	7	16-Apr-09	96	3.65E+09	2.02E+08	2.68E+09
X-333	33-5	3	8	16-Apr-09	130	4.94E+09	2.73E+08	3.62E+09
X-333	33-5	4	1	16-Apr-09	50	2.07E+09	1.05E+08	1.12E+09
X-333	33-5	4	2	16-Apr-09	55	2.27E+09	1.16E+08	1.23E+09
X-333	33-5	4	3	16-Apr-09	54	2.23E+09	1.13E+08	1.21E+09
X-333	33-5	4	4	16-Apr-09	56	2.31E+09	1.18E+08	1.26E+09
X-333	33-5	4	5	16-Apr-09	54	2.23E+09	1.13E+08	1.21E+09
X-333	33-5	4	6	16-Apr-09	54	2.23E+09	1.13E+08	1.21E+09
X-333	33-5	4	7	16-Apr-09	51	2.11E+09	1.07E+08	1.14E+09
X-333	33-5	4	8	16-Apr-09	61	2.52E+09	1.28E+08	1.37E+09
X-333	33-5	5	1	16-Apr-09	81	3.26E+09	1.70E+08	2.00E+09
X-333	33-5	5	2	16-Apr-09	79	3.18E+09	1.66E+08	1.95E+09
X-333	33-5	5	3	16-Apr-09	66	2.66E+09	1.39E+08	1.63E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-5	5	4	16-Apr-09	63	2.54E+09	1.32E+08	1.55E+09
X-333	33-5	5	5	16-Apr-09	63	2.54E+09	1.32E+08	1.55E+09
X-333	33-5	5	6	16-Apr-09	54	2.17E+09	1.13E+08	1.33E+09
X-333	33-5	5	7	16-Apr-09	54	2.17E+09	1.13E+08	1.33E+09
X-333	33-5	5	8	16-Apr-09	57	2.29E+09	1.20E+08	1.41E+09
X-333	33-5	6	1	16-Apr-09	36	1.28E+09	7.56E+07	1.32E+09
X-333	33-5	6	2	16-Apr-09	40	1.43E+09	8.40E+07	1.47E+09
X-333	33-5	6	3	16-Apr-09	35	1.25E+09	7.35E+07	1.29E+09
X-333	33-5	6	4	16-Apr-09	53	1.89E+09	1.11E+08	1.95E+09
X-333	33-5	6	5	16-Apr-09	43	1.53E+09	9.03E+07	1.58E+09
X-333	33-5	6	6	16-Apr-09	46	1.64E+09	9.66E+07	1.69E+09
X-333	33-5	6	7	16-Apr-09	41	1.46E+09	8.61E+07	1.51E+09
X-333	33-5	6	8	16-Apr-09	45	1.60E+09	9.45E+07	1.65E+09
X-333	33-5	7	1	16-Apr-09	47	1.74E+09	9.87E+07	1.55E+09
X-333	33-5	7	2	16-Apr-09	46	1.71E+09	9.66E+07	1.52E+09
X-333	33-5	7	3	16-Apr-09	47	1.74E+09	9.87E+07	1.55E+09
X-333	33-5	7	4	16-Apr-09	52	1.93E+09	1.09E+08	1.72E+09
X-333	33-5	7	5	16-Apr-09	56	2.08E+09	1.18E+08	1.85E+09
X-333	33-5	7	6	16-Apr-09	35	1.30E+09	7.35E+07	1.16E+09
X-333	33-5	7	7	16-Apr-09	30	1.11E+09	6.30E+07	9.90E+08
X-333	33-5	7	8	16-Apr-09	83	3.08E+09	1.74E+08	2.74E+09
X-333	33-5	8	1	16-Apr-09	42	1.72E+09	8.82E+07	9.76E+08
X-333	33-5	8	2	16-Apr-09	43	1.77E+09	9.03E+07	9.99E+08
X-333	33-5	8	3	16-Apr-09	44	1.81E+09	9.24E+07	1.02E+09
X-333	33-5	8	4	16-Apr-09	42	1.72E+09	8.82E+07	9.76E+08
X-333	33-5	8	5	16-Apr-09	59	2.42E+09	1.24E+08	1.37E+09
X-333	33-5	8	6	16-Apr-09	54	2.22E+09	1.13E+08	1.26E+09
X-333	33-5	8	7	16-Apr-09	56	2.30E+09	1.18E+08	1.30E+09
X-333	33-5	8	8	16-Apr-09	56	2.30E+09	1.18E+08	1.30E+09
X-333	33-5	9	1	16-Apr-09	56	1.95E+09	1.18E+08	2.18E+09
X-333	33-5	9	2	16-Apr-09	39	1.36E+09	8.19E+07	1.52E+09
X-333	33-5	9	3	16-Apr-09	43	1.50E+09	9.03E+07	1.68E+09
X-333	33-5	9	4	16-Apr-09	37	1.29E+09	7.77E+07	1.44E+09
X-333	33-5	9	5	16-Apr-09	49	1.71E+09	1.03E+08	1.91E+09
X-333	33-5	9	6	16-Apr-09	36	1.25E+09	7.56E+07	1.40E+09
X-333	33-5	9	7	16-Apr-09	33	1.15E+09	6.93E+07	1.29E+09
X-333	33-5	9	8	16-Apr-09	34	1.18E+09	7.14E+07	1.32E+09
X-333	33-5	10	1	16-Apr-09	37	1.53E+09	7.77E+07	8.42E+08
X-333	33-5	10	2	16-Apr-09	33	1.36E+09	6.93E+07	7.51E+08
X-333	33-5	10	3	16-Apr-09	38	1.57E+09	7.98E+07	8.64E+08
X-333	33-5	10	4	16-Apr-09	37	1.53E+09	7.77E+07	8.42E+08
X-333	33-5	10	5	16-Apr-09	30	1.24E+09	6.30E+07	6.82E+08
X-333	33-5	10	6	16-Apr-09	45	1.86E+09	9.45E+07	1.02E+09
X-333	33-5	10	7	16-Apr-09	31	1.28E+09	6.51E+07	7.05E+08
X-333	33-5	10	8	16-Apr-09	28	1.16E+09	5.88E+07	6.37E+08
X-333	33-6	1	1	16-Apr-09	50	1.91E+09	1.05E+08	1.34E+09
X-333	33-6	1	2	16-Apr-09	44	1.68E+09	9.24E+07	1.18E+09
X-333	33-6	1	3	16-Apr-09	50	1.91E+09	1.05E+08	1.34E+09
X-333	33-6	1	4	16-Apr-09	45	1.72E+09	9.45E+07	1.20E+09
X-333	33-6	1	5	16-Apr-09	47	1.80E+09	9.87E+07	1.26E+09
X-333	33-6	1	6	16-Apr-09	50	1.91E+09	1.05E+08	1.34E+09
X-333	33-6	1	7	16-Apr-09	50	1.91E+09	1.05E+08	1.34E+09
X-333	33-6	1	8	16-Apr-09	47	1.80E+09	9.87E+07	1.26E+09
X-333	33-6	2	1	16-Apr-09	48	2.07E+09	1.01E+08	9.33E+08
X-333	33-6	2	2	16-Apr-09	50	2.15E+09	1.05E+08	9.72E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-6	2	3	16-Apr-09	58	2.50E+09	1.22E+08	1.13E+09
X-333	33-6	2	4	16-Apr-09	50	2.15E+09	1.05E+08	9.72E+08
X-333	33-6	2	5	16-Apr-09	58	2.50E+09	1.22E+08	1.13E+09
X-333	33-6	2	6	16-Apr-09	63	2.71E+09	1.32E+08	1.22E+09
X-333	33-6	2	7	16-Apr-09	51	2.20E+09	1.07E+08	9.91E+08
X-333	33-6	2	8	16-Apr-09	40	1.72E+09	8.40E+07	7.77E+08
X-333	33-6	3	1	16-Apr-09	44	1.84E+09	9.24E+07	9.53E+08
X-333	33-6	3	2	16-Apr-09	48	2.01E+09	1.01E+08	1.04E+09
X-333	33-6	3	3	16-Apr-09	47	1.97E+09	9.87E+07	1.02E+09
X-333	33-6	3	4	16-Apr-09	44	1.84E+09	9.24E+07	9.53E+08
X-333	33-6	3	5	16-Apr-09	47	1.97E+09	9.87E+07	1.02E+09
X-333	33-6	3	6	16-Apr-09	55	2.30E+09	1.16E+08	1.19E+09
X-333	33-6	3	7	16-Apr-09	47	1.97E+09	9.87E+07	1.02E+09
X-333	33-6	3	8	16-Apr-09	54	2.26E+09	1.13E+08	1.17E+09
X-333	33-6	4	1	16-Apr-09	71	2.72E+09	1.49E+08	1.93E+09
X-333	33-6	4	2	16-Apr-09	83	3.18E+09	1.74E+08	2.26E+09
X-333	33-6	4	3	16-Apr-09	73	2.79E+09	1.53E+08	1.98E+09
X-333	33-6	4	4	16-Apr-09	70	2.68E+09	1.47E+08	1.90E+09
X-333	33-6	4	5	16-Apr-09	72	2.76E+09	1.51E+08	1.96E+09
X-333	33-6	4	6	16-Apr-09	73	2.79E+09	1.53E+08	1.98E+09
X-333	33-6	4	7	16-Apr-09	65	2.49E+09	1.37E+08	1.77E+09
X-333	33-6	4	8	16-Apr-09	82	3.14E+09	1.72E+08	2.23E+09
X-333	33-6	5	1	16-Apr-09	38	1.59E+09	7.98E+07	8.07E+08
X-333	33-6	5	2	16-Apr-09	32	1.34E+09	6.72E+07	6.80E+08
X-333	33-6	5	3	16-Apr-09	36	1.51E+09	7.56E+07	7.65E+08
X-333	33-6	5	4	16-Apr-09	42	1.76E+09	8.82E+07	8.92E+08
X-333	33-6	5	5	16-Apr-09	45	1.89E+09	9.45E+07	9.56E+08
X-333	33-6	5	6	16-Apr-09	42	1.76E+09	8.82E+07	8.92E+08
X-333	33-6	5	7	16-Apr-09	40	1.68E+09	8.40E+07	8.50E+08
X-333	33-6	5	8	16-Apr-09	35	1.47E+09	7.35E+07	7.43E+08
X-333	33-6	6	1	16-Apr-09	48	1.92E+09	1.01E+08	1.23E+09
X-333	33-6	6	2	16-Apr-09	46	1.84E+09	9.66E+07	1.18E+09
X-333	33-6	6	3	16-Apr-09	43	1.72E+09	9.03E+07	1.10E+09
X-333	33-6	6	4	16-Apr-09	49	1.96E+09	1.03E+08	1.26E+09
X-333	33-6	6	5	16-Apr-09	50	2.00E+09	1.05E+08	1.28E+09
X-333	33-6	6	6	16-Apr-09	41	1.64E+09	8.61E+07	1.05E+09
X-333	33-6	6	7	16-Apr-09	63	2.52E+09	1.32E+08	1.62E+09
X-333	33-6	6	8	16-Apr-09	71	2.84E+09	1.49E+08	1.82E+09
X-333	33-6	7	1	16-Apr-09	49	2.07E+09	1.03E+08	1.02E+09
X-333	33-6	7	2	16-Apr-09	53	2.24E+09	1.11E+08	1.10E+09
X-333	33-6	7	3	16-Apr-09	54	2.28E+09	1.13E+08	1.12E+09
X-333	33-6	7	4	16-Apr-09	53	2.24E+09	1.11E+08	1.10E+09
X-333	33-6	7	5	16-Apr-09	53	2.24E+09	1.11E+08	1.10E+09
X-333	33-6	7	6	16-Apr-09	51	2.15E+09	1.07E+08	1.06E+09
X-333	33-6	7	7	16-Apr-09	48	2.02E+09	1.01E+08	1.00E+09
X-333	33-6	7	8	16-Apr-09	49	2.07E+09	1.03E+08	1.02E+09
X-333	33-6	8	1	16-Apr-09	46	1.76E+09	9.66E+07	1.23E+09
X-333	33-6	8	2	16-Apr-09	44	1.68E+09	9.24E+07	1.18E+09
X-333	33-6	8	3	16-Apr-09	49	1.88E+09	1.03E+08	1.31E+09
X-333	33-6	8	4	16-Apr-09	59	2.26E+09	1.24E+08	1.58E+09
X-333	33-6	8	5	16-Apr-09	44	1.68E+09	9.24E+07	1.18E+09
X-333	33-6	8	6	16-Apr-09	47	1.80E+09	9.87E+07	1.26E+09
X-333	33-6	8	7	16-Apr-09	54	2.07E+09	1.13E+08	1.44E+09
X-333	33-6	8	8	16-Apr-09	45	1.72E+09	9.45E+07	1.20E+09
X-333	33-6	9	1	16-Apr-09	24	9.30E+08	5.04E+07	6.21E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-6	9	2	16-Apr-09	24	9.30E+08	5.04E+07	6.21E+08
X-333	33-6	9	3	16-Apr-09	25	9.69E+08	5.25E+07	6.47E+08
X-333	33-6	9	4	16-Apr-09	29	1.12E+09	6.09E+07	7.50E+08
X-333	33-6	9	5	16-Apr-09	24	9.30E+08	5.04E+07	6.21E+08
X-333	33-6	9	6	16-Apr-09	23	8.91E+08	4.83E+07	5.95E+08
X-333	33-6	9	7	16-Apr-09	27	1.05E+09	5.67E+07	6.98E+08
X-333	33-6	9	8	16-Apr-09	21	8.14E+08	4.41E+07	5.43E+08
X-333	33-6	10	1	16-Apr-09	48	2.01E+09	1.01E+08	1.03E+09
X-333	33-6	10	2	16-Apr-09	34	1.42E+09	7.14E+07	7.27E+08
X-333	33-6	10	3	16-Apr-09	39	1.63E+09	8.19E+07	8.34E+08
X-333	33-6	10	4	16-Apr-09	40	1.68E+09	8.40E+07	8.55E+08
X-333	33-6	10	5	16-Apr-09	33	1.38E+09	6.93E+07	7.06E+08
X-333	33-6	10	6	16-Apr-09	49	2.05E+09	1.03E+08	1.05E+09
X-333	33-6	10	7	16-Apr-09	44	1.84E+09	9.24E+07	9.41E+08
X-333	33-6	10	8	16-Apr-09	33	1.38E+09	6.93E+07	7.06E+08
X-333	33-7	1	1	16-Apr-09	46	2.02E+09	9.66E+07	8.42E+08
X-333	33-7	1	2	16-Apr-09	42	1.85E+09	8.82E+07	7.69E+08
X-333	33-7	1	3	16-Apr-09	41	1.80E+09	8.61E+07	7.51E+08
X-333	33-7	1	4	16-Apr-09	39	1.71E+09	8.19E+07	7.14E+08
X-333	33-7	1	5	16-Apr-09	50	2.20E+09	1.05E+08	9.16E+08
X-333	33-7	1	6	16-Apr-09	35	1.54E+09	7.35E+07	6.41E+08
X-333	33-7	1	7	16-Apr-09	39	1.71E+09	8.19E+07	7.14E+08
X-333	33-7	1	8	16-Apr-09	41	1.80E+09	8.61E+07	7.51E+08
X-333	33-7	2	1	16-Apr-09	39	1.71E+09	8.19E+07	7.18E+08
X-333	33-7	2	2	16-Apr-09	54	2.37E+09	1.13E+08	9.95E+08
X-333	33-7	2	3	16-Apr-09	48	2.11E+09	1.01E+08	8.84E+08
X-333	33-7	2	4	16-Apr-09	60	2.64E+09	1.26E+08	1.11E+09
X-333	33-7	2	5	16-Apr-09	39	1.71E+09	8.19E+07	7.18E+08
X-333	33-7	2	6	16-Apr-09	54	2.37E+09	1.13E+08	9.95E+08
X-333	33-7	2	7	16-Apr-09	44	1.93E+09	9.24E+07	8.10E+08
X-333	33-7	2	8	16-Apr-09	42	1.85E+09	8.82E+07	7.74E+08
X-333	33-7	3	1	16-Apr-09	50	2.21E+09	1.05E+08	8.95E+08
X-333	33-7	3	2	16-Apr-09	55	2.44E+09	1.16E+08	9.85E+08
X-333	33-7	3	3	16-Apr-09	50	2.21E+09	1.05E+08	8.95E+08
X-333	33-7	3	4	16-Apr-09	52	2.30E+09	1.09E+08	9.31E+08
X-333	33-7	3	5	16-Apr-09	57	2.52E+09	1.20E+08	1.02E+09
X-333	33-7	3	6	16-Apr-09	54	2.39E+09	1.13E+08	9.67E+08
X-333	33-7	3	7	16-Apr-09	51	2.26E+09	1.07E+08	9.13E+08
X-333	33-7	3	8	16-Apr-09	77	3.41E+09	1.62E+08	1.38E+09
X-333	33-7	4	1	16-Apr-09	65	2.80E+09	1.37E+08	1.29E+09
X-333	33-7	4	2	16-Apr-09	52	2.24E+09	1.09E+08	1.03E+09
X-333	33-7	4	3	16-Apr-09	56	2.41E+09	1.18E+08	1.11E+09
X-333	33-7	4	4	16-Apr-09	57	2.45E+09	1.20E+08	1.13E+09
X-333	33-7	4	5	16-Apr-09	61	2.63E+09	1.28E+08	1.21E+09
X-333	33-7	4	6	16-Apr-09	68	2.93E+09	1.43E+08	1.35E+09
X-333	33-7	4	7	16-Apr-09	69	2.97E+09	1.45E+08	1.37E+09
X-333	33-7	4	8	16-Apr-09	57	2.45E+09	1.20E+08	1.13E+09
X-333	33-7	5	1	16-Apr-09	51	2.08E+09	1.07E+08	1.20E+09
X-333	33-7	5	2	16-Apr-09	44	1.79E+09	9.24E+07	1.04E+09
X-333	33-7	5	3	16-Apr-09	52	2.12E+09	1.09E+08	1.23E+09
X-333	33-7	5	4	16-Apr-09	52	2.12E+09	1.09E+08	1.23E+09
X-333	33-7	5	5	16-Apr-09	45	1.84E+09	9.45E+07	1.06E+09
X-333	33-7	5	6	16-Apr-09	64	2.61E+09	1.34E+08	1.51E+09
X-333	33-7	5	7	16-Apr-09	62	2.53E+09	1.30E+08	1.46E+09
X-333	33-7	5	8	16-Apr-09	52	2.12E+09	1.09E+08	1.23E+09

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-7	6	1	16-Apr-09	66	3.08E+09	1.39E+08	1.46E+09
X-333	33-7	6	2	16-Apr-09	55	2.56E+09	1.16E+08	1.22E+09
X-333	33-7	6	3	16-Apr-09	61	2.84E+09	1.28E+08	1.35E+09
X-333	33-7	6	4	16-Apr-09	63	2.94E+09	1.32E+08	1.39E+09
X-333	33-7	6	5	16-Apr-09	55	2.56E+09	1.16E+08	1.22E+09
X-333	33-7	6	6	16-Apr-09	66	3.08E+09	1.39E+08	1.46E+09
X-333	33-7	6	7	16-Apr-09	50	2.33E+09	1.05E+08	1.11E+09
X-333	33-7	6	8	16-Apr-09	51	2.38E+09	1.07E+08	1.13E+09
X-333	33-7	7	1	16-Apr-09	64	2.88E+09	1.34E+08	1.09E+09
X-333	33-7	7	2	16-Apr-09	58	2.61E+09	1.22E+08	9.88E+08
X-333	33-7	7	3	16-Apr-09	59	2.65E+09	1.24E+08	1.01E+09
X-333	33-7	7	4	16-Apr-09	70	3.14E+09	1.47E+08	1.19E+09
X-333	33-7	7	5	16-Apr-09	58	2.61E+09	1.22E+08	9.88E+08
X-333	33-7	7	6	16-Apr-09	62	2.79E+09	1.30E+08	1.06E+09
X-333	33-7	7	7	16-Apr-09	61	2.74E+09	1.28E+08	1.04E+09
X-333	33-7	7	8	16-Apr-09	53	2.38E+09	1.11E+08	9.03E+08
X-333	33-7	8	1	16-Apr-09	70	2.97E+09	1.47E+08	1.44E+09
X-333	33-7	8	2	16-Apr-09	62	2.63E+09	1.30E+08	1.27E+09
X-333	33-7	8	3	16-Apr-09	41	1.74E+09	8.61E+07	8.43E+08
X-333	33-7	8	4	16-Apr-09	109	4.63E+09	2.29E+08	2.24E+09
X-333	33-7	8	5	16-Apr-09	47	2.00E+09	9.87E+07	9.66E+08
X-333	33-7	8	6	16-Apr-09	117	4.68E+09	2.46E+08	3.00E+09
X-333	33-7	8	7	16-Apr-09	40	1.70E+09	8.40E+07	8.22E+08
X-333	33-7	8	8	16-Apr-09	86	3.65E+09	1.81E+08	1.77E+09
X-333	33-7	9	1	16-Apr-09	33	1.38E+09	6.93E+07	7.06E+08
X-333	33-7	9	2	16-Apr-09	27	1.13E+09	5.67E+07	5.77E+08
X-333	33-7	9	3	16-Apr-09	29	1.21E+09	6.09E+07	6.20E+08
X-333	33-7	9	4	16-Apr-09	20	8.38E+08	4.20E+07	4.28E+08
X-333	33-7	9	5	16-Apr-09	28	1.17E+09	5.88E+07	5.99E+08
X-333	33-7	9	6	16-Apr-09	27	1.13E+09	5.67E+07	5.77E+08
X-333	33-7	9	7	16-Apr-09	24	1.01E+09	5.04E+07	5.13E+08
X-333	33-7	9	8	16-Apr-09	18	7.54E+08	3.78E+07	3.85E+08
X-333	33-7	10	1	16-Apr-09	41	1.90E+09	8.61E+07	6.63E+08
X-333	33-7	10	2	16-Apr-09	44	2.04E+09	9.24E+07	7.11E+08
X-333	33-7	10	3	16-Apr-09	32	1.48E+09	6.72E+07	5.17E+08
X-333	33-7	10	4	16-Apr-09	42	1.94E+09	8.82E+07	6.79E+08
X-333	33-7	10	5	16-Apr-09	38	1.76E+09	7.98E+07	6.14E+08
X-333	33-7	10	6	16-Apr-09	33	1.53E+09	6.93E+07	5.34E+08
X-333	33-7	10	7	16-Apr-09	39	1.80E+09	8.19E+07	6.31E+08
X-333	33-7	10	8	16-Apr-09	29	1.34E+09	6.09E+07	4.69E+08
X-333	33-8	1	1	16-Apr-09	44	1.81E+09	9.24E+07	1.02E+09
X-333	33-8	1	2	16-Apr-09	51	2.09E+09	1.07E+08	1.19E+09
X-333	33-8	1	3	16-Apr-09	44	1.81E+09	9.24E+07	1.02E+09
X-333	33-8	1	4	16-Apr-09	47	1.93E+09	9.87E+07	1.09E+09
X-333	33-8	1	5	16-Apr-09	56	2.30E+09	1.18E+08	1.30E+09
X-333	33-8	1	6	16-Apr-09	44	1.81E+09	9.24E+07	1.02E+09
X-333	33-8	1	7	16-Apr-09	38	1.56E+09	7.98E+07	8.83E+08
X-333	33-8	1	8	16-Apr-09	47	1.93E+09	9.87E+07	1.09E+09
X-333	33-8	2	1	16-Apr-09	49	2.11E+09	1.03E+08	9.64E+08
X-333	33-8	2	2	16-Apr-09	46	1.98E+09	9.66E+07	9.05E+08
X-333	33-8	2	3	16-Apr-09	41	1.77E+09	8.61E+07	8.06E+08
X-333	33-8	2	4	16-Apr-09	54	2.33E+09	1.13E+08	1.06E+09
X-333	33-8	2	5	16-Apr-09	44	1.89E+09	9.24E+07	8.65E+08
X-333	33-8	2	6	16-Apr-09	54	2.33E+09	1.13E+08	1.06E+09
X-333	33-8	2	7	16-Apr-09	47	2.02E+09	9.87E+07	9.24E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-8	2	8	16-Apr-09	48	2.07E+09	1.01E+08	9.44E+08
X-333	33-8	3	1	16-Apr-09	69	2.95E+09	1.45E+08	1.37E+09
X-333	33-8	3	2	16-Apr-09	52	2.22E+09	1.09E+08	1.04E+09
X-333	33-8	3	3	16-Apr-09	62	2.65E+09	1.30E+08	1.23E+09
X-333	33-8	3	4	16-Apr-09	55	2.35E+09	1.16E+08	1.10E+09
X-333	33-8	3	5	16-Apr-09	61	2.61E+09	1.28E+08	1.21E+09
X-333	33-8	3	6	16-Apr-09	57	2.44E+09	1.20E+08	1.14E+09
X-333	33-8	3	7	16-Apr-09	54	2.31E+09	1.13E+08	1.08E+09
X-333	33-8	3	8	16-Apr-09	51	2.18E+09	1.07E+08	1.02E+09
X-333	33-8	4	1	16-Apr-09	69	3.37E+09	1.45E+08	1.29E+09
X-333	33-8	4	2	16-Apr-09	60	2.93E+09	1.26E+08	1.12E+09
X-333	33-8	4	3	16-Apr-09	64	3.12E+09	1.34E+08	1.20E+09
X-333	33-8	4	4	16-Apr-09	60	2.93E+09	1.26E+08	1.12E+09
X-333	33-8	4	5	16-Apr-09	49	2.39E+09	1.03E+08	9.19E+08
X-333	33-8	4	6	16-Apr-09	50	2.44E+09	1.05E+08	9.37E+08
X-333	33-8	4	7	16-Apr-09	52	2.54E+09	1.09E+08	9.75E+08
X-333	33-8	4	8	16-Apr-09	50	2.44E+09	1.05E+08	9.37E+08
X-333	33-8	5	1	16-Apr-09	65	3.12E+09	1.37E+08	1.18E+09
X-333	33-8	5	2	16-Apr-09	62	2.98E+09	1.30E+08	1.13E+09
X-333	33-8	5	3	16-Apr-09	67	3.22E+09	1.41E+08	1.22E+09
X-333	33-8	5	4	16-Apr-09	66	3.17E+09	1.39E+08	1.20E+09
X-333	33-8	5	5	16-Apr-09	63	3.03E+09	1.32E+08	1.15E+09
X-333	33-8	5	6	16-Apr-09	66	3.17E+09	1.39E+08	1.20E+09
X-333	33-8	5	7	16-Apr-09	60	2.88E+09	1.26E+08	1.09E+09
X-333	33-8	5	8	16-Apr-09	68	3.27E+09	1.43E+08	1.24E+09
X-333	33-8	6	1	16-Apr-09	64	2.39E+09	1.34E+08	1.83E+09
X-333	33-8	6	2	16-Apr-09	54	2.02E+09	1.13E+08	1.55E+09
X-333	33-8	6	3	16-Apr-09	67	2.50E+09	1.41E+08	1.92E+09
X-333	33-8	6	4	16-Apr-09	68	2.54E+09	1.43E+08	1.95E+09
X-333	33-8	6	5	16-Apr-09	72	2.69E+09	1.51E+08	2.06E+09
X-333	33-8	6	6	16-Apr-09	90	3.36E+09	1.89E+08	2.58E+09
X-333	33-8	6	7	16-Apr-09	100	3.73E+09	2.10E+08	2.86E+09
X-333	33-8	6	8	16-Apr-09	105	3.92E+09	2.21E+08	3.00E+09
X-333	33-8	7	1	16-Apr-09	57	2.74E+09	1.20E+08	1.15E+09
X-333	33-8	7	2	16-Apr-09	53	2.55E+09	1.11E+08	1.07E+09
X-333	33-8	7	3	16-Apr-09	60	2.88E+09	1.26E+08	1.21E+09
X-333	33-8	7	4	16-Apr-09	57	2.74E+09	1.20E+08	1.15E+09
X-333	33-8	7	5	16-Apr-09	65	3.12E+09	1.37E+08	1.31E+09
X-333	33-8	7	6	16-Apr-09	54	2.60E+09	1.13E+08	1.09E+09
X-333	33-8	7	7	16-Apr-09	58	2.79E+09	1.22E+08	1.17E+09
X-333	33-8	7	8	16-Apr-09	47	2.26E+09	9.87E+07	9.48E+08
X-333	33-8	8	1	16-Apr-09	73	3.54E+09	1.53E+08	1.40E+09
X-333	33-8	8	2	16-Apr-09	60	2.91E+09	1.26E+08	1.15E+09
X-333	33-8	8	3	16-Apr-09	67	3.25E+09	1.41E+08	1.29E+09
X-333	33-8	8	4	16-Apr-09	65	3.15E+09	1.37E+08	1.25E+09
X-333	33-8	8	5	16-Apr-09	66	3.20E+09	1.39E+08	1.27E+09
X-333	33-8	8	6	16-Apr-09	67	3.25E+09	1.41E+08	1.29E+09
X-333	33-8	8	7	16-Apr-09	52	2.52E+09	1.09E+08	9.98E+08
X-333	33-8	8	8	16-Apr-09	60	2.91E+09	1.26E+08	1.15E+09
X-333	33-8	9	1	16-Apr-09	32	1.55E+09	6.72E+07	6.26E+08
X-333	33-8	9	2	16-Apr-09	39	1.89E+09	8.19E+07	7.62E+08
X-333	33-8	9	3	16-Apr-09	27	1.31E+09	5.67E+07	5.28E+08
X-333	33-8	9	4	16-Apr-09	42	2.03E+09	8.82E+07	8.21E+08
X-333	33-8	9	5	16-Apr-09	39	1.89E+09	8.19E+07	7.62E+08
X-333	33-8	9	6	16-Apr-09	37	1.79E+09	7.77E+07	7.23E+08

Facility ID	Unit ID	Cell ID	Stage ID	Date	Max U235 Gms X-333 Adjusted	U-234 pCi	U-235 pCi	U-238 pCi
X-333	33-8	9	7	16-Apr-09	37	1.79E+09	7.77E+07	7.23E+08
X-333	33-8	9	8	16-Apr-09	41	1.99E+09	8.61E+07	8.02E+08
X-333	33-8	10	1	16-Apr-09	100	4.43E+09	2.10E+08	1.80E+09
X-333	33-8	10	2	16-Apr-09	47	2.08E+09	9.87E+07	8.46E+08
X-333	33-8	10	3	16-Apr-09	99	4.38E+09	2.08E+08	1.78E+09
X-333	33-8	10	4	16-Apr-09	75	3.32E+09	1.58E+08	1.35E+09
X-333	33-8	10	5	16-Apr-09	77	3.41E+09	1.62E+08	1.39E+09
X-333	33-8	10	6	16-Apr-09	94	4.16E+09	1.97E+08	1.69E+09
X-333	33-8	10	7	16-Apr-09	67	2.97E+09	1.41E+08	1.21E+09
X-333	33-8	10	8	16-Apr-09	83	3.68E+09	1.74E+08	1.49E+09

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APPENDIX L: COST ESTIMATE

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ACRONYMS

D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
EC	engineering category
FML	flexible membrane liner
FS	feasibility study
FY	fiscal year
GCL	geosynthetic clay liner
ILTS	interim leachate treatment system
IMTA	interim materials transfer area
NNSS	Nevada National Security Site
OMB	Office of Management and Budget
OSDC	on-Site disposal cell
PORTS	Portsmouth Gaseous Diffusion Plant
RC	regulatory category
RFP	request for proposal
RI	remedial investigation
S&M	surveillance and maintenance
WAC	waste acceptance criteria
WBS	work breakdown structure

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Basis of Estimate for Waste Disposition Remedial Investigation/Feasibility Study (RI/FS) Cost Estimate

Introduction

Two action alternatives are presented in the waste disposition RI/FS: on-Site with some off-Site disposal and all off-Site disposal. Alternative 2, on-Site disposal, involves siting, constructing, and operating a potential engineered on-Site disposal cell (OSDC) for disposal of anticipated decontamination and decommissioning (D&D) waste (regulatory category [RC]-1) generated at the Portsmouth Gaseous Diffusion Plant (PORTS), referred to as *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) waste. In Alternative 2, waste not meeting a potential OSDC waste acceptance criteria (WAC) would be shipped to appropriate off-Site disposal facilities. Alternative 3, off-Site disposal, involves transporting and disposing of PORTS DFF&O waste at off-Site facilities.

Methodology

The U.S. Department of Energy's (DOE's) D&D contractor will perform the majority of the activities with direct-hired forces. Specialty subcontractors will be used as needed.

Estimate Type and Approach

This is a bottoms-up activity based cost estimate based on process knowledge of the project team. The estimates for the majority of the labor activities are based on field experience with similar waste management and disposal operations. The majority of the materials and equipment costs are based on vendor quotes and pricing guides such as R.S. Means and Richardson's. Labor costs were estimated using composite labor rates. Less defined items where no design was available, the details of the scope could not be accurately quantified, or that did not warrant more accuracy, were included as allowances based on project team and estimator judgment.

A total capital (unescalated) cost is presented including annual surveillance and maintenance (S&M) costs which are presented first as S&M during operation of the permanent leachate treatment system and second as S&M during operation of the passive leachate treatment system for a period of 1,000 years. A present value (capital, S&M, and total) cost is also presented.

Key Financial Data

- All costs included are in fiscal year (FY) 2013 unescalated dollars.
- A 7 percent sales tax has been added on all materials to account for Ohio sales tax.
- Contractor indirect cost of 12 percent has been added (no Contractor Indirects are applied to DOE Prime contract costs (i.e., Nevada National Security Site [NNSS] & Energy*Solutions* disposal fees).
- Net present value of unescalated costs has been calculated in FY 2010 dollars using a 2 percent real discount rate (Office of Management and Budget [OMB] 2011).
- No contingency is included.

Schedule

The design, construction, operation, and capping schedule for a potential OSDC is assumed to be 13 years. After that, the permanent leachate collection system would remain operational through

year 2055, when it is then demolished. In fact, the system would be removed once the leachate generation rate has lessened and stabilized. S&M costs were estimated for 1,000 years after capping, but in 2055 the annual S&M costs are assumed to stabilize at a lower rate, reflecting the lower treatment costs from the passive leachate treatment system.

The off-Site disposal alternative is assumed to take 20 years to implement. This schedule is based on level funding. All S&M costs are assumed to be borne by the off-Site disposal cell operators and are included in the cost of disposal.

Basis of Estimate for Waste Disposition RI/FS Alternative 2, On-Site Waste Disposal

The cost estimate is summarized in 16 work breakdown structure (WBS) items. The scope and estimate assumptions for each WBS item are presented below. Key parameters are shown in Table L.1. The total waste volume is either in situ volume or the segmented volume (primarily for converters), which is assumed to be the disposed volume for OSDC capacity determination. The volumes include waste generated as a result of D&D of PORTS (RC-1), as well as waste (RC-3, engineering category [EC]-2) generated from using contaminated soil as fill (RC-2, RC-3, EC-1). As applicable, bulked volumes were used for estimating the cost of transporting the waste.

Table L.1. On-Site Waste Disposal Alternative Key Parameters

Alternative parameters	Volume (Disposed) (cy)
Total waste volume (RC-1, RC-3, EC-2)	1,587,000
Waste volume for recycling	110,000
Waste volume for off-Site disposal	122,000
Waste volume for OSDC (RC-1, RC-3, EC-2)	1,354,000
Additional soil fill required for OSDC	2,549,000
OSDC capacity	3,903,000
OSDC waste footprint	1,430 ft by 1,600 ft (approximately 52.5 acres)

EC = engineering category
OSDC = on-Site disposal cell
RC = regulatory category

1. Regulatory Documents

Scope. Preparation of the Remedial Design Report, Remedial Action Work Plan, and Remedial Action Report in accordance with DFF&O requirements.

Estimate Assumptions

- A lump sum based on professional judgment is included.

2. Remedial Design Documents

Scope. Preparation of design drawings and specifications for OSDC and infrastructure construction, preparation of requests for proposals (RFPs), bid and award of subcontracts, and procurement support. Reference Section 8.3.2.1.1, *Potential OSDC design*, of the waste disposition RI/FS Report.

Estimate Assumptions

- Four RFPs would be prepared and four contracts would be awarded.

- The estimate for drawings, specifications and procurement packages for a potential OSDC and cap construction is estimated at 9 percent of the construction costs for a potential OSDC.

- The estimate for drawings, specifications and procurement packages for infrastructure and the leachate collection/treatment systems is estimated at 7 percent of the infrastructure construction costs.

3. Pre Design/Construction

Scope. Construction of test pits at potential borrow areas and within the disposal facility footprint; construction of test pads for materials of construction evaluations; demonstration of waste disposal methods; and installation of a global positioning system station. Reference Section 8.3.2.1.2, *Pre-design studies*, of the waste disposition RI/FS Report.

4. Cell Construction

Scope. Site preparation, rough cut grading, and construction of a potential OSDC and final cover; excavation and transfer of materials from the off-Site borrow area; establishing the on-Site stockpile area. Reference Sections 8.3.2.1.1, *Potential OSDC design*, and 8.3.2.1.3, *Site preparation and potential OSDC construction*, of the waste disposition RI/FS Report.

Estimate Assumptions

- 122 acres would be cleared and grubbed for a potential OSDC, 37 acres for the off-PORTS borrow area, and 100 acres for the on-Site stockpile area. Additional areas would be cleared as part of subsequent activities for a total of 320 acres cleared.

- 1,717,000 cy of bedrock would be cut at a potential OSDC and 394,000 cy at the off-PORTS borrow area.

- A potential OSDC would be constructed in a modular fashion and would have a compacted clay liner with a double geocomposite liner system, along with two low-permeability liners, a leachate collection and removal system, and a leak detection system. From the OSDC base the multi-layer liner system would include: 3 ft of compacted clay; a geosynthetic clay liner (GCL) and flexible membrane liner (FML); 1-ft-thick gravel leak detection layer in between the two geotextile layers; a primary liner consisting of an FML and low-permeability GCL; 1-ft-thick gravel layer and highly permeable geonet on sloping walls; and a 1-ft-thick soil layer.

- The final cover would be 10 ft thick. From the base the cover would consist of: 1-ft-thick soil cover; 2-ft-thick, low permeability, clay layer; a GCL and an FML; 1-ft-thick gravel drainage layer; 3-ft-thick biointrusion barrier; and 2-ft-thick vegetated soil layer.

- A bottoms up estimate was initially prepared for construction of a potential OSDC to dispose 4.77 million cy. The cost for construction of the potential OSDC in Alternative 2 was developed by scaling the costs down by 18 percent for a cell capacity of 3.90 million cy.

5. Infrastructure Construction

Scope. Upgrade of existing roads and railroad system; and construction of new haul roads, security roads, patrol road, interim materials transfer area (IMTA), IMTA contact water retention basins, sediment basins, support facilities, and the leachate transmission system. Reference Sections 8.3.2.1.1, *Potential*

OSDC design, and 8.3.2.1.3, *Site preparation and potential OSDC construction*, of the waste disposition RI/FS Report.

Estimate Assumptions

- The IMTA would encompass 23 acres and would be constructed of the following: 2-ft compacted base followed by a geotextile cushion, 60 mil geomembrane liner, geonet, geotextile fabric, and a 1-ft-thick layer of soil. The area would be surrounded with a perimeter berm tied to the contact water retention basin.

6. Interim Leachate Treatment System Construction

Scope. Construction of interim leachate treatment system (ILTS). Reference Section 8.3.2.1.1, *Potential OSDC design*, of the waste disposition RI/FS Report.

Estimate Assumptions

- The ILTS would be sized to treat 350 gpm of leachate and equipped with chemical precipitation, ion exchange, and carbon adsorption.

7. Cell Operations

Scope. Operation a potential OSDC and IMTA for 9 years. Reference Section 8.3.2.1.5, *Potential OSDC operations*, of the waste disposition RI/FS Report.

Estimate Assumptions

- On-Site disposal volumes are shown in Table L.1.

- A bottoms up estimate was prepared for operation of a potential OSDC for 5 years. The annual costs were extended to 9 years by increasing the estimate by 35 percent.

8. Waste Transport to Cell

Scope. Transporting waste meeting disposal facility WAC to a potential OSDC. Reference Section 8.3.2.1.5, *Potential OSDC operations*, of the waste disposition RI/FS Report.

Estimate Assumptions

- Total volumes transported are shown in Table L.1.

- Estimates were prepared using a unit rate assembly that combines labor, equipment and materials. The assembly was developed based on process knowledge from similar previous projects.

- The majority of waste would be transported to a potential OSDC in articulated dump trucks.

- Transportation is assumed to be completely within a radiological area, which allows transport without survey or tarps. This results in nominally 10 turns per day from the point of generation to a potential OSDC.

9. Off-Site Shipment and Disposal

Scope. Transporting waste not meeting WAC of a potential OSDC to off-Site disposal facilities. Reference Section 8.3.2.1.9, *Off-Site disposal*, of the waste disposition RI/FS Report.

Estimate Assumptions

- Volumes for off-Site disposal are shown in Table L.1.

- Estimates were prepared using unit rate assemblies for each disposal location that combines labor, equipment, materials, and transportation. The assemblies were developed based on process knowledge from previous projects.

- Gondola rail transport to Energy*Solutions* is assumed to require 3 months for loading, shipping, disposal, and return.

- Gondolas are weight limited.

- Disposal fees were from vendor quotes.

10. Interim Leachate Treatment System Operation During Cell Construction/Operations
Scope. Operating the ILTS for 9 years during OSDC construction and operations. Reference Section 8.3.2.1.1, *Potential OSDC design,* of the waste disposition RI/FS Report.

Estimate Assumptions
- An annual cost of labor, equipment, materials and subcontract support was estimated and extended for 9 years.

11. Cell Maintenance During Construction
Scope. Annual inspection and maintenance of the cell for 9 years during construction and operations of a potential OSDC. Reference Section 8.3.2.1.3, *Site preparation and potential OSDC construction,* of the waste disposition RI/FS Report.

Estimate Assumptions
- An annual cost of labor, equipment, materials and subcontract support was estimated and extended for 9 years.

12. Permanent Leachate Treatment Facility Construction
Scope. Construction and installation of the permanent leachate treatment facility. Reference Sections 8.3.2.1.1, *Potential OSDC design,* and 8.3.2.1.8, *Post-operations surveillance and maintenance,* of the waste disposition RI/FS Report.

Estimate Assumptions
- A bottoms up estimate for labor, materials, equipment, and subcontracted services was estimated.

13. Land Use Controls
Scope. Preparation of administrative control documents and legal support. Reference Section 8.3.2.1.8, *Post-operations surveillance and maintenance,* of the waste disposition RI/FS Report.

Estimate Assumptions
- Estimate provided as a lump sum based costs associated with similar projects.

14. Long Term S&M and Monitoring
Scope. Perform S&M and monitoring after OSDC capping. Reference Section 8.3.2.1.8, *Post-operations surveillance and maintenance,* of the waste disposition RI/FS Report.

Estimate Assumptions

- Annual inspection and maintenance of the disposal facility cap would continue after OSDC capping at the same annual cost as 2025.

- Security patrol would occur once per week after OSDC capping.

- Five-year-review regulatory reviews would be performed during years 1 through 30 after OSDC capping.

- The permanent leachate treatment system would be operated for 30 years after OSDC capping and removed and disposed of in year 2054. The passive leachate treatment system would not require any active S&M starting in year 2055.

- Seven groundwater wells would be sampled and analyzed quarterly for 30 years after OSDC capping and annually following.

15. Recyclables (Nickel) Staging Construction and Operations

Scope. Design, construction, transport to, and operations of a staging facility to store 6,400 metric tons of nickel recovered from X-330 and X-333 converters. Reference Section 8.3.2.1.10 *Recycling and/or reuse*, of the waste disposition RI/FS Report.

Estimate Assumptions

- X-744G will be hardened for secure storage and the roof replaced with a membrane roof.

- Nickel in IP-1 containers (provided by the segmentation process in the Process Buildings and Complex Facilities D&D Evaluation RI/FS) with security locks will be transported. Nominally 3,000 trips with a forklift will be used.

- Active secure staging (filling the facility) will occur for 5 years; 4 additional years of passive staging is assumed before the nickel is removed for recovery and decontamination. Removal, further transport, recovery and decontamination is not in the scope.

16. Fill Soil From Landfills and Plumes (RC-2, RC-3)

Scope. Regulatory documents, remedial design, and pre-design characterization will be performed for each landfill and plume area. Site preparation and remediation will occur with excavation control characterization. Impacted soils (and waste requiring fill [RC-3, EC-2] from the landfills) will be transported to a potential OSDC for use as fill. Placement of the fill soil and landfill waste at a potential OSDC is included in Cell Operations above. Soils not meeting the OSDC WAC will be treated on Site before transport for disposal at a potential OSDC. Waste not meeting the OSDC WAC will be packaged and transported to off-Site treatment and disposal (Energy*Solutions*). Reference Section 8.3.2.1.6 *Fill operations*, of the waste disposition RI/FS Report.

Estimate Assumptions

- Total volumes excavated and transported are 222,000 cy of landfill waste requiring fill (RC-3, EC-2) and 1,839,000 cy of contaminated soils (RC-2, RC-3 and EC-1). An additional 710,000 cy of clean soil is needed to be transported from the landfill areas (overburden or cap materials) to a potential OSDC to meet the fill needs.

- Estimates were prepared using a unit rate assembly that combines labor, equipment and materials. The assembly was developed based on process knowledge from similar previous projects.

- The majority of fill (and landfill waste) is transported to a potential OSDC in articulated dump trucks.

- Excavation and transportation is assumed to be completely within a radiological area which allows transport without survey or tarps. This results in nominally 10 turns per day from the point of generation to a potential OSDC.

- All landfill cap material and 14 percent of the plume clean overburden will be transported to a potential OSDC for use as fill. The remainder of the plume overburden will be stockpiled and restored to the excavation during site restoration.

- Site restoration will include contouring of the excavation area to promote runoff to existing streams and bodies of water, including revegetation and runoff controls.

Basis of Estimate for Waste Disposition RI/FS Alternative 3, Off-Site Waste Disposal

The cost estimate for off-Site disposal is summarized in five WBS items. The scope and estimate assumptions for each WBS item are presented below. Key parameters for the off-Site disposal alternative are shown in Table L.3. The waste volume is presented based on in situ volumes; however, estimates use the bulked volume for transport and disposal off Site. In the case of segmented process gas equipment, transport and disposal estimates factor in a segmentation ratio for off-Site transport and disposal. The major differences in volumes from the on-Site alternative are the absence of waste requiring fill from the landfills (RC-2, RC-3 and EC-2) and the quantity and extent of process gas equipment segmentation. More information can be found in Section 8.3.3.2, *Detailed description of off-Site alternative,* of the waste disposition RI/FS.

Table L.2. Off-Site Waste Disposal Alternative Key Parameters

Alternative parameters	Volume (In Situ) (cy)
Total waste volume	1,467,000
Waste Disposal at NNSS	272,000
Waste Disposal at ES	845,000
Waste Disposal at Pike Sanitation Landfill	240,000
Recycle and/or reuse	110,000

ES = Energy*Solutions*
NNSS = Nevada National Security Site

1. Regulatory Documents

Scope. Preparation of the Remedial Design Report, Remedial Action Work Plan, and Remedial Action Report in accordance with DFF&O requirements.

Estimate Assumptions

- The level of effort is based on experience at other DOE facilities.

2. Remedial Design Documents

Scope. Preparation of design drawings and specifications for infrastructure modifications, specifications for off-Site waste shipments and RFPs; bid and award of subcontracts; and procurement support.

Estimate Assumptions

- Six RFPs would be prepared and six contracts would be awarded.

- The estimate for drawings, specifications and procurement packages for infrastructure modifications is estimated at 7 percent of the infrastructure construction costs.

3. Infrastructure Construction

Scope. Upgrade of existing roads and railroad system and construction of loading and transfer stations.

Estimate Assumptions

- The level of effort required and cost are based on estimator's judgment based on preliminary drawings.

4. Recyclables (Nickel) Staging Construction and Operations

Scope. Construction, transport to, and operations of a staging facility to store 6,400 metric tons of nickel recovered from X-330 and X-333 converters. Reference Section 8.3.2.1.10 *Recycling and/or reuse* of the waste disposition RI/FS Report.

Estimate Assumptions

- All assumptions are the same as the on-Site alternative, including passive storage for only 4 years before recovery and decontamination begins.

5. Off-Site Shipment and Disposal

Scope. Transportation of all alternative waste to an appropriate off-Site facility for disposal.

Estimate Assumptions

- Waste volumes to be shipped to each disposal facility are shown in Table L.3.

- Estimates were prepared using unit rate assemblies that combine labor, equipment, and materials (such as waste packages). The assemblies were developed based on process knowledge from previous projects.

- Gondola rail transport to Energy*Solutions* is assumed to require 3 months for loading, shipping, disposal, and return.

- Gondolas are weight limited.

- Disposal fees were obtained from Energy*Solutions* and Pike Sanitation Landfill. The NNSS disposal facility is directly funded by DOE-National Nuclear Safety Administration. Therefore, no chargeback or fee is applicable. To legitimately compare disposal alternatives, the FY 11 for disposal at NNSS was used as the disposal fee.

REFERENCE

OMB 2011, *OMB Circular No. A-94, Appendix C, Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses*, Office of Management and Budget, Washington D.C., December.

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ATTACHMENT L.1: ALTERNATIVE 2 ESTIMATE

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Table L.1.1. Alternative 2
Estimate Cost Summary

Summary Description	Costs
	Unescalated-FY 2013 $
Capital Costs	
Indirect Cost for OSDC	
Regulatory Documents	$414,086
Remedial Design	
Remedial Design Documents	$34,649,513
Pre Design/Construction Activities	$9,149,384
Total OSDC Indirect Cost	**$44,212,984**
Direct Cost for OSDC	
Cell Construction	$273,285,480
Infrastructure Construction	$53,659,075
Interim Leachate Treatment System Construction	$4,756,562
Cell Operations	$158,440,000
Waste Transport to Cell	$30,442,747
Off Site Shipment and Disposal	$154,370,787
Interim Leachate Treatment System Operation	$8,490,574
During Cell Construction/Operations	
Cell Maintenance During Construction	$1,922,666
Permanent Leachate Treatment Facility Construction	$741,120
Land Use Controls	$176,232
Total OSDC Direct Cost	**$686,285,243**
Direct/Indirect Costs for Other	
Recyclables (Nickel) Staging Construction and Operations	$14,527,577
Fill Soil from Landfills and Plumes	$273,988,206
Total Other Direct/Indirect Cost	**$288,515,784**
Total Capital Cost	**$1,019,014,011**
Surveillance and Maintenance (S & M)	
S & M and Monitoring-Year 1 thru 30-Annual Cost	$665,496
S & M and Monitoring-Year 31 and Out-Annual Cost	$131,915
Net Present Value (FY 2010 Dollars)	
Present Value for Capital	$868,331,389
Present Value for S & M (1,000 years)	$14,021,748
Present Value Total	**$882,353,136**

Table L.1.2. Alternative 2
Escalation and Present Value

ALT 2 ON SITE DISPOSAL RI/FS DFFO/CERCLA CASE — PROJ. ESTIMATOR: C. Oldham

PROJECT LOCATION: PORTSMOUTH, OHIO — DATE: January 30, 2013

FY		Capital Costs		S & M Costs	Present Value (NPV)		
	Escalation Rate	Unescalated	Escalated	L. T. Monitor	Discount Rate	Capital	S & M
				Unescalated	2%		
				For 30 years			
TOTALS		1,019,014,010		20,478,882	NPV 1000 YEARS	868,331,389	14,021,748
					FY 2010 Dollars		
2011	1.000	207,043		0			
2012	1.000	207,043		0			
2013	1.000	60,023,044		0			
2014	1.024	$118,483,225		0			
2015	1.049	103,933,422		0			
2016	1.074	93,202,901		0			
2017	1.100	100,311,251		0			
2018	1.126	89,663,614		0			
2019	1.153	86,582,953		0			
2020	1.181	82,745,288		0			
2021	1.209	70,695,683		0			
2022	1.238	67,761,505		0			
2023	1.268	60,027,097		0			
2024	1.298	57,484,846		0			
2025	1.329	27,673,015		0			
2026				665,496			
2027				665,496			
2028				665,496			
2029				665,496			
2030				707,456			
2031				665,496			
2032				665,496			
2033				665,496			
2034				665,496			
2035				707,456			
2036				665,496			
2037				665,496			
2038				665,496			
2039				665,496			
2040				707,456			
2041				665,496			
2042				665,496			
2043				665,496			
2044				665,496			
2045				707,456			
2046				665,496			
2047				665,496			
2048				665,496			
2049				665,496			
2050				707,456			
2051				665,496			
2052				665,496			
2053				665,496			
2054				665,496			
2055				969,706			
2056				131,915			
2057				131,915			
2058				131,915			
2059				131,915			
2060				131,915			
2061				131,915			
2062				131,915			
2063				131,915			
2064				131,915			
2065				131,915			
2066				131,915			
2067				131,915			
2068				131,915			
2069				131,915			
2070				131,915			
2071				131,915			
2072				131,915			
2073				131,915			
2074				131,915			
2075				131,915			
2076				131,915			
2077				131,915			
2078				131,915			
2079				131,915			

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2080		131,915	
2081		131,915	
2082		131,915	
2083		131,915	
2084		131,915	
2085		131,915	
2086		131,915	
2087		131,915	
2088		131,915	
2089		131,915	
2090		131,915	
2091		131,915	
2092		131,915	
2093		131,915	
2094		131,915	
2095		131,915	
2096		131,915	
2097		131,915	
2098		131,915	
2099		131,915	
2100		131,915	
2101		131,915	
2102		131,915	
2103		131,915	
2104		131,915	
2105		131,915	
2106		131,915	
2107		131,915	
2108		131,915	
2109		131,915	
2110		131,915	
2111		131,915	
2112		131,915	
2113		131,915	
2114		131,915	
2115		131,915	
2116		131,915	
2117		131,915	
2118		131,915	
2119		131,915	
2120		131,915	
2121		131,915	
2122		131,915	
2123		131,915	
2124		131,915	
2125		131,915	
2126		131,915	
2127		131,915	
2128		131,915	
2129		131,915	
2130		131,915	
2131		131,915	
2132		131,915	
2133		131,915	
2134		131,915	
2135		131,915	
2136		131,915	
2137		131,915	
2138		131,915	
2139		131,915	
2140		131,915	
2141		131,915	
2142		131,915	
2143		131,915	
2144		131,915	
2145		131,915	
2146		131,915	
2147		131,915	
2148		131,915	
2149		131,915	
2150		131,915	
2151		131,915	
2152		131,915	
2153		131,915	
2154		131,915	
2155		131,915	
2156		131,915	
2157		131,915	
2158		131,915	
2159		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2160		131,915	
2161		131,915	
2162		131,915	
2163		131,915	
2164		131,915	
2165		131,915	
2166		131,915	
2167		131,915	
2168		131,915	
2169		131,915	
2170		131,915	
2171		131,915	
2172		131,915	
2173		131,915	
2174		131,915	
2175		131,915	
2176		131,915	
2177		131,915	
2178		131,915	
2179		131,915	
2180		131,915	
2181		131,915	
2182		131,915	
2183		131,915	
2184		131,915	
2185		131,915	
2186		131,915	
2187		131,915	
2188		131,915	
2189		131,915	
2190		131,915	
2191		131,915	
2192		131,915	
2193		131,915	
2194		131,915	
2195		131,915	
2196		131,915	
2197		131,915	
2198		131,915	
2199		131,915	
2200		131,915	
2201		131,915	
2202		131,915	
2203		131,915	
2204		131,915	
2205		131,915	
2206		131,915	
2207		131,915	
2208		131,915	
2209		131,915	
2210		131,915	
2211		131,915	
2212		131,915	
2213		131,915	
2214		131,915	
2215		131,915	
2216		131,915	
2217		131,915	
2218		131,915	
2219		131,915	
2220		131,915	
2221		131,915	
2222		131,915	
2223		131,915	
2224		131,915	
2225		131,915	
2226		131,915	
2227		131,915	
2228		131,915	
2229		131,915	
2230		131,915	
2231		131,915	
2232		131,915	
2233		131,915	
2234		131,915	
2235		131,915	
2236		131,915	
2237		131,915	
2238		131,915	
2239		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2240		131,915	
2241		131,915	
2242		131,915	
2243		131,915	
2244		131,915	
2245		131,915	
2246		131,915	
2247		131,915	
2248		131,915	
2249		131,915	
2250		131,915	
2251		131,915	
2252		131,915	
2253		131,915	
2254		131,915	
2255		131,915	
2256		131,915	
2257		131,915	
2258		131,915	
2259		131,915	
2260		131,915	
2261		131,915	
2262		131,915	
2263		131,915	
2264		131,915	
2265		131,915	
2266		131,915	
2267		131,915	
2268		131,915	
2269		131,915	
2270		131,915	
2271		131,915	
2272		131,915	
2273		131,915	
2274		131,915	
2275		131,915	
2276		131,915	
2277		131,915	
2278		131,915	
2279		131,915	
2280		131,915	
2281		131,915	
2282		131,915	
2283		131,915	
2284		131,915	
2285		131,915	
2286		131,915	
2287		131,915	
2288		131,915	
2289		131,915	
2290		131,915	
2291		131,915	
2292		131,915	
2293		131,915	
2294		131,915	
2295		131,915	
2296		131,915	
2297		131,915	
2298		131,915	
2299		131,915	
2300		131,915	
2301		131,915	
2302		131,915	
2303		131,915	
2304		131,915	
2305		131,915	
2306		131,915	
2307		131,915	
2308		131,915	
2309		131,915	
2310		131,915	
2311		131,915	
2312		131,915	
2313		131,915	
2314		131,915	
2315		131,915	
2316		131,915	
2317		131,915	
2318		131,915	
2319		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2320		131,915	
2321		131,915	
2322		131,915	
2323		131,915	
2324		131,915	
2325		131,915	
2326		131,915	
2327		131,915	
2328		131,915	
2329		131,915	
2330		131,915	
2331		131,915	
2332		131,915	
2333		131,915	
2334		131,915	
2335		131,915	
2336		131,915	
2337		131,915	
2338		131,915	
2339		131,915	
2340		131,915	
2341		131,915	
2342		131,915	
2343		131,915	
2344		131,915	
2345		131,915	
2346		131,915	
2347		131,915	
2348		131,915	
2349		131,915	
2350		131,915	
2351		131,915	
2352		131,915	
2353		131,915	
2354		131,915	
2355		131,915	
2356		131,915	
2357		131,915	
2358		131,915	
2359		131,915	
2360		131,915	
2361		131,915	
2362		131,915	
2363		131,915	
2364		131,915	
2365		131,915	
2366		131,915	
2367		131,915	
2368		131,915	
2369		131,915	
2370		131,915	
2371		131,915	
2372		131,915	
2373		131,915	
2374		131,915	
2375		131,915	
2376		131,915	
2377		131,915	
2378		131,915	
2379		131,915	
2380		131,915	
2381		131,915	
2382		131,915	
2383		131,915	
2384		131,915	
2385		131,915	
2386		131,915	
2387		131,915	
2388		131,915	
2389		131,915	
2390		131,915	
2391		131,915	
2392		131,915	
2393		131,915	
2394		131,915	
2395		131,915	
2396		131,915	
2397		131,915	
2398		131,915	
2399		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2400		131,915	
2401		131,915	
2402		131,915	
2403		131,915	
2404		131,915	
2405		131,915	
2406		131,915	
2407		131,915	
2408		131,915	
2409		131,915	
2410		131,915	
2411		131,915	
2412		131,915	
2413		131,915	
2414		131,915	
2415		131,915	
2416		131,915	
2417		131,915	
2418		131,915	
2419		131,915	
2420		131,915	
2421		131,915	
2422		131,915	
2423		131,915	
2424		131,915	
2425		131,915	
2426		131,915	
2427		131,915	
2428		131,915	
2429		131,915	
2430		131,915	
2431		131,915	
2432		131,915	
2433		131,915	
2434		131,915	
2435		131,915	
2436		131,915	
2437		131,915	
2438		131,915	
2439		131,915	
2440		131,915	
2441		131,915	
2442		131,915	
2443		131,915	
2444		131,915	
2445		131,915	
2446		131,915	
2447		131,915	
2448		131,915	
2449		131,915	
2450		131,915	
2451		131,915	
2452		131,915	
2453		131,915	
2454		131,915	
2455		131,915	
2456		131,915	
2457		131,915	
2458		131,915	
2459		131,915	
2460		131,915	
2461		131,915	
2462		131,915	
2463		131,915	
2464		131,915	
2465		131,915	
2466		131,915	
2467		131,915	
2468		131,915	
2469		131,915	
2470		131,915	
2471		131,915	
2472		131,915	
2473		131,915	
2474		131,915	
2475		131,915	
2476		131,915	
2477		131,915	
2478		131,915	
2479		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2480		131,915	
2481		131,915	
2482		131,915	
2483		131,915	
2484		131,915	
2485		131,915	
2486		131,915	
2487		131,915	
2488		131,915	
2489		131,915	
2490		131,915	
2491		131,915	
2492		131,915	
2493		131,915	
2494		131,915	
2495		131,915	
2496		131,915	
2497		131,915	
2498		131,915	
2499		131,915	
2500		131,915	
2501		131,915	
2502		131,915	
2503		131,915	
2504		131,915	
2505		131,915	
2506		131,915	
2507		131,915	
2508		131,915	
2509		131,915	
2510		131,915	
2511		131,915	
2512		131,915	
2513		131,915	
2514		131,915	
2515		131,915	
2516		131,915	
2517		131,915	
2518		131,915	
2519		131,915	
2520		131,915	
2521		131,915	
2522		131,915	
2523		131,915	
2524		131,915	
2525		131,915	
2526		131,915	
2527		131,915	
2528		131,915	
2529		131,915	
2530		131,915	
2531		131,915	
2532		131,915	
2533		131,915	
2534		131,915	
2535		131,915	
2536		131,915	
2537		131,915	
2538		131,915	
2539		131,915	
2540		131,915	
2541		131,915	
2542		131,915	
2543		131,915	
2544		131,915	
2545		131,915	
2546		131,915	
2547		131,915	
2548		131,915	
2549		131,915	
2550		131,915	
2551		131,915	
2552		131,915	
2553		131,915	
2554		131,915	
2555		131,915	
2556		131,915	
2557		131,915	
2558		131,915	
2559		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2560		131,915	
2561		131,915	
2562		131,915	
2563		131,915	
2564		131,915	
2565		131,915	
2566		131,915	
2567		131,915	
2568		131,915	
2569		131,915	
2570		131,915	
2571		131,915	
2572		131,915	
2573		131,915	
2574		131,915	
2575		131,915	
2576		131,915	
2577		131,915	
2578		131,915	
2579		131,915	
2580		131,915	
2581		131,915	
2582		131,915	
2583		131,915	
2584		131,915	
2585		131,915	
2586		131,915	
2587		131,915	
2588		131,915	
2589		131,915	
2590		131,915	
2591		131,915	
2592		131,915	
2593		131,915	
2594		131,915	
2595		131,915	
2596		131,915	
2597		131,915	
2598		131,915	
2599		131,915	
2600		131,915	
2601		131,915	
2602		131,915	
2603		131,915	
2604		131,915	
2605		131,915	
2606		131,915	
2607		131,915	
2608		131,915	
2609		131,915	
2610		131,915	
2611		131,915	
2612		131,915	
2613		131,915	
2614		131,915	
2615		131,915	
2616		131,915	
2617		131,915	
2618		131,915	
2619		131,915	
2620		131,915	
2621		131,915	
2622		131,915	
2623		131,915	
2624		131,915	
2625		131,915	
2626		131,915	
2627		131,915	
2628		131,915	
2629		131,915	
2630		131,915	
2631		131,915	
2632		131,915	
2633		131,915	
2634		131,915	
2635		131,915	
2636		131,915	
2637		131,915	
2638		131,915	
2639		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2640		131,915	
2641		131,915	
2642		131,915	
2643		131,915	
2644		131,915	
2645		131,915	
2646		131,915	
2647		131,915	
2648		131,915	
2649		131,915	
2650		131,915	
2651		131,915	
2652		131,915	
2653		131,915	
2654		131,915	
2655		131,915	
2656		131,915	
2657		131,915	
2658		131,915	
2659		131,915	
2660		131,915	
2661		131,915	
2662		131,915	
2663		131,915	
2664		131,915	
2665		131,915	
2666		131,915	
2667		131,915	
2668		131,915	
2669		131,915	
2670		131,915	
2671		131,915	
2672		131,915	
2673		131,915	
2674		131,915	
2675		131,915	
2676		131,915	
2677		131,915	
2678		131,915	
2679		131,915	
2680		131,915	
2681		131,915	
2682		131,915	
2683		131,915	
2684		131,915	
2685		131,915	
2686		131,915	
2687		131,915	
2688		131,915	
2689		131,915	
2690		131,915	
2691		131,915	
2692		131,915	
2693		131,915	
2694		131,915	
2695		131,915	
2696		131,915	
2697		131,915	
2698		131,915	
2699		131,915	
2700		131,915	
2701		131,915	
2702		131,915	
2703		131,915	
2704		131,915	
2705		131,915	
2706		131,915	
2707		131,915	
2708		131,915	
2709		131,915	
2710		131,915	
2711		131,915	
2712		131,915	
2713		131,915	
2714		131,915	
2715		131,915	
2716		131,915	
2717		131,915	
2718		131,915	
2719		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2720		131,915	
2721		131,915	
2722		131,915	
2723		131,915	
2724		131,915	
2725		131,915	
2726		131,915	
2727		131,915	
2728		131,915	
2729		131,915	
2730		131,915	
2731		131,915	
2732		131,915	
2733		131,915	
2734		131,915	
2735		131,915	
2736		131,915	
2737		131,915	
2738		131,915	
2739		131,915	
2740		131,915	
2741		131,915	
2742		131,915	
2743		131,915	
2744		131,915	
2745		131,915	
2746		131,915	
2747		131,915	
2748		131,915	
2749		131,915	
2750		131,915	
2751		131,915	
2752		131,915	
2753		131,915	
2754		131,915	
2755		131,915	
2756		131,915	
2757		131,915	
2758		131,915	
2759		131,915	
2760		131,915	
2761		131,915	
2762		131,915	
2763		131,915	
2764		131,915	
2765		131,915	
2766		131,915	
2767		131,915	
2768		131,915	
2769		131,915	
2770		131,915	
2771		131,915	
2772		131,915	
2773		131,915	
2774		131,915	
2775		131,915	
2776		131,915	
2777		131,915	
2778		131,915	
2779		131,915	
2780		131,915	
2781		131,915	
2782		131,915	
2783		131,915	
2784		131,915	
2785		131,915	
2786		131,915	
2787		131,915	
2788		131,915	
2789		131,915	
2790		131,915	
2791		131,915	
2792		131,915	
2793		131,915	
2794		131,915	
2795		131,915	
2796		131,915	
2797		131,915	
2798		131,915	
2799		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2800		131,915	
2801		131,915	
2802		131,915	
2803		131,915	
2804		131,915	
2805		131,915	
2806		131,915	
2807		131,915	
2808		131,915	
2809		131,915	
2810		131,915	
2811		131,915	
2812		131,915	
2813		131,915	
2814		131,915	
2815		131,915	
2816		131,915	
2817		131,915	
2818		131,915	
2819		131,915	
2820		131,915	
2821		131,915	
2822		131,915	
2823		131,915	
2824		131,915	
2825		131,915	
2826		131,915	
2827		131,915	
2828		131,915	
2829		131,915	
2830		131,915	
2831		131,915	
2832		131,915	
2833		131,915	
2834		131,915	
2835		131,915	
2836		131,915	
2837		131,915	
2838		131,915	
2839		131,915	
2840		131,915	
2841		131,915	
2842		131,915	
2843		131,915	
2844		131,915	
2845		131,915	
2846		131,915	
2847		131,915	
2848		131,915	
2849		131,915	
2850		131,915	
2851		131,915	
2852		131,915	
2853		131,915	
2854		131,915	
2855		131,915	
2856		131,915	
2857		131,915	
2858		131,915	
2859		131,915	
2860		131,915	
2861		131,915	
2862		131,915	
2863		131,915	
2864		131,915	
2865		131,915	
2866		131,915	
2867		131,915	
2868		131,915	
2869		131,915	
2870		131,915	
2871		131,915	
2872		131,915	
2873		131,915	
2874		131,915	
2875		131,915	
2876		131,915	
2877		131,915	
2878		131,915	
2879		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2880		131,915	
2881		131,915	
2882		131,915	
2883		131,915	
2884		131,915	
2885		131,915	
2886		131,915	
2887		131,915	
2888		131,915	
2889		131,915	
2890		131,915	
2891		131,915	
2892		131,915	
2893		131,915	
2894		131,915	
2895		131,915	
2896		131,915	
2897		131,915	
2898		131,915	
2899		131,915	
2900		131,915	
2901		131,915	
2902		131,915	
2903		131,915	
2904		131,915	
2905		131,915	
2906		131,915	
2907		131,915	
2908		131,915	
2909		131,915	
2910		131,915	
2911		131,915	
2912		131,915	
2913		131,915	
2914		131,915	
2915		131,915	
2916		131,915	
2917		131,915	
2918		131,915	
2919		131,915	
2920		131,915	
2921		131,915	
2922		131,915	
2923		131,915	
2924		131,915	
2925		131,915	
2926		131,915	
2927		131,915	
2928		131,915	
2929		131,915	
2930		131,915	
2931		131,915	
2932		131,915	
2933		131,915	
2934		131,915	
2935		131,915	
2936		131,915	
2937		131,915	
2938		131,915	
2939		131,915	
2940		131,915	
2941		131,915	
2942		131,915	
2943		131,915	
2944		131,915	
2945		131,915	
2946		131,915	
2947		131,915	
2948		131,915	
2949		131,915	
2950		131,915	
2951		131,915	
2952		131,915	
2953		131,915	
2954		131,915	
2955		131,915	
2956		131,915	
2957		131,915	
2958		131,915	
2959		131,915	

Table L.1.2. Alternative 2
Escalation and Present Value (continued)

FY	Capital Costs	S & M Costs	Present Value (NPV)
2960		131,915	
2961		131,915	
2962		131,915	
2963		131,915	
2964		131,915	
2965		131,915	
2966		131,915	
2967		131,915	
2968		131,915	
2969		131,915	
2970		131,915	
2971		131,915	
2972		131,915	
2973		131,915	
2974		131,915	
2975		131,915	
2976		131,915	
2977		131,915	
2978		131,915	
2979		131,915	
2980		131,915	
2981		131,915	
2982		131,915	
2983		131,915	
2984		131,915	
2985		131,915	
2986		131,915	
2987		131,915	
2988		131,915	
2989		131,915	
2990		131,915	
2991		131,915	
2992		131,915	
2993		131,915	
2994		131,915	
2995		131,915	
2996		131,915	
2997		131,915	
2998		131,915	
2999		131,915	
3000		131,915	
3001		131,915	
3002		131,915	
3003		131,915	
3004		131,915	
3005		131,915	
3006		131,915	
3007		131,915	
3008		131,915	
3009		131,915	
3010		131,915	
3011		131,915	
3012		131,915	
3013		131,915	
3014		131,915	
3015		131,915	
3016		131,915	
3017		131,915	
3018		131,915	
3019		131,915	
3020		131,915	
3021		131,915	
3022		131,915	
3023		131,915	
3024		131,915	
3025		131,915	
	TOTAL:	148,436,332	

Table L.1.3. Alternative 2
Regulatory Documents

PROJ. ESTIMATOR: C. Oldham

TITLE: Regulatory Documents | PROJECT LOCATION: Portsmouth, Ohio | DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Regulatory Documents														
1	Remedial Design Report and Remedial Action Work Plan	2	ea	1,500	3,000	Eng	90.00	270,000	15,000	30,000		0		0	300,000
2	Remedial Action Report	1	ea	500	500	Eng	90.00	45,000	5,000	5,000		0		0	50,000
	Subtotal							**315,000**		**35,000**		**0**		**0**	**350,000**
	Sales Tax on Material only @ 7 %									2,450					2,450
	Subtotal							**315,000**		**37,450**		**0**		**0**	**352,450**
	Contractor Markups at 26.0% (N/A)														0
	Subtotal														**352,450**
	Indirects @ 12 %														42,294
														FY 2011 TOTAL	**394,744**

** T O T A L- FY 2013** $ 414,086

Table L.1.4. Alternative 2
Remedial Design

Title: Remedial Design Documents				PROJECT LOCATION: Portsmouth, Ohio							PROJ. ESTIMATOR: C. Oldham DATE: January 30, 2013				
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Design, Engineering, and Procurement														
1	Develop drawings, specs & procurement package for a 4.77 M. CY Cell and Cap Construction at 9 % of Construction cost	9	%		0			0		0		0		284,478,746	25,603,087
2	Develop drawings, specs & procurement package for Infrastructure Facilities and Leachate Treatment Facilities at 7 % of Construction costs	7	%		0			0		0		0		50,351,318	3,524,592
3	RFP & S/C Procurement support	4	Ea	600	2400	Eng	90.00	216,000	1,000	4,000		0		0	220,000
4	Bid and award S / C support	4	Ea	400	1600	Eng	90.00	144,000		0		0		0	144,000
	Subtotal							**360,000**		**4,000**		**0**			**29,491,679**
	Sales Tax on Material only @ 7 %									280					280
	Subtotal							**360,000**		**4,280**		**0**		**0**	**29,491,959**
	Contractor Markups at 26.0% (N/A)													0	0
	Subtotal													**0**	**29,491,959**
	Indirects @ 12 %														3,539,035
														FY 2011 TOTAL	**33,030,995**
														** T O T A L- FY 2013**	**$ 34,649,513**

Table L.1.5. Alternative 2
Pre-design

PROJ. ESTIMATOR: C. Oldham

Title: Pre Design/Construction Activities **PROJECT LOCATION: Portsmouth, Ohio** **DATE: January 30, 2013**

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Pre Design /Construction/Activities														
1	Off Site Borrow Test Pits	1	Lot					4,337		177		12,419		6,770	23,703
2	Install GPS Station	1	Ea					246,097		4,680		66,310		3,908	320,995
3	Test Pits in Borrow Area	1	Lot					3,431		133		5,816		9,314	18,694
4	Decon Facility	1	Ea					620,890		1,594,352		659,749		58,620	2,933,611
5	Implementation of Large Equipment Placement	1	Lot					156,495		154,913		305,100		35,172	651,680
6	Three Off Site Borrow Area Locations	1	Lot					865,266		135,187		1,427,109		199,308	2,626,870
7	North OSDC Test Pit	1	Lot					95,969		78,034		223,875		11,448	409,326
8	South OSDC Test Pit	1	Lot					172,268		79,523		420,654		17,632	690,077
9	West OSDC Test Pit	1	Lot					12,205		1,753		89,729		8,862	112,549
	Subtotal							**2,176,958**		**2,048,752**		**3,210,761**		**351,034**	7,787,505
	Sales Tax on Material only @ 7 % (NA) (Included in above Estimates)									0					0
	Subtotal							**2,176,958**		**2,048,752**		**3,210,761**		**351,034**	7,787,505
	Contractor Markups at 26.0% (NA)														0
	Subtotal														7,787,505
	Indirects @ 12 %														934,501
														FY 2011 TOTAL	**8,722,006**
														**** T O T A L- FY 2013****	**$ 9,149,384**

Table L.1.6. Alternative 2
Cell Construction

PROJ. ESTIMATOR: C. Oldham

TITLE: Cell Construction **PROJECT LOCATION: Portsmouth, Ohio** **DATE: January 30, 2013**

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Cell Construction														
1	Site Preparation	122	AC	24,702	24,702			1,059,078		3,680		1,013,965		0	2,076,723
2	Rough Grading Cut	1,717,500	BCY	76,659	76,659			3,286,337		0		13,412,096		0	16,698,433
3	Off Site Borrow Area	1	Lot	73,000	73,000			3,290,805		259,986		13,671,680		0	17,222,471
4	On site Stockpile Area	100	AC	110,004	110,004			4,952,891		120,225		20,099,721		0	25,172,837
	Liner Construction														
5	Cell Floor Liner	1	Lot	471,010	471,010			20,342,926		22,322,806		17,806,587		0	60,472,319
6	Side Slope Liner	1	Lot	262,359	262,359			11,354,160		11,551,726		5,506,554		0	28,412,440
7	Liner Top of Berm	1	Lot	106,537	106,537			4,600,523		3,599,692		6,783,500		0	14,983,715
8	Liner Anchor Trench	1	Lot	83,692	83,692			3,592,890		2,330,837		2,575,733		0	8,499,460

Table L.1.6. Alternative 2
Cell Construction (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Cap Construction														
9	Final Cover	1	Lot	711,605	711,605			30,636,860		46,279,052		34,024,436		0	110,940,348
	Subtotal				**1,919,568**			**83,116,470**		**86,468,004**		**114,894,272**		**0**	**284,478,746**
	Sales Tax on Material only @ 7 % (NA)									0					0
	(Included in above Estimates)														
	Subtotal							**83,116,470**		**86,468,004**		**114,894,272**		**0**	**284,478,746**
	Contractor Markups at 26.0% (NA)														0
	Subtotal														**284,478,746**
	Indirects @ 12 %														34,137,450
													** TOTAL **		$ 318,616,196

The above Estimate is for Cell Construction for a Total Cell Volume of approx. 4,770,000 CY (including soil cover) and amounts to approx.$66.80./CY . The Total Cell Volume for the RI/FS-DFFO/CERCLA Case is Approx. 3,900,000 CY. Therefore the Cell Construction Estimated Cost for the RI/FS -DFFO/CERCLA Case is $66.80/CY X 3,900,000 = $260,520,000 FY2011 $

USE **$273,285,480 FY 2013 $**

Table L.1.7. Alternative 2
Infrastructure

TITLE: Infrastructure Construction		PROJECT LOCATION: Portsmouth, Ohio									PROJ. ESTIMATOR: C. Oldham DATE: January 30, 2013				
Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	OMTA Area / Contact Water Detention Basin														
1	Construction Laydown	1	ea	1,563	1,563			66,762		628,457		787,820		0	1,483,039
2	Contact Water Detention Basin	1	ea	578	578			24,825		19,602		30,496		0	74,923
3	Waste Handling	1	ea	3,762	3,762			161,414		855,288		89,171		0	1,105,873
4	Perimeter Berm	10667	CY	6,133	6,133			263,210		1,503,347		912,300		0	2,678,857
	HAUL ROAD														
5	Gravel Haul Road	1	ea	11,906	11,906			511,039		4,554,053		1,143,196		0	6,208,288
6	Turn out and Load Ramp	1	ea	598	598			26,169		48,584		45,205		0	119,958
7	Haul Road Underpass	1	ea	1,520	1,520			66,889		238,367		28,048		0	333,304
8	Periphery Road / OSDC Access Road	1	ea	10,875	10,875			466,633		2,111,636		459,284		0	3,037,553
9	Contact Water Basin	1	ea	314	314			13,500		15,846		32,424		0	61,770
10	Contact Water Return	1	ea	653	653			30,634		527,849		9,525		0	568,008
	Sediment Basins														
11	Dewatering Device	1	ea	51	51			2,263		6,468		1,748		0	10,479
12	Temporary Sediment Device	1	ea	4,384	4,384			187,965		501,866		381,399		0	1,071,230

Table L.1.7. Alternative 2
Infrastructure (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Construction Support Facilities														
13	Site Facilities Site Prep	2	AC	652	652			27,984		26,271		0		0	54,255
14	Staff Facility Parking Area	1	ea	193	193			8,370		126,490		2,511,576		0	2,646,436
15	Security Fencing	7	AC	5,151	5,151			220,855		692,202		79,994		0	993,051
16	Security Requirements	1	ea	12,874	12,874			594,036		925,310		0		0	1,519,346
17	Water and Sewer	1	ea	2,757	2,757			123,420		330,067		10,107		0	463,594
18	Raw Water	1	ea	2,567	2,567			114,636		99,200		97,391		0	311,227
19	Equipment Maintenance Area	1	ea	5,541	5,541			247,092		1,607,192		92,036		0	1,946,320
20	Temporary Power and Lighting	1	ea	16,468	16,468			779,420		1,468,820		0		0	2,248,240
21	Laydown Area	100	AC	39,318	39,318			1,686,768		3,737,275		1,129,789		0	6,553,832
	Leachate Transmission, Manholes & Lift Station														
22	Leachate Pipe Laterals	1	Lot	4,018	4,018			172,476		502,964		347,795		0	1,023,235
23	Leachate Pipe Headers	1	Lot	20,913	20,913			911,936		1,204,748		2,274,462		0	4,391,146
24	Valve House for Leachate	1	Lot	12,195	12,195			547,796		1,243,040		325,056		0	2,115,892
26	Leachate Storage Tank	1	ea	218	218			9,677		374,740		0		0	384,417
27	Horizontal Monitoring	1	ea	759	759			32,927		55,152		7,265		0	95,344

Table L.1.7. Alternative 2
Infrastructure (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
28	Security Patrol Road	1	ea	5,225	5,225			181,116		485,830		365,870		0	1,032,816
29	Renovate Existing Rail System	1	Lot		0			0		0		0		1,467,183	1,467,183
	Subtotal				**171,186**			**7,479,812**		**23,890,664**		**11,161,957**		**1,467,183**	**43,999,616**
	Sales Tax on Material only @ 7 %									1,672,346					1,672,346
	Subtotal							**7,479,812**		**25,563,010**		**11,161,957**		**1,467,183**	**45,671,962**
	Contractor Markups at 26.0% (NA)														0
	Subtotal														**45,671,962**
	Indirects @ 12 %														5,480,635
														FY 2011 TOTAL	**51,152,598**

**** T O T A L- FY 2013**** **$ 53,659,075**

Table L.1.8. Alternative 2
Interim Leachate Treatment System Construction

Interim Leachate Treatment System Construction Summary								
Activity	Labor		Material	Equipment	Subcontract	Subtotal	Indirects @ 12%	Total
	Man-Hrs	$ Value						
Fabrication	7,605	317,946	1,137,771	824	1,224,142	2,680,683	321,682	$3,002,365
Installation	3,261	126,481	462,521	62,298	666,293	1,317,593	158,111	$1,475,704
Const. Support	46	4,085	309	140	45,741	50,275	6,033	$56,308
							Total FY 2011 $	$4,534,377
							Total FY 2013 $	$4,756,562
NOTE:								
Engineering ,Sales Tax, and Contractor's Markups are included in above Estimates								

Table L.1.9. Alternative 2
On-Site Cell Operation

PROJ. ESTIMATOR: C. Oldham

TITLE: CELL OPERATIONS | PROJECT LOCATION: Portsmouth, Ohio | DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	CELL PLACEMENT														
	Year 1														
	Composite Field Labor Crews	1	EA		47,926		48.75	2,336,339		0		0		0	2,336,339
	Equipment--Backhoe, Compacters, Loaders, Dozer, etc	1	EA		0			0		0	23180 hrs	1,755,511		0	1,755,511
	Fuel Oil/Grease	1	EA		0			0		780,589		0		0	780,589
	PPE--Level "C" and "D"	1	EA		0			0		269,942		0		0	269,942
	Office Supplies, Small Tools. And Consumables	1	EA		0			0		37,714		0		0	37,714
	Field Support /Supervision Personnel	1	EA		24,295		49.24	1,196,246		0		0		0	1,196,246
	Subtotal				72,221			3,532,585		1,088,245		1,755,511		0	**6,376,341**
	Year 2														
	Composite Field Labor Crews	1	EA		110,796		49.25	5,456,383		0		0		0	5,456,383
	Equipment--Backhoe, Compacters, Loaders, Dozer, etc	1	EA		0			0		0	57824 hrs	4,588,664		0	4,588,664
	Fuel Oil/Grease	1	EA		0			0		2,051,330		0		0	2,051,330
	PPE--Level "C" and "D"	1	EA		0			0		422,535		0		0	422,535
	Office Supplies, Small Tools. And Consumables	1	EA		0			0		74,782		0		0	74,782
	Field Support /Supervision Personnel	1	EA		20,550		59.61	1,224,970		0		0		0	1,224,970
	Subtotal				131,346			6,681,353		2,548,647		4,588,664		0	**13,818,664**

Table L.1.9. Alternative 2
On-Site Cell Operation (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Year 3														
	Composite Field Labor Crews	1	EA		129,449		50.36	6,519,227		0		0		0	6,519,227
	Equipment--Backhoe, Compacters, Loaders, Dozer, etc	1	EA		0			0		0	71768 hrs	5,955,972		0	5,955,972
	Fuel Oil/Grease	1	EA		0			0		2,663,712		0		0	2,663,712
	PPE--Level "C" and "D"	1	EA		0			0		337,510		0		0	337,510
	Office Supplies, Small Tools. And Consumables	1	EA		0			0		88,126		0		0	88,126
	Field Support /Supervision Personnel	1	EA		20,550		61.35	1,260,711		0		0		0	1,260,711
	Subtotal				149,999			7,779,938		3,089,348		5,955,972		0	**16,825,258**
	Year 4														
	Composite Field Labor Crews	1	EA		123,683		51.18	6,329,643		0		0		0	6,329,643
	Equipment--Backhoe, Compacters, Loaders, Dozer, etc	1	EA		0			0		0	71151 hrs	6,050,332		0	6,050,332
	Fuel Oil/Grease	1	EA		0			0		2,700,736		0		0	2,700,736
	PPE--Level "C" and "D"	1	EA		0			0		227,651		0		0	227,651
	Office Supplies, Small Tools. And Consumables	1	EA		0			0		86,386		0		0	86,386
	Field Support /Supervision Personnel	1	EA		20,550		62.51	1,284,483		0		0		0	1,284,483
	Subtotal				144,233			7,614,126		3,014,773		6,050,332		0	**16,679,231**

Table L.1.9. Alternative 2
On-Site Cell Operation (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Year 5														
	Composite Field Labor Crews	1	EA		102,435		52.70	5,398,068		0		0		0	5,398,068
	Equipment--Backhoe, Compacters, Loaders, Dozer, etc	1	EA		0			0		0	63396 hrs	5,650,372		0	5,650,372
	Fuel Oil/Grease	1	EA		0			0		2,507,523		0		0	2,507,523
	PPE--Level "C" and "D"	1	EA		0			0		63,254		0		0	63,254
	Office Supplies, Small Tools, And Consumables	1	EA		0			0		74,200		0		0	74,200
	Field Support (Supervision Personnel)	1	EA		17,810		65.43	1,165,332		0		0		0	1,165,332
	Subtotal				**120,245**			**6,563,400**		**2,645,067**		**5,650,372**		**0**	**14,858,839**
	Subcontracts	Numerous												18,656,103	18,656,103
	Subtotal				618,044			32,171,402		12,386,080		24,000,851		18,656,103	**87,214,436**
	Extend Cell Operations to 9 years	1	Ea		216,315			11,259,991		4,335,128		8,400,298		6,529,636	**30,525,053**
	Materials Transfer Area Operations	1	EA		77,832		67.61	5,261,154		42,817		0		0	**5,304,971**
	Fill Processing from Excavated Weathered Shale (See XMDC1080)	1	EA		0			0		0		0		0	**0**
	Subtotal				912,191			48,693,547		16,764,025		32,401,149		25,185,739	**123,044,459**
	Sales Tax on Material only (included above)									0					0
	Subtotal				**912,191**			**48,693,547**		**16,764,025**		**32,401,149**		**25,185,739**	**123,044,459**
	Contractor Markups @ 16 % (NA)														0
	Subtotal														**123,044,459**
	Indirects @ 12 %														**14,765,335**
														FY 2011 TOTAL	**137,809,795**
														** TOTAL FY 2013**	$ 144,562,474

NOTE: The above Estimate is for a Waste Cell Volume Total of approx. 3.56 million CY.

The above Estimate is for Cell Operations for a Waste Volume Total of approx. 3.56 million CY without Clay processing. The Waste Volume Total for the RI/FS DFFO/CERCLA Case is approx. 3.90 million CY. Therefore the Cell Operating Estimated Cost for the RI/FS DFFO/CERCLA Case is 3.90/3.56 for an increase of 9.6% or 1.096 X $137,809,795=$151,039,535 (FY 2011 $)

USE $158,440,000 (FY 2013 $)

Table L.1.10. Alternative 2
Waste Transport to Cell

XWST1060R1	Assembly Number and Name						
Rad	Transport Debris in Articulated Dump to OSDC						
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.20	Radiological Control Tech	HR	0.0005	[redacted]	
	0.10	QA/QC Representative/Technician	HR	0.0003		
	0.10	Safety/IH Technician	HR	0.0003		
	0.25	Specialist-Transportation	HR	0.0006		
0.90	0.25	Supervisor	HR	0.0006		
		Craft Labor				
	1.00	Truck Driver (USW)	HR	0.0026	[redacted]	
	1.00	Laborer (USW)	HR	0.0026		
2.00						
		Labor Total				$0.34
		Material				
		Subcontract				
		Equipment				
	1.00	Dump Truck (Articulating Rear)	HR	0.0026	140.82	$0.36
		Other Costs				
	2.90	PPE Level D	HR	0.0074	1.23	$0.01
			UoM	CF		**$0.71**
			Hrs/Day	10		
			Production Rate	3,915		
			Production Unit	CF/Day		
			Productivity Factor	1	3915	
			Subtotal Direct	CY		**$19.13**
			Indirects @ 12 %			$2.30
			Total FY 2011 $	CY		**$21.43**

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
3,915 CF/Day = Production rate is based on 10 loads/day

Note: Rates are based on generation, transport and disposal all being a radiological operation with no transition surveys.

Summary

Disposal Site: On Site Disposal Cell

Waste Form	In-Situ Volume CY's	Expanded Volume CY's	Transport Mode	Transport Cost/CY	Disposal Fee Cost/CY	Total
Mixed	1,354,391	1,563,388	Transport Debris in Articulated Dump to OSDC (XWST1060 Rev. 1)	$21.43	$0.00	$29,020,732
			Transport to On-Site Disposal Cell	TOTAL 2011		$29,020,732
				TOTAL 2013		$30,442,747

Table L.1.11. Alternative 2
Off-Site Shipment Summary

Disposal Site: Pike County							
Waste Form	In-Situ Volume CY's	Shipped Volume CY's	Transport Mode		Transport Cost/CY	Disposal Fee Cost/CY	Total
Debris - Industrial and Industrial ACM	38,781	50,362	Solid Waste - Truck (XWST1000)		$24.33	$81.00	$5,304,589
Subtotal	38,781	50,362					$5,304,589
				Pike County	Subtotal FY 2011		$5,304,589

Disposal Site: ES, Clive, UT							
Waste Form	In-Situ Volume CY's	Shipped Volume CY's	Transport Mode		Transport Cost/CY	Disposal Fee Cost/CY	Total
MLLW (and other Hazardous Wastes)	9,168	9,373	Intermodals - Rail (XWST1150A)		$481.85	$1,248.75	$16,220,920
Soil (MLLW - Landfill and RCRA)	0	0	Intermodals - Rail (XWST1150A)		$481.85	$1,248.75	$0
Soil (LLW - Adhered and Utility)	0	0	Gondolas - Rail (XWST1240)		$560.03	$228.96	$0
Debris	21,028	27,330	Gondolas - Rail (XWST1040A)		$467.57	$570.78	$28,378,223
Subtotal	30,196	36,703					$44,599,143
				ES, Clive, UT	Subtotal FY 2011		$44,599,143

Disposal Site: NNSS, Mercury, NV							
Waste Form	In-Situ Volume CY'S	Shipped Volume CY'S	Transport Mode		Transport Cost/CY	Disposal Fee Cost/CY	Total
PGE - Size Reduced Compressors and Converters (X-330 and X-333)	15,629	3,474	Intermodals - PGE Debris - Truck (XWST1200A)		$523.11	$419.31	$9,632,334
PGE - Piping Etc	10,457	13,213	Transport IP-1 B-25 Box (Fissile) - Truck (XWST1290)		$2,611.55	$419.31	$40,046,767
PGE - Converters (X-326)	18,024	18,024	Classified Converters - Truck (XWST1140A)		$1,037.09	$419.31	$26,249,769
PGE - Compressors (X-326)	1,217	1,217	Classified Excepted Compressors - Truck (XWST1130A)		$1,033.03	$419.31	$1,768,033
PGE - Compressors (X-326)	8,031	8,031	Fissile Classified Compressors - Truck (XWST1050A)		$2,016.03	$419.31	$19,559,314
Landfills - Classified LLW (Soils and Debris)	0	0	Intermodals - Truck (XWST1200A)		$523.11	$419.31	$0
Subtotal	53,359	43,960					$97,256,217
				NNSS, Mercury, NV	Subtotal FY 2011		$97,256,217

	In-Situ(CY)	Shipped(CY)			
Total Volumes	122,336	131,025			
			Portsmouth Off-Site Waste Disposal Cost	TOTAL FY 2011	$147,159,949
				TOTAL FY 2013	$154,370,787

Table L.1.12. Alternative 2
Interim Leachate Treatment System Operation

Interim Leachate Treatment System Operations Summary

	Estimated Costs FY 11 $	
Labor	633,114	
Material/Equipment	54,560	
Subcontracts	111,480	
SUBTOTAL	799,154	
Sales Tax on Material/Equipment @ 7 %	3,819	
SUBTOTAL	802,973	
Contractor Markups @ 26 % (NA)	0	
SUBTOTAL	802,973	
Indirects @ 12 %	96,357	
TOTAL ANNUAL COSTS	**$899,330**	
Interim LTS operations will continue during OSDC operations		
OSDC operations duration= 9 Years: Total cost =	**$8,093,970**	**FY 2011**
	$8,490,574	**FY 2013**

Table L.1.13. Alternative 2
Cell Maintenance

Cell Maintenance During Construction Summary

Year	Labor	Mat/Equip	Subtotal	Sales Tax @ 7%	Subtotal	Contractor Markups @ 26% (NA)	Subtotal	Indirects @ 12%	**Total Costs FY11 $**	
2017	23,791	57,193	80,984	5,669	86,653	0	86,653	10,398	**$97,051**	
2018	47,478	67,489	114,967	8,048	123,015	0	123,015	14,762	**$137,776**	
2019	71,165	124,681	195,846	13,709	209,555	0	209,555	25,147	**$234,702**	
2020	94,852	158,425	253,277	17,729	271,006	0	271,006	32,521	**$303,527**	
2021	118,643	192,170	310,813	21,757	332,570	0	332,570	39,908	**$372,478**	
								Total	$1,145,535	
					Extend Cell Cap Maintenance to 8 years				$687,321	
									$1,832,856	**FY 2011**
									$1,922,666	**FY 2013**

Annual Inspection and Maintenance of cell caps will continue for 30 years after cell construction at the same annual cost as 2021 (delayed to 2024) --See Long Term Monitoring

Table L.1.14. Alternative 2
Permanent Leachate Treatment System

Permanent Leachate Treatment Facility Construction Summary

Activity	Labor		Material	Equipment	Subcontract	Subtotal	Indirects @ 12%	Total
	Man-Hrs	$ Value						
Construction	1,883	66,261	220,727	29,996	313,821	630,805	75,697	$706,502
							Total FY 2011	**$706,502**
							Total FY 2013	**$741,120**

NOTE:
Engineering ,Sales Tax, and Contractor's Markups are included in above Estimates

Table L.1.15. Alternative 2
Land Use Controls

PROJ. ESTIMATOR: C. Oldham

Title: Land Use Controls | PROJECT LOCATION: Portsmouth, Ohio | DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Deed Restrictions														
1	Allowance for Legal Fees, Administration Controls, and Documentation	1	Lot					0		0		0	150000	150,000	150,000
	Sub-total							**0**		**0**		**0**		**150,000**	**150,000**
	Sales Tax on Material only @ 7 %									0					0
	Subtotal							**0**		**0**		**0**		**150,000**	**150,000**
	Contractor Markups @ 26% (NA)														0
	Subtotal														**150,000**
	Indirects @ 12 %														18,000
														FY 2011 TOTAL	**168,000**

** T O T A L- FY 2013** $ 176,232

Table L.1.16. Alternative 2
Recyclables (Nickel) Staging Construction and Operations

PROJ. ESTIMATOR: C. Oldham

Title: Recyclables (Nickel) Staging Construction and Operations **PROJECT LOCATION: Portsmouth, Ohio** **DATE:** January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Recyclables (Nickel) Staging Construction and Operations														
1	X-744G Storage Facility Mods	1	Ea		11786			883,973		228,079		167,918		258,000	1,537,970
2	Transport of Nickel to X-744G	1	Ea		8706			574,612		35,913		107,740		0	718,265
3	Staging Facility Operations (Active and Passive)	1	Ea		137117			9,049,726		502,763		502,763		0	10,055,251
	Subtotal							**10,508,311**		**766,755**		**778,420**		**258,000**	**12,311,486**
	Sales Tax on Material only @ 7 %									53,673					53,673
	Subtotal							**10,508,311**		**820,428**		**778,420**		**258,000**	**12,365,158**
	Contractor Markups at 26.0% (N/A)														0
	Subtotal														**12,365,158**
	Indirects @ 12 %														1,483,819
														FY 2011 TOTAL	**13,848,977**
														**** T O T A L- FY 2013****	**$ 14,527,577**

Table L.1.17. Alternative 2
Landfill and Plume Remediation Cost Summary

Summary Description	Costs
	Unescalated FY 2013 $
Capital Costs	
Regulatory Documents	$600,000
Remedial Design	
Remedial Design Documents	$11,496,400
Pre Design Sampling Activities	$960,887
Subtotal Indirect Costs	**$13,057,286**
Remedial Action	
General Construction Support	$2,531,405
Site Preparation	$1,621,478
Landfill Soil Excavation and Transport	$18,425,231
Debris Excavation and Transport	$3,637,171
Landfill Remediation w / Off Site Disposal	$3,689,638
Plumes Soil Excavation and Transport	$205,242,032
Excavation Control Sampling	$1,429,276
Soil Treatment (Landfill and Plumes)	$18,360,450
Remediation Site Restoration	$5,994,238
Subtotal Direct Costs	**$260,930,920**
Total Capital Cost	**$273,988,206**

Table L.1.18. Alternative 2
Long-term Monitoring

Title: Long Term S & M and Monitoring				PROJECT LOCATION: Portsmouth, Ohio									PROJ. ESTIMATOR: C. Oldham DATE: January 30, 2013		
Item				LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		
No.	DESCRIPTION	QTY	UNIT	UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	TOTAL ($)
	Cell S & M Year 1-30														
1	Annual Operating cost for Permanent	1	Yr										75000	75,000	75,000
	Leachate Treatment System --includes														
	Media change out and disposal														
	Allowance														
2	Annual Inspection and Maintenance of														
	Cell Caps will continue for 30 years	1	Yr										372478	372,478	372,478
	at the same Annual cost as Year 2021														
	(See Cell Maintenance)														
3	Security Patrol of Cell Area @ 1/week	52	Wk										1200	62,400	62,400
	Assume 4 hrs/ea @ $300/hr=$1200/week														
4	Utility /lighting Allowance	12	Mo										2000	24,000	24,000
	TOTAL ANNUAL COSTS														**533,878**
	TOTAL COST FOR 30 YEARS	30	Yrs												**$16,016,340**
5	Provide Complete Review of Cell Activities	6	Ea										40000	240,000	240,000
	including Regulatory Interface and														
	Report Preparation every 5 Years														
6	Remove and Dispose of Permanent Leachate														
	Treatment System in Year 2051	1	Ea										250000	250,000	250,000
	Allowance														
	Note: Sales Tax, Contractor Markups and														
	Indirects Included in above costs														
	Cell S & M Year 1-30 Total														**$16,506,340**

Table L.1.18. Alternative 2
Long-term Monitoring (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	MONITORING OF 7 WELLS														
	Years 1-30--Quarterly Sampling														
	Annual Costs														
1	Project Management/ misc support	160	hrs	1	160	pm	100.00	16,000	10	1,600		0		0	17,600
2	Collect and prepare samples (GW)	28	ea	16	448	tech	70.00	31,360	140	3,920	60	1,680		0	36,960
3	Sample analysis (radionuclides,VOC's Semi-VOC's, and metals)	28	ea					0		0		0	850	23,800	23,800
4	Annual report	1	ea	120	120	eng	90.00	10,800	200	200		0		0	11,000
	Subtotal							**58,160**		**5,720**		**1,680**		**23,800**	**89,360**
	Taxes @ 7.00 %									400					400
	Subtotal							**58,160**		**6,120**		**1,680**		**23,800**	**89,760**
	Contractor Markups @ 26% (NA)														0
	Subtotal														**89,760**
	Indirects @ 12 %														10,771
	TOTAL ANNUAL COSTS														**$ 100,532**
	GW Monitoring Years 1-30 Total														**$ 3,015,949**

Table L.1.18. Alternative 2
Long-term Monitoring (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	CELL S & M Years 31-1000														
1	Annual Monitoring of Cell Leachate Allowance	1	Yr										15000	15,000	15,000
2	Utility / lighting Allowance	12	Mo										1500	18,000	18,000
3	Security Patrol of Cell Area @ 1/week Assume 4 hrs/ea @ $300/hr=$1200/week	52	ea										1200	62,400	62,400
	TOTAL ANNUAL COSTS														**95,400**
	Note: Sales Tax, Contractor Markups and Indirects Included in above costs														
	Cell S & M-970 Year Total														**$92,538,000**

Table L.1.18. Alternative 2
Long-term Monitoring (continued)

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	MONITORING OF 7 WELLS														
	Years 31-1000-Annual Sampling														
	Annual Costs														
1	Project Management/ misc support	40	hrs	1	40	pm	100.00	4,000	10	400		0		0	4,400
2	Collect and prepare samples (GW)	7	ea	16	112	tech	70.00	7,840	140	980	60	420		0	9,240
3	Sample analysis (radionuclides, VOC's Semi-VOC's, and metals)	7	ea					0		0		0	850	5,950	5,950
4	Annual report	1	ea	80	80	eng	90.00	7,200	200	200		0		0	7,400
	Subtotal							**19,040**		**1,580**		**420**		**5,950**	**26,990**
	Taxes @ 7.00 %									111					111
	Subtotal							**19,040**		**1,691**		**420**		**5,950**	**27,101**
	Contractor Markups @ 26% (NA)														0
	Subtotal														**27,101**
	Indirects @ 12 %														3,252
	TOTAL ANNUAL COSTS														**$ 30,353**
	GW Monitoring- 970 Year Total														**$ 29,442,092**

**** TOTAL FY 2011 **** **$ 141,502,381**
**** TOTAL FY 2013 **** **$ 148,435,998**

Table L.1.19. Alternative 2
Assembly Summary

Transportation Assemblies		Direct Costs--FY 2011		Total w/Markups--Cost/CY	
Assembly No.	Assembly Name	Cost/CF	Cost/CY	FY 2011 $	FY 2013 $
XWST1000	Transport Roll Off to Local Landfill (Pike County)	$0.80	$21.72	$24.33	$25.52
XWST1030	Transport Soil/Debris in Articulated Dump from project stockpiles to rail load out	$1.12	$30.19	$33.81	$35.47
XWST1040A	Transport Gondola with Debris (LLW/ACM/PCBS) to ES - (3 Month Turn)	$15.46	$417.48	$467.57	$490.49
XWST1050A	Transport X-326 Fissile Classified Compressors via truck to (NNSS)	$66.67	$1,800.03	$2,016.03	$2,114.82
XWST1060R1	Transport Debris in Articulated Dump to OSDC	$0.71	$19.13	$21.43	$22.48
XWST1130A	Transport X-326 Classified Excepted Compressors by truck (NNSS)	$34.16	$922.35	$1,033.03	$1,083.65
XWST1140A	Transport X-326 Fissile and Excepted Classified Converters via truck to (NNSS)	$34.30	$925.98	$1,037.09	$1,087.91
XWST1150A	Transport Intermodal (LLW/*ACM/PCB) Rail to Energy Solutions-Debris & Soil	$15.93	$430.22	$481.85	$505.46
XWST1200A	Transport X-330 & X-333 Classified Size Reduced Compressors and Converters to (NNSS) by truck	$17.30	$467.06	$523.11	$548.74
XWST1240	Transport Gondola with Soil (LLW/PCBS)to ES-(3 Month Turn)	$18.52	$500.03	$560.03	$587.47
XWST1290	Transport IP-1 B-25 box to NNSS (Fissile)	$86.36	$2,331.74	$2,611.55	$2,739.52

Table L.1.20. Alternative 2
Assembly XWST1000

XWST1000	Assembly Number and Name						
Non-Rad	2	Transport Roll Off to Local Landfill (Pike County)					
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.050	Radiological Control Tech	HR	0.0009	[redacted]	
	0.03	Q/A Engineer/Specialist	HR	0.0005		
	0.03	Safety/IH Technician	HR	0.0005		
	0.05	Specialist-Transportation	HR	0.0009		
0.20	0.05	Supervisor	HR	0.0009		
		Craft Labor				
0.20	0.20	D&D Worker	HR	0.0037	[redacted]	
				Labor Total		$0.37
		Material				
		Subcontract				
	1.00	Transport roll-off to local landfill (round trip)	EA	0.0019	$161.00	$0.30
		Equipment				
	1.00	Roll Off Container	EA	0.0000378	$3,432.86	$0.13
		Other Costs				
	0.40	PPE Level D	HR	0.0074	$1.23	$0.01
			UoM	CF		**$0.80**
			Hrs/Day	10		
			Production Rate	540		
			Production Unit	CF/Box		
			Productivity Factor	1	540	
			Subtotal Direct	CY		**$21.72**
			Indirects @ 12 %			$2.61
			Total-FY 2011	CY		**$24.33**

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
540 CF/Day = Production rate per BOE is 1 shipment(1 roll off)
Assume roll off waste volume @ 80% capacity = 675 cf X 0.8=540 cf

Table L.1.21. Alternative 2
Assembly XWST1030

XWST1030	Assembly Number and Name					
Rail	2	Transport Soil/ Debris in Articulated Dump from Project stockpiles to rail load out				
FTE Count	Qty	Resource Description	UOM	Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.0014		
	0.10	QA/QC Representative/Technician	HR	0.0001		
	0.25	Clerk	HR	0.0004		
	0.25	Work Control Planner	HR	0.0004		
	0.25	Safety/IH Technician	HR	0.0004		
	1.00	Specialist-Transportation	HR	0.0014		
3.10	0.25	Supervisor	HR	0.0004		
		Craft Labor				
	3.00	Truck Driver (USW)	HR	0.0042		
	2.00	Laborer (USW)	HR	0.0028		
5.00						
		Labor Total				$0.51
		Material				
		Subcontract				
		Equipment				
	3.00	Dump Truck (Articulating Rear)	HR	0.0042	140.82	$0.59
		Other Costs				
	8.10	PPE Level D	HR	0.0114	1.23	$0.01
		UoM	CF			**$1.12**
		Hrs/Day	10			
		Production Rate	[illegible]			
		Production Unit	CF/Day			
		Productivity Factor	0.6	7128		
		Subtotal Direct	CY			**$30.19**
		Indirects @ 12 %				$3.62
		Total-FY 2011	CY			**$33.81**

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
7,128 CF/Day = Production rate is based on 12 loads/day

Table L.1.22. Alternative 2
Assembly XWST1040A

XWST1040A	Assembly Number and Name					
Rail		Transport Gondola with Debris (LLW/ACM/PCBS) to ES (3-Month Turnaround)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.00104	[redacted]	
	0.37	Clerk	HR	0.00039		
	0.36	QA/QC Representative/Technician	HR	0.00038		
	0.50	Safety/IH Technician	HR	0.00052		
	0.10	Specialist-Transportation	HR	0.00010		
3.33	1.00	Supervisor	HR	0.00104		
		Craft Labor				
	2.00	D&D Worker (DBA)	HR	0.00208	[redacted]	
4.00	2.00	Operators (DBA)	HR	0.00208		
		Labor Total				$0.36
		Material				
	0.06	Air sampling	MO	0.00001	326.93	$0.002
	5.00	Labeling and Placarding	LOT	0.00052	27.37	$0.01
	5.00	Burito liner/Bag for Gondola	EA	0.00052	530.72	$0.28
	30.00	Absorbent material (6 bags per super gondola)	EA	0.00313	133.75	$0.42
		Subcontract				
	5.00	Transport Rail Car to Clive, UT EnergySolutions	CAR	0.00052	14657.5	$7.63
		Equipment				
	0.50	Grappler	HR	0.00052	68.16	$0.04
	10950.00	Gondola Rail Car	HR	1.14063	4.56	$5.20
	1.00	Rail Mover	HR	0.00104	79.72	$0.08
	1.00	Wheel Loader 7	HR	0.00104	91.27	$0.10
	0.50	Water Tanker	HR	0.00052	106.87	$0.06
	0.50	Dust Boss	HR	0.00052	7.54	$0.00
	0.50	Bobcat	HR	0.00052	32.28	$0.02
	0.50	Gator	HR	0.00052	6.37	$0.00
	1.00	Manlift Articlating 45-ft	HR	0.00104	37.22	$0.04
		Other Costs				
	4.00	PPE Level C	HR	0.00417	24.81	$0.10
	3.33	PPE Level D	HR	0.00347	1.23	$0.00
	1.00	Transport Wastefrom Stockpile to Rail Loadout, (XWST1030)	CF	1.00000	1.12	$1.12
		UoM	CF			**$15.46**
		Hrs/Day	10			
		Production Rate	[redacted]			
		Production Rate	CF/Day			
		Productivity Factor	1	9,600		
		Subtotal Direct	CY			**$417.48**
		Indirects @ 12%				$50.10
		Total-FY 2011	CY			**$467.57**

Assumes 70% of of 2,743 ft3 due to weight restrictions = 1,920 ft3 per gondola = 9,600 ft3 per day.
Qty (above) = Includes labor to Receive, unload, inspect, preparation and loading of rail car.
Gondola Rail Car Rental = 5 Gondolas @ 3 mos (10,950 hrs) rent per shipment (24hrs/day*365days/yr/4)
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = (Qty/Prod Rate)/Prod Factor
Unit Rates = Hours or Units per Each *ACM NEEDS PRE APPROVAL PRIOR TO SHIPMENT
9600 CF/Day = Production rate per BOE is 5 gondola/day

Table L.1.23. Alternative 2
Assembly XWST1050A

XWST1050A	Assembly Number and Name					
Rnd	2	Transport X-326 Fissile Classified Compressors via truck to (NNSS)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.20	Radiological Control Tech	HR	0.0093	[redacted]	
	0.20	Security Representative	HR	0.0093		
	0.02	Clerk	HR	0.0009		
	0.02	QA/QC Representative/Technician	HR	0.0009		
	0.02	Safety/IH Technician	HR	0.0009		
	0.20	Specialist-Transportation	HR	0.0093		
0.70	0.04	Supervisor	HR	0.0019		
		Craft Labor				
0.80	0.80	D&D Worker	HR	0.0374	[redacted]	
		Labor Total				$3.36
		Material				
	1.00	Blocking and Bracing for XWST1050	LOT	0.0047	700.00	$3.27
	1.00	Labeling and Placarding	LOT	0.0047	27.37	$0.13
	2.00	Intermodal 37 cy 7A Type A (Returnable)	EA	0.0093	1,078.56	$10.08
		Subcontract				
	1.00	NNSS Mercury, NV (round trip)	TRUCK	0.0047	10,222.78	$47.77
		Equipment				
	0.20	Fork Lift - 60,000	HR	0.0093	35.97	$0.34
	0.20	100-Ottawa 50 y Tractor	HR	0.0093	80.80	$0.76
		Other Costs				
	0.80	PPE Level C	HR	0.0374	24.81	$0.93
	0.70	PPE Level D	HR	0.0327	1.23	$0.04
		UoM	CF			**$66.67**
		Hrs/Day	10			
		Production Rate	214			
		Production Unit	CF/Day			
		Productivity Factor	1	214		
		Subtotal Direct	CY			**$1,800.03**
		Indirects @ 12 %				$216.00
		Total-FY 2011	CY			**$2,016.03**

Notes:
Assume average Compressor volume = 107 cubic feet.
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
214 CF/Day = Production rate per BOE is 2 compressors/Truck

Table L.1.24. Alternative 2
Assembly XWST1060R1

XWST1060R1	Assembly Number and Name					
Rad	Transport Debris in Articulated Dump to OSDC					
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.20	Radiological Control Tech	HR	0.0005		
	0.10	QA/QC Representative/Technician	HR	0.0003		
	0.10	Safety/IH Technician	HR	0.0003		
	0.25	Specialist-Transportation	HR	0.0006		
0.90	0.25	Supervisor	HR	0.0006		
		Craft Labor				
	1.00	Truck Driver (USW)	HR	0.0026		
	1.00	Laborer (USW)	HR	0.0026		
2.00						
		Labor Total				$0.34
		Material				
		Subcontract				
		Equipment				
	1.00	Dump Truck (Articulating Rear)	HR	0.0026	140.82	$0.36
		Other Costs				
	2.90	PPE Level D	HR	0.0074	1.23	$0.01
		UoM	CF			**$0.71**
		Hrs/Day	10			
		Production Rate	3915			
		Production Unit	CF/Day			
		Productivity Factor	1	3915		
		Subtotal Direct	CY			**$19.13**
		Indirects @ 12 %				$2.30
		Total FY 2011 $	CY			**$21.43**

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
3,915 CF/Day = Production rate is based on 10 loads/day

Note: Rates are based on generation, transport and disposal all being a radiological operation with no transition surveys.

Table L.1.25. Alternative 2
Assembly XWST1130A

XWST1130A	Assembly Number and Name						
Rad	2	(NNSS)					
FTE Count	Qty	Resource Description	UOM	Rate	$ Rate	Total
		Non-Manual Labor				
	0.25	Radiological Control Tech	HR	0.0058	[redacted]	
	0.03	Clerk	HR	0.0006		
	0.25	Security Representative	HR	0.0058		
	0.03	QA/QC Representative/Technician	HR	0.0006		
	0.03	Safety/III Technician	HR	0.0006		
	0.25	Specialist-Transportation	HR	0.0058		
0.88	0.05	Supervisor	HR	0.0012		
		Craft Labor				
1.00	1.00	D&D Worker	HR	0.0234	[redacted]	
			Labor Total			$2.10
		Material				
	1.00	Blocking and Bracing XWT1130	LOT	0.0023	1,000.00	$2.34
	1.00	Labeling and Placarding	LOT	0.0023	27.37	$0.06
	2.00	Intermodal 37 cy 7A Type A (Returnable)	EA	0.0047	1,078.56	$5.04
		Subcontract				
	1.00	(round trip)	TRUCK	0.0023	10,222.78	$23.89
		Equipment				
	0.25	Fork Lift - 60,000 lb	HR	0.0058	35.97	$0.21
	0.25	100-Ottawa 50 y Tractor	HR	0.0058	80.80	$0.47
		Other Costs				
	1.88	PPE Level D	HR	0.0438	1.23	$0.05
			UoM	CF		**$34.16**
			Hrs/Day	10		
			Production Rate	[redacted]		
			Production Unit	CF/Day		
			Productivity Factor	1	428	
			Subtotal Direct	CY		**$922.35**
			Indirects @ 12 %			$110.68
			Total-FY 2011	CY		**$1,033.03**

Notes:
Assume average Compressor volume = 107 cubic feet, size reduced as necessary.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
428 CF/Day = Production rate per BOE is 4 compressors/truck
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.

Table L.1.26. Alternative 2
Assembly XWST1140A

XWST1140A	Assembly Number and Name						
Rad	2	Transport X-326 Fissile and Excepted Classified Converters via truck to (NNSS)					
FTE Count	Qty	Resource Description		UOM	Unit	$ Rate	Total
		Non-Manual Labor					
	0.20	Radiological Control Tech		HR	0.0048	[redacted]	
	0.20	Security Representative		HR	0.0048		
	0.02	Clerk		HR	0.0005		
	0.02	QA/QC Representative/Technician		HR	0.0005		
	0.02	Safety/IH Technician		HR	0.0005		
	0.20	Specialist-Transportation		HR	0.0048		
0.70	0.04	Supervisor		HR	0.0010		
		Craft Labor					
0.80	0.80	D&D Worker		HR	0.0192	[redacted]	
			Labor Total				$1.73
		Material					
	1.00	Blocking and Bracing for XWST1140		LOT	0.0024	700.00	$1.68
	1.00	Labeling and Placarding		LOT	0.0024	27.37	$0.07
	2.00	Intermodal 37 cy 7A Type A (Returnable)		EA	0.0048	1,078.56	$5.19
		Subcontract					
	1.00	Classified Truck Transport (2 converters /truck) to NNSS Mercury, NV (round trip)		TRUCK	0.0024	10,222.78	$24.57
		Equipment					
	0.20	Fork Lift - 60,000		HR	0.0048	35.97	$0.17
	0.20	100-Ottawa 50 y Tractor		HR	0.0048	80.80	$0.39
		Other Costs					
	0.80	PPE Level C		HR	0.0192	24.81	$0.48
	0.70	PPE Level D		HR	0.0168	1.23	$0.02
			UoM	CF			**$34.30**
			Hrs/Day	10			
			Production Rate	416			
			Production Unit	CF/Day			
			Productivity Factor	1	416		
			Subtotal Direct	CY			**$925.98**
			Indirects @ 12 %				$111.12
			Total-FY 2011	CY			**$1,037.09**

Notes:
Assume average Converter volume = 208 cubic feet, size reduced as necessary.
Intermodal cost based on verbal vendor "budget quote".
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
416 CF/Day = Production rate per BOE is 2 converters/Truck

Table L.1.27. Alternative 2
Assembly XWST1150A

XWST1150A	Assembly Number and Name						
Rad	2	Transport Intermodal (LLW/*ACM/PCB) Rail to Energy Solutions-Debris & Soil					
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total	
		Non-Manual Labor					
	0.25	Radiological Control Tech	HR	0.0012	[redacted]		
	0.05	Supervisor	HR	0.0002			
	0.03	Clerk	HR	0.0001			
	0.03	QA/QC Representative/Technician	HR	0.0001			
	0.25	Specialist-Transportation	HR	0.0012			
0.63	0.03	Safety/IH Technician	HR	0.0001			
		Craft Labor					
1.25	1.25	D&D Worker	HR	0.0058	[redacted]		
		Labor Total				$0.42	
		Material					
	1.00	Labeling and Placarding	EA	0.0019	27.37	$0.05	
	3.00	Absorbent Material (3-Bags per Intermodal)	EA	0.0056	133.75	$0.74	
	8.00	4'x8' OSB Boards (8-per Intermodal)	EA	0.0148	23.86	$0.35	
	1.00	Plastic Liner for IM	EA	0.0019	144.45	$0.27	
		Subcontract					
	1.00	Transport IMs by ABC rail car to Clive, UT (round trip)	EA	0.0005	18,706.81	$8.66	
	1.00	Per Trip Cleaning Intermodal	EA	0.0019	387.63	$0.72	
		Equipment					
	0.25	Fork Lift - 60,000 lb	HR	0.0012	35.97	$0.04	
	730.00	ABC Articulating Rail Car 320,000 lbs	HR	0.3380	8.51	$2.88	
	0.25	006- Rail Mover	HR	0.0012	43.52	$0.05	
	1.00	Intermodal Container IP-1	Mo	0.0019	288.90	$0.54	
		Other Costs					
	1.88	PPE Level D	HR	0.0087	1.23	$0.01	
	1.00	Fees, Transport (Iowa)($175 per shipment + Tax)	EA	0.0005	187.25	$0.09	
	1.00	Transport Waste from Stockpile to Rail Load-out - (XWST1030)	CF	1.0000	1.12	$1.12	
		UoM	CF			**$15.93**	
		Hrs/Day	10				
		Production Rate	[redacted]				
		Production Unit	CF/Day				
		Productivity Factor	0.8	2160			
		Subtotal Direct	CY			**$430.22**	
		Indirects @ 12 %				$51.63	
		Total-FY 2011	CY			**$481.85**	

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
2,160 CF/Day = Production rate per BOE is 1 railcar=4 intermodals/railcar/day
Assume intermodal waste volume @ 80% capacity = 675 cf X 0.8=540 cf

Table L.1.28. Alternative 2
Assembly XWST1200A

XWST1200A	Assembly Number and Name					
Rad	2	Transport X-330 & X-333 Classified Size Reduced Compressors and Converters to (NNSS) by truck				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.0055	[redacted]	
	1.00	Security Representative	HR	0.0055		
	0.10	QA/QC Representative/Technician	HR	0.0005		
	0.10	Safety/IH Technician	HR	0.0005		
	1.00	Specialist-Transportation	HR	0.0055		
3.40	0.20	Supervisor	HR	0.0011		
		Craft Labor				
4.00	4.00	D&D Worker	HR	0.0220	[redacted]	
		Labor Total				$1.96
		Material				
	1.00	Blocking and Bracing for XWST1200	LOT	0.0005	126.05	$0.07
	1.00	Labeling and Placarding	LOT	0.0005	27.37	$0.02
	1.00	Intermodal boxes 7A TYPE A (675 ft3) (Non-Returnable)	EA	0.0005	16,000.00	$8.78
		Subcontract				
	1.00	Classified truck transport to NNSS Mercury, NV (round trip)	TRUCK	0.0005	10,222.78	$5.61
		Equipment				
	1.00	Fork Lift - 60,000 lb	HR	0.0055	35.97	$0.20
	1.00	Flatbed Truck	HR	0.0055	31.29	$0.17
	1.00	100-Ottawa 50 y Tractor	HR	0.0055	80.80	$0.44
		Other Costs				
	7.40	PPE Level D	HR	0.0406	1.23	$0.05
		UoM	CF			**$17.30**
		Hrs/Day	10			
		Production Rate	1,822			
		Production Unit	CF/Day			
		Productivity Factor	1	1822		
		Subtotal Direct	CY	1		**$467.06**
		Indirects @ 12 %				$56.05
		Total-FY 2011	CY			**$523.11**

Notes:
Assume In Situ Converter & Compressor volume = 1,822 cubic feet, size reduced to 405 ft3.
Intermodal cost based on verbal vendor "budget quote".
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
1,822 CF/Day = Production rate

Table L.1.29. Alternative 2
Assembly XWST1240

XWST1240	Assembly Number and Name					
Rail		Transport Gondola with Soil (LLW/PCBS)to ES (3 Month Turnaround)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.001250	[redacted]	
	0.37	Clerk	HR	0.000463		
	0.36	QA/QC Representative/Technician	HR	0.000450		
	1.00	Engineer Jr. (WPC)	HR	0.001250		
	0.50	Safety/IH Technician	HR	0.000625		
	1.00	Specialist-Transportation	HR	0.001250		
5.23	1.00	Supervisor	HR	0.001250		
		Craft Labor				
4.00	2.00	D&D Worker (DBA)	HR	0.002500	[redacted]	
	2.00	Operator (DBA)	HR	0.002500		
		Labor Total				$0.57
		Material				
	0.06	Air sampling	EA	0.00000758	$326.93	$0.00
	5.00	Labeling and Placarding	LOT	0.00062500	$37.27	$0.02
	5.00	Liner for Gondola	EA	0.00062500	$530.72	$0.33
	30.00	Absorbent Material	EA	0.00375000	$133.75	$0.50
		Subcontract				
	5.00	Transport Rail Car to Clive, UT EnergySolutions	CAR	0.00062500	$14,657.45	$9.16
		Equipment				
	1.00	M322D Grappler	HR	0.00125000	$68.16	$0.09
	10,950.00	Gondola	HR	1.36875000	$4.56	$6.24
	1.00	006- Rail Mover	HR	0.00125000	$79.72	$0.10
	1.00	4WD Articulated Wheel Loader 7cy bucket	HR	0.00125000	$91.27	$0.11
	0.50	2042 Off Highway Water Tanker	HR	0.00062500	$106.87	$0.07
	0.50	Dust Boss	HR	0.00062500	$7.54	$0.00
	0.50	Bobcat 745	HR	0.00062500	$32.28	$0.02
	0.50	John Deere Gator	HR	0.00062500	$6.37	$0.00
	1.00	Manlift Articlating 45-ft (inspect lid and waste)	HR	0.00125000	$37.22	$0.05
		Other Costs				
	4.00	PPE Level C	HR	0.00500000	$24.81	$0.12
	5.23	PPE Level D	HR	0.00653750	$1.23	$0.01
	1.00	Fees, Transport (Iowa) ($175 per shipment)	EA	0.00012500		$0.00
	1.00	Transport Waste Stockpile to Rail Loadout, (XWST1030)	CF	1.00000000	$1.12	$1.12
		UoM	CF			**$18.52**
		Hrs/Day	10			
		Production Rate	8000			
		Production Rate	CF/Day			
		Production Factor	1	8000		
		Subtotal Direct	CY			**$500.03**
		Indirects @ 12%				$60.00
		Total-FY 2011	CY			**$560.03**

Notes:
Assumes: Receive, unload, inspection, preparation and load times.
Assume 1 Gondola holds 1600 CF of soil.
Assume 3 month turn-around.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = (Qty/Prod Rate)/Prod Factor
Unit Rates = Hours or Units per Each *ACM NEEDS PRE APPROVAL PRIOR TO SHIPMENT
8000 CF/Day = Production rate per BOE is 5 gondola/day

Table L.1.30. Alternative 2
Assembly XWST1290

XWST1290	Assembly Number and Name						
Rad	2	Transport IP-1 B-25 boxes to NNSS (Fissile)					
FTE Count	Qty	Resource Description	UOM	Rate	$ RATE	TOTAL
		Non-Manual Labor				
	0.10	Radiological Control Tech	HR	0.0069	[redacted]	
	0.25	Security Representative	HR	0.0174		
	0.05	Clerk	HR	0.0035		
	0.03	QA/QC Representative/Technician	HR	0.0017		
	0.03	Safety/IH Technician	HR	0.0017		
	0.25	Specialist-Transportation	HR	0.0174		
0.75	0.05	Supervisor	HR	0.0035		
		Craft Labor				
0.40	0.40	D&D Worker	HR	0.0278	[redacted]	
		Labor Total				$3.75
		Material				
	1.00	Blocking and Bracing for XWST1290	LOT	0.0139	$14.84	$0.21
	2.00	Labeling and Placarding	LOT	0.0278	$27.37	$0.76
		Subcontract				
	1.00	Classified Truck Transport (2 B-25/truck) to Mercury, NV (one way)	TRUCK	0.0069	$11,545.30	$80.18
		Equipment				
	0.20	Fork Lift - 10,000 lb	HR	0.0139	$17.65	$0.25
	0.20	100-Ottawa 50 y Tractor	HR	0.0139	$80.80	$1.12
		Other Costs				
	1.15	PPE Level D	HR	0.0799	$1.23	$0.10
		UoM	CF			**$86.36**
		Hrs/Day	10			
		Production Rate	180			
		Production Unit	CF/Day			
		Productivity Factor	0.8	144		
		Subtotal Direct	CY			**$2,331.74**
		Indirects @ 12 %				$279.81
		Total-FY 2011	CY			**$2,611.55**

Notes:
Assume B-25 waste volume @ 80% capacity = 90 x .8 = 72 CF
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
180 CF/Day = Production rate per BOE is 2 boxes/shipment

ATTACHMENT L.2: ALTERNATIVE 3 ESTIMATE

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Table L.2.1. Alternative 3
Estimate Cost Summary

Summary Description	Costs
	Unescalated-FY 2013 $
Capital Costs	
Regulatory Documents	$187,981
Remedial Design	
Remedial Design Documents	$2,268,834
Subtotal Indirect Costs	**$2,456,815**
Remedial Action	
Infrastructure Construction	$17,623,200
Recyclables (Nickel) Staging Construction and Operations	$14,527,577
Off Site Shipment and Disposal	$1,362,261,670
Subtotal Direct Costs	**$1,394,412,447**
Total Capital Cost	**$1,396,869,262**
Surveillance and Maintenance (S & M)	**$0**
Net Present Value (FY 2010 Dollars)	
Present Value for Capital	$1,122,111,570
Present Value for S & M	$0
Present Value Total	**$1,122,111,570**

Table L.2.2. Alternative 3
Escalation and Present Value

ALT 3-OFFSITE DISPOSAL RI/FS-DFFO/CERCLA CASE					PROJ. ESTIMATOR:	C. Oldham		
PROJECT LOCATION: PORTSMOUTH, OHIO					DATE:	January 30, 2013		
FY		Capital Costs		S & M Costs		Present Value (NPV)		
	Escalation Rate	Unescalated	Escalated	L. T. Monitor		Discount Rate	Capital	S & M
				Unescalated		2%		
2011	1.000	93,990		0		NPV	1,122,111,570	0
2012	1.000	93,990		0		2010 Dollars		
2013	1.000	50,000,000		0				
2014	1.024	70,000,000		0				
2015	1.049	85,000,000		0				
2016	1.074	85,000,000		0				
2017	1.100	85,000,000		0				
2018	1.126	85,000,000		0				
2019	1.153	85,000,000		0				
2020	1.181	85,000,000		0				
2021	1.209	85,000,000		0				
2022	1.238	85,000,000		0				
2023	1.268	85,000,000		0				
2024	1.298	85,000,000		0				
2025	1.329	85,000,000		0				
2026	1.361	85,000,000		0				
2027	1.394	85,000,000		0				
2028	1.427	85,000,000		0				
2029	1.462	85,000,000		0				
2030	1.497	1,681,281		0				
2031	1.532	0	0	0				
2032	1.569	0	0	0				
2033	1.607	0	0	0				
2034	1.646	0	0	0				
TOTALS		1,396,869,262	0	0				

Table L.2.3. Alternative 3
Regulatory Documents

PROJ. ESTIMATOR: C. Oldham

TITLE: Regulatory Documents | PROJECT LOCATION: Portsmouth, Ohio | DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Regulatory Documents														
1	Remedial Design Report, Remedial Action	1	Lot		0			0		0		0		160,000	160,000
	Work Plan & Report, Completion														
	Reports, etc.-Allowance														
	Subtotal							**0**		**0**		**0**		**160,000**	**160,000**
	Sales Tax on Material only @ 7 % (NA)									0					0
	Subtotal							**0**		**0**		**0**		**160,000**	**160,000**
	Contractor Markups at 26.0% (N/A)														0
	Subtotal														**160,000**
	Indirects @ 12 %														19,200
														FY 2011 TOTAL	**179,200**

** TOTAL- FY 2013** $ 187,981

Table L.2.4. Alternative 3
Remedial Design

PROJ. ESTIMATOR: C. Oldham

Title: Remedial Design Documents — PROJECT LOCATION: Portsmouth, Ohio — DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Design, Engineering, and Procurement														
1	Develop drawings, specs & procurement pkg for Infrastructure Construction @ 7% of construction costs	7	%		0			0		0		0		15,000,000	1,050,000
2	Develop specifications & procurement packages for offsite shipment and Infrastructure construction	5	Ea	1200	6000	Eng	90.00	540,000	2,000	10,000		0		0	550,000
3	RFP & S/C Procurement support	6	Ea	400	2400	Eng	90.00	216,000	1,000	6,000		0		0	222,000
4	Bid and award S / C support	6	Ea	200	1200	Eng	90.00	108,000		0		0		0	108,000
	Subtotal							**864,000**		**16,000**		**0**		**15,000,000**	**1,930,000**
	Sales Tax on Material only @ 7 %									1,120					1,120
	Subtotal							**864,000**		**17,120**		**0**		**15,000,000**	**1,931,120**
	Contractor Markups at 26.0% (N/A)														0
	Subtotal														**1,931,120**
	Indirects @ 12 %														231,734
														FY 2011 TOTAL	**2,162,854**

** T O T A L- FY 2013** $ 2,268,834

Table L.2.5. Alternative 3
Infrastructure

PROJ. ESTIMATOR: C. Oldham

Title: Infrastructure Construction | PROJECT LOCATION: Portsmouth, Ohio | DATE: January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	OTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
1	Rail Facilities Modifications including necessary transfer and/or loading stations -- Allowance	1	Lot					0		0		0	13000000	13,000,000	13,000,000
2	Upgrade of site roads/bridges to accommodate increased vehicle traffic-- Allowance	1	Lot										2000000	2,000,000	2,000,000
	Sub-total							**0**		**0**		**0**		**15,000,000**	**15,000,000**
	Sales Tax on Material only @ 7 % (NA)									0					0
	Subtotal							**0**		**0**		**0**		**15,000,000**	**15,000,000**
	Contractor Markups at 26.0% (N/A)														0
	Subtotal														**15,000,000**
	Indirects @ 12%														1,800,000
														FY 2011 TOTAL	**16,800,000**

** T O T A L- FY 2013** $ 17,623,200

Table L.2.6. Alternative 3
Recyclables (Nickel) Staging Construction and Operations

PROJ. ESTIMATOR: C. Oldham

Title: Recyclables (Nickel) Staging Construction and Operations | **PROJECT LOCATION: Portsmouth, Ohio** | **DATE:** January 30, 2013

Item No.	DESCRIPTION	QTY	UNIT	LABOR					MATERIAL		EQUIPMENT		SUBCONTRACT		TOTAL ($)
				UNIT MH	TOTAL MH	CRAFT	$/MH	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	$/UNIT	$ VALUE	
	Recyclables (Nickel) Staging Construction and Operations														
1	X-744G Storage Facility Mods	1	Ea		11786			883,973		228,079		167,918		258,000	1,537,970
2	Transport of Nickel to X-744G	1	Ea		8706			574,612		35,913		107,740		0	718,265
3	Staging Facility Operations (Active and Passive)	1	Ea		137117			9,049,726		502,763		502,763		0	10,055,251
	Subtotal							**10,508,311**		**766,755**		**778,420**		**258,000**	**12,311,486**
	Sales Tax on Material only @ 7 %									53,673					53,673
	Subtotal							**10,508,311**		**820,428**		**778,420**		**258,000**	**12,365,158**
	Contractor Markups at 26.0% (N/A)													0	0
	Subtotal													**258,000**	**12,365,158**
	Indirects @ 12 %														1,483,819
														FY 2011 TOTAL	**13,848,977**
														** T O T A L- FY 2013**	$ 14,527,577

Table L.2.7. Alternative 3
Off-Site Shipment and Disposal Summary

Disposal Site: Pike County						
Waste Form	In-Situ Volume CY's	Shipped Volume CY's	Transport Mode	Transport Cost/CY	Disposal Fee Cost/CY	Total
Debris - Industrial and Industrial ACM	240,423	311,586	Solid Waste - Truck (XWST1000)	$24.33	$81.00	$32,819,104
Subtotal	240,423	311,586				$32,819,104
			Pike County	Subtotal FY 2011		$32,819,104

Disposal Site: ES, Clive, UT						
Waste Form	In-Situ Volume CY's	Shipped Volume CY's	Transport Mode	Transport Cost/CY	Disposal Fee Cost/CY	Total
MLLW Debris (and other Hazardous Wastes)	49,128	37,260	Intermodals - Rail (XWST1150A)	$481.85	$1,248.75	$64,482,183
Soil (MLLW - RCRA)	0	0	Intermodals - Rail (XWST1150A)	$481.85	$1,248.75	$0
Soil (LLW - RCRA and Utility)	53,303	63,963	Gondolas - Rail (XWST1240)	$560.03	$228.96	$50,466,365
Debris	742,095	865,381	Gondolas - Rail (XWST1040A)	$467.57	$570.78	$898,571,695
Subtotal	844,526	966,604				$1,013,520,243
			ES, Clive, UT	Subtotal FY 2011		$1,013,520,243

Disposal Site: NNSS, Mercury, NV						
Waste Form	In-Situ Volume CY'S	Shipped Volume CY'S	Transport Mode	Transport Cost/CY	Disposal Fee Cost/CY	Total
PGE - Size Reduced Compressors and Converters (X-330 and X-333)	222,979	49,564	Intermodals - PGE Debris - Truck (XWST1200A)	$523.11	$419.31	$137,424,247
PGE - Piping Etc	22,089	22,201	Transport IP-1 B-25 Box (Fissile) - Truck (XWST1290)	$2,611.55	$419.31	$67,288,147
PGE - Converters (X-326)	18,024	18,024	Classified Converters - Truck (XWST1140A)	$1,037.09	$419.31	$26,249,769
PGE - Compressors (X-326)	1,217	1,217	Classified Excepted Compressors - Truck (XWST1130A)	$1,033.03	$419.31	$1,768,033
PGE - Compressors (X-326)	8,031	8,031	Fissile Classified Compressors - Truck (XWST1050A)	$2,016.03	$419.31	$19,559,314
Subtotal	272,340	99,038				$252,289,509
			NNSS, Mercury, NV	Subtotal FY 2011		$252,289,509

	In-Situ(CY)	Shipped(CY)			
Total Volumes	1,357,289	1,377,228			
			Portsmouth Off-Site Waste Disposal Cost	TOTAL FY 2011	$1,298,628,856
				TOTAL FY 2013	$1,362,261,670

Table L.2.8. Alternative 3
Assembly Summary

Transportation Assemblies		Direct Costs--FY 2011		Total w/Markups--Cost/CY	
Assembly No.	Assembly Name	Cost/CF	Cost/CY	FY 2011 $	FY 2013 $
XWST1000	Transport Roll Off to Local Landfill (Pike County)	$0.80	$21.72	$24.33	$25.52
XWST1030	Transport Soil/Debris in Articulated Dump from project stockpiles to rail load out	$1.12	$30.19	$33.81	$35.47
XWST1040A	Transport Gondola with Debris (LLW/ACM/PCBS) to ES (3 Month Turnaround)	$15.46	$417.48	$467.57	$490.49
XWST1050A	Transport X-326 Fissile Classified Compressors via truck to (NNSS)	$66.67	$1,800.03	$2,016.03	$2,114.82
XWST1130A	Transport X-326 Classified Excepted Compressors by truck (NNSS)	$34.16	$922.35	$1,033.03	$1,083.65
XWST1140A	Transport X-326 Fissile and Excepted Classified Converters via truck to (NNSS)	$34.30	$925.98	$1,037.09	$1,087.91
XWST1150A	Transport Intermodal (LLW/*ACM/PCB) Rail to Energy Solutions-Debris & Soil	$15.93	$430.22	$481.85	$505.46
XWST1200A	Transport X-330 & X-333 Classified Size Reduced Compressors and Converters to (NNSS) by truck	$17.30	$467.06	$523.11	$548.74
XWST1240	Transport Gondola with Soil (LLW/PCBS)to ES (3 Month Turnround)	$18.52	$500.03	$560.03	$587.47
XWST1290	Transport IP-1 B-25 box to NNSS (Fissile)	$86.36	$2,331.74	$2,611.55	$2,739.52

Table L.2.9. Alternative 3
Assembly XWST1000

XWST1000	Assembly Number and Name						
Non-Rad	2	Transport Roll Off to Local Landfill (Pike County)					
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.050	Radiological Control Tech	HR	0.0009		
	0.03	Q/A Engineer/Specialist	HR	0.0005		
	0.03	Safety/IH Technician	HR	0.0005		
	0.05	Specialist-Transportation	HR	0.0009		
0.20	0.05	Supervisor	HR	0.0009		
		Craft Labor				
0.20	0.20	D&D Worker	HR	0.0037		
				Labor Total		$0.37
		Material				
		Subcontract				
	1.00	Transport roll-off to local landfill (round trip)	EA	0.0019	$161.00	$0.30
		Equipment				
	1.00	Roll Off Container	EA	0.0000378	$3,432.86	$0.13
		Other Costs				
	0.40	PPE Level D	HR	0.0074	$1.23	$0.01
			UoM	CF		$0.80
			Hrs/Day	10		
			Production Rate	540		
			Production Unit	x		
			Productivity Factor	1	540	
			Subtotal Direct	CY		$21.72
			Indirects @ 12 %			$2.61
			Total-FY 2011	CY		$24.33

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
540 CF/Day = Production rate per BOE is 1 shipment(1 roll off)
Assume roll off waste volume @ 80% capacity = 675 cf X 0.8=540 cf

Table L.2.10. Alternative 3
Assembly XWST1030

XWST1030	Assembly Number and Name					
Rad	2	Transport Soil/ Debris in Articulated Dump from Project stockpiles to rail load out				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.0014	[redacted]	
	0.10	QA/QC Representative/Technician	HR	0.0001		
	0.25	Clerk	HR	0.0004		
	0.25	Work Control Planner	HR	0.0004		
	0.25	Safety/IH Technician	HR	0.0004		
	1.00	Specialist-Transportation	HR	0.0014		
3.10	0.25	Supervisor	HR	0.0004		
		Craft Labor				
	3.00	Truck Driver (USW)	HR	0.0042	[redacted]	
	2.00	Laborer (USW)	HR	0.0028		
5.00						
		Labor Total				$0.51
		Material				
		Subcontract				
		Equipment				
	3.00	Dump Truck (Articulating Rear)	HR	0.0042	140.82	$0.59
		Other Costs				
	8.10	PPE Level D	HR	0.0114	1.23	$0.01
		UoM	CF			**$1.12**
		Hrs/Day	10			
		Production Rate	[redacted]			
		Production Unit	CF/Day			
		Productivity Factor	0.6	7128		
		Subtotal Direct	CY			**$30.19**
		Indirects @ 12 %				$3.62
		Total-FY 2011	CY			**$33.81**

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
7,128 CF/Day = Production rate is based on 12 loads/day

Table L.2.11. Alternative 3
Assembly XWST1040A

XWST1040A	Assembly Number and Name					
Rad		Transport Gondola with Debris (LLW/ACM/PCBS) to ES (3 Month Turnaround)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.00104		
	0.37	Clerk	HR	0.00039		
	0.36	QA/QC Representative/Technician	HR	0.00038		
	0.50	Safety/IH Technician	HR	0.00052		
	0.10	Specialist-Transportation	HR	0.00010		
3.33	1.00	Supervisor	HR	0.00104		
		Craft Labor				
	2.00	D&D Worker (DBA)	HR	0.00208		
4.00	2.00	Operators (DBA)	HR	0.00208		
		Labor Total				$0.36
		Material				
	0.06	Air sampling	MO	0.00001	326.93	$0.0021
	5.00	Labeling and Placarding	LOT	0.00052	27.37	$0.0143
	5.00	Burito liner/Bag for Gondola	EA	0.00052	530.72	$0.28
	30.00	Absorbent material (6 bags per super gondola)	EA	0.00313	133.75	$0.42
		Subcontract				
	5.00	Transport Rail Car to Clive, UT EnergySolutions	CAR	0.00052	14657.45	$7.63
		Equipment				
	0.50	Grappler	HR	0.00052	68.16	$0.04
	10950.00	Gondola Rail Car	HR	1.14063	4.56	$5.20
	1.00	Rail Mover	HR	0.00104	79.72	$0.08
	1.00	Wheel Loader 7	HR	0.00104	91.27	$0.10
	0.50	Water Tanker	HR	0.00052	106.87	$0.06
	0.50	Dust Boss	HR	0.00052	7.54	$0.00
	0.50	Bobcat	HR	0.00052	32.28	$0.02
	0.50	Gator	HR	0.00052	6.37	$0.00
	1.00	Manlift Articlating 45-ft	HR	0.00104	37.22	$0.04
		Other Costs				
	4.00	PPE Level C	HR	0.00417	24.81	$0.10
	3.33	PPE Level D	HR	0.00347	1.23	$0.00
	1.00	Transport Wastefrom Stockpile to Rail Loadout, (XWST10	CF	1.00000	1.12	$1.12
		UoM	CF			**$15.46**
		Hrs/Day	10			
		Production Rate	9,600			
		Production Rate	CF/Day			
		Productivity Factor	1	9,600		
		Subtotal Direct	CY			**$417.48**
		Indirects @ 12%				$50.10
		Total-FY 2011	CY			**$467.57**

Assumes 70% of of 2,743 ft3 due to weight restrictions = 1,920 ft3 per gondola = 9,600 ft3 per day.
Qty (above) = Includes labor to Receive, unload, inspect, preparation and loading of rail car.
Gondola Rail Car Rental = 5 Gondolas @ 3 mos rent per shipment (24hrs/day*365days/yr/12*3)
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = (Qty/Prod Rate)/Prod Factor
Unit Rates = Hours or Units per Each *ACM NEEDS PRE APPROVAL PRIOR TO SHIPMENT
9600 CF/Day = Production rate per BOE is 5 gondola/day

Table L.2.12. Alternative 3
Assembly XWST1050A

XWST1050A	Assembly Number and Name					
Rad	2	Transport X-326 Fissile Classified Compressors via truck to (NNSS)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.20	Radiological Control Tech	HR	0.0093		
	0.20	Security Representative	HR	0.0093		
	0.02	Clerk	HR	0.0009		
	0.02	QA/QC Representative/Technician	HR	0.0009		
	0.02	Safety/IH Technician	HR	0.0009		
	0.20	Specialist-Transportation	HR	0.0093		
0.70	0.04	Supervisor	HR	0.0019		
		Craft Labor				
0.80	0.80	D&D Worker	HR	0.0374		
		Labor Total				$3.36
		Material				
	1.00	Blocking and Bracing for XWST1050	LOT	0.0047	700.00	$3.27
	1.00	Labeling and Placarding	LOT	0.0047	27.37	$0.13
	2.00	Intermodal 37 cy 7A Type A (Returnable)	EA	0.0093	1,078.56	$10.08
		Subcontract				
	1.00	Classified Truck Transport (2 compressors/truck) to NNSS Mercury, NV (round trip)	TRUCK	0.0047	10,222.78	$47.77
		Equipment				
	0.20	Fork Lift - 60,000	HR	0.0093	35.97	$0.34
	0.20	100-Ottawa 50 y Tractor	HR	0.0093	80.80	$0.76
		Other Costs				
	0.80	PPE Level C	HR	0.0374	24.81	$0.93
	0.70	PPE Level D	HR	0.0327	1.23	$0.04
		UoM	CF			**$66.67**
		Hrs/Day	10			
		Production Rate	214			
		Production Unit	CF/Day			
		Productivity Factor	1	214		
		Subtotal Direct	CY			**$1,800.03**
		Indirects @ 12 %				$216.00
		Total-FY 2011	CY			**$2,016.03**

Notes:
Assume average Compressor volume = 107 cubic feet.
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
214 CF/Day = Production rate per BOE is 2 compressors/Truck
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.

Table L.2.13. Alternative 3
Assembly XWST1130A

XWST1130A	Assembly Number and Name					
Rad	2	Transport X-326 Classified Excepted Compressors by truck (NNSS)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.25	Radiological Control Tech	HR	0.0058	[redacted]	
	0.03	Clerk	HR	0.0006		
	0.25	Security Representative	HR	0.0058		
	0.03	QA/QC Representative/Technician	HR	0.0006		
	0.03	Safety/IH Technician	HR	0.0006		
	0.25	Specialist-Transportation	HR	0.0058		
0.88	0.05	Supervisor	HR	0.0012		
		Craft Labor				
1.00	1.00	D&D Worker	HR	0.0234	[redacted]	
		Labor Total				$2.10
		Material				
	1.00	Blocking and Bracing XWT1130	LOT	0.0023	1,000.00	$2.34
	1.00	Labeling and Placarding	LOT	0.0023	27.37	$0.06
	2.00	Intermodal 37 cy 7A Type A (Returnable)	EA	0.0047	1,078.56	$5.04
		Subcontract				
	1.00	Classified truck transport (4 Compressors/truck) to NNSS Mercury, NV (round trip)	TRUCK	0.0023	10,222.78	$23.89
		Equipment				
	0.25	Fork Lift - 60,000 lb	HR	0.0058	35.97	$0.21
	0.25	100-Ottawa 50 y Tractor	HR	0.0058	80.80	$0.47
		Other Costs				
	1.88	PPE Level D	HR	0.0438	1.23	$0.05
		UoM	CF			**$34.16**
		Hrs/Day	10			
		Production Rate	428			
		Production Unit	CF/Day			
		Productivity Factor	1	428		
		Subtotal Direct	CY			**$922.35**
		Indirects @ 12 %				$110.68
		Total-FY 2011	CY			**$1,033.03**

Notes:
Assume average Compressor volume = 107 cubic feet, size reduced as necessary.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
428 CF/Day = Production rate per BOE is 4 compressors/truck
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.

Table L.2.14. Alternative 3
Assembly XWST1140A

XWST1140A	Assembly Number and Name					
Rad	2	Transport X-326 Fissile and Excepted Classified Converters via truck to (NNSS)				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	0.20	Radiological Control Tech	HR	0.0048		
	0.20	Security Representative	HR	0.0048		
	0.02	Clerk	HR	0.0005		
	0.02	QA/QC Representative/Technician	HR	0.0005		
	0.02	Safety/IH Technician	HR	0.0005		
	0.20	Specialist-Transportation	HR	0.0048		
0.70	0.04	Supervisor	HR	0.0010		
		Craft Labor				
0.80	0.80	D&D Worker	HR	0.0192		
		Labor Total				$1.73
		Material				
	1.00	Blocking and Bracing for XWST1140	LOT	0.0024	700.00	$1.68
	1.00	Labeling and Placarding	LOT	0.0024	27.37	$0.07
	2.00	Intermodal 37 cy 7A Type A (Returnable)	EA	0.0048	1,078.56	$5.19
		Subcontract				
	1.00	Classified Truck Transport (2 converters /truck) to NNSS Mercury, NV (round trip)	TRUCK	0.0024	10,222.78	$24.57
		Equipment				
	0.20	Fork Lift - 60,000	HR	0.0048	35.97	$0.17
	0.20	100-Ottawa 50 y Tractor	HR	0.0048	80.80	$0.39
		Other Costs				
	0.80	PPE Level C	HR	0.0192	24.81	$0.48
	0.70	PPE Level D	HR	0.0168	1.23	$0.02
		UoM	CF			**$34.30**
		Hrs/Day	10			
		Production Rate	416			
		Production Unit	CF/Day			
		Productivity Factor	1	416		
		Subtotal Direct	CY			**$925.98**
		Indirects @ 12 %				$111.12
		Total-FY 2011	CY			**$1,037.09**

Notes:
Assume average Converter volume = 208 cubic feet, size reduced as necessary.
Intermodal cost based on verbal vendor "budget quote".
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
416 CF/Day = Production rate per BOE is 2 converters/Truck
Assume Intermodals are reused 50 times and 5% additional cost is added for maintenance.

Table L.2.15. Alternative 3
Assembly XWST1150A

XWST1150A	Assembly Number and Name						
Rad	2	Transport Intermodal (LLW/*ACM/PCB) Rail to Energy Solutions-Debris & Soil					
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total	
		Non-Manual Labor					
	0.25	Radiological Control Tech	HR	0.0012	[redacted]		
	0.05	Supervisor	HR	0.0002			
	0.03	Clerk	HR	0.0001			
	0.03	QA/QC Representative/Technician	HR	0.0001			
	0.25	Specialist-Transportation	HR	0.0012			
0.63	0.03	Safety/IH Technician	HR	0.0001			
		Craft Labor					
1.25	1.25	D&D Worker	HR	0.0058	[redacted]		
		Labor Total				$0.42	
		Material					
	1.00	Labeling and Placarding	EA	0.0019	27.37	$0.05	
	3.00	Absorbent Material (3-Bags per Intermodal)	EA	0.0056	133.75	$0.74	
	8.00	4'x8' OSB Boards (8-per Intermodal)	EA	0.0148	23.86	$0.35	
	1.00	Plastic Liner for IM	EA	0.0019	144.45	$0.27	
		Subcontract					
	1.00	Transport IMs by ABC rail car to Clive, UT (round trip)	EA	0.0005	18,706.81	$8.66	
	1.00	Per Trip Cleaning Intermodal	EA	0.0019	387.63	$0.72	
		Equipment					
	0.25	Fork Lift - 60,000 lb	HR	0.0012	35.97	$0.04	
	730.00	ABC Articulating Rail Car 320,000 lbs	HR	0.3380	8.51	$2.88	
	0.25	006- Rail Mover	HR	0.0012	43.52	$0.05	
	1.00	Intermodal Container IP-1	Mo	0.0019	288.90	$0.54	
		Other Costs					
	1.88	PPE Level D	HR	0.0087	1.23	$0.01	
	1.00	Fees, Transport (Iowa)($175 per shipment + Tax)	EA	0.0005	187.25	$0.09	
	1.00	Transport Waste from Stockpile to Rail Load-out - (XWST10	CF	1.0000	1.12	$1.12	
		UoM	CF			**$15.93**	
		Hrs/Day	10				
		Production Rate	[redacted]				
		Production Unit	CF/Day				
		Productivity Factor	0.8	2160			
		Subtotal Direct	CY			**$430.22**	
		Indirects @ 12 %				$51.63	
		Total-FY 2011	CY			**$481.85**	

Notes:
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
2,160 CF/Day = Production rate per BOE is 1 railcar=4 intermodals/railcar/day
Assume intermodal waste volume @ 80% capacity = 675 cf X 0.8=540 cf

Table L.2.16. Alternative 3
Assembly XWST1200A

XWST1200A	Assembly Number and Name					
Rad	2	Transport X-330 & X-333 Classified Size Reduced Compressors and Converters to (NNSS) by truck				
FTE Count	Qty	Resource Description	UOM	Unit Rate	$ Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.0055	[redacted]	
	1.00	Security Representative	HR	0.0055		
	0.10	QA/QC Representative/Technician	HR	0.0005		
	0.10	Safety/IH Technician	HR	0.0005		
	1.00	Specialist-Transportation	HR	0.0055		
3.40	0.20	Supervisor	HR	0.0011		
		Craft Labor				
4.00	4.00	D&D Worker	HR	0.0220	[redacted]	
		Labor Total				$1.96
		Material				
	1.00	Blocking and Bracing for XWST1200	LOT	0.0005	126.05	$0.07
	1.00	Labeling and Placarding	LOT	0.0005	27.37	$0.02
	1.00	Intermodal boxes 7A TYPE A (675 ft3) (Non-Returnable)	EA	0.0005	16,000.00	$8.78
		Subcontract				
	1.00	Classified truck transport to NNSS Mercury, NV (round	TRUCK	0.0005	10,222.78	$5.61
		Equipment				
	1.00	Fork Lift - 60,000 lb	HR	0.0055	35.97	$0.20
	1.00	Flatbed Truck	HR	0.0055	31.29	$0.17
	1.00	100-Ottawa 50 y Tractor	HR	0.0055	80.80	$0.44
		Other Costs				
	7.40	PPE Level D	HR	0.0406	1.23	$0.05
			UoM	CF		**$17.30**
			Hrs/Day	10		
			Production Rate	[redacted]		
			Production Unit	CF/Day		
			Productivity Factor	1	1822	
			Subtotal Direct	CY	1	**$467.06**
			Indirects @ 12 %			$56.05
			Total-FY 2011	CY		**$523.11**

Notes:
Assume In Situ Converter & Compressor volume = 1,822 cubic feet, size reduced to 405 ft3.
Intermodal cost based on verbal vendor "budget quote".
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
1,822 CF/Day = Production rate

Table L.2.17. Alternative 3
Assembly XWST1240

XWST1240	Assembly Number and Name					
Rad		Transport Gondola with Soil (LLW/PCBS)to ES (3 Month Turnaround)				
Count	Qty	Resource Description	UOM	Unit Rate	Rate	Total
		Non-Manual Labor				
	1.00	Radiological Control Tech	HR	0.001250	[redacted]	
	0.37	Clerk	HR	0.000463		
	0.36	QA/QC Representative/Technician	HR	0.000450		
	1.00	Engineer Jr. (WPC)	HR	0.001250		
	0.50	Safety/IH Technician	HR	0.000625		
	1.00	Specialist-Transportation	HR	0.001250		
5.23	1.00	Supervisor	HR	0.001250		
		Craft Labor				
4.00	2.00	D&D Worker (DBA)	HR	0.002500	[redacted]	
	2.00	Operator (DBA)	HR	0.002500		
		Labor Total				$0.57
		Material				
	0.06	Air sampling	EA	0.00000758	$326.93	$0.00
	5.00	Labeling and Placarding	LOT	0.00062500	$37.27	$0.02
	5.00	Liner for Gondola	EA	0.00062500	$530.72	$0.33
	30.00	Absorbent Material	EA	0.00375000	$133.75	$0.50
		Subcontract				
	5.00	Transport Rail Car to Clive, UT EnergySolutions	CAR	0.00062500	$14,657.45	$9.16
		Equipment				
	1.00	M322D Grappler	HR	0.00125000	$68.16	$0.09
	10,950.00	Gondola	HR	1.36875000	$4.56	$6.24
	1.00	006- Rail Mover	HR	0.00125000	$79.72	$0.10
	1.00	4WD Articulated Wheel Loader 7cy bucket	HR	0.00125000	$91.27	$0.11
	0.50	2042 Off Highway Water Tanker	HR	0.00062500	$106.87	$0.07
	0.50	Dust Boss	HR	0.00062500	$7.54	$0.00
	0.50	Bobcat 745	HR	0.00062500	$32.28	$0.02
	0.50	John Deere Gator	HR	0.00062500	$6.37	$0.00
	1.00	Manlift Articlating 45-ft (inspect lid and waste)	HR	0.00125000	$37.22	$0.05
		Other Costs				
	4.00	PPE Level C	HR	0.00500000	$24.81	$0.12
	5.23	PPE Level D	HR	0.00653750	$1.23	$0.01
	1.00	Fees, Transport (Iowa) ($175 per shipment)	EA	0.00012500		$0.00
	1.00	Transport Waste Stockpile to Rail Loadout, (XWST103	CF	1.00000000	$1.12	$1.12
		UoM	CF			**$18.52**
		Hrs/Day	10			
		Production Rate	[redacted]			
		Production Rate	CF/Day			
		Production Factor	1	8000		
		Subtotal Direct	CY			**$500.03**
		Indirects @ 12%				$60.00
		Total-FY 2011	CY			**$560.03**

Notes:
Assumes: Receive, unload, inspection, preparation and load times.
Assume 1 Gondola holds 1600 CF of soil.
Assume 3 month turn-around.
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = (Qty/Prod Rate)/Prod Factor
Unit Rates = Hours or Units per Each *ACM NEEDS PRE APPROVAL PRIOR TO SHIPMENT
8000 CF/Day = Production rate per BOE is 5 gondola/day

Table L.2.18. Alternative 3
Assembly XWST1290

XWST1290	Assembly Number and Name						
Kit#	2	Transport IP-1 B-25 boxes to NNSS (Fissile)					
Count	Qty	Resource Description	UOM	Unit Rate	$ RATE	TOTAL
		Non-Manual Labor				
	0.10	Radiological Control Tech	HR	0.0069	[redacted]	
	0.25	Security Representative	HR	0.0174		
	0.05	Clerk	HR	0.0035		
	0.03	QA/QC Representative/Technician	HR	0.0017		
	0.03	Safety/IH Technician	HR	0.0017		
	0.25	Specialist-Transportation	HR	0.0174		
0.75	0.05	Supervisor	HR	0.0035		
		Craft Labor				
0.40	0.40	D&D Worker	HR	0.0278	[redacted]	
		Labor Total				$3.75
		Material				
	1.00	Blocking and Bracing for XWST1290	LOT	0.0139	$14.84	$0.21
	2.00	Labeling and Placarding	LOT	0.0278	$27.37	$0.76
		Subcontract				
	1.00	Classified Truck Transport (2 B-25/truck) to Mercury, NV (one wa	TRUCK	0.0069	$11,545.30	$80.18
		Equipment				
	0.20	Fork Lift - 10,000 lb	HR	0.0139	$17.65	$0.25
	0.20	100-Ottawa 50 y Tractor	HR	0.0139	$80.80	$1.12
		Other Costs				
	1.15	PPE Level D	HR	0.0799	$1.23	$0.10
		UoM	CF			**$86.36**
		Hrs/Day	10			
		Production Rate	180			
		Production Unit	CF/Day			
		Productivity Factor	0.8	144		
		Subtotal Direct	CY			**$2,331.74**
		Indirects @ 12 %				$279.81
		Total-FY 2011	CY			**$2,611.55**

Notes:
Assume B-25 waste volume @ 80% capacity = 90 x .8 = 72 CF
Qty (above) = FTEs (for Labor, Equip & PPE) and Units/Production Rate (for other items)
Labor/Equip/PPE Unit Rate Calc = ((Qty x Hrs/Day)/Prod Rate))/Prod Factor
Material/Subcontract/Other Costs Unit Rate Calc = Qty/Container Waste Volume
Unit Rates = Hours or Units per Each
180 CF/Day = Production rate per BOE is 2 boxes/shipment

SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT:

PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

U.S. Department of Energy
DOE/PPPO/03-0646&D1

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This document is approved for public release per review by:

Henry Thomas (signature on file)	10-14-2014
PORTS Information/Classification Officer	Date
Sam Eldridge (signature on file)	10-14-2014
PORTS Export Controlled Information Officer	Date

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Prepared for
U.S. Department of Energy

Prepared by
Fluor-B&W Portsmouth LLC, Under Contract DE-AC30-10CC40017
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ACRONYMS

AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CAMU	Corrective Action Management Unit
CAS	Cleanup Alternatives Study
CFR	*Code of Federal Regulations*
CMS	Corrective Measures Study
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DNAPL	dense non-aqueous phase liquid
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
FR	Federal Register
IMTA	Impacted Material Transfer Area
LDR	land disposal restriction
OAC	*Ohio Administrative Code*
Ohio EPA	Ohio Environmental Protection Agency
OSDC	on-Site disposal cell
PHC	principal hazardous constituent
PORTS	Portsmouth Gaseous Diffusion Plant
PPE	personnel protective equipment
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RFI	RCRA Facility Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SWMU	solid waste management unit
TCE	trichloroethene
WAC	waste acceptance criteria

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PREAMBLE

The Portsmouth Gaseous Diffusion Plant (PORTS) cleanup project is one of the largest environmental cleanup projects underway in the nation today. As described in the Site-wide Waste Disposition Evaluation Project (Waste Disposition) Remedial Investigation/Feasibility Study (RI/FS) and the subsequent Intermediate Design Package for the potential on-Site disposal cell (OSDC), the PORTS cleanup project is anticipated to produce nearly 1.4 million cy of decontamination and decommissioning (D&D) waste from the demolition of approximately 250 buildings, structures, and systems. The approximate 250 buildings, structures, and systems are found within a 1,000-acre industrial area near the center of the 3,777-acre U.S. Department of Energy (DOE) Portsmouth federal reservation. The complete PORTS cleanup project is likely to take more than 30 years to implement[1].

Of the 1.4 million cy of D&D waste anticipated from the cleanup conducted under *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O), it is estimated that 1.1 million cy would be suitable for on-Site disposal, should Alternative 2, the combined on-Site and off-Site waste disposal alternative from the Waste Disposition RI/FS, be selected as the preferred alternative in the forthcoming Waste Disposition Proposed Plan. The remaining waste volume (approximately 300,000 cy) would be sent off Site for disposal or recycling as appropriate. For planning purposes, it is estimated that once recycling initiatives are met, about 85 percent of the D&D waste volume would remain on Site in the new OSDC, and about 15 percent would be sent off Site for disposal should Alternative 2 be selected as the preferred alternative in the Proposed Plan.

Placement of the 1.1 million cy of D&D waste in a new potential OSDC would require an additional 2.65 million cy of engineered fill soil to properly place the waste, fill void spaces, and achieve design-based waste placement compaction requirements for the OSDC. The sources of engineered fill (herein "engineered fill" or "fill") can either be uncontaminated (purchased fill or fill obtained from on-site clean borrow areas) or can be from contaminated on-site areas provided the contaminated fill meets the waste acceptance criteria of a potential OSDC.

Regardless of the source of fill, roughly 221,000 truckloads of fill would be needed, resulting in an average of 35 to 40 trucks a day, every working day for upwards of 25 years. If an off-site clean source of fill is used, more than 2 million additional road miles would be needed to transport the fill to PORTS. The planning capacity for the potential OSDC is 5 million cy, and at completion, would occupy a dedicated land area of about 100 acres.

To place the size and magnitude of the PORTS D&D cleanup project into perspective, the anticipated D&D waste volume of 1.4 million cy is nearly triple the D&D waste volume encountered at the Fernald DOE cleanup site, the largest environmental cleanup project conducted to date in the State of Ohio. The volume far exceeds the U. S. Environmental Protection Agency's (EPA's) ranking of the largest cleanup sites in the country, where EPA ranks the largest sites based on a rule-of-thumb index as those sites containing 50,000 cy or more of affected waste volume. Of the nation's largest sites, those with

[1] As support for the Corrective Action Management Unit (CAMU) designation by the Ohio Environmental Protection Agency (Ohio EPA) Director, this supplement contains additional information that has been updated since the Waste Disposition RI/FS, primarily from the Intermediate Design Package for the OSDC and cost and schedule information from the revised life-cycle baseline for PORTS. As part of the updates, funding projections have changed significantly, potentially affecting the cost estimates and durations of the overall project. Currently, based on funding, the schedule estimate requires 30 years for completion, whereas the RI/FS assumed a 10-year duration if on-Site disposal is selected as the preferred alternative.

more than $50 million in total estimated costs are considered to be the nation's clean-up "megasites" (EPA 2003). Clearly, with the 1.4 million cy projected D&D waste volume, and the estimated disposal-only costs[2] of $882 million for Alternative 2 in the Waste Disposition RI/FS, the PORTS cleanup project ranks as one of the nation's largest and more costly cleanup sites.

The Ohio EPA has been working with DOE and overseeing the remediation of environmental media at PORTS for the past 25 years, since 1989 when the Consent Decree with Ohio EPA along with the Administrative Consent Order with EPA were signed. As PORTS has been in the corrective action program for those 25 years with dedicated oversight by the regulators (resulting in eight Resource Conservation and Recovery Act of 1976, as amended [RCRA] Facility Investigation final reports and associated Cleanup Alternatives Study/Corrective Measures Study reports, along with seven major decision documents), Ohio EPA has detailed knowledge of the history of PORTS, previous releases, historical and current environmental conditions, and has been involved with the various treatment technologies applied at PORTS.

In turn, DOE is working with Ohio EPA to make the best possible environmental decisions for the D&D of PORTS and the cleanup of the environmental media contamination outside the D&D activities, considering regulatory requirements, the need to provide short- and long-term protection of workers and the public, and the need to be good stewards of the money that will be used to fund the cleanup. One of the tools under consideration by DOE and Ohio EPA as part of the decision making is the use of the CAMU rule (67 Federal Register 2962, January 22, 2002) to help facilitate implementation of the PORTS cleanup project. The CAMU rule was adopted as an applicable or relevant and appropriate requirement in the Waste Disposition RI/FS, for consideration under Alternative 2.

EPA recognized in its 2002 Amendments to the CAMU rule that the comprehensive regulatory framework that governs the identification, generation, transportation, treatment, storage and disposal of hazardous wastes (the 1984 Hazardous and Solid Waste Amendments to RCRA) can present serious disincentives to management of hazardous wastes during cleanups. As EPA noted in the development of the CAMU rule, when the land disposal restriction (LDR) requirements for as-generated industrial RCRA hazardous wastes are applied in the context of site cleanup, EPA has found they can act as disincentives to decisions to excavate and consolidate cleanup wastes for disposal. EPA also recognized there may be significant physical and chemical differences between "as-generated" RCRA hazardous industrial wastes and cleanup wastes that affect their ability to undergo treatment. EPA indicated it has been its experience that application of the regulations developed for as-generated industrial hazardous wastes, in particular the LDRs and minimum technical requirements, to cleanup wastes often presents remediation project managers with only two choices: to pursue the legal option of capping or treating cleanup wastes in place, thereby avoiding the LDR and certain other management requirements; or, excavating the cleanup waste and treating it to the full extent required by the LDR requirements and disposing of the waste in compliance with the as-generated hazardous waste disposal unit requirements. EPA has found that this situation has created an incentive at certain cleanup sites to select less permanent remedies that involve leaving the cleanup wastes in place.

The CAMU rule promulgated by EPA and subsequently by Ohio EPA (*Ohio Administrative Code* [*OAC*] 3745-57-72) provides for the creation of special units under RCRA to facilitate treatment, storage,

[2] When the Waste Disposition RI/FS was developed, the available funding projections were used to develop cost estimates for the two action alternatives (Alternatives 2 and 3) as explained in Section 9.3.1 of the RI/FS. An evaluation was performed during the RI/FS to determine the impact declining funds and increasing schedules would have on the cost estimates. Costs for both alternatives would increase as the schedule increases; however, Alternative 2 remains less expensive than Alternative 3, even if the duration triples over the original assumption.

and disposal of hazardous wastes managed for implementing cleanup actions. These special units, known as CAMUs, require designation by the Director of the Ohio EPA. CAMU designations by the Ohio EPA Director are made on a case-by-case basis for cleanup sites, considering site-specific needs and conditions. The Waste Disposition RI/FS indicated that DOE would be seeking a CAMU treatment, storage, and disposal unit designation from the Ohio EPA Director for a potential OSDC at PORTS under *OAC* 3745-57-72.

This supplement to the Waste Disposition RI/FS provides the information for the Director to consider for issuing a CAMU designation for the potential OSDC under Alternative 2. Using the information presented in this Waste Disposition RI/FS supplement, DOE is requesting the following from the Ohio EPA Director:

- Designate the potential OSDC described in Alternative 2 of the Waste Disposition RI/FS as a treatment, storage, and disposal CAMU, if Alternative 2 is selected, contingent on approval of the design plans for the CAMU which demonstrate compliance with all applicable CAMU rules.

- Designate the Impacted Material Transfer Area described in Alternative 2 of the Waste Disposition RI/FS as a storage and/or treatment CAMU, if Alternative 2 is selected, contingent on approval of the design plans for the CAMU which demonstrate compliance with all applicable CAMU rules.

- Concur with the proposed process for identifying principal hazardous constituents (PHCs) and associated treatment standards at PORTS, as described in this document.

- Concur that trichloroethene (TCE) is the only currently identified PHC at PORTS, although additional PHCs could potentially be identified as additional data is collected in future environmental remediation efforts. The proposed process for identifying PHCs, as described in this document, will remain in effect over the life of Alternative 2, if Alternative 2 is selected.

- Concur with a cost-effective adjusted standard of 5,000 mg/kg for TCE that is protective of human health and the environment, based on application of Ohio EPA's adjustment factors under the CAMU rule, as described in this document. DOE is proposing an adjusted standard of 5,000 mg/kg for TCE in PORTS soils to serve as a ceiling limit after the preparation of the soils, including dewatering if needed, to meet all other waste acceptance criteria. This adjusted standard will help support the productive use of contaminated soil at PORTS as waste-placement fill in the new potential OSDC if Alternative 2 is selected. If soils have TCE concentrations over 5,000 mg/kg after necessary preparation or blending to meet other OSDC operational requirements, the soils would be segregated and further treated in accordance with applicable or relevant and appropriate requirements to meet the 5,000 mg/kg ceiling limit, or otherwise shipped off Site for treatment and disposal.

- Concur that if additional PHCs beyond TCE are identified during the design and implementation of the remediation efforts at PORTS, additional treatment standard(s) or adjusted standard(s) will be developed using the approaches described in this document, subject to Ohio EPA's approval/concurrence.

- With the approval/concurrence of design plans, and following public notice requirements, Ohio EPA can authorize future storage and/or treatment CAMUs that may be necessary during the design and implementation of the remediation efforts at PORTS. These CAMUs will meet all applicable CAMU and staging pile rule requirements, including design, operation and closure requirements, and plans

for such CAMUs demonstrating compliance with all applicable rules, which will be submitted to Ohio EPA for approval/concurrence.

Designation of CAMUs for the PORTS cleanup project will promote the cost-effective D&D of PORTS' structures and remediation of "residual soil" (as defined by the DFF&O). The rule will also allow the project to focus on using contaminated fill for placement of D&D waste in a new potential OSDC, versus the alternative of purchasing clean soil. Considering the entirety of the PORTS cleanup and all potential waste streams anticipated for disposal in the potential OSDC, DOE has conducted economic and other evaluations of the trade-offs of using contaminated soil versus clean purchased soil as fill materials for the OSDC. (Note that all anticipated waste is to be considered as required by the DFF&O RI/FS statement of work [Attachment A of the DFF&O, Section 3.5.1].) This evaluation found that the use of contaminated soil can be done economically in a manner that is safe for the workforce; is protective of human health; and will not exacerbate the contamination already present in the areas in which fill could be contained. The use of contaminated soil from select landfills and contaminated soil associated with groundwater contamination as fill will remove considerable mass of contamination from the environment quickly. It is also projected to save costs in the future by shortening the time required for active groundwater restoration efforts.

The CAMU rule and its flexibilities for developing cost-effective treatment levels is important to DOE both when considering the use of contaminated fill to meet the extensive fill demands (2.65 million cy) anticipated for a potential OSDC, and when evaluating alternatives for other anticipated environmental media cleanup actions under the Ohio Consent Decree or other regulatory authorizations. If a cost-effective TCE treatment level for contaminated fill soil cannot be established through the CAMU rule, PORTS project decision makers may not have the economic motivations to seek contaminated fill soil as a preference, and would therefore be economically inclined to pursue the clean fill option; thus leaving the various compliant landfills in place without consolidation into the state-of-the-art OSDC and continuing with long-term groundwater extraction and treatment operations, as necessary.

This supplement to the Waste Disposition RI/FS contains the information for the Ohio EPA Director to provide the agency's CAMU designations and PHC treatment level determinations for inclusion in the Waste Disposition Proposed Plan and Record of Decision (ROD), if Alternative 2 is selected for the disposal of DFF&O-authorized D&D waste. The CAMU designations and PHC treatment levels adopted by the Waste Disposition ROD would then be available for universal application to all other anticipated non-DFF&O waste streams envisioned for on-Site disposal, using the appropriate regulatory authorizations/approvals for on-Site disposal of the non-DFF&O waste as necessary.

INTRODUCTION

The Waste Disposition Remedial Investigation/Feasibility Study (RI/FS) for the Portsmouth Gaseous Diffusion Plant (PORTS) (U.S. Department of Energy [DOE] 2014) identified that DOE would be seeking a Corrective Action Management Unit (CAMU) designation for a potential on-Site disposal cell (OSDC) that is part of Alternative 2 as a treatment, storage and disposal unit under *Ohio Administrative Code (OAC)* 3745-57-72, which is already included in the applicable or relevant and appropriate requirements (ARARs) of the Waste Disposition RI/FS. During the identification of the preferred alternative for the Waste Disposition decision that occurs after the RI/FS (during preparation of the Proposed Plan), both agencies (DOE and the Ohio Environmental Protection Agency [Ohio EPA]) have agreed that the Waste Disposition Record of Decision (ROD) should designate a potential OSDC as a CAMU, if an OSDC is part of the selected alternative.

To allow the Director of Ohio EPA to designate a potential OSDC as a CAMU, and to then provide an opportunity for public review of that designation, the regulation requires that certain information be provided. This supplement to the Waste Disposition RI/FS provides the information necessary for the Director to designate a potential OSDC as a CAMU in the ROD once public comments are considered.

The CAMU designation of a potential OSDC at PORTS allows for the excavation, consolidation, and on-Site disposal of cleanup wastes that are contaminated with Resource Conservation and Recovery Act of 1976, as amended (RCRA)-regulated hazardous wastes and hazardous wastes constituents into a potential OSDC, provided the wastes meet all waste acceptance criteria (WAC), including all waste treatment standards established for disposal in the CAMU. This supplement includes a discussion of the designated area of contamination (AOC); the information needed for the Director's approval of a potential OSDC and Impacted Material Transfer Area (IMTA) as CAMUs; a discussion of the waste that is considered CAMU-eligible; the process for identifying principal hazardous constituents (PHCs); and the basis for the adjusted standard based on adjustment factors for trichloroethene (TCE), the only PHC currently identified. The supplement also describes the potential for identifying and designating future storage and/or treatment CAMUs that may be necessary during the design and implementation of the remediation efforts at PORTS. DOE seeks the Director's authorization to establish these CAMUs, contingent on approval of design plans, which will meet all applicable CAMU and staging pile rule requirements, including design, operation and closure requirements. These design plans for such CAMUs, demonstrating compliance with all applicable rules, will be submitted to Ohio EPA for concurrence/approval. Whenever excavation and/or disposal of non-decontamination and decommissioning (D&D) waste (soils and wastes under a regulatory category other than the *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* [DFF&O]) is discussed in this document, whether in terms of additional waste material or fill, it is to be understood that additional authorization/approval would be required to undertake this activity.

The data which is evaluated within this supplement to the Waste Disposition RI/FS report for the proposed CAMU has been collected over the last 25 years under the oversight and approval of Ohio EPA and the U.S. Environmental Protection Agency (EPA). The data was collected in response to the requirements of the 1989 Consent Decree; the EPA Administrative Order by Consent, issued on September 29, 1989 (1989 Administrative Order by Consent) and amended on May 11, 1994 (1994 Administrative Order by Consent); and the Administrative Consent Order issued on August 11, 1997 (1997 Administrative Consent Order), which replaced the 1994 EPA Administrative Order by Consent. References to reports generated under these regulatory authorities are presented in the

section entitled “Identification of CAMU-Eligible Waste Streams”; the references are located in the Administrative Records and can be accessed at the Environmental Information Center.

The key information necessary for consideration by the Director of the Ohio EPA is presented in the main text of this document. Five appendices have been included to provide more detailed information to support the technical conclusions drawn in the document. The five appendices and their contents are as follows:

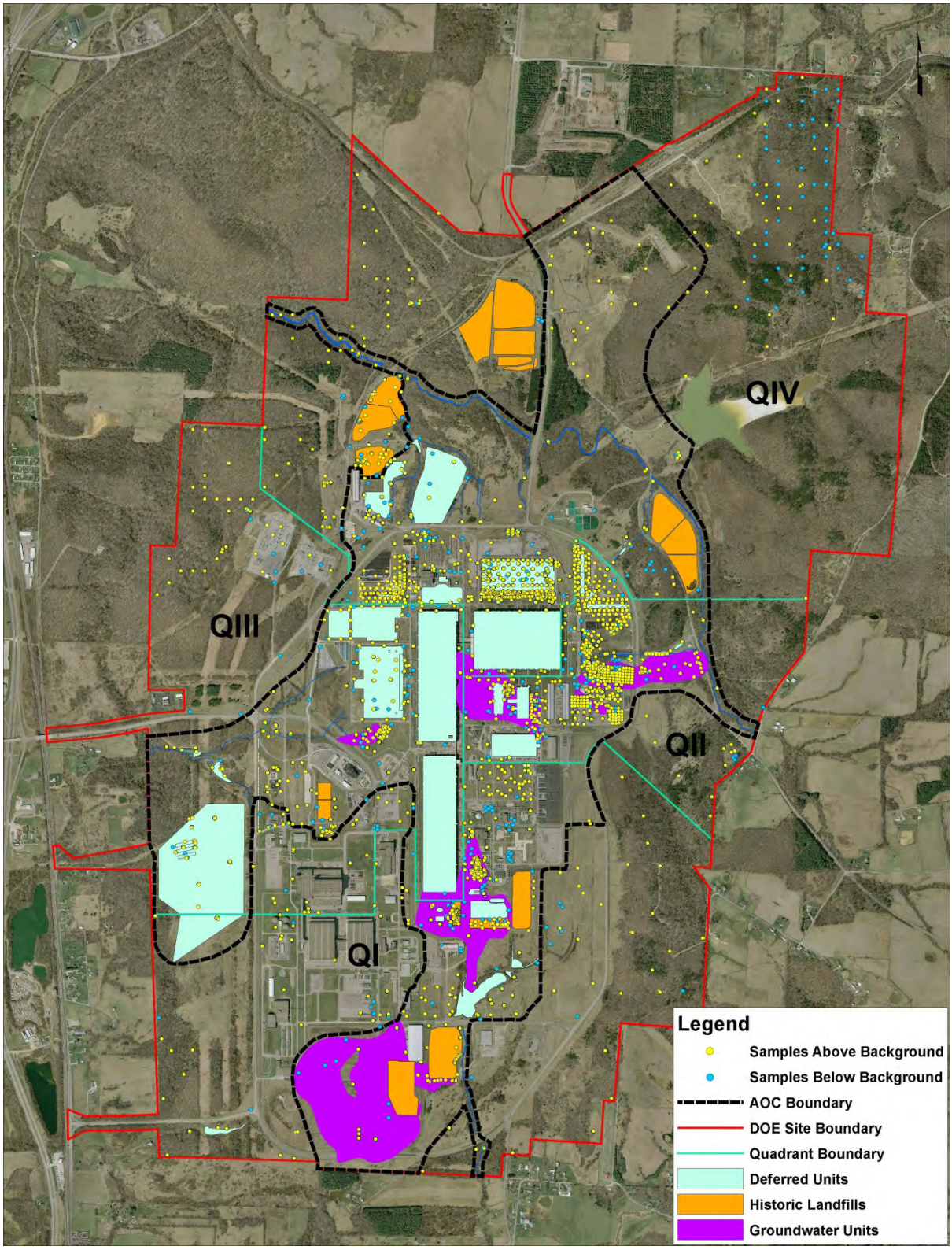
- Appendix A: Area of Contamination Identification
- Appendix B: Comparison Crosswalk of *OAC* 3745-57-72 Requirements to DOE’s Proposed Approach for CAMU Designations
- Appendix C: Identification of Anticipated CAMU-Eligible Waste Streams Associated with the PORTS Cleanup
- Appendix D: Identification of Principal Hazardous Constituents
- Appendix E: Adjusted Treatment Standard.

RECOGNITION OF THE AREA OF CONTAMINATION

Along with the CAMU designation, DOE is asking the Ohio EPA Director to recognize a portion of the PORTS Facility as an AOC as a tool for the efficient management and consolidation of remediation wastes generated during implementation of the cleanup actions at PORTS. Through extensive sampling, DOE has defined the horizontal boundaries of the AOC at DOE’s Portsmouth reservation as depicted in Figure 1. While the contiguous vertical depth of contamination within this area varies, by using this extensive sampling data, DOE will be able to navigate during the remediation to either ensure remedial activities comport with the AOC Policy when working in contaminated media for purposes of RCRA compliance, or use other appropriate remedial regulatory tools, such as storage/treatment CAMUs as discussed in the document, when remedial activities are outside the scope of the AOC policy. Furthermore, while extensive sample data results have not been gathered from underneath buildings within the potential AOC, DOE believes that, at a minimum, the Director should concur that these areas under the buildings would be within the general horizontal AOC presented. These buildings, as they exist currently, are encompassed by other areas of generally dispersed contamination and therefore fall within the scope of an AOC.

Using the AOC would allow for the unencumbered movement of D&D wastes, waste not within DFF&O (non-DFF&O waste), and other remediation waste within the confines of the AOC, without triggering the generation of hazardous waste that would result in the need for additional handling requirements to be implemented.

The justification for the AOC boundaries is presented in Appendix A. In general, the areas of soil and groundwater contamination identified over 25 years of environmental studies conducted under the Ohio Consent Decree through RCRA Facility Investigations (RFIs), as well as closed landfills, are all included within the boundary of the AOC.



Note: The AOC also includes the wastewater outfall line to the Scioto River.

Figure 1. Area of Contamination Lateral Boundary

DESIGNATION OF TWO CORRECTIVE ACTION MANAGEMENT UNITS AT PORTS

DOE has provided information in this document to: (1) support the designation of the potential OSDC as a treatment, storage and disposal CAMU, if Alternative 2 from the Waste Disposition RI/FS is selected in the Waste Disposition Proposed Plan; and (2) to support the designation of the IMTA associated with the potential OSDC as a storage and/or treatment CAMU.

The locations of both potential CAMUs are presented in Figure 2. In designating the two CAMUs, DOE is providing information to address the criteria set forth in *OAC* 3745-57-72. Appendix B to this supplement provides a crosswalk of the various requirements of the regulations against a demonstration of how the requirements would be met by the potential OSDC and IMTA, based on the technical information contained in the Waste Disposition RI/FS and the Intermediate Design Package previously submitted to Ohio EPA.

It is also recognized in this supplement that the potential exists for the need to designate additional storage and/or treatment CAMUs during remedial design or in the selection of other PORTS cleanup actions outside the DFF&O; these designations, if found to be necessary, would be addressed in future regulatory submittals to Ohio EPA.

Designation of the Potential OSDC as a Treatment, Storage and Disposal CAMU
OAC 3745-57-72(C) requires that the Director consider the following seven elements when designating a treatment, storage and disposal CAMU, which only applies to the potential OSDC. The federal CAMU rule documented in 58 Federal Register (FR) 8658, February 16, 1993, states that the rationale for a CAMU decision generally only needs to address those criteria that are considered determinative for a given CAMU designation. All seven criteria specified in the rule are discussed below.

1) *The CAMU facilitates the implementation of a reliable, effective, protective, and cost-effective remedy.*

   EPA has included this criterion to "*… emphasiz[e] that a CAMU is not intended as a mechanism that will undercut the protectiveness of remedies; rather, CAMUs will facilitate the implementation of more reliable, effective, protective, and cost-effective remedies.*" (58 FR 8658, February 16, 1993). As indicated in the preamble to the rule, EPA does not require detailed cost-benefit or other quantitative analyses.

   There are three potential sources of RCRA-hazardous waste that are anticipated to be encountered in the remediation of PORTS. One is a waste stream from work to be performed under the DFF&O while the others would result from actions conducted under other regulatory authorities. All anticipated waste must be considered as required by the DFF&O RI/FS statement of work (Attachment A of the DFF&O, Section 3.5.1). Each source of RCRA-hazardous waste is described in more detail below.

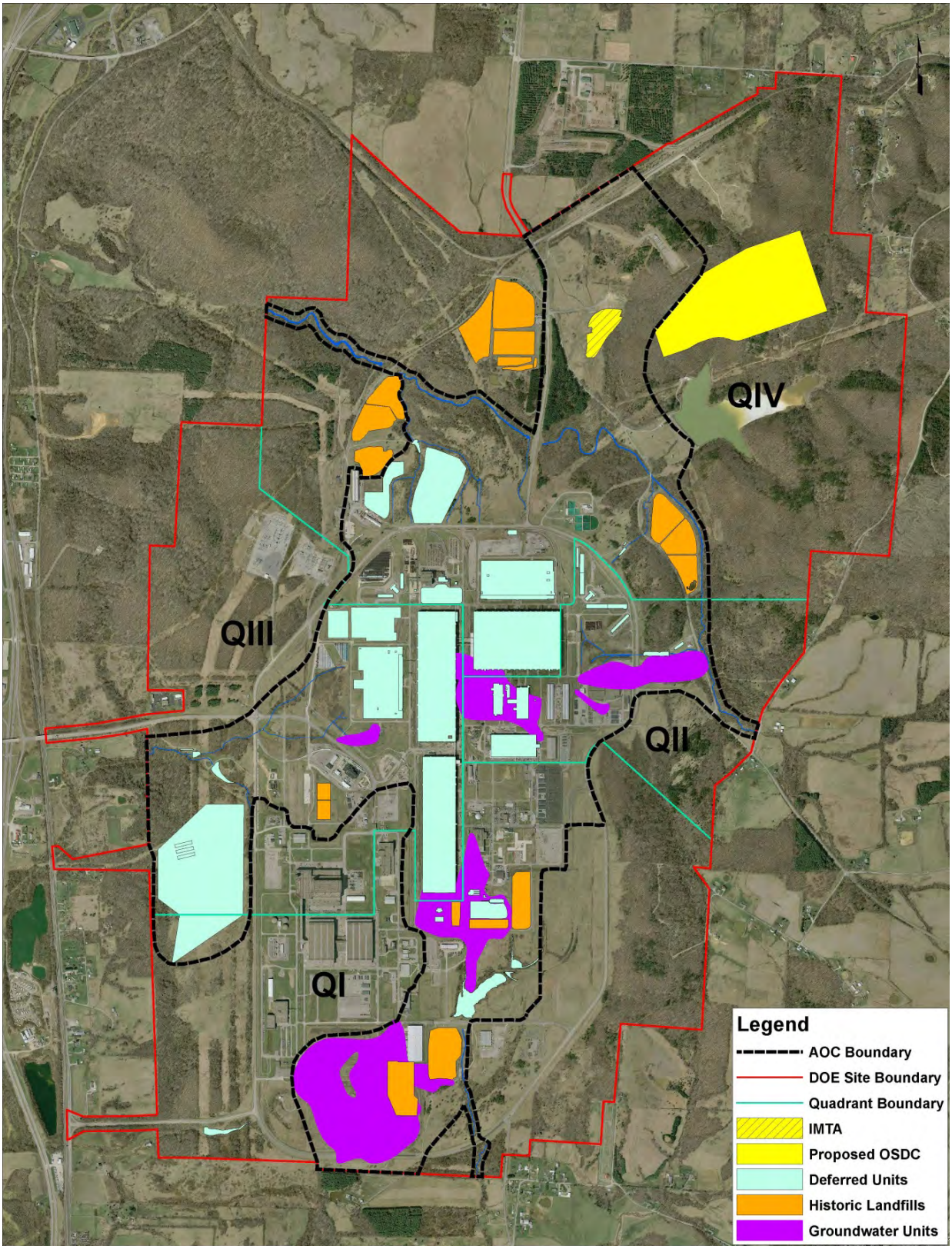


Figure 2. Location of Treatment, Storage, and Disposal CAMU and Treatment and Storage CAMU

1) **RCRA-hazardous wastes encountered during building D&D activities.** Both CAMU-eligible and CAMU-ineligible RCRA-hazardous wastes are anticipated to be produced during building D&D activities, including those wastes that are considered "residual soil" as defined by the DFF&O. Waste created during deactivation or demolition of buildings is considered CAMU-eligible as these actions are managed as part of the implementation of the PORTS cleanup. Current plans are for all CAMU-ineligible RCRA-hazardous waste to be removed from the interior of the buildings prior to demolition and sent off the Site for appropriate treatment and compliant disposal. And while the current plan is to also remove CAMU-eligible RCRA listed or characteristic waste (for example, universal waste) from the interior of the buildings prior to demolition and send that removed waste off Site for disposal or recycling, there is the potential in the future that the off-Site disposal facilities for such waste are no longer available or are not an effective option. The D&D project is likely to be a 30-year project and the cost or availability of off-Site disposal options could change in that time frame. In that case, consideration to dispose of some of this CAMU-eligible waste at a potential OSDC needs to be an option. No waste from the building contents or structures has currently been identified in this category; however, there is a small volume of CAMU-eligible residual soil that is considered as hazardous waste that is planned to be disposed on Site.

2) **Contaminated soil and associated waste contemplated for use as engineered fill for a potential OSDC.** DOE has conducted an economic analysis in support of the Waste Disposition RI/FS that shows that the initial short-term investment cost of nearly $400[3] million to excavate select landfills and groundwater contamination areas to use the materials as OSDC fill (compared to purchasing clean fill at a short-term cost of $28 million) can have advantageous life-cycle cost benefits when the opportunity to reduce long-term groundwater extraction and treatment costs is considered. Groundwater restoration at PORTS is projected in some instances to take 300 years or more. But if contaminated fill is used, over the long term there would be a projected cost avoidance resulting from shortening groundwater restoration efforts. This is because the contaminated fill option provides the opportunity to directly remove contaminant sources from the groundwater contamination areas and to then reduce and ultimately eliminate long-term active groundwater extraction and treatment operations. Use of the cheaper-in-the-short-term clean fill would not provide the opportunity to reduce or eliminate the long-term active groundwater extraction and treatment operations, and is therefore the less preferable option in the long term. Some of the soil anticipated to be used as fill is currently determined by Ohio EPA to contain F-listed RCRA-hazardous waste.

3) **Contaminated soil and associated waste from future Ohio Consent Decree decision(s).** Future remediation decisions that will take place for the deferred solid waste management units (SWMUs) under the Ohio Consent Decree may produce additional F-listed RCRA hazardous waste as well as contaminated media which contains F-listed RCRA-hazardous waste. The future Ohio Consent Decree cleanup actions could result in the excavation of additional contaminated soil and associated wastes to meet final environmental-media cleanup levels established for the deferred SWMUs as part of the Ohio Consent Decree decisions. The future Ohio Consent Decree decisions could also separately contemplate disposal of that soil in a potential OSDC, if one is available from the DFF&O decisions. While most of the soil and associated wastes produced from the Ohio Consent Decree decisions would not be anticipated to be RCRA-hazardous based on characteristic properties, there is the potential for the soil and

[3] All costs in this paragraph are net present value costs in 2013 base year dollars developed to support the PORTS life-cycle baseline.

associated wastes to either contain F-listed RCRA-hazardous waste or be F-listed RCRA-hazardous waste.

In view of the potential for producing RCRA-hazardous wastes during cleanup as described above, there are two elements of the CAMU rule that can be used to facilitate the implementation of a reliable, effective, protective, and cost-effective remedy at PORTS. The first is the ability to identify PHCs and to focus treatment on these constituents alone. When evaluating treatment of characteristic hazardous waste according to the land disposal restrictions (LDRs), there would be a need to identify all underlying hazardous constituents and also treat any of them that are above 10 times the Universal Treatment Standard. Underlying hazardous constituents do not apply to RCRA-listed waste. The industrial processes at PORTS resulted in a number of different types of environmental contamination including metals, polychlorinated biphenyls, volatile and semi-volatile organics, pesticides, and radioactivity. A considerable addition to sampling costs would occur in order to identify and confirm treatment of underlying hazardous constituents for any RCRA-characteristic wastes. But mostly, the need to consider treatment for several contaminants on varying types of waste streams would lead to such an excessive burden that lower levels of contamination would likely be left in the ground with a reliance on long-term containment and institutional controls. Also, if there is no other choice but to dispose of this material on Site (such as if D&D hazardous waste can no longer be sent off Site), the excessive sampling and treatment requirements would result in an expenditure of limited funds with no benefit.

Secondly, the CAMU rules provide for flexibility when setting treatment standards. The purpose of this flexibility is to recognize the environmental benefits associated with excavation and disposal of contamination that is in the environment and to not offset these benefits with required treatment efforts that do not provide any additional benefits.

Under LDR requirements, if the landfills and contaminated groundwater soil are excavated to be used as fill, it is likely that additional treatment methodologies other than dewatering (required to meet a potential OSDC WAC) would be needed to meet required treatment standards. Such additional treatment options can be $10 million or higher with the additional cost increases associated with delay of D&D activities (see Appendix E), quickly decreasing the cost benefit that use of this material as fill provides DOE, the environment, and the community and decreasing the cost-effectiveness of any future excavation remediation alternatives that are considered. For remaining environmental contamination that is not used as fill, there are still future remediation decisions that are needed. Cost-effective excavation options ensure that more of this contamination is removed from the environment than remains under future controls. And for potential future D&D waste streams that can no longer be sent off Site, the use of treatment would use funds that could be spent providing more benefit to human health or the environment.

Although the current LDRs do allow for treatment standard variances, these variances must be granted by the EPA Administrator before the Ohio EPA Director will recognize them. However, the LDR regulations are more rigid as compared to the flexibilities made available under the CAMU rule. Additionally, the criteria for such LDR variances are not clearly defined. A CAMU would permit a deviation from those levels to allow a more timely, effective, and cost-effective disposal while nevertheless remaining protective (see discussion of *OAC* 3745-57-72 (E)(4)(d) and (e) *infra*). Deviations from treatment levels ensure that future decisions concerning remaining environmental contamination or D&D waste have cost-effective excavation and disposal options available for consideration.

The location of a potential OSDC is outside of areas of most likely future redevelopment. As shown in Figure 2, the potential OSDC is located to the northeast of the industrial facility. It is also proposed to be located over very competent bedrock, greatly decreasing any chance of contamination leaching from the bottom of the treatment, storage, and disposal CAMU. Under the CAMU regulations, the flexibility of the treatment requirements would support cost-effective disposal of waste or use of contaminated fill, increasing the extent of consolidation of contamination into the CAMU. This increase in consolidation would lessen the restrictions on future use of the land within the industrialized portion of the Facility, decreasing DOE's long-term liability and increasing future reuse opportunities.

2) *The management of waste at the designated CAMU will not create unacceptable risk to human health or the environment resulting from exposure to hazardous wastes or hazardous waste constituents.*

"*Since CAMUs are likely to increase the amounts of waste that are remediated, this provision is intended to ensure that remediation waste management activities are conducted so as to control short-term risks that could potentially occur from remedial activities.*" (58 FR 8658, February 16, 1993). As noted in Criterion 1, EPA is not requiring a quantitative risk assessment of the short-term risks associated with a CAMU designation.

Regardless of its CAMU designation, a potential OSDC would need to be built if Alternative 2 is selected. Designating the potential OSDC as a CAMU provides the opportunity that contaminated fill could be used cost-effectively in the operations of a potential OSDC. Therefore, this criterion evaluates the short-term risks associated with construction and operation of a potential OSDC, as well as the impact designating the disposal facility as a CAMU and increasing the opportunity to use contaminated fill would have on those risks.

As described in the short-term effectiveness criteria evaluation in the Waste Disposition RI/FS and summarized here, disposal of waste in a potential OSDC would not create unacceptable risk to human health or the environment. Additionally, none of the short-term effectiveness criteria, as described below, would be negatively impacted by designating the potential OSDC as a CAMU.

Protection of the Community during Remedial Action

DOE has employed rigorous design and operations standards to mitigate potential risk to the public from the presence of a potential OSDC, transportation of hazardous and radioactive waste, operation of a potential OSDC, and windborne dispersion of contaminants. Risk to the public from waste handling and disposal activities at PORTS would be low because of the robust and conservative protective systems supporting all phases of operation. Public access would be restricted at any disposal facilities and at all waste generation, packaging, and handling locations. Selection of appropriate transport routes; compliance with U.S. Department of Transportation (DOT) packaging and other requirements; and adherence to project-specific transportation safety and spill plans would minimize the likelihood of an accident and the severity of a release should an accident occur.

Establishing CAMUs at PORTS would substantially reduce the impact of D&D project-related vehicle traffic on public roadways, since fill would be generated within the PORTS Perimeter Road rather than generated at off-site locations for transport to PORTS. Appendix H to the Waste Disposition RI/FS provided an engineered fill source evaluation for the potential OSDC that compared three principal sources of engineered fill for constructing the potential OSDC: off-site clean fill sources, PORTS clean fill sources, and PORTS contaminated fill sources. (As described in the preamble, the term "engineered fill" or "fill" refers to any material, clean or contaminated, used to fill

in void spaces in waste.) Based on the evaluation contained in Appendix H, the Waste Disposition RI/FS adopted the use of contaminated fill from PORTS sources as the representative process option for fill for inclusion in Alternative 2.

Irrespective of which source of fill is used to construct the potential OSDC, it would take approximately 221,000 individual truckload shipments to transport the needed fill materials to the new potential OSDC to support construction activities and satisfy the 2.65 million cy fill demand. This would average to about 35 to 40 trucks each and every working day, over a 25-year construction period. If off-site sources of clean fill are used to satisfy the demand, the 35 to 40 trucks per day truck traffic would need to travel local routes through the neighboring communities. Assuming the local clean sources are within a 5-mile radius of PORTS (with a 10-mile per round trip average distance), this would equate to about 2.2 million road miles of additional traffic over local public highways to satisfy the extensive multi-decade fill demand. However, if contaminated fill can be cost-effectively used to support operations at a CAMU, the truck traffic would remain on PORTS, not impacting the surrounding community.

During construction and operations, DOE would control emissions of fugitive dust to ensure protection of human health and the environment in adherence with ARARs. These actions would minimize community exposure to fugitive dust generated by construction of a potential OSDC and exposure to contaminants from the dispersion of waste by high winds during operation. During construction and operation, fugitive dust generation and other airborne emissions would be monitored. Engineering controls, such as the application of water or chemical dust suppressants and seeding of spoil piles and exposed soils, would be implemented to minimize fugitive dust emissions beyond the facility boundary.

Protection of Workers during Remedial Action

The primary risks to workers from construction of an OSDC and waste handling, transportation, and disposal activities are exposure to contaminants, heavy equipment accidents, and transportation accidents. DOE has thorough health and safety protocols to minimize risks during D&D activities. These activities would be conducted by trained personnel in accordance with ARARs/to-be-considered (guidances), DOT regulations, DOE requirements, approved health and safety plans, and as low as reasonably achievable principles. Risk from exposure during disposal activities would be generally limited because the waste would meet a potential OSDC's WAC, which would include components for worker safety (developed during the design). Worker exposure would be further minimized by compliance with DOT and DOE waste packaging, transport, and handling requirements; the use of shielding and personnel protective equipment (PPE); limits on driver work schedules; and other operational restrictions, such as spacing and distancing, to ensure that radiation doses to workers are kept below 5,000 mrem/year. Therefore, the overall risk to workers from constructing and operating a potential OSDC is low.

Designating the potential OSDC as a CAMU should not notably increase risk to workers. Although there is the potential for an increase in accidents as a result of excavating contaminated soil and landfills as sources of fill, these risks can be adequately mitigated by standard health and safety protocols. DOE has excavated other landfills across the complex successfully. Additionally, with more flexibility granted to treatment standards, there is the potential that fewer treatment activities may be needed or less waste would need to be sent off Site, decreasing the potential exposure to radionuclides and other contaminants to workers involved in the treatment, additional handling, or long-haul transportation activities which offsets the increased risk from excavating and transporting contaminated soil and landfills.

Short-term Environmental Effects
The potential for short-term environmental impacts from the construction and operation of the potential OSDC would be posed primarily by construction activities, spills during transportation and handling of wastes or leachate, releases during decontamination operations, other operational releases, and potential OSDC capping activities. Short-term environmental impacts would be minimized by use of best management practices, including engineered and administrative controls.

The short-term environmental risk from transportation would arise primarily from the potential for spills during waste shipment and impacts to air quality resulting from commuter, construction and operations traffic. Adverse environmental impacts in the event of a spill during waste transport would be minimal because wastes would not be in liquid form, waste volumes per shipment would be small, contaminant concentrations would be low for most waste streams, waste would be properly packaged, and spill plans would be quickly implemented if a spill occurred. Safeguards would be implemented to ensure protectiveness during waste transport. Leachate would be conveyed in piping, with secondary containment where releases are possible. Impacts to air quality, surface water resources, and groundwater are discussed below.

Air quality. Impacts to air quality from the construction and operation of a potential OSDC would result from the increase in generation of fugitive dust by earthmoving activities such as during construction. During construction and operation, there would be significant earthmoving activities at the cell. A number of large trucks, including tractor-trailer rigs, large dump trucks, and excavation equipment, would deliver soil and waste daily. The peak level of particulate emissions would be expected during the first 2 years of construction, when the majority of land clearing and fill activities take place. Clearing of land and construction of a potential OSDC and support facilities may result in fugitive dust being visible at facility boundaries. Operations at the potential OSDC or at an IMTA may release some contaminants into the air, but compliance with ARARs, such as Ohio EPA fugitive dust limits would ensure compliance with federal National Ambient Air Quality Standards. Engineering controls, such as the application of water or chemical dust suppressants and seeding of spoil piles and exposed soils, could be implemented to minimize fugitive dust emissions.

Designation of the potential OSDC as a CAMU would not increase the impacts to air quality beyond the discussion above for the potential OSDC. Although there may be a limited release of volatile compounds during the excavation of contaminated fill, there is also less treatment required for residual soil, thereby reducing the air releases from treatment of this D&D waste. During the 2011 X-701B Interim Remedial Measure excavation action, which is a similar excavation action to that being proposed, DOE used air emission controls and calculated releases within the area. Based on that experience, with appropriate controls, the worst case average daily TCE concentration can be maintained at less than one-third of the Ohio EPA de minimus levels for air emissions as set under *OAC* 3745-15-05(B).

Surface water resources. A total of 14,335 linear ft of streams (Class I, II, and IIIA) would be directly impacted by construction of a potential OSDC and supporting infrastructure while additional lengths could be indirectly impacted from changes in water quality or quantity. Roughly 0.11 acres of wetlands would be directly affected with another 2 acres of wetlands in Study Area D having the potential for impact during construction activities. DOE is evaluating impacts of the proposed actions for potential adverse effects to streams and wetlands and is developing potential mitigation measures for any adverse effects where avoidance or minimization is not practicable.

Upon closure of the OSDC, much of the area would be recontoured for drainage following removal of requisite infrastructure, except for the area beneath the OSDC footprint.

Potential impacts to surface water resources could result from sediment loading to surface water bodies or migration of contaminants. Land clearing and construction activities would expose varying areas, depending on the location selected and the ultimate size of the facility. The potential impacts to surface water resources would be minimized by using standard erosion controls, such as siltation fences and buffer zones of natural riparian vegetation, during construction activities.

Potentially contaminated runoff from a potential OSDC, water used for decontamination, water from the leachate detection/collection system, contaminated runoff from an IMTA during storage, size reduction, or decontamination efforts, and other wastewater would be collected in storage tanks. This water would be sampled and conveyed to an appropriate treatment facility, as required. The potential for impact to surface water resources from migration of contaminants from a potential OSDC in groundwater would be exceedingly low because of engineered and active controls.

Potential impacts to surface water would be minimized by only constructing the portions of a potential OSDC that are planned to be used in the immediate future. By not having the entire disposal facility open at one time, the amount of disturbed area would be minimized.

Designation of the potential OSDC as a CAMU and the resultant opportunity to use contaminated fill could have a greater impact on surface water quality in the near term over that impacted by the construction of the potential OSDC using clean fill alone. Excavation of contaminated landfills and plume areas for use as fill could have an impact on other streams or wetlands in the area. Streams may need to be diverted temporarily and some wetlands may be destroyed. Any impacts to the streams or wetlands resulting from this excavation of contaminated fill would be mitigated in accordance with ARARs. However, in the long term, the consolidation of this contamination in the fill into an engineered disposal facility would limit future migration potential of contamination to surface water bodies from runoff, erosion, or discharge from underlying groundwater contamination, thereby improving surface water quality.

Groundwater resources. During OSDC construction, there may potentially be minor releases of contamination to the environment. Contaminant sources include spills of D&D waste, spills of oil and diesel fuel, releases from transportation or waste handling accidents, and accidental releases of leachate from the disposal cell. However, compliance with an approved Erosion and Sedimentation Control Plan and a spill plan would mitigate potential impacts from surface spills. Engineered controls and active controls, including the leachate collection system, would reduce the potential for impact to groundwater resources that could result from contaminant migration during construction and operation of the disposal cell.

The designation of a potential OSDC as a CAMU and the resultant opportunity for use of contaminated fill would result in improvements to groundwater resources. In the event that contaminated soil were used as fill, the primary and secondary continuing sources of groundwater contamination would be removed from the environment and placed in an engineered facility. The overall time and cost required to meet remediation objectives for groundwater would be significantly reduced; therefore, contaminated groundwater would be beneficially impacted by the designation of a potential OSDC as a CAMU.

3) *The CAMU includes uncontaminated areas of PORTS only to the extent inclusion of such areas is more protective than managing the waste at contaminated areas.*

EPA intended for this criterion to "*… ensure that any land area of a facility that is not already contaminated … will be included within a CAMU only if remediation waste management at such an area will … be more protective than management of such wastes at contaminated areas of the facility.*" (58 FR 8658, February 16, 1993).

Four locations were evaluated for siting a potential OSDC (treatment, storage, and disposal CAMU). More detail on the conditions of each of the locations can be found in Appendix D of the Waste Disposition RI/FS. Three of the locations, Study Areas A, C, and D were located in uncontaminated areas and Study Area B was located in a contaminated area. Any properly designed OSDC would be considered protective of human health and the environment because of the design of the impermeable cap and liner systems. However, within the compliance timeframe of 1,000 years or longer, the natural hydrogeologic conditions at each location must be further analyzed in differentiating the degree of protectiveness of the different study areas. Hydrogeologic conditions at each location determine the depth and migration (direction and rate) of groundwater. In the event contaminants migrate through the liner over time, the fate and transport of those contaminants will depend on the hydrogeologic and geochemical conditions of the underlying strata. While a shallow groundwater zone may exist within the regolith and weathered/jointed bedrock, most of this zone would be removed during construction of a potential OSDC. Table 1 provides a comparison of the protectiveness of each of the study areas relative to each other.

Table 1. Comparison of Protectiveness at Each Study Area

Criteria	Study Area A	Study Area B	Study Area C	Study Area D
Hydrogeologic Conditions	Study Area A overlies the ancestral river valley with the Gallia sand aquifer. Groundwater moves through the sand towards nearby surface water discharge in Big Run Creek. Minford water table is approximately 15 ft below surface.	Study Area B, similar to Study Area A, overlies the ancestral river valley with the Gallia sand aquifer. Groundwater moves through the sand towards nearby surface water discharge in Little Beaver Creek. Minford water table is less than 15 ft below surface.	Study Area C is underlain by low permeability bedrock. The uppermost aquifer at this study area, the Berea sandstone, is overlain by more than 100 ft of low permeability Cuyahoga and Sunbury shale.	Study Area D is similar to Study Area C in that it is underlain by low permeability bedrock. The uppermost aquifer at this study area, the Berea sandstone, is overlain by up to 100 ft of low permeability Cuyahoga and Sunbury shale.
Contaminant Fate and Transport	pWAC modeling indicated Study Area A had travel times to reach peak dose similar to Study Area B (a few organic compounds reached the point of exposure in less than 1,000 years).	pWAC modeling indicated Study Area B had the fastest travel times to reach peak dose compared to the other locations (a few organic compounds reached the point of exposure in less than 1,000 years).	pWAC modeling indicated Study Area C had travel times to reach peak dose several times longer than either Study Areas A or B. No constituents reached peak dose in less than 1,000 years and many constituents took more than 150,000 years.	pWAC modeling indicated Study Area D travel times to reach peak dose several times longer than either Study Areas A or B. No constituents reached peak dose in less than 1,000 years and many constituents took more than 150,000 years.

Table 1. Comparison of Protectiveness at Each Study Area (Continued)

Criteria	Study Area A	Study Area B	Study Area C	Study Area D
Protectiveness Compared to Other Study Areas	Similar protectiveness as Study Area B; less protective than Study Areas C and D	Similar protectiveness as Study Area A; less protective than Study Areas C and D	Similar protectiveness as Study Area D; more protective than Study Areas A and B	Similar protectiveness as Study Area C; more protective than Study Areas A and B

DOE = U.S. Department of Energy
RI/FS = remedial investigation/feasibility study
pWAC = preliminary waste acceptance criteria (model results reported in the waste disposition RI/FS Work Plan [DOE 2012])

Based on the above analysis, which is detailed in Appendix D of the Waste Disposition RI/FS, Study Areas C and D are more protective of human health and the environment than Study Areas A and B; therefore, Study Areas A and B were eliminated from further consideration in the context of the siting study. The contaminated area (Study Area B) had one of the least protective siting conditions.

Based on the overwhelming benefits offered by the underlying geology and on the best compliance with Ohio EPA siting criteria, Study Area D was selected as the representative location for a potential OSDC in the Waste Disposition RI/FS. All of these beneficial factors are discussed in full detail in Appendix D of the RI/FS. Highlights of the beneficial factors discussed in Appendix D include the following:

- Located on geotechnically stable ground, situated at a high point on PORTS
- Drainage is away from the area, not onto the area, decreasing the clean water that must be handled
- Underlain entirely by 100 ft or more of competent shale bedrock with low permeability
- Located 100 ft or more above the local groundwater table
- No significant pathway to the regional aquifer in the Berea Sandstone Formation
- Sufficiently large footprint to provide the needed capacity
- Not located in an area requiring major D&D and soil remediation activities, thereby allowing early construction of a potential OSDC with minimal coordination with D&D or remediation required.

Although Study Area D requires a commitment of uncontaminated land for long-term disposal, it is still preferable when compared to the contaminated area available at PORTS. The only contaminated area potentially available that could be suitable (Study Area B) has the following undesirable drawbacks: existing facilities that would require demolition prior to construction of a disposal cell, a shallow groundwater table, and WAC development modeling that has indicated that contaminants would migrate readily to the groundwater should the liner fail.

In addition to the siting and geological benefits discussed above, locating the potential OSDC in Study Area D and outside of the area of interest for reuse also supports the future reindustrialization objective of the local community, which is an added benefit for consideration in locating the potential OSDC.

Study Area D will be adopted as the location for the potential OSDC through the Waste Disposition ROD if Alternative 2 is selected. That decision will commit the uncontaminated land associated with the potential OSDC for long-term disposal. Designating the potential OSDC as a CAMU does not incrementally increase the extent of uncontaminated area impacted by long-term disposal beyond that already committed by Alternative 2 in the absence of a CAMU. Additionally, there is the potential for decreasing areas of contamination elsewhere at PORTS by using contaminated fill at the potential OSDC.

4) *Wastes in the CAMU that remain after closure would be managed and contained to minimize future release, to the extent practicable.*

EPA intended this criterion to "*… consider… whether long-term reliability and effectiveness will be ensured through the implementation of a CAMU, particularly when it is necessary to leave waste in place after implementation of remedial activities.*" (58 FR 8658, February 16, 1993). The long-term (i.e., post-closure) reliability and effectiveness of CAMU-related actions must be considered.

As described in the long-term effectiveness criteria evaluation in the Waste Disposition RI/FS and summarized here, disposal of waste in a potential OSDC that is designated as a CAMU would not create unacceptable risk to human health or the environment post-closure. As discussed below, the same robust geologic and engineering factors that make the potential OSDC effective would not be negatively impacted by the designation of the potential OSDC as a CAMU. Designating the potential OSDC as a CAMU enhances the opportunity for contaminated fill to be used for waste placement and removes the contaminated material from the environment from where it is presently located. Because of the robust engineering and geologic factors for the potential OSDC, use of contaminated fill would be protective of human health and the environment.

The siting and engineering elements considered for a potential OSDC are focused on developing a disposal option that minimizes future contaminant releases both during operations and after closure. The modeled WAC analysis conducted for the Waste Disposition RI/FS demonstrated limited mobility of potential contaminants from the bottom of a potential OSDC because the preferred location is over competent bedrock. The liner and cover designs included in the intermediate design package exceed the regulatory requirements for a treatment, storage and disposal CAMU, as summarized in Table 2. Design of the leachate collection system to be submitted to Ohio EPA will contain the features detailed in Table 2. The groundwater monitoring and post-closure care elements to be specified in the final design package would also meet the requirements.

Table 2. OSDC Intermediate Design Summary

Design Element	CAMU Requirements	Potential OSDC Design
Liner	1) Composite liner consisting of: • An upper FML with a minimum thickness of 60 mil for HDPE or 30 mil for all other FMLs that is installed in direct and uniform contact with the lower compacted soil component. • A lower component consisting of at least a 2-ft layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/s. 2) Leachate collection system that maintains less than a 30-cm (12-in.) depth of leachate over the liner (40 *CFR* 264.552[e][3], *OAC* 3745-57-72 [E][3][a])	1) Double liner and leachate collection system consisting of: (a) a composite liner consisting of a 3-ft compacted low-permeability soil with a permeability of 10^{-7} cm/s, a geo-composite (bentonite) liner, and a 80-mil HDPE geomembrane, and (b) an upper liner of an 80-mil HDPE geomembrane, a geo-composite (bentonite) liner, and a leak detection layer consisting of geotextile, 1 ft of drainage gravel, and a perforated pipe. The components of the potential OSDC design meet or exceed the design requirements of a RCRA Subtitle C-type liner and would not be affected by the CAMU regulations. 2) Leachate collection system consisting of 1 ft of drainage gravel, leachate collection pipes, and geotextile maintains less than 30-cm depth of leachate over the liner.
Cap	CAMUs with constituent concentrations above remedial levels or goals applicable to PORTS; cover the CAMU with a final cover designed and constructed to meet the five performance criteria: • Provide long-term minimization of migration of liquids through the closed unit • Function with minimum maintenance • Promote drainage and minimize erosion or abrasion of the cover • Accommodate settling and subsidence so that the cover's integrity is maintained • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. (40 *CFR* 264.552[e][6][iv], *OAC* 3745-57-72[E][6][d][i])	A potential OSDC design includes a 9-ft final cap over the entire facility consisting of a contouring layer over the waste, a 2-ft low permeability compacted clay layer, a geo-composite (bentonite) liner, an 80-mil HDPE geomembrane, geotextile protective layer, a 1-ft cover drainage layer, a 3-ft bio-intrusion barrier, a 0.25-ft chock stone layer, a 0.5-ft granular filter layer, a 1.5-ft vegetative soil layer, a 1-ft top soil layer, and a vegetative cover with native grass. This design is more than required by the RCRA Subtitle C-type cap design requirements. The components of the potential OSDC design meet or exceed the design requirements of a RCRA Subtitle C-type cap and would not be affected by the CAMU regulations. The impermeable geomembrane layer within the cap would provide equal initial permeability to the bottom liner system. Both systems rely on geomembrane layers to provide practically impermeable barriers of water. The cap could also be repaired or replaced if necessary in the future, unlike the bottom liner system for which repair or replacement would not be practical or even possible. Therefore, the cap would be able to maintain longer term low permeability beyond the time frame expected for the bottom liner system.

Table 2. OSDC Intermediate Design Summary (Continued)

Design Element	CAMU Requirements	Potential OSDC Design
Monitoring	1) Continue to detect and to characterize the nature, extent, concentration, direction and movement of existing releases of hazardous constituents in ground water from sources located within the CAMU; and 2) Detect and subsequently characterize releases of hazardous constituents to groundwater that may occur from areas of the CAMU in which wastes will remain in place after closure of the CAMU; and 3) Require notification to the Director and corrective action as necessary to protect human health and the environment for releases to groundwater from the CAMU.	There is no existing release of hazardous constituents in groundwater from sources located within the proposed OSDC footprint. OSDC groundwater monitoring for each cell would consist of up-gradient and down-gradient wells installed in clusters or nested to monitor three different elevations: the Berea Formation, the 680-sandstone layer (in the Cuyahoga Formation), and the 720-sandstone layer (in the Cuyahoga Formation). Lateral monitoring points directly under the lowest point of each cell liner system would also be installed. A potential OSDC groundwater monitoring plan would require Ohio EPA notification of any releases. The groundwater monitoring plan would state that a corrective action plan would be submitted to Ohio EPA for review/concurrence, as necessary, to ensure protection human health and the environment.
Closure and Post-closure	Control, minimize or eliminate, to the extent necessary to protect human health and the environment, for areas where wastes remain in place, post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, to surface waters, or to the atmosphere.	The potential OSDC design would minimize the need for further maintenance; and control, minimize or eliminate, to the extent necessary to protect human health and the environment, for areas where wastes remain in place, post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, to surface waters, or to the atmosphere. This would be achieved by siting of the facility at the best geological and hydrogeological location at PORTS and incorporating the best design approach and construction materials available for long-term containment of hazardous and other wastes to be generated during D&D and environmental remediation at PORTS.

CAMU = Corrective Action Management Unit
CFR = Code of Federal Regulations
D&D = decontamination and decommissioning
FML = flexible membrane liner
HDPE = high-density polyethylene
OAC = Ohio Administrative Code
Ohio EPA = Ohio Environmental Protection Agency
OSDC = on-Site disposal cell
PORTS = Portsmouth Gaseous Diffusion Plant
RCRA = Resource Conservation and Recovery Act of 1976, as amended

CAMU-eligible wastes, treated as appropriate, would be placed in a potential OSDC designed to isolate waste from the environment and significantly reduce the possibility of intrusion into the waste cell or migration of contaminants away from the facility, representing an overall collective decrease in residual risk. By design, meeting the facility WAC would ensure that the total excess lifetime cancer risk (ELCR) from the cell would be less than 1×10^{-5}, the total noncarcinogenic risk hazard index would be less than 1 to future residents living adjacent to the facility, and the underlying groundwater would be protected by ensuring maximum contaminant levels are not exceeded.

Modeling to support draft modeled WAC selection illustrates that Study Area D has geologic characteristics that, in concert with the engineering design, do not allow for contaminants at unacceptable levels to migrate from the cell to beyond the waste boundary within a period of 1,000 years, assuming that the facility performs according to projections (Appendix I of the Waste Disposition RI/FS). Because the input parameters used for these calculations were based on the assumption that man-made materials would fail and are likely to overestimate actual future risks from disposed waste, the modeled results are inherently conservative.

Engineered controls would be built into a potential OSDC to prevent exposure to contaminants and to prevent, detect and mitigate contaminant releases. The flexible membrane liner and geosynthetic clay liner components of the primary liner would control releases of leachate to groundwater for their design life, which is at least 200 years. The active leachate collection system above the primary liner and the leak detection system below would be effective until the volume of leachate generated is minimal and stable. Long-term control of leachate release would be provided by the secondary liner and geologic buffer and the passive leachate treatment system; these controls would last at least for their design life. An assessment was conducted to estimate the impact on adjacent surface water bodies if the leachate collection or treatment system were to fail and leachate were released directly into the environment. An estimated curie content in the waste in the cell, a TCE mass, and an estimated flow of future leachate (after capping) were used to estimate a concentration of contaminants in the leachate that could be released untreated from a potential OSDC. The entire volume of leachate was then assumed to directly discharge to Little Beaver Creek. Resultant estimated concentrations (see Appendix K of the Waste Disposition RI/FS for method and results) were significantly below recreational risk-based levels, and no impact to the surface water quality would occur, even under a failure scenario.

The disposal cell cap would prevent airborne releases and direct contact with or exposure to the waste or any contaminated fill. The thickness of the cap (10 ft) and the presence of the biointrusion layer would discourage inadvertent penetration by humans and would prevent or minimize damage from burrowing animals and tree roots. The disposal cell and cap would be designed to remain stable under expected environmental conditions, including possible erosion and earthquakes, for the foreseeable future. Aside from intentional human disturbance or major global climate changes, no credible scenarios for exposing human or ecological receptors to the waste have been identified.

Institutional controls would prevent access to the on-Site disposal facility and use of local groundwater. Institutional controls would continue for an indefinite period, and land use restrictions would be permanent. Monitoring to determine the effectiveness of the primary controls would continue indefinitely.

The final cap is designed to resist erosion with minimal maintenance, and only extensive erosion would breach containment. Surveillance and maintenance of the cap, however, is planned to stop erosions before they could become extensive.

5) *The CAMU expedites the timing of remedial activity implementation.*

EPA has stated a preference to use CAMUs if they will expedite the timing of remedy implementation by eliminating unnecessary delays. EPA states though that CAMUs may not always result in remedies that take less time, so EPA "*… only requires that a CAMU expedite remedial time frames when it is appropriate and practicable, in consideration of the other remedial objectives for the facility.*" (58 FR 8658, February 16, 1993).

Designation of a disposal CAMU and providing relief from LDR requirements at PORTS beneficially affects timing in two ways when considering other remedial objectives of the facility:

1) Provides fill when needed at the generation rate required to support the pace of D&D waste generation. This prevents the D&D schedule from being impacted by a lack of fill.

2) Groundwater restoration time is significantly decreased by decades because the primary and secondary sources of contamination can be removed from the environment during the generation of that fill.

Designating a potential OSDC as a CAMU provides the opportunity to select other protective treatment standards for RCRA-hazardous constituents. Initial estimates in Appendix E (Section E.1.5) suggest that the selection of other protective and appropriate treatment standards may save $10 million and 2 years of effort. Because the competent bedrock and engineering design of a potential OSDC at PORTS can mitigate additional handling requirements for contaminated media that may be used as OSDC fill, there is an opportunity to expedite the generation of OSDC fill. Lower costs associated with handling fill allows available funds to be used for increasing the protective state of PORTS by focusing efforts on excavation, D&D, and disposal actions thereby expediting removal of significant contamination from the environment.

If soil contaminated from groundwater contamination is excavated and used as fill, there is expected to be a shorter time required for final groundwater remediation efforts as the major secondary source of groundwater contamination would be consolidated in a potential OSDC. By removing the source, improving the ability to extract groundwater, and reducing the need for active groundwater restoration, schedule savings could be as high as several hundred years.

6) *The CAMU uses, to the extent appropriate, treatment to reduce the toxicity, mobility or volume of waste remaining after closure of the CAMU.*

EPA intended this criterion to require, as appropriate, the use of "*… treatment technologies (including innovative technologies) to enhance long-term effectiveness of remedial actions at the facility by reducing the toxicity, mobility, or volume of waste that remains after closure of the CAMU.*" This criterion is analogous to the preference under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 for treatment-based remedies. EPA has clarified that "*…this criterion does not preclude remedial actions that do not employ treatment, as long as they are capable of ensuring long-term effectiveness.*" (58 FR 8658, February 16, 1993). EPA provides an example that in a situation involving large volumes of low concentration contaminated soils or other wastes, there is the discretion to evaluate containment-based remedial approaches.

Technical appropriateness is also used in one of EPA's definitions of technical impracticability. Technical impracticability is defined to include technical infeasibility or inordinately costly from the National Contingency Plan and unachievable and technically inappropriate under the RCRA LDR treatment standard requirements (67 FR 2962, January 22, 2002).

In general, PORTS has large volumes (over 1 million cy) of low-concentration contaminated waste. Additionally, the waste takes many forms (building materials, soil, concrete, etc.). In these conditions, the use of final containment instead of many different treatment technologies is more cost-effective. The Waste Disposition RI/FS concluded that disposal was the only viable final alternative for this waste. However, there is likely to be some treatment needed to meet the WAC of a potential OSDC. In particular, dewatering of saturated soil and other waste is needed to avoid placement of free liquids in the cell. The water that is separated would then be treated in the existing groundwater treatment facilities and/or supplemented with additional systems, reducing the volume and mobility of the contaminants (primarily anticipated to be volatile organic compounds). At this time, no other treatment technologies are anticipated to be used, but if other PHCs are identified, additional treatment options may be used.

7) *The CAMU, to the extent practicable, minimizes the land area of the facility upon which wastes will remain in place after closure of the CAMU.*

EPA intends, through this criterion, to "*… promote consolidation of remediation wastes into smaller discrete areas of the facility, that are suitable as long-term repositories for the wastes, and which can be effectively managed and monitored over the long term.*" (58 FR 8658, February 16, 1993).

To accommodate the estimated 5 million cy of potential capacity needed, an area roughly 100 acres in size would be dedicated to long-term disposal. The buildings and structures that would be demolished and disposed in the potential OSDC are primarily in the industrialized area of PORTS. The removal of the buildings and eventual remediation of the associated contaminated soil and underlying groundwater would consolidate roughly 1,000 acres of industrialized area where the sources of contamination are found into the 100-acre CAMU. In addition, roughly 30 acres of a total of 90 acres of landfills may also be consolidated into the CAMU by using the associated soils as fill.

Designation of the Storage and/or Treatment CAMU

CAMUs that are used for storage and/or treatment only and do not exceed the staging pile time limits (2 years) are subject to the performance criteria and design, operating, and closure standards for staging piles as defined in *OAC* 3745-57-74, which is an ARAR in the Waste Disposition RI/FS. They would not be subject to CAMU designation criteria nor the CAMU design, treatment, groundwater monitoring and corrective action, and closure requirements. However, those units for which the staging pile limits must be exceeded are subject to the CAMU rule which requires the establishment of time limits for operation that are no longer than necessary to achieve a timely remedy selected for the waste. These units also must comply with the design and operating requirements for CAMUs in which waste will remain after closure along with the performance criteria and design, operating and closure standards for staging piles as defined in *OAC* 3745-57-74.

A waste staging area, called the IMTA, would serve as a temporary storage area for incoming waste. This area would be used if the rate of incoming waste deliveries exceeds the rate of waste placement in the disposal facility, as could occur during inclement weather. It would also be used to stockpile waste to allow the most economical placement of waste requiring fill and waste that can be used as fill. The IMTA is assumed to be constructed of the following: 2-ft compacted base followed by a geotextile cushion, 80-mil geomembrane liner, geonet, geotextile fabric, and finally a 1-ft soil protective layer graded to drain. The 7-acre IMTA would be graded so water would flow by gravity to a sump pump system. The collected impacted water would be pumped to the interim leachate treatment system and be discharged when discharge limits are met.

The IMTA would contain waste throughout the operational life of the potential OSDC. That time frame cannot be established at this time but will take considerably longer than the staging pile limits of two years. DOE requests that the operational time limits for the storage and/or treatment CAMU be extended and tied to the operational time frame of the OSDC rather than an absolute duration. An operational time limit extension is also requested for all other CAMUs which are established under this authorization, due to the massive nature of this cleanup project and the extended time period for this cleanup (in excess of 30 years). The specific extension timeframes will be presented in design plans for each CAMU for approval/concurrence by Ohio EPA.

The IMTA will be designed and operated in accordance with all ARARs, including the CAMU rule.

IDENTIFICATION OF CAMU-ELIGIBLE WASTE STREAMS

EPA defines CAMU-eligible waste as "*[a]ll solid waste and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris that contain listed hazardous waste or that themselves exhibit a hazardous characteristic and are managed as part of the implementation of cleanup. As-generated waste (either hazardous or nonhazardous) from ongoing industrial operations at a site are not CAMU-eligible wastes.*" (67 FR 2962, January 22, 2002). As discussed in detail in the 1993 CAMU rule preamble, EPA clarified that "*the definition of remediation waste includes nonhazardous solid waste…[although] management of such wastes would not require the designation of a CAMU.*"

EPA also clarified that soil or other materials contaminated by product spills or releases from ongoing industrial operations are not considered as-generated waste and, as such, are CAMU-eligible when managed for implementing cleanup (67 FR 2962, January 22, 2002). However, EPA provides a provision to "kick out" certain otherwise CAMU-eligible waste streams where noncompliance with applicable RCRA regulations "likely contributed to the release of the waste". CAMU-eligible waste is not limited only to historical waste or contamination; waste generated during the cleanup of current releases is also considered CAMU-eligible. The cleanup of contaminated soils or similar materials is not considered by EPA to be an ongoing industrial process, even if the contamination itself derives from an ongoing industrial process.

EPA also clarified that closure of land-based units (e.g., landfills and surface impoundments) by removal to be "cleanup" for such permanent land disposal units (67 FR 2962, January 22, 2002). Therefore, waste removed from closed permanent land-based units are considered wastes "managed for implementing cleanup" and are CAMU-eligible. EPA indicated that management of containers (even if they are substantially intact) that are excavated from land-based units during the course of cleanup are allowed to be managed in a CAMU.

In addition to disallowing waste generated during ongoing industrial operations, EPA has prohibited management in a CAMU of wastes found during cleanup of intact or substantially intact containers, tanks, or other non-land-based units.

Appendix C presents the various known waste streams at PORTS and estimated volumes of these waste streams. The volumes are divided by the volumes estimated during the Waste Disposition RI/FS to be disposed on Site (in the CAMU) and those volumes estimated to be disposed off Site. Consistent with the definition of CAMU-eligible waste in the CAMU rule, building waste created under the DFF&O, which is considered to be waste generated during the implementation of a cleanup effort, is CAMU-eligible waste. These volumes are subject to change as remedial actions are implemented and more information is obtained. All waste that results from building demolition as part of the remediation of PORTS, contaminated soil or groundwater remediation, and landfill excavation is considered CAMU-eligible, whether or not it is a hazardous waste. PPE and other secondary waste streams (including leachate treatment wastes) are also considered CAMU-eligible as they are generated during remediation efforts and not during industrial operations. The waste at PORTS not considered to be CAMU-eligible would be hazardous waste stored in above-ground tanks and above-ground tank systems, cylinders, containers or other containment units. Therefore, all CAMU-eligible waste could be stored and/or treated at the potential IMTA and disposed at the potential OSDC.

Appendix C also presents the reasonably available information requested in the rule for each waste stream: (1) the origin of the waste and how it was subsequently managed (including a description of the timing and circumstance surrounding the disposal and/or release), (2) whether the waste was listed or

identified as hazardous at the time of disposal and/or release, and (3) whether the waste was subject to the land disposal requirements of 40 *Code of Federal Regulations (CFR)* Part 268 at the time of disposal and/or release. This information has been gathered from the earlier RFI efforts, the Process Buildings and Complex Facilities D&D Evaluation Project (Process Buildings) RI/FS, and other previous environmental investigations.

The data which is evaluated within this supplement to the Waste Disposition RI/FS report for the proposed CAMU has been collected over the last 25 years under the oversight and approval of Ohio EPA and EPA. To place this in context, in response to the requirements of the 1989 Consent Decree, the EPA Administrative Order by Consent issued on September 29, 1989 (1989 Administrative Order by Consent), and amended on May 11, 1994 (1994 Administrative Order by Consent), and the Administrative Consent Order issued on August 11, 1997 (1997 Administrative Consent Order), which replaced the 1994 EPA Administrative Order by Consent, DOE has conducted numerous environmental investigations at PORTS. These investigations have resulted in reports, corrective action alternatives studies, implementation of interim measures, approved decision documents, and implementation of several corrective actions. The 1989 Consent Decree and the 1997 Administrative Consent Order specified that the investigation, study, and implementation of corrective actions should proceed in a phased approach that divides the facility into quadrants, which roughly correspond to distinct groundwater flow directions within the primary water-bearing unit beneath PORTS. The major documents prepared to satisfy some of the 1989 Consent Decree and 1997 Administrative Consent Order corrective action requirements are as follows:

- Quadrant I RFI Final Report (DOE 1996a)
- Quadrant II RFI Final Report (DOE 1996b)
- Quadrant III RFI Final Report (DOE 1996c)
- Quadrant IV RFI Final Report (DOE 1996d)
- Quadrant III Cleanup Alternatives Study (CAS)/Corrective Measures Study (CMS) Final Report (DOE 1998a)
- Quadrant IV CAS/CMS Final Report (DOE 1998b)
- Quadrant I CAS/CMS Final Report (DOE 2000)
- Quadrant II CAS/CMS Final Report (DOE 2001)
- Quadrant III Decision Document (Ohio EPA 1999a)
- Quadrant IV Decision Document (Ohio EPA 2000)
- Quadrant I Decision Document (Ohio EPA 2001)
- X-701B Decision Document (Ohio EPA 2003)
- X-734 Landfill Area Decision Document (Ohio EPA 1999b)
- X-749B (Peter Kiewit Landfill) Decision Document (Ohio EPA 1996a, EPA 1997)

- X-611A Decision Document (Ohio EPA 1996b, EPA 1996).

IDENTIFICATION OF PRINCIPAL HAZARDOUS CONSTITUENTS

Under the CAMU rule, PHCs must meet either minimum national treatment standards adapted from the LDR Phase IV soil treatment standards or, in specific circumstances, adjusted standards based on defined adjustment factors. The CAMU rule specifies that treatment standards would apply only to PHCs to be disposed in a storage, treatment, and disposal CAMU. Treatment standards and PHCs do not apply to storage and/or treatment only CAMUs such as the IMTA.

PHCs are defined as those constituents that "pose a risk to human health or the environment that is substantially higher than the cleanup levels or goals at the site." PHCs are selected from those constituents that would otherwise be subject to treatment under the RCRA LDR treatment standards for as-generated waste. In general, PHCs are identified as "*… carcinogens that pose a potential direct risk from ingestion or inhalation at the site at or above 10^{-3}; and non-carcinogens that pose a potential direct risk from ingestion or inhalation at the site an order of magnitude or greater over the reference dose.*" (67 FR 2962, January 22, 2002). EPA has also included the potential migration of constituents to groundwater as a pathway of concern for the identification of PHCs (67 FR 2962, January 22, 2002). PHCs are to be identified based on concentrations in the waste as initially managed, not after pre-treatment or other activity intended to reduce the concentration.

At PORTS, PHCs were identified from in situ soil sample results to avoid any inadvertent reduction in concentration that may occur during excavation and transportation. These samples represent the potential waste streams from both environmental remediation and from excavation of contaminated media to use as fill. Once the waste is excavated, there is the potential that levels of volatile organic compounds may be lower. The identification of PHCs is currently based on an extensive environmental database at PORTS collected over the last 25 years with Ohio EPA oversight. The PHC(s) identification process used in this document has clearly identified those PHC(s) at PORTS. Although there are additional data planned to be collected from environmental media at PORTS, it is very unlikely that a contaminant would be identified that meets the PHC definition that has not already been identified. However, although unlikely, if the next environmental media data collection effort should identify another constituent that could be of sufficient significance to meet the definition of a PHC, the following steps would be used to assess the potential presence of a new PHC. After that point in the characterization of environmental media at PORTS, there is no longer a sufficient management risk of future PHCs being identified and the PHC identification process for environmental media would no longer be necessary.

No PHCs were identified for D&D building demolition waste as the current plan is to remove all segregatable RCRA-hazardous wastes, regardless if CAMU-eligible or CAMU-ineligible, from the buildings before they are demolished, leaving only solid and low-level waste for the next phase of D&D. This waste would be sent off Site for disposal or recycling, as appropriate. As was discussed in Section 7.3 of the Process Buildings RI/FS, process knowledge, visual inspections, field data, and laboratory analytical results can all be used to answer questions during design and implementation of a remedial action. The end-state of the building after removal of RCRA-hazardous waste will be primarily assessed through process knowledge and visual inspection. Field and laboratory data can be used if determined necessary during the design and implementation of the remedy but the volume of any remaining non-segregatable hazardous waste (that does not require segregation) would be so low that by regulatory definition, the remaining D&D waste, considered as a universe, would be considered solid or low-level waste, therefore no PHC evaluation is needed because the waste is not considered hazardous. Residual

soils that may be generated during subsurface demolition activities may contain TCE or other PHCs and will be evaluated. Should a decision on the disposal location change and DOE elect to send RCRA-hazardous waste from building D&D that was planned for off-Site disposal to the CAMU, an evaluation for 1) its CAMU-eligibility; and 2) for new PHCs associated with that waste would also be conducted.

The existing landfills inside Perimeter Road are one of the key potential sources of contaminated fill. Additional characterization specified in future plans would be conducted to support the excavation of the landfills and to determine WAC compliance of the material excavated. The new data and other information collected will be evaluated to determine CAMU-eligibility as well as if there are additional PHCs in the landfill waste.

The four steps that have been used and would be used in the future to identify PHCs in CAMU-eligible waste at PORTS are described below. The PHCs are those constituents that may require treatment prior to disposal in a CAMU.

1) First, a contaminant must be a hazardous constituent defined under *OAC* 3745-270 that would be subject to treatment standards for an as-generated waste. If a contaminant is not defined as a hazardous constituent, it is not a PHC.

2) Second, the maximum contaminant level present is compared to a risk-based screening level equating to a 1×10^{-3} ELCR through ingestion or inhalation (or a hazard quotient of 10 for non-carcinogenic compounds) for the potential future outdoor industrial user of PORTS in soil. The necessary values can be found in the most current PORTS Risk Methods Document that is available at the time of evaluation. (This document is updated semi-annually.) Appendix D presents the exposure assumptions and parameters used to calculate the risk-based screening level, also called a PHC threshold value. If that PHC threshold value is not exceeded, the contaminant is not a PHC.

3) Third, if the maximum value does exceed the PHC threshold value, either a qualitative or quantitative risk evaluation is done to conclude if the contaminant would cause an ELCR of 1×10^{-3} or a hazard quotient of 10 across an investigative area.

4) And finally, when risks to human health and the environment posed by the potential migration of constituents in wastes to groundwater are substantially higher than cleanup levels or goals at the site, these constituents may be designated as PHCs. Current concentrations of groundwater are used in this analysis instead of modeled results because typically the contaminants in the primary waste have been in the environment a sufficient amount of time that migration to groundwater has occurred if it were going to occur. The major contaminant in groundwater at PORTS is TCE. All other groundwater constituents result in notably less threat to human health. Therefore, the migration pathway to groundwater aspect of PHC identification would only evaluate TCE.

Appendix D presents the rationale for the PHC selection for PORTS. Based on the large amount of existing soil data collected under the Ohio Consent Decree investigation efforts since the early 1990s for over 100 potential contaminants at PORTS, providing nearly 400,000 analytical results, only TCE is currently identified as a PHC in environmental media. TCE is a PHC because (1) it would otherwise be subject to RCRA treatment standards due to the process by which it was used at the Facility (F-listed waste); (2) because the known soil concentrations at PORTS exceed the calculated 282 mg/kg PHC threshold value for TCE; (3) there are sufficient samples exceeding the level that are co-located, indicating that there is an elevated risk likely; and (4) TCE groundwater contamination results in human risk from groundwater use that is substantially higher than PORTS cleanup goals. Should future data

collected for other purposes identify the potential that other contaminants may be PHCs, the same process would be conducted to evaluate these contaminants.

Table 3 presents the comparison of existing soil concentration values for PORTS compounds identified by Ohio EPA (during scoping meetings occurring after the Waste Disposition RI/FS) to their risk-based PHC threshold values.

Table 3. Screening Results for CAMU-eligible Soil – Chemicals of Potential Concern

COPC	Number of Results	Number of Detects	Number Above PHC Limit	Percent Above PHC Limit (%)	Minimum Detect (mg/kg)	Maximum Detect (mg/kg)	Outdoor Worker PHC Threshold Value[a] (mg/kg)
All Existing RFI Soil Data							
Arsenic	4,907	4,772	0	0	0.0066	470	3,340
Chromium, total	5,455	5,424	0	0	1.2	6,050	7,010 (Cr^{+6})
Chromium (VI)	884	87	0	0	0.13	23	7,010 (Cr^{+6})
Lead	4,828	4,791	0	0	1.1	450	800
Mercury	4,767	2,790	0	0	0.0029	208	497
Tetrachloroethene	4,836	377	0	0	0.0005	90	5,830
Trichloroethene	**8,152**	**4,206**	**108**	**1.32**	**0.00022**	**110,000**	**282**
1,1-Dichloroethene	5,810	805	0	0	0.0006	240	14,900
cis-1,2-Dichloroethene	5,172	915	0	0	0.00024	342	26,000
trans-1,2-Dichloroethene	4,776	212	0	0	0.00042	2.51	9,560
Vinyl chloride	5,085	75	0	0	0.00061	1.7	2,240

Bold indicates a maximum value above the PHC threshold value.

[a]The outdoor worker PHC limits (except lead and elemental mercury) were obtained using the equations in the PORTS HHRA Risk Methods Document and the most recent 2014 EPA exposure parameters for body weight (80 kg), skin surface area (3,470 cm^2) and adherence factor (0.12 mg/cm^2). PHC limits for lead are based on the EPA soil screening level of 800 mg/kg. PHC limits for elemental mercury, for an outdoor worker, were obtained from Ohio EPA. The outdoor worker exposure scenario was selected to be consistent with the reasonably anticipated potential future use scenario.

COPC = chemical of potential concern
EPA = U.S. Environmental Protection Agency
HHRA = Human Health Risk Assessment
Ohio EPA = Ohio Environmental Protection Agency
PHC = principal hazardous constituent
PORTS = Portsmouth Gaseous Diffusion Plant
RFI = Resource Conservation and Recovery Act of 1976, as amended, Facility Investigation

IDENTIFICATION OF TREATMENT STANDARDS

There are two provisions in the CAMU regulations that can be used to set treatment standards. PHCs must either meet treatment standards adapted from the LDR Phase IV alternative soil treatment standards under Section 3745-57-72(E)(4)(d) or, in specific circumstances, adjusted standards based on defined adjustment factors under Section 3745-57-72(E)(4)(e). EPA and Ohio EPA have developed a treatment standard of 90 percent reduction in concentrations of PHCs unless such treatment would result in concentrations that are less than 10 times the relevant Universal Treatment Standard, in which case treatment would be capped at 10 times the Universal Treatment Standard. EPA believes that this standard is appropriate and generally will result in meaningful treatment. But EPA also developed adjustment factors to result in adjusted standards; technical impracticability, consistency with site cleanup standard, community views, short-term risks, and protection offered by engineering controls under specified circumstances. When one or more of the adjustment factors are applied, EPA requires that the resulting adjusted standard be protective of human health and the environment.

This section uses eight major points to describe the process used to set an adjusted standard based on CAMU adjustment factors for TCE. If additional PHCs are identified in the future, a similar evaluation would be done for those contaminants to set either a treatment or adjusted standard.

Point 1

EPA has expressed no preference for using the treatment standard or the adjusted standard based on adjustment factors.

As stated in the final CAMU rule (67 FR 2962, January 22, 2002), "*EPA recognizes that the minimum treatment standards will often be the preferable approach … adjustments of the minimum treatment standards might be appropriate because they represent circumstances where failure to adjust treatment could result in discouraging aggressive cleanup*". EPA expressed that there is "*… neither a preference for nor against application of the factors*". Therefore, DOE considers both approaches for TCE and for any future PHCs and selects the approach that best represents the site-conditions and supports the most aggressive cleanup when setting treatment standards for PHCs.

Treatment Standard Evaluation

Point 2

A calculated 90 percent reduction in TCE concentrations results in an estimated concentration of 250 to 700 mg/kg, both in DFF&O-acknowledged residual soil and in non-DFF&O soil.

Currently, only TCE has been identified as a PHC. The waste (and contaminated fill, if used) that contains the TCE was evaluated initially using the 3745-57-72(E)(4)(d) provisions. Initial average concentrations of TCE in soil in the areas where TCE would be considered a PHC are approximately 2,500 to 7,000 mg/kg, resulting in a value of 250 to 700 mg/kg after consideration of a 90 percent reduction (See Appendix E, Figures E.1 through E.4).

Appendix E presents the information that was used to reach this conclusion. Both residual soil and non-DFF&O soil were evaluated site wide and found to yield similar results.

Point 3
Application of a treatment standard of 250 to 700 mg/kg to the universe of PORTS soil would require the use of treatment that is not considered cost-effective.

As a result of the WAC, free liquids must be removed from the waste prior to disposal. Some of the waste or contaminated fill that contains high levels of TCE is likely to have free liquids present, especially when the soil is below the groundwater table. Current data suggests that only soil in the X-700, X-701B, X-701E, and X-720 areas have the potential to have TCE present at levels above the PHC threshold value of 282 mg/kg. There is the potential that additional elevated levels of TCE may be found in soils associated with landfills being considered as potential sources of fill.

Sampling results at PORTS indicates levels of TCE in some of the soils near buildings X-700, X-701E, and X-720 in the range of 290 to 15,000 mg/kg above the PHC threshold value (see Appendix E, Figure E.2). These soils are considered residual soils under DFF&O that would be excavated with the removal of building structures as part of the Process Buildings Project. Unsaturated soils generally would not require any treatment, unless they are directly under historical sources of TCE such as the northeastern corner of Building X-720. Waste or contaminated fill with TCE as a PHC that also contains free liquid would be dewatered prior to use in a potential OSDC to remove the liquids. The water would be collected and treated. In some soil types, the dewatering process is likely to effectively reduce TCE concentrations significantly. However, there are certain soil types (high in clay and/or silt) at PORTS that would not have much reduction in TCE concentrations through dewatering, thereby needing additional treatment to meet a 90 percent reduction standard. Based on the evaluation of the Minford clay soils in the vadose zone (Appendix E) the effectiveness of dewatering the soils is limited due to the high clay content. High levels of up to 15,000 mg/kg under Building X-720 remain in vadose zone residual soils after at least decades of gravity draining and percolation of surface water (rain, run-on/run-off) through those soils. Thus, dewatering of these soils would not reduce the TCE concentration below an average of over 5,000 mg/kg (see TCE concentration in vadose zone soil under the northeastern corner of X-720, Figure E.4, Appendix E of this supplement) in any rational time frame, which is far above the LDR treatment standards for TCE (60 mg/kg) or a unit-specific 90 percent reduction target of up to 700 mg/kg. This condition is also expected in saturated Minford clay after gravity draining is complete.

Site-specific Adjusted Treatment Standard Evaluation
Because additional treatment may not be considered cost-effective and may discourage the consolidation of waste and use of contaminated fill, the adjustment factors considered to develop adjusted standards were also evaluated. Four of the five adjustment factors are considered applicable to PORTS. Only the adjustment factor to have treatment standards consistent with site cleanup levels is not applicable.

Point 4
It is technically inappropriate to treat TCE waste at PORTS beyond dewatering (Adjustment Factor 4(e)(i)).

Using the technical impracticability adjustment factor, the treatment standard can be adjusted on a site-specific basis when it is not technically practicable to achieve these standards because of factors related to technologies and cost (*OAC* 3745-57-72(E)(4)(e)(i)). EPA intends "*… that the technical impracticability adjustment factor will include the general concepts of "technical infeasible" and "inordinately costly" as those terms are used in the federal CERCLA program. These concepts are also described in the RCRA corrective action [advanced notice of proposed rulemaking] ANPR at 61 FR 19432 (May 1, 1990).*" [67 FR 2962, January 22, 2002]. "*Under the "technically inappropriate" variance, the Regional Administrator may approve a site-specific treatment standard if treatment to the*

otherwise applicable standard is not appropriate, even though such treatment is technically possible." In the case of PORTS waste, treatment is feasible and achievable to a TCE level of 250 to 700 mg/kg but it would be costly and inappropriate. Under the technically inappropriate variance for RCRA treatment standards, a site-specific treatment standard may be set if treatment to the otherwise applicable standard is not appropriate, even though such treatment is technically possible. Where, as here, there is an option to leave some contaminated soils in place, as opposed to a more aggressive remediation such as excavation, then it is considered technically inappropriate to require treatment when avoiding such treatment will nevertheless be protective and more cost-effective (62 FR 64504, December 5, 1997).

Appendix E demonstrates that there have been many TCE treatment methods applied at PORTS. A list of technologies that have been demonstrated at PORTS are listed in Table 4. Most of these are in situ technologies but they generally have not met treatment goals. Additional efforts at in situ treatment prior to excavation could not be considered to be effective. Ex situ treatment technologies that are effective, such as low temperature thermal desorption or incineration, are very expensive and time consuming. Although these technologies are effective at reducing TCE concentrations, the additional concentration reduction does not add any protection value prior to disposal for the cost (up to $250/cy, as presented in Appendix E) and or time required to implement (15 to 20 cy/hour production rates, as presented in Appendix E). The waste limits calculated that would protect against unacceptable contamination release through the bottom of the landfill, are orders of magnitude higher than any projected TCE concentration in soil after dewatering. Additionally, the removal of free liquids also results in a waste stream that is protective of the underlying liner system. Treatment of soil that has been dewatered or does not contain PHCs would not result in any additional protection of the underlying groundwater or the underlying liner.

Table 4. Pilot Studies/Technology Demonstrations at PORTS

Quadrant I
X-625 Passive Groundwater Treatment • 1996 – Installation of a horizontal (directionally drilled) well • 1996 – Multiple variations of iron filings to evaluate their relative efficiency for destruction of VOCs • 1996 – Palladium-coated iron filings to evaluate their relative efficiency for destruction of VOCs • 1997 – Slow release potassium permanganate grout for destruction of VOCs
X-749 Plume • 1998 – Vacuum-enhanced recovery for more efficient VOC destruction
X-2230N Clean Test Site • 1994 – Installation of a pair of horizontal (directionally drilled) wells and innovative screen material • 1994 – Multi-point injection system for injection of treatment chemicals in the vadose zone • 1994 – Pneumatic fracturing to enhance the subsurface permeability to aid in contaminant removal efficiency • 1995 – Deployment of the colloidal borescope to evaluate groundwater flow direction and velocity to aid in remediation design and deployment • 1996 – Hydraulic fracturing to enhance the subsurface permeability to aid in contaminant removal efficiency and to more efficiently deliver treatment chemicals to the contaminant zone
X-231B • 1992 – In situ soil mixing using solidification/stabilization for contaminant control • 1992 – In situ soil mixing using ambient air vapor extraction for VOC contaminant removal • 1992 – In situ soil mixing using thermally enhanced vapor extraction for enhanced VOC contaminant removal • 1992 – In situ soil mixing using peroxidation for in situ destruction of the organic contaminants

Table 4. Pilot Studies/Technology Demonstrations at PORTS (Continued)

Quadrant I (continued)
X-231A • 1996 – Installation of hydraulically emplaced stacked horizontal soil fractures to enhance contaminant removal efficiency and delivery of treatment chemicals • 1996 – Thermally enhanced vapor extraction using in situ steam generation and sand propped fractures • 1996 – Thermally enhanced vapor extraction using in situ air heaters • 1996 – Hydraulic fractures using iron filings as the proppant for in situ destruction of organic contaminants • 1996 – Hydraulic fractures using permanganate grout as the proppant for in situ destruction of organic contaminants • 1996 – Oxidant grout emplacement in vertical wells for in situ destruction of organic contaminants
Quadrant II
X-701B • 1990 – Contaminated sludges and soils removed from X-701B Holding Pond and Sludge Containment Ponds (800 B-25 boxes/3 million lb) • 1994 – In situ soil mixing using ambient air vapor extraction for VOC contaminant removal • 1996 – Partitioning inner-well tracer tests to evaluate the mass of separate phase contaminant in the zone of interest • 1996 – Surfactant flood to increase the solubility of contaminants in water for enhanced removal efficiencies • 1996 – Installation of a pair of horizontal (directionally drilled) wells and innovative screen material • 1996 – Recirculation between horizontal wells with VOC treatment using iron filings in canisters designed to be installed in situ • 1996 – Photocatalytic destruction of VOCs in groundwater • 1997 – Ultraviolet light destruction of VOCs in groundwater using porous tubes • 1997 – In situ destruction of VOC contaminants using oxidant recirculation between horizontal wells • 1999 – Enhanced in situ VOC removal using steam injection • 1999 – In situ destruction of VOCs using hydrous pyrolysis oxidation • 1999 – Use of electrical resistivity tomography to monitor treatment effectiveness • 1999 – Installation of wells using rotosonic techniques to minimize waste generation • 2000 – Lance permeation of treatment chemicals (oxidants) to destroy VOC contaminants in situ • 2008 – Hydrogen peroxide injections • 2011 – X-701B Interim Remedial Measure (ex situ oxidant)
Quadrant III
X-740 • Installation of poplar trees at X-740 to in situ phytoremediate VOC contaminants
Quadrant IV
X-734 • Installation of poplar trees at X-734 to in situ phytoremediate VOC contaminants

VOC = volatile organic compound

Point 5

The community has expressed a strong preference for consolidating landfills and contaminated soil associated with plumes into an engineered landfill (Adjustment Factor 4(e)(iii)).

Under the community views adjustment factor, EPA and Ohio EPA have identified that the treatment standards can be adjusted (increased or decreased) based on "*The views of the affected local community on the treatment levels or methods in paragraph (E)(4)(d) of this rule as applied at the site, and, for treatment levels, the treatment methods necessary to achieve these levels.*" (*OAC* 3745-57-72(E)(4)(e)(iii)).

While the PORTS community has not yet formally expressed its opinion of the treatment standards or methods being proposed (a step that will occur during the review of the Proposed Plan, if Alternative 2 is the preferred alternative), other interactions have revealed that the community has strongly expressed a desire to have landfills inside of Perimeter Road and soil from groundwater contamination plumes excavated and consolidated into the potential OSDC.

Because of the availability of inexpensive clean fill, the use of contaminated soil and associated waste from select landfills as potential OSDC fill must remain cost effective. There are long-term cost benefits to using the contaminated soil as OSDC fill, as the reliance on long-term engineering and institutional controls across PORTS is reduced; however those cost benefits can be overcome by short-term costs if non-cost-effective treatment methods (such as thermal desorption or chemical oxidation technologies previously implemented at PORTS with high cost but very limited success) are required to be used based on preference or desire.

Therefore, adjustment factor *OAC* 3745-57-72(E)(4)(e)(iii) is an important consideration in PORTS' remedial approach. Consolidation of landfills inside Perimeter Road and obtainment of contaminated fill soil from groundwater contamination areas should support the community desire for potential reuse of the DOE property, following DOE cleanup. This is a factor DOE has considered in developing its proposed adjusted TCE treatment level for consideration by the Ohio EPA Director.

Point 6

Treatment beyond dewatering adds short-term risks to implementation with no commensurate or proportional additional protectiveness benefit (Adjustment Factor 4(e)(iv)).

EPA and Ohio EPA have identified an adjustment factor based on "*The short-term risks presented by the on-site treatment method necessary to achieve the levels or treatment methods in paragraph (E)(4)(d) of this rule*." (*OAC* 3745-57-72(E)(4)(e)(iv)).

Treatment technologies that would have to be considered beyond dewatering that would be required to meet the treatment standard calculated under *OAC* 3745-57-72(E)(4)(d) (90 percent reduction standard) to reduce the concentrations of TCE in the Minford clays typically include some form of heating. Low-temperature thermal treatment is one viable option. With appropriate engineering controls and health and safety considerations, this process should be able to be implemented safely. However, when dealing with heat and additional waste handling, there are increased risks and exposure to industrial, chemical, and radiological hazards. Any off-gases must be collected and treated to avoid inadvertent releases through the air. The chance of spills through additional handling exists as waste is transferred from storage areas to the treatment process and then to the disposal location. Also, the additional heavy equipment and machinery can put workers at risk, even under the best of circumstances.

If the additional treatment was providing additional increases in level of protectiveness or performance of the potential OSDC, then assumption of this risk may be considered worthwhile. However, in the case of pursuing additional treatment prior to disposal in a potential OSDC, there is no added benefit to make assumption of this risk acceptable; therefore, the additional short-term risks from the pursuit of treatment steps beyond dewatering, if they have no commensurate improvement in OSDC protectiveness or performance, are considered unacceptable.

Point 7

Less treatment is appropriate because of the additional protection offered by the engineering design of a potential OSDC (Adjustment Factor 4(e)(v)).

EPA and Ohio EPA provide the opportunity to adjust the treatment standard on a site-specific basis to require less treatment than would otherwise be required because of the protection offered by the engineering design of a CAMU. Five sets of circumstances were identified to use this adjustment factor. The second set of circumstances are most applicable for the potential OSDC, when cost-effective treatment has been used and the CAMU meets the liner and leachate collection requirements for new hazardous waste land disposal units under RCRA.

Under the adjustment factor provided in *OAC* 3745-57-72(E)(4)(e)(v)(b), the Director may adjust the treatment standards based on the long-term protection offered by the engineering design of a CAMU and related engineering controls. As discussed in the EPA CAMU regulation preamble, this adjustment factor reflects the concerns about the uncertainties of long-term containment; thus, when the treatment standards from 3745-57-72(E)(4)(d) have not been substantially met, this adjustment factor would require more robust engineering controls to reduce the potential for and consequences of unit failure. It would also require cost-effective treatment.

As discussed in the preamble to EPA's proposed amendments to the CAMU rule, "*… the concept of "cost-effective" treatment for the purpose of this adjustment factor E [v for OAC 3745-57-72(E)(4)(e)] means that the additional cost associated with increased treatment is proportionate to the increase in protection that the treatment would provide. EPA expects that assessments of cost-effectiveness will be made based on a reasonable review of the costs and the increased protection provided by treatment and on the best professional judgment of the decision maker.*" (65 FR 51106, August 22, 2000).

This adjustment factor requires a more rigorous approach to engineering design and related controls than the minimum State of Ohio and national design standards for CAMUs in that it requires compliance with the liner and leachate collection requirements for new hazardous waste land disposal units at 40 *CFR* 264.301(c) and (d). As discussed in the national regulation, the liner and leachate collection requirements for new hazardous waste landfills are well established and understood, and units constructed to meet the liner and leachate collection requirements for new hazardous waste landfills generally offer a high degree of protection over time (65 FR 51107, August 22, 2000). Because the engineering design and related engineering controls required by this provision are very robust, EPA did not limit this adjustment factor to just PHCs of very low mobility.

Because TCE at PORTS has a cost-effective treatment option of dewatering of free liquids for free-product removal, and because the potential OSDC has engineering design and related controls that exceed the minimum design standards for CAMUs (including liner and leachate collection requirements for new hazardous waste land disposal units under 40 *CFR* 264.301(c) and (d) [see Table 2]), the adjustment factor under 3745-57-72(E)(4)(e)(v)(b) is the most appropriate. Waste Disposition RI/FS Appendix J and the OSDC Intermediate Design Package provide more information about the design of the potential OSDC.

Dewatering of waste to remove free liquids, including pure organic solvents, would be the treatment method of choice at PORTS. Dewatering of waste to remove free liquids is required to meet other elements of the draft WAC of a potential OSDC and to remove free product that may impact liner performance. This process primarily removes free liquids that could compromise the structural stability or liner effectiveness of a potential OSDC. It also lessens any burden on a leachate collection and treatment system. Dewatering is therefore considered cost-effective. Any additional treatment does not provide any additional environmental protection because the engineering elements and siting geology (competent bedrock) are robust, protecting against contaminant migration. Through the final cap and institutional controls, protection of public health and the environment would continue to occur after

closure of the potential OSDC. And once free product is removed from a waste stream, additional treatment will not provide more protection of the underlying liner.

DOE's Proposed Adjusted Standard for TCE

On the basis of the four adjustment factors described above, DOE has identified an adjusted standard for TCE. This standard only applies to waste streams where TCE is identified as a PHC. It is proposed as an adjusted standard for application to representative soil and waste material conditions after the initial treatment process (dewatering) is completed, as necessary. Demonstration of achievement of the standard during field implementation can be shown either through pre-excavation or post-excavation and/or treatment characterization.

Point 8

The proposed site-specific adjusted TCE treatment standard will be applied to unsaturated soil (or saturated soil after dewatering) and is protective of human health and the environment.

DOE is requesting, as a conservative measure, an adjusted treatment standard under *OAC* 3745-57-72(E)(4)(e) for TCE of 5,000 mg/kg for contaminated soils to be used as fill. As demonstrated in the Waste Disposition RI/FS, Alternative 2 will require substantial amounts of soil that will be used as fill. Fill is critical to the management of wastes in the OSDC/CAMU because it is used to structurally support D&D wastes and provide a buffer to protect the liner that contains leachate that will be generated. The use of PORTS borrow soil consisting of contaminated residual soils and aquifer materials has an added benefit of removing contaminated soils that would serve as source for continued groundwater contamination and impact future use of the site. Other future groundwater remediation alternatives would still offer containment of contaminated groundwater, but source areas containing TCE dense non-aqueous phase liquid (DNAPL) do not have to be removed to accomplish these goals. Therefore, use of residual soil as fill and, potentially, highly contaminated aquifer material, offers an opportunity to significantly enhance the scope of remediation and benefit the site for future use. If soils must be treated to a treatment standard of 500 mg/kg as demonstrated in Appendix E, significant constraints on the operation and management of the remedy may result. This appendix lists specific potential problems that can impact the ability to treat heavily contaminated soils in a timely manner. The concept of an adjusted treatment standard posed by EPA was designed just for cases such as PORTS where the extra cost and time for alternative treatments is also not justified, based on the capabilities of the engineering design. One aspect of the design is that the proposed adjusted treatment standard is still within a concentration range that has been found to have little degradation effect on the initial liner or the liner system. DOE is proposing an adjusted treatment standard on a site-wide basis because it has determined that PORTS sources of clay-rich soils are beneficial for Alternative 2. If a PORTS fill source of contaminated soils is not used, then an adjusted treatment standard will have no basis and the treatment standard will revert to the accepted treatment standard of 500 mg/kg.

During excavation, both saturated and unsaturated contaminated soils would be broken up by heavy excavation equipment to facilitate draining of liquid and removal of potential TCE free product. This process would prepare the contaminated soils for subsequent WAC characterization, transportation to, and placement in the OSDC. The adjusted treatment standard will serve as a "ceiling" limit whereby the representative TCE soil or waste concentrations cannot exceed the adjusted standard after cost-effective treatment, if needed, has occurred. This standard is one-third to one-half the EPA guidance level of 10,000 to 15,000 mg/kg in clay soil indicative of free product. It is mainly proposed out of excess caution to safeguard the OSDC liner materials from exposure to excessive remaining TCE free product potentially still trapped in certain soil types even through the initial excavation process and after field dewatering. If

the representative concentrations exceed the ceiling limit, additional steps will be necessary prior to acceptance for disposal at the potential OSDC to meet the free liquid prohibition in the WAC.

Therefore, an adjusted standard of 5,000 mg/kg will also significantly benefit the environment by allowing for an increase of the amount of remediation that will occur at PORTS. Without an adjusted treatment standard, the movement of contaminated residual soil, and other contaminated fill to the CAMU would be more costly in terms of time and management costs and offer less improvement to the site because large areas of contamination may remain in place instead of being placed into a protective engineered landfill. The increased costs and time management concerns to treat volumes of highly contaminated soil is not justified because the adjusted standard is also based on protectiveness of the engineered liner system.

Appendix E also illustrates the potential impact dewatering may have on TCE-contaminated soil at PORTS. Dewatering to other ARAR-based restrictions will be required prior to any waste disposal to assure no free liquids are disposed in the OSDC and Ohio EPA has considered dewatering and DNAPL removal to be a cost-effective treatment for TCE removal in water saturated soils. Appendix E illustrates that some soil matrices (e.g., Gallia Formation sand and gravel) would dewater relatively easy, resulting in fairly low concentrations of TCE. However, those soil matrices (e.g., Minford Formation clay and silt) with high clay content are unlikely to have significant reduction in levels of TCE through dewatering. Contaminated Minford soils are desirable as fill material, but using it is also weighing heavily in the request for an adjusted treatment standard. The characteristics of clay-rich soils like those of the Minford Formation indicate that drainage of these soils to meet geotechnical and geochemical standards may require a significant time period or extensive post-generation processing. Because the logic of operations required to place building materials in the OSDC requires adequate volumes of fill to pack around building wastes, delays in disposal can result if fill is not available and impact the scope of remedial operations. In addition, after dewatering, the residual levels of TCE in soil are estimated to be, on the average, over 5,000 mg/kg, but could be as high as 15,000 mg/kg (see Figure E.4, Appendix E) in some of the most significant TCE source areas at PORTS with facilities that stored and/or used large quantity of TCE for many decades, such as Building X-720. Therefore, additional steps may be required in this area to achieve the proposed adjusted standard of 5,000 mg/kg following any required dewatering and processing for disposal.

If soil or waste exceeds the proposed adjusted standard (measured after soil has been prepared/blended with other material from the AOC to meet all other operational requirements of the potential OSDC), the contaminated soil or wastes would be segregated and further treated to reduce TCE concentrations to below 5,000 mg/kg or be shipped off Site for treatment and disposal. As an example, it is noted in Appendix E that residual soil data from underneath Building X-720 suggests that dewatered soils from this area of PORTS may still have TCE concentrations over 5,000 mg/kg. In this example case, if these soils have TCE concentrations over 5,000 mg/kg after necessary preparation or blending to meet other OSDC operational requirements, these contaminated soils would be segregated and further treated to meet the 5,000 mg/kg ceiling limit, or otherwise shipped off Site for treatment and disposal.

Under *OAC* 3745-57-72(E)(4)(e)(v)(*b*), the Director of Ohio EPA has the basis to approve this adjusted standard of dewatering and a ceiling limit of 5,000 mg/kg because cost-effective treatment has been used and the resulting condition is protective of the potential OSDC liner. As also required under *OAC* 3745-57-72(E)(4)(e)(v)(*b*), the potential OSDC liner system design exceeds the liner and leachate collection requirements for new land disposal units as required by paragraphs C and D of *OAC* 3745-57-03, which has been adopted as an ARAR for the potential OSDC under Alternative 2. The other adjustment factors discussed under Points 4, 5, and 6 provide further supporting bases for the Director of Ohio EPA to approve the proposed adjusted standard. The adjusted standard will allow implementation of the remedy

in a timely and cost effective manner that is in keeping with scope of the remedial actions for a mega-site like PORTS. As discussed in Alternative 2 of the Waste Disposition RI/FS, more contamination will be removed if residual soils, along with other contaminated soils, are used as fill, which has a benefit of revitalizing larger areas of the site. By providing justification for the adjusted standard under several adjustment factors (Points 4, 5, 6, and 8), the proposed designation of the CAMU and the adoption of an adjusted standard meets the requirements of *OAC* 3745-57-72(E)(4).

The director may adjust the treatment level based on the long-term protection offered by the engineering design of the CAMU and related engineering controls where, after review of appropriate treatment technologies, the director determines that cost-effective treatment has been used, and the CAMU meets the liner and leachate collection requirements for new land disposal units at paragraphs (C) and (D) of rule 3745-57-03 of the Administrative Code, as appropriate. The adjusted level or method must be protective of human health and the environment.

FUTURE STORAGE AND/OR TREATMENT CAMU(S)

Storage and/or treatment CAMU(s) can also be used for temporary storage and/or treatment of wastes which would not remain after closure of the treatment, storage and disposal CAMU (the potential OSDC). It is likely that one or more temporary storage and/or treatment CAMU(s) may be established within the AOC during implementation of Alternative 2. The identification of such CAMU(s) would be presented in future regulatory design documents or remedial design submittals subject to approval/concurrence by Ohio EPA under the DFF&O, Consent Decree, or other applicable regulatory agreements with Ohio EPA.

RELATIONSHIP TO OTHER CLEANUP DECISIONS

Consistent with the DFF&O RI/FS statement of work (Attachment A of the DFF&O, Section 3.5.1), DOE has considered all anticipated waste streams to be generated under the DFF&O work activities and the potential waste streams outside of the DFF&O in the technical evaluation of the CAMU designations and the associated identification of PHCs and setting of treatment standards presented in this supplement to the Waste Disposition RI/FS. Although all anticipated waste streams have been considered in the technical CAMU evaluations, additional regulatory authorizations/approvals would be necessary to place those waste streams that originate outside of the DFF&O work activities into the CAMU.

If the future authorizations/approvals for the excavation and placement of waste streams that originate outside the DFF&O work activities in a potential OSDC occur, the identified PHC and adjusted standard presented in this supplement to the Waste Disposition RI/FS would serve as overarching WAC limits for all CAMU-eligible waste streams authorized for disposal in a potential OSDC, irrespective of their regulatory origin.

PUBLIC NOTICE OF CAMU DESIGNATION

Under *OAC* 3745-57-72(H), the Ohio EPA Director is required to provide public notice and a reasonable opportunity for public comment before final designation of the CAMU. If Alternative 2 is identified as the preferred alternative, Ohio EPA could use the Waste Disposition Proposed Plan as the means to provide public notice and seek public comments on the proposed CAMU designation. Following the receipt and review of public comments on the Proposed Plan, the Ohio EPA Director could provide his final designation of the CAMU, and any revisions necessary as a result of public comment, in the Waste Disposition ROD.

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APPENDIX A: AREA OF CONTAMINATION IDENTIFICATION

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FIGURES

A.1. PORTS Sample Locations – Above and Below Background A-6
A.2. Area of Contamination Boundary A-7

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ACRONYMS

AOC	area of contamination
CAMU	Corrective Action Management Unit
DOE	U.S. Department of Energy
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended

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Appendix A presents the known information about the widespread indicators of contamination (i.e., locations on Portsmouth Gaseous Diffusion Plant [PORTS] with constituent concentrations above background) and provides the rationale for identifying a formal Area of Contamination (AOC). This AOC is a fundamental component for the overall efficient cleanup of PORTS.

The AOC concept was discussed in detail in the preamble to the National Contingency Plan (55 Federal Register 8758-8760; March 8, 1990). In this discussion, the U.S. Environmental Protection Agency clarified that certain areas of generally-dispersed contamination can be called "areas of contamination" or "AOCs" and that movement of hazardous wastes within those areas would not be considered land disposal and would not trigger the Resource Conservation and Recovery Act of 1976, as amended (RCRA), land disposal restrictions.

PORTS has been extensively investigated over that past 25 years to characterize the soil (surface and subsurface, Figure A.1) and groundwater through invasive sampling and analysis. The results of this characterization have identified generally dispersed soil contamination across PORTS.

In light of the generally-dispersed contamination as depicted in Figure A.1 and in conjunction with the Corrective Action Management Unit (CAMU) designation, an AOC has been identified to facilitate the efficient removal and remedial activities discussed in the Site-wide Waste Disposition Evaluation Project Remedial Investigation/Feasibility Study report, should Alternative 2 be selected. The AOC has been limited to depict only the necessary footprint to allow the unencumbered movement of waste within the confines of the AOC during planned remedial activities and to ensure that the overall cleanup can be done in an efficient and cost effective manner.

Figure A.2 shows the AOC boundary and the locations where contamination has been identified.

In compliance with applicable or relevant and appropriate requirements, and as described in future design plans, the AOC will be utilized to: (1) remove free liquids in situ from CAMU-eligible waste, which is the first step in treatment to meet principal hazardous constituent treatment standards; (2) collect free liquids removed from CAMU-eligible and -ineligible wastes for treatment and disposal; (3) collect trichloroethene dense non-aqueous phase liquids for off-Site disposal; and (4) transport of wastes to treatment CAMU(s) and the disposal CAMU. Through extensive sampling, the U.S. Department of Energy (DOE) has defined the horizontal boundaries of the AOC at DOE's Portsmouth reservation as depicted in Figure A.2. While the contiguous vertical depth of contamination within this area varies, by using this extensive sampling data, DOE will be able to navigate during the remediation to either ensure remedial activities comport with the AOC policy when working in contaminated media for purposes of RCRA compliance, or use other appropriate remedial regulatory tools, such as storage/treatment CAMUs as discussed in the document, when remedial activities are outside the scope of the AOC policy. Furthermore, while extensive sample data results have not been gathered from underneath buildings within the potential AOC, DOE believes that, at a minimum the Director should concur that these areas under the buildings would be within the general horizontal AOC presented. These buildings as they exist currently are encompassed by other areas of generally dispersed contamination and therefore fall within the scope of an AOC.

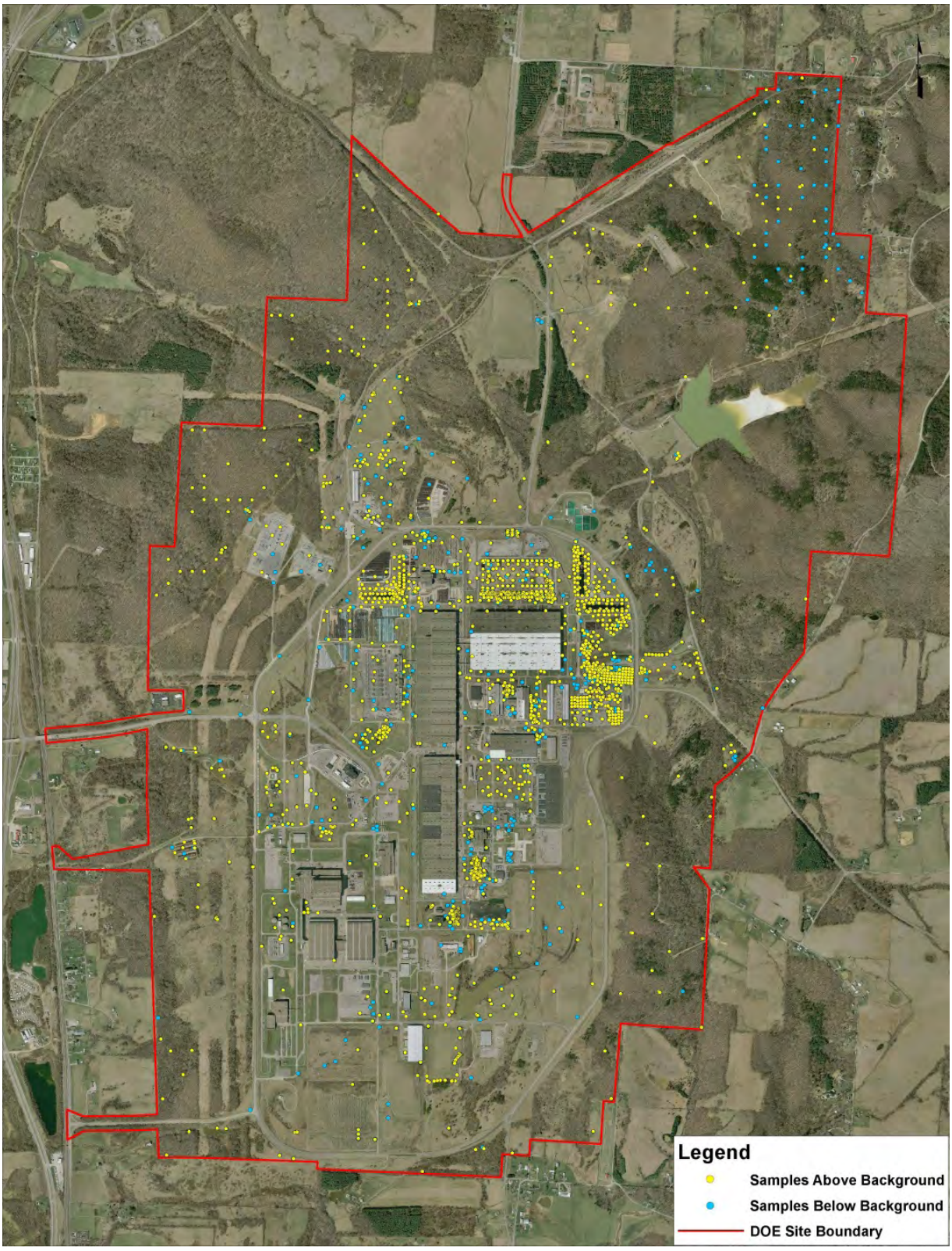

Figure A.1. PORTS Sample Locations – Above and Below Background

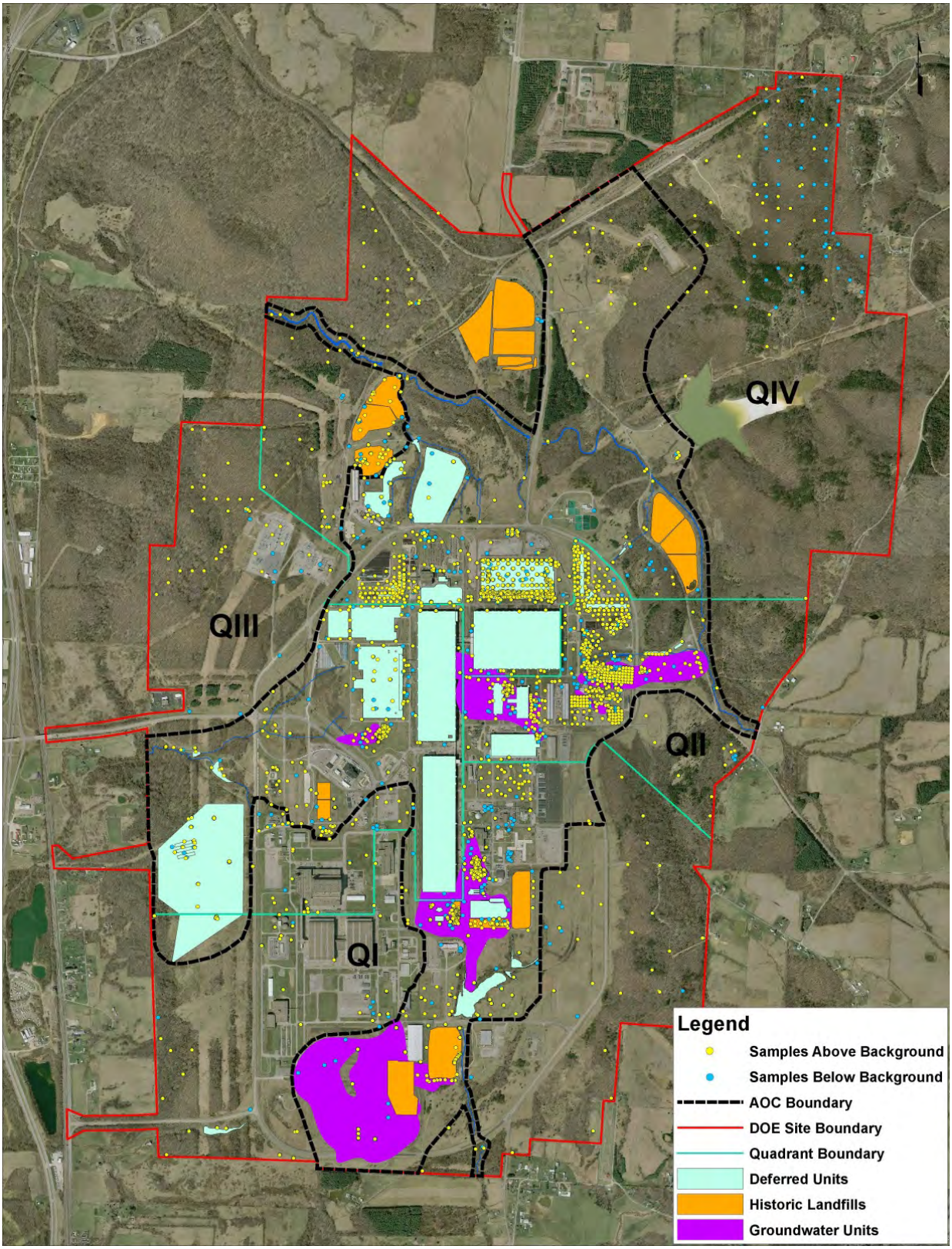

Figure A.2. Area of Contamination Boundary

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APPENDIX B: COMPARISON CROSSWALK OF *OAC* 3745-57-72 REQUIREMENTS TO DOE'S PROPOSED APPROACH FOR CAMU DESIGNATIONS

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Appendix B is a crosswalk matrix of the *Ohio Administrative Code* 3745-57-72 Corrective Action Management Unit rule requirements alongside text that describes the U.S. Department of Energy's (DOE's) approach to complying with this rule. The crosswalk matrix is a line-by-line presentation of the rule with the corresponding proposed action that demonstrates DOE's approach addresses each and every aspect of the rule.

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3745-57-72 Corrective Action Management Units (CAMUs)

RULE	DOE Approach
(A) To implement remedies under rule 3745-54-101 of the Administrative Code or Section 3008(h) of RCRA, or to implement remedies at a permitted facility that is not subject to rule 3745-54-101 of the Administrative Code, the director may designate an area at the facility as a corrective action management unit under the requirements in this rule. Corrective action management unit (CAMU) means an area within a facility that is used only for managing CAMU-eligible wastes for implementing corrective action or cleanup at the facility. A CAMU must be located within the contiguous property under the control of the owner or operator where the wastes to be managed in the CAMU originated. One or more CAMUs may be designated at a facility.	CAMUs designated at PORTS will be located within the contiguous property under the control of DOE. One disposal CAMU and one or more T/S CAMUs are requested for designation. The T/S/D CAMU will be adjacent to the AOC at PORTS. The T/S CAMU(s), as needed, will be located within the AOC, represented in Appendix A. The AOC will be utilized to: (1) remove free liquids from CAMU-eligible waste, which is the first step in treatment to meet PHC treatment standards; (2) remove free liquids from CAMU-ineligible wastes; (3) collect free liquids removed from CAMU-eligible and -ineligible wastes for treatment and disposal; (4) collection of TCE DNAPL for off-Site disposal; and (5) transport of wastes to treatment CAMU(s) and the disposal CAMU. The AOC will extend areally as depicted in Appendix A and within the area will extend from the surface of the contamination in the AOC to the full depth of contamination below the ground surface in the AOC.
(1) CAMU-eligible waste means:	--
(a) All non-hazardous and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris, that are managed for implementing cleanup. As-generated wastes (either hazardous or non-hazardous) from ongoing industrial operations at a site are not CAMU-eligible wastes.	Appendix C identifies the projected types and quantities of CAMU-eligible and -ineligible hazardous and non-hazardous wastes slated for on-Site disposal at PORTS, based on Waste Disposition and Process Buildings RI/FS information. All wastes are managed for implementing cleanup, and no as-generated wastes from ongoing industrial operations are envisioned.
(b) Wastes that would otherwise meet the description in paragraph (A)(1)(a) of this rule are not "CAMU-Eligible Wastes" where:	--
(i) The wastes are hazardous wastes found during cleanup in intact or substantially intact containers, tanks, or other non-land-based units found above ground, unless the wastes are first placed in the tanks, containers or non-land-based units as part of cleanup, or the containers or tanks are excavated during the course of cleanup; or	See Appendix C. Non-CAMU-eligible wastes have been identified In Appendix C, based on RI/FS information.
(ii) The director exercises the discretion in paragraph (A)(2) of this rule to prohibit the wastes from management in a CAMU.	Acknowledged. However, it is not expected that this discretion is necessary.
(c) Notwithstanding paragraph (A)(1)(a) of this rule, where appropriate, as-generated non-hazardous waste may be placed in a CAMU where such waste is being used to facilitate treatment or the performance of the CAMU.	Acknowledged. However, this type of waste is not expected -- Appendix C identifies the non-hazardous wastes that will be disposed in the potential OSDC (future references to the OSDC within this crosswalk without the preface of 'potential' recognize that until Alternative 2 is selected as the remedy, the OSDC is still a potential part of that remedy). All wastes are managed for implementing cleanup.
(2) The director may prohibit, where appropriate, the placement of waste in a CAMU where the director has or receives information that such wastes have not been managed in compliance with applicable land disposal treatment standards of Chapter 3745-270 of the Administrative Code, or applicable unit design requirements of Chapters 3745-54 to 3745-57 and 3745-205 of the Administrative Code, or applicable unit design requirements of Chapters 3745-65 to 3745-69 and 3745-256 of the Administrative Code, or that non-compliance with other applicable requirements of the hazardous waste rules likely contributed to the release of the waste.	Acknowledged. However, it is not expected that this prohibition will be necessary.
(3) Prohibition against placing liquids in CAMUs.	See (3)(a),(b),(c), and (d) below.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(a) The placement of bulk or noncontainerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not sorbents have been added) in any CAMU is prohibited except where placement of such wastes facilitates the remedy selected for the waste.	There will be free liquids associated with remediation of soil, including saturated soil. In addition, there will be rainwater and infiltration water in the remediation area which must be managed. The water (rainwater/infiltration water) from an open remediation/excavation is indistinguishable from the rainwater that will enter the OSDC. The remediation plan will require draining of these free liquids within the AOC at the active remediation area, so the contaminated water can be collected and treated in a wastewater treatment system. Encountered DNAPLs will be collected from the remediation/excavation and segregated from the waste stream being sent to the OSDC. If required, the excavated soil will then be transported to a T/S CAMU for treatment to meet PHC treatment requirements, or the soil will be transported to the disposal CAMU for disposal. It is possible that during transport of the excavated soil, some additional liquids may be freed from the soil matrix. Excavated/remediated soil may require blending to support operational requirements and will be placed in the disposal CAMU so long as the material can pass the Proctor test after compaction.
(b) The requirements in paragraph (C) of rule 3745-57-14 of the Administrative Code for placement of containers holding free liquids in landfills apply to placement in a CAMU except where placement facilitates the remedy selected for the waste.	The disposition (placement) of containers holding free liquids into the OSDC will not occur. The requirements in paragraph (C) of rule 3745-57-14 of the Administrative Code are listed as an ARAR and will be complied with.
(c) The placement of any liquid which is not a hazardous waste in a CAMU is prohibited unless such placement facilitates the remedy selected for the waste or a demonstration is made pursuant to paragraph (E) of rule 3745-57-14 of the Administrative Code.	The placement of liquids that are not hazardous wastes into a T/S or disposal CAMU will not occur. The requirements in paragraph (E) of rule 3745-57-14 of the Administrative Code are listed as an ARAR and will be complied with.
(d) The absence or presence of free liquids in either a containerized or a bulk waste must be determined in accordance with paragraph (B) of rule 3745-57-14 of the Administrative Code. Sorbents used to treat free liquids in CAMUs must meet the requirements of paragraph (D) of rule 3745-57-14 of the Administrative Code.	The presence of free liquids will be demonstrated through the "Paint Filters Liquids Test" (Method 9095B), and DOE will define the use of treatment including free-draining liquids/water and the use of absorbents, if appropriate, during remedial design. The DFF&O-required WAC Implementation Plan and OSDC Operations Plan will be the design documents utilized to present a compliant design plan meeting this requirement, for Ohio EPA review and approval/concurrence.
(4) Placement of CAMU-eligible wastes into or within a CAMU does not constitute land disposal of hazardous wastes.	Agreed.
(5) Consolidation or placement of CAMU-eligible wastes into or within a CAMU does not constitute creation of a unit subject to minimum technology requirements.	Agreed.
(B)	
(1) The director may designate a regulated unit [as described in paragraph (A)(2) of rule 3745-54-90 of the Administrative Code] as a CAMU, or may incorporate a regulated unit into a CAMU, if:	This provision is not applicable. The proposed disposal location will be in a clean, uncontaminated area and, not locating it at the site of or extending the boundaries of an existing regulated unit and treatment/storage CAMUs as needed, will not incorporate regulated units.
(a) The regulated unit is closed or closing, meaning it has begun the closure process under rule 3745-55-13 or 3745-66-13 of the Administrative Code; and	As above.
(b) Inclusion of the regulated unit will enhance implementation of effective, protective, and reliable remedial actions for the facility.	As above.
(2) The requirements of rules 3745-54-90 to 3745-54-101, 3745-55-10 to 3745-55-20, and 3745-55-40 to 3745-55-51 of the Administrative Code and the unit-specific requirements of Chapters 3745-54 to 3745-57, 3745-65 to 3745-69, 3745-205, and 3745-256 of the Administrative Code that applied to the regulated unit will continue to apply to that portion of the CAMU after incorporation into the CAMU.	As above.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(C) The director will designate a CAMU that will be used for storage and/or treatment only in accordance with paragraph (F) of this rule. The director will designate all other CAMUs in accordance with the following:	
(1) The CAMU must facilitate the implementation of reliable, effective, protective, and cost-effective remedies;	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(2) Waste management activities associated with the CAMU must not create unacceptable risks to humans or to the environment resulting from exposure to hazardous wastes or hazardous constituents;	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(3) The CAMU must include uncontaminated areas of the facility, only if including such areas for the purpose of managing CAMU-eligible waste is more protective than management of such wastes at contaminated areas of the facility;	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(4) Areas within the CAMU, where wastes remain in place after closure of the CAMU, must be managed and contained so as to minimize future releases, to the extent practicable;	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(5) The CAMU must expedite the timing of remedial activity implementation, when appropriate and practicable;	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(6) The CAMU must enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU; and	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(7) The CAMU must, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the CAMU.	See text in CAMU Designation section contained within the "SUPPLEMENT NO. 1 TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT FOR THE SITE-WIDE WASTE DISPOSITION EVALUATION PROJECT PROPOSED CORRECTIVE ACTION MANAGEMENT UNIT AND AREA OF CONTAMINATION DESIGNATIONS FOR ALTERNATIVE 2 AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO"
(D) The owner/operator must provide sufficient information to enable the director to designate a CAMU in accordance with the criteria in this rule. This must include, unless not reasonably available, information on:	
(1) The origin of the waste and how it was subsequently managed (including a description of the timing and circumstances surrounding the disposal and/or release);	Based on the RFIs under the Consent Decree conducted under Ohio EPA oversight, the CAMU-eligible waste (which is the source of the PHC in soil and groundwater) was generated during GDP operations during the 1950s, '60s, '70s, and early '80s when wastes were managed in unlined wastewater treatment ponds, were disposed in landfills with no engineered liners, and were not managed per current standards. The Consent Decree required multiple RCRA unit closures which were implemented pursuant to Ohio EPA-approved closure plans and closures under solid waste regulations, as well as implementation of corrective measures for other waste units.
(2) Whether the waste was listed or identified as hazardous at the time of disposal and/or release; and	Initial releases and disposal of CAMU-eligible wastes occurred prior to and after the effective date of RCRA rules; management of F-listed wastes did occur post-RCRA until implementation of RCRA closures approved by Ohio EPA pursuant to the Consent

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
	Decree. Based on the RFIs under the Consent Decree conducted under Ohio EPA oversight, the CAMU-eligible waste (which is the source of the PHC in soil and groundwater) was generated during GDP operations during the 1950s, '60s, '70s, and early '80s when wastes were managed in unlined wastewater treatment ponds, were disposed in landfills with no engineered liners, and were not managed per current standards.
(3) Whether the disposal and/or release of the waste occurred before or after the land disposal requirements of Chapter 3745-270 of the Administrative Code were in effect for the waste listing or characteristic.	Initial releases & disposal occurred prior to and after the effective date of RCRA rules and before the LDRs of Chapter 3745-270 were in effect. Based on the RFIs under the Consent Decree conducted under Ohio EPA oversight, the CAMU-eligible waste (which is the source of the PHC in soil and groundwater) was generated during GDP operations during the 1950s, '60s, '70s, and early '80s when wastes were managed in unlined wastewater treatment ponds, were disposed in landfills with no engineered liners, and were not managed per current standards.
(E) The director will specify, in the permit or order, requirements for CAMUs to include the following:	
(1) The areal configuration of the CAMU.	The disposal CAMU (OSDC) will have an areal configuration that accommodates 12 potential cells to contain approximately 5 million cubic yards of waste (solid waste, construction/demolition debris, treated waste, soil, etc.). The design plans will be consistent with the Waste Disposition ROD and the specific design will be submitted in design plans for Ohio EPA concurrence. T/S CAMU configurations will be presented in the Integrated Remedial Design Plans (or the like) for remediation areas that are subject to approval/concurrence by Ohio EPA. These will comply with Section (F) below.
(2) Except as provided in paragraph (G) of this rule, requirements for CAMU-eligible waste management to include the specification of applicable design, operation, treatment and closure requirements in the hazardous waste rules.	The disposal CAMU (OSDC) will have an areal configuration that accommodates 12 potential cells to contain approximately 5 million cubic yards of waste (solid waste, construction/demolition debris, treated waste, soil, etc.). The design plans will be consistent with the Waste Disposition ROD and the specific design will be submitted in design plans for Ohio EPA concurrence. T/S CAMU configurations will be presented in the Integrated Remedial Design Plans (or the like) for remediation areas that are subject to approval/concurrence by Ohio EPA. These will comply with Section (F) below.
(3) Minimum design requirements. CAMUs, except as provided in paragraph (F) of this rule, into which wastes are placed must be designed in accordance with the following:	The disposal CAMU (OSDC) will have an areal configuration that accommodates 12 potential cells to contain approximately 5 million cubic yards of waste (solid waste, construction/demolition debris, treated waste, soil, etc.). The design plans will be consistent with the Waste Disposition ROD and the specific design will be submitted in design plans for Ohio EPA concurrence. T/S CAMU configurations will be presented in the Integrated Remedial Design Plans (or the like) for remediation areas that are subject to approval/concurrence by Ohio EPA. These will comply with Section (F) below.
(a) Unless the director approves alternate requirements under paragraph (E)(3)(b) of this rule, CAMUs that consist of new, replacement, or laterally expanded units must include a [1]composite liner and a leachate collection system that is designed and constructed to maintain [2]less than a thirty centimeter depth of leachate over the liner. For purposes of this rule, composite liner means a system [3]consisting of two components; the upper component must consist of a [4]minimum thirty mil flexible membrane liner, and the lower component must consist of [5]at least a two-foot layer of compacted soil with a [6]hydraulic conductivity of no more than 1×10^{-7} cm/sec. Flexible membrane liner components consisting of high density polyethylene must be [7]at least sixty mil thick. The flexible membrane liner component must be installed in [8]direct and uniform contact with the compacted soil component; *NOTE: the superscript brackets [ ] have been added for ease of comparison to the proposed design.*	The OSDC Liner system is a composite liner system[1] consisting of 5 components[3]. The components of the liner system consist of the following from bottom to top: a. **Compacted Clay Liner**: 3 ft of compacted clay[5] (hydraulic conductivity less than 1×10^{-7} cm/sec)[6], b. **Secondary Barrier Layer**: GCL, 80-mil-thick HDPE flexible membrane liner[8], and cushion geotextile, e. **Leak Detection System Drainage Layer**: 1 ft leak detection gravel, f. **Primary Barrier Layer**: GCL, 80-mil-thick flexible membrane liner, and cushion geotextile,[4,7] i. **Leachate Collection System Drainage Layer**: 1 ft of drainage gravel. Drainage and leak detection layers have a minimum permeability of 1×10^{-2} cm/sec and are designed to allow no more than 1 ft (30 cm) of head on the liner[2]. The liner surface has a minimum slope of 2% toward the leachate collection corridor and 1% within the leachate collection corridor which allows the leachate to exit the OSDC via gravity.
(b) Alternate requirements. The director may approve alternate requirements if:	See (E)(3)(a) above.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(i) The director finds that alternate design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into the ground water or surface water at least as effectively as the liner and leachate collection systems in paragraph (E)(3)(a) of this rule; or	See (E)(3)(a) above.
(ii) The CAMU is to be established in an area with existing significant levels of contamination, and the director finds that an alternative design, including a design that does not include a liner, would prevent migration from the unit that would exceed long-term remedial goals.	See (E)(3)(a) above.
(4) Minimum treatment requirements: Unless the wastes will be placed in a CAMU for storage and/or treatment only in accordance with paragraph (F) of this rule, CAMU-eligible wastes that, absent this rule, would be subject to the treatment requirements of Chapter 3745-270 of the Administrative Code, and that the director determines contain principal hazardous constituents must be treated to the standards specified in paragraph (E)(4)(c) of this rule.	See (E)(4)(d)(iii).
(a) Principal hazardous constituents are those constituents that the director determines pose a risk to human health and the environment substantially higher than the cleanup levels or goals at the site.	Acknowledged.
(i) In general, the director will designate as principal hazardous constituents:	Acknowledged; see below.
(a) Carcinogens that pose a potential direct risk from ingestion or inhalation at the site at or above 10^{-3}; and	The analysis indicates that TCE has met this criterion for designation as a PHC (see Appendix D). The existing data, all of which is part of the Administrative Record as data collected pursuant to Ohio EPA Consent Decree requirements and as data collected pursuant to requirements under the D&D DFF&O, has been evaluated and shows that only TCE is present in CAMU-eligible wastes at concentrations that would pose a $>10^{-3}$ ELCR or HQ of 10. An evaluation of the PORTS databases for other prominent carcinogenic COPCs has been performed against their respective threshold value and no other constituent has been detected above the threshold criteria. Therefore, TCE is recognized as the single PHC for the T/S/D CAMU. However, if during evaluation of data gained by additional routine characterization during the corrective action and remedial design/remedial action processes, a constituent is identified as a potential PHC, Ohio EPA will be notified to determine if conditions warrant the designation of an additional PHC.
(b) Non-carcinogens that pose a potential direct risk from ingestion or inhalation at the site an order of magnitude or greater over their reference dose.	An evaluation of the PORTS databases for non-carcinogenic COPCs has been performed against their respective threshold value and no constituent has been detected above the threshold criteria. However, if during evaluation of data gained by additional routine characterization during the corrective action and remedial design/remedial action processes, a constituent is identified as a potential PHC, Ohio EPA will be notified to determine if conditions warrant the designation of an additional PHC.
(ii) The director will also designate constituents as principal hazardous constituents, where appropriate, when risks to human health and the environment posed by the potential migration of constituents in wastes to ground water are substantially higher than cleanup levels or goals at the site; when making such a designation, the director may consider such factors as constituent concentrations, and fate and transport characteristics under site conditions.	Acknowledged. It is not anticipated that risks to human health and the environment posed by potential migration of constituents in wastes to groundwater will be substantially higher than cleanup levels or goals. TCE is proposed as the single PHC in soil. However, if during evaluation of data gained by additional routine characterization during the corrective action and remedial design/remedial action processes, a constituent is identified as a potential PHC, Ohio EPA will be notified to determine if conditions warrant the designation of an additional PHC.
(iii) The director may also designate other constituents as principal hazardous constituents that the director determines pose a risk to human health and the environment substantially higher than the cleanup levels or goals at the site.	Acknowledged. However, other constituents in soil have not been identified that meet this criterion. If during evaluation of data gained by additional routine characterization during the corrective action and remedial design/remedial action processes, a constituent is identified as a potential PHC, Ohio EPA will be notified to determine if conditions warrant the designation of an additional PHC.
(b) In determining which constituents are "principal hazardous constituents," the director will consider all constituents which, absent this rule, would be subject to the treatment requirements in Chapter 3745-270 of the Administrative Code.	Acknowledged. TCE is proposed to be the single PHC in soil as it is the only constituent that poses $>1E^{-3}$ ELCR or HQ of 10 and is the driver for all groundwater corrective action. If other PHCs are identified in the future, this section will be reevaluated and reviewed with Ohio EPA for applicability.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(c) Waste that the director determines contains principal hazardous constituents must meet treatment standards determined in accordance with paragraph (E)(4)(d) or (E)(4)(e) of this rule.	Acknowledged. TCE is proposed to be the single PHC in soil.
d) Treatment standards for wastes placed in CAMUs.	See below.
(i) For non-metals, treatment must achieve ninety per cent reduction in total principal hazardous constituent concentrations, except as provided by paragraph (E)(4)(d)(iii) of this rule.	Acknowledged. However, due to site-specific circumstances with TCE as the single PHC, Section (E)(4)(e) is more appropriate and applicable. See (E)(4)(e)(iii) and (E)(4)(e)(v)(b). If other PHCs are identified in the future, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(ii) For metals, treatment must achieve ninety per cent reduction in principal hazardous constituent concentrations as measured in leachate from the treated waste or media [tested according to the toxicity characteristic leaching procedure (TCLP)] or ninety per cent reduction in total constituent concentrations (when a metal removal treatment technology is used), except as provided by paragraph (E)(4)(d)(iii) of this rule.	Acknowledged. However, TCE is proposed as the single PHC in soil based on existing data. If other PHCs are identified in the future, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(iii) When treatment of any principal hazardous constituent to a ninety per cent reduction standard would result in a concentration less than ten times the universal treatment standard for that constituent, treatment to achieve constituent concentrations less than ten times the universal treatment standard is not required. Universal treatment standards are identified in the table in rule 3745-270-48 of the Administrative Code.	Acknowledged.
(iv) For waste exhibiting the hazardous characteristic of ignitability, corrosivity or reactivity, the waste must also be treated to eliminate these characteristics.	Not applicable based on existing data. However, if additional data indicates the presence of other PHCs, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(v) For debris, the debris must be treated in accordance with rule 3745-270-45 of the Administrative Code, or by methods or to levels established under paragraphs (E)(4)(d)(i) to (E)(4)(d)(iv) or paragraph (E)(4)(e) of this rule, whichever the director determines is appropriate.	Hazardous Waste and Universal Waste will be removed prior to demolition of facilities that would render the remainder of the facility as Non-Hazardous Solid Waste or Construction and Demolition Debris (as appropriate) for demolition. The subsequent disposal of the accumulated Universal Waste/Hazardous Waste needs to comply with the WAC (LDR) as it relates to the OSDC. Non-Hazardous Solid Waste and Construction and Demolition Debris are not addressed under this rule.
(vi) Alternatives to TCLP. For metal bearing wastes for which metals removal treatment is not used, the director may specify a leaching test other than the TCLP (U.S. EPA publication SW-846 method 1311) to measure treatment effectiveness, provided the director determines that an alternative leach testing protocol is appropriate for use, and that the alternative more accurately reflects conditions at the site that affect leaching.	Acknowledged.
(e) Adjusted standards. The director may adjust the treatment level or method in paragraph (E)(4)(d) of this rule to a higher or lower level, based on one or more of the following factors, as appropriate. The adjusted level or method must be protective of human health and the environment:	The design and construction of a potential OSDC (the requested disposal CAMU) will provide long-term protection to human health and the environment by containing the contamination inside a double-lined, capped, monitored disposal facility with leachate collection and treatment capabilities. The Intermediate Design Package of the OSDC is included in the Waste Disposition RI/FS and has been reviewed by Ohio EPA. Also see (E)(4)(e)(v)(b).
(i) The technical impracticability of treatment to the levels or by the methods in paragraph (E)(4)(d) of this rule;	DOE believes that, based on U.S. EPA guidance, treating contaminated fill further would be considered technically inappropriate under 3745-57-72(E)(4)(e)(i). Where, as here, if there is an option to leave some contaminated soils in place as opposed to a more aggressive remediation such as excavation, then it is considered technically inappropriate to require treatment when avoiding such treatment will nevertheless be protective and more cost-effective." (62 FR 64504, December 5, 1997)
(ii) The levels or methods in paragraph (E)(4)(d) of this rule would result in concentrations of principal hazardous constituents that are significantly above or below cleanup standards applicable to the site;	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(iii) The views of the affected local community on the treatment levels or methods in paragraph (E)(4)(d) of this rule as applied at the site, and, for treatment levels, the treatment methods necessary to achieve these levels;	The local community will have the opportunity to comment on the Waste Disposition Proposed Plan. The expectation of the local community is for DOE to complete D&D and environmental remediation at PORTS safely and expeditiously and return PORTS to potential reindustrialization. Even more importantly, the community is interested in having the landfills and groundwater plume soil excavated and disposed and, therefore, a cost-effective treatment for that waste is needed.
(iv) The short-term risks presented by the on-site treatment method necessary to achieve the levels or treatment methods in paragraph (E)(4)(d) of this rule;	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(v) The long-term protection offered by the engineering design of the CAMU and related engineering controls:	See (E)(4)(e)(v)(*b*).
(a) Where the treatment standards in paragraph (E)(4)(d) of this rule are substantially met and the principal hazardous constituents in the waste or residuals are of very low mobility; or	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(b) Where cost-effective treatment has been used and the CAMU meets the liner and leachate collection requirements for new land disposal units at paragraphs (C) and (D) of rule 3745-57-03 of the Administrative Code; or	See justification under Point 8 in the main text and Appendix E.
(c) Where, after review of appropriate treatment technologies, the director determines that cost-effective treatment is not reasonably available, and the CAMU meets the liner and leachate collection requirements for new land disposal units at paragraphs (C) and (D) of rule 3745-57-03 of the Administrative Code; or	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(d) Where cost-effective treatment has been used and the principal hazardous constituents in the treated wastes are of very low mobility; or	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(e) Where, after review of appropriate treatment technologies, the director determines that cost-effective treatment is not reasonably available, the principal hazardous constituents in the wastes are of very low mobility, and either the CAMU meets or exceeds the liner standards for new, replacement, or laterally expanded CAMUs in paragraphs (E)(3)(a) and (E)(3)(b) of this rule, or the CAMU provides substantially equivalent or greater protection.	Acknowledged. If additional data indicates the presence of PHCs other than TCE, this section will be reevaluated and reviewed with Ohio EPA for applicability.
(f) The treatment required by the treatment standards must be completed prior to, or within a reasonable time after, placement in the CAMU.	Treatment Standards will be met prior to or within a reasonable time after placement and as a requisite for placement/disposal in the OSDC.
(g) For the purpose of determining whether wastes placed in CAMUs have met site-specific treatment standards, the director may, as appropriate, specify a subset of the principal hazardous constituents in the waste as analytical surrogates for determining whether treatment standards have been met for other principal hazardous constituents. This specification will be based on the degree of difficulty of treatment and analysis of constituents with similar treatment properties.	Not needed based on TCE as single PHC. If other PHCs are identified in the future, this section will be re-evaluated.
(5) Except as provided in paragraph (F) of this rule, requirements for ground water monitoring and corrective action that are sufficient to:	The details of groundwater monitoring, which will comply with all ARARs (solid waste rule requirements and hazardous waste rule requirements), will be submitted as part of the OSDC Design Criteria, OSDC Monitoring Plan that will be submitted for approval/concurrence by Ohio EPA. In general, each cell in the OSDC will have monitoring wells that cover the underlying aquifer system formation by formation.
(a) Continue to detect and to characterize the nature, extent, concentration, direction, and movement of existing releases of hazardous constituents in ground water from sources located within the CAMU; and	OSDC Groundwater monitoring for each cell will consist of upgradient and downgradient wells installed in clusters or nested to monitor 3 different elevations: the Berea Formation, the 680 Sandstone layer (in the Cuyahoga Formation), and the 720 Sandstone layer (in the Cuyahoga Formation).

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(b) Detect and subsequently characterize releases of hazardous constituents to ground water that may occur from areas of the CAMU in which wastes will remain in place after closure of the CAMU; and	OSDC Groundwater monitoring will consist of upgradient and downgradient wells installed in clusters or nested to monitor 3 different elevations: the Berea Formation, the 680 Sandstone layer (in the Cuyahoga Formation), and the 720 Sandstone layer (in the Cuyahoga Formation).
(c) Require notification to the director and corrective action as necessary to protect human health and the environment for releases to ground water from the CAMU.	OSDC Groundwater monitoring plan will require Ohio EPA notification of any releases. The groundwater monitoring plan will state that a corrective action plan will be submitted to Ohio EPA for review/concurrence, as necessary, to ensure protection human health and the environment.
(6) Except as provided in paragraph (F) of this rule, closure and post-closure requirements:	The OSDC Closure Plan, which will comply with all ARARs, will be submitted for approval/concurrence by Ohio EPA. This Closure Plan will address these closure requirements for the area of the T/S/D CAMU (OSDC).
(a) Closure of corrective action management units must:	See (E)(6).
(i) Minimize the need for further maintenance; and	See (E)(6).
(ii) Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, for areas where wastes remain in place, post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, to surface waters, or to the atmosphere.	See (E)(6).
(b) Requirements for closure of CAMUs must include the following, as appropriate and as deemed necessary by the director for a given CAMU:	Acknowledged.
(i) Requirements for excavation, removal, treatment, or containment of wastes; and	Acknowledged. Wastes will be contained within the OSDC. The leachate collection and removal system will allow leachate to drain from the OSDC. This leachate will be conveyed through double-walled pipes to the ILTS during construction and operation and the PLTS after closure.
(ii) Requirements for removal and decontamination of equipment, devices, and structures used in CAMU-eligible waste management activities within the CAMU.	Acknowledged. Equipment used during waste placement will be decontaminated at the end of their use.
(c) In establishing specific closure requirements for CAMUs under paragraph (E) of this rule, the director will consider the following factors:	See (E)(6).
(i) CAMU characteristics;	See (E)(6).
(ii) Volume of wastes which remain in place after closure;	See (E)(6).
(iii) Potential for releases from the CAMU;	See (E)(6).
(iv) Physical and chemical characteristics of the waste;	See (E)(6).
(v) Hydrogeological and other relevant environmental conditions at the facility which may influence the migration of any potential or actual releases; and	See (E)(6).
(vi) Potential for exposure of humans and environmental receptors if releases were to occur from the CAMU.	See (E)(6).

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(d) Cap requirements:	--
(i) At final closure of the CAMU, for areas in which wastes will remain after closure of the CAMU, with constituent concentrations at or above remedial levels or goals applicable to the site, the owner or operator must cover the CAMU with a final cover designed and constructed to meet the following performance criteria, except as provided in paragraph (E)(6)(d)(ii) of this rule:	The Final Cover system will consist of the following layers from bottom to top: a. Contouring layer, 2 ft compacted clay (max hydraulic conductivity less than 1 x 10^{-7} cm/sec), b. GCL, 80-mil-thick HDPE flexible membrane liner, cushion geotextile, c. 1 ft cover drainage layer, d. 3-ft-thick type D dumped rock fill for biointrusion barrier layer, e. 6 in. filter sand layer, f. 21 in. vegetative soil, and g. 6 in. topsoil with vegetation. This final cover system extends beyond the limits of waste to prevent intrusion of surface water and groundwater into the OSDC after closure. Final cover slopes are anticipated to be 20:1, 10:1, and 6:1 for ease of maintenance, and to maintain stability and minimize erosion.
(a) Provide long-term minimization of migration of liquids through the closed unit;	See (E)(6)(d)(i) above.
(b) Function with minimum maintenance;	See (E)(6)(d)(i) above.
(c) Promote drainage and minimize erosion or abrasion of the cover;	See (E)(6)(d)(i) above.
(d) Accommodate settling and subsidence so that the cover's integrity is maintained; and	See (E)(6)(d)(i) above.
(e) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	The impermeable GML layer within the OSDC cap will provide equal initial permeability to the bottom liner system. Both systems rely on GML layers to provide practically impermeable barriers. The cap could also be repaired or replaced if necessary in the future, unlike the bottom liner system for which repair or replacement would not be practical or even possible. Therefore, the cap would be able to maintain longer term low permeability beyond the time frame expected for the bottom liner system.
(ii) The director may determine that modifications to paragraph (E)(6)(d)(i) of this rule are needed to facilitate treatment or the performance of the CAMU (e.g., to promote biodegradation).	See (E)(6)(d)(i)(*e*) above.
(e) Post-closure requirements as necessary to protect human health and the environment, to include, for areas where wastes will remain in place, monitoring and maintenance activities, and the frequency with which such activities must be performed to ensure the integrity of any cap, final cover, or other containment system.	See (E)(6)(d)(i) above. The OSDC Post Closure Care Plan will specify the requirements for monitoring and maintenance of the OSDC after closure to ensure the integrity of the final cover system. Monitoring and maintenance activities and their frequencies will be established in this plan.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(F) CAMUs used for storage and/or treatment only are CAMUs in which wastes will not remain after closure. Such CAMUs must be designated in accordance with all of the requirements of this rule, except as follows.	
(1) CAMUs that are used for storage and/or treatment only and that operate in accordance with the time limits established in the staging pile regulations at paragraphs (D)(1)(c), (H), and (I) of rule 3745-57-74 of the Administrative Code are subject to the requirements for staging piles at paragraphs (D)(1)(a), (D)(1)(b), (D)(2), (E), (F), (J), and (K) of rule 3745-57-74 of the Administrative Code in lieu of the performance standards and requirements for CAMUs in paragraphs (C) and (E)(3) to (E)(6) of this rule.	Treatment/Storage CAMUs will be established as needed near remediation sites and use Staging Piles, which will be described in the Integrated Remedial Design Plans for those specific remediations subject to approval/concurrence by Ohio EPA, as appropriate. Those plans will describe the time limits intended for implementation of the remedy (3745-57-74 (D)(1)(c)) and the requirements of: (D)(1)(a) - facilitation of effective remedy ... (D)(1)(b) - design to prevent or minimize releases ... (D)(2) - establishment of design criteria ... (E) - Ignitable/Reactive prohibitions/criteria ... (F) - Incompatibility of wastes within staging piles ... (J) - Closure Requirements in previously contaminated areas ... (K) - Closure Requirements in previously uncontaminated areas ... Additionally, the OSDC design depicts a T/S CAMU, referenced as the IMTA used to stage/transfer impacted material to the OSDC (Disposal CAMU), where the design of the IMTA is included as part of the design packages submitted to Ohio EPA for their review and concurrence/approval, as appropriate. The design of the IMTA will comply with the requirements of paragraphs (D)(1)(a), (D)(1)(b), (D)(2), (E), (F), (J), and (K) of rule 3745-57-74 of the Administrative Code. However, the time limits for the IMTA must be adjusted to coincide with the operation of the T/S/D CAMU (OSDC); see (F)(2)(a) below.
(2) CAMUs that are used for storage and/or treatment only and that do not operate in accordance with the time limits established in the staging pile regulations at paragraphs (D)(1)(c), (H), and (I) of rule 3745-57-74 of the Administrative Code:	Acknowledged. See (a) below.
(a) Must operate in accordance with a time limit, established by the director, that is no longer than necessary to achieve a timely remedy selected for the waste, and	The OSDC design depicts a T/S CAMU used to stage/transfer impacted material to the OSDC (Disposal CAMU) during timeframes of the year when placement of waste within the OSDC is temporarily postponed due to freeze/thaw cycles in southern Ohio at which times OSDC operational requirements cannot be met. This area is the IMTA and will remain in operation for the duration that the OSDC (Disposal CAMU) is in operation, which is necessary to achieve a timely remedy for the waste.
(b) Are subject to the requirements for staging piles at paragraphs (D)(1)(a), (D)(1)(b), (D)(2), (E), (F), (J), and (K) of rule 3745-57-74 of the Administrative Code in lieu of the performance standards and requirements for CAMUs in paragraphs (C), (E)(4), and (E)(6) of this rule.	Acknowledged. See (F)(1) above.
(G) CAMUs into which wastes are placed where all wastes have constituent levels at or below remedial levels or goals applicable to the site do not have to comply with the requirements for liners at paragraph (E)(3)(a) of this rule, caps at paragraph (E)(6)(d) of this rule, ground water monitoring requirements at paragraph (E)(5) of this rule or, for treatment and/or storage-only CAMUs, the design standards at paragraph (F) of this rule.	Acknowledged.
(H) The director will provide public notice and a reasonable opportunity for public comment before designating a CAMU. Such notice must include the rationale for any proposed adjustments under paragraph (E)(4)(e) of this rule to the treatment standards in paragraph (E)(4)(d) of this rule.	CAMU will be included in the Waste Disposition Proposed Plan/ROD process and in the Deferred Units Preferred Plan/Decision Document process. Public Comment will be addressed.

3745-57-72 Corrective Action Management Units (CAMUs) (Continued)

RULE	DOE Approach
(I) Notwithstanding any other provision of this rule, the director may impose additional requirements as necessary to protect human health and the environment	Acknowledged.
(J) Incorporation of a CAMU into an existing permit must be approved by the director according to the procedures for permit modifications under rule 3745-50-51 of the Administrative	Not applicable.
(K) The designation of a CAMU does not change Ohio EPA's existing authority to address clean-up levels, media-specific points of compliance to be applied to remediation at a facility, or other remedy selection decisions.	Acknowledged.

AOC = area of contamination
ARAR = applicable or relevant and appropriate requirement
CAMU = Corrective Action Management Unit
COPC = chemical of potential concern
D&D = decontamination and decommissioning
DFF&O = *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DNAPL = dense non-aqueous phase liquids
DOE = U.S. Department of Energy
ELCR = excess lifetime cancer risk
FR = Federal Register
GCL = geosynthetic clay liner
GDP = gaseous diffusion plant
GML = geomembrane liner
HDPE = high density polyethylene
HQ = hazard quotient
ILTS = Interim Leachate Treatment System
IMTA = impacted material transfer area
LDR = land disposal restriction
Ohio EPA = Ohio Environmental Protection Agency
OSDC = on-Site disposal cell
PHC = principal hazardous constituent
PLTS = Permanent Leachate Treatment System
PORTS = Portsmouth Gaseous Diffusion Plant
RCRA = Resource Conservation and Recovery Act of 1976, as amended
RFI = RCRA Facility Investigation
RI/FS = Remedial Investigation/Feasibility Study
ROD = Record of Decision
TCE = trichloroethene
TCLP = Toxicity Characteristic Leaching Procedure
T/S = treatment/storage
T/S/D = treatment/storage/disposal
U.S. EPA = United States Environmental Protection Agency
WAC = waste acceptance criteria

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APPENDIX C: IDENTIFICATION OF ANTICIPATED CAMU-ELIGIBLE WASTE STREAMS ASSOCIATED WITH THE PORTS CLEANUP

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ACRONYMS

CAMU	Corrective Action Management Unit
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
PCB	polychlorinated biphenyl
PORTS	Portsmouth Gaseous Diffusion Plant
RAD	radiological
RCRA	Resource Conservation and Recovery Act of 1976, as amended
TSCA	Toxic Substances Control Act of 1976

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Appendix C describes the U.S. Department of Energy's (DOE's) evaluation process to determine the Corrective Action Management Unit (CAMU) eligibility of materials generated at the Portsmouth Gaseous Diffusion Plant (PORTS) during overall cleanup. This appendix is a regulatory road map of all anticipated waste materials generated from both *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O) and non-DFF&O cleanup activities. The appendix organizes the origin of the anticipated waste streams into four major categories: building contents, the building structures, contaminated fill, and remaining contaminated environmental media. Within each category, specific waste sources are identified and each is identified with one of 12 different regulatory waste types (e.g., "Radiological (RAD) Free: [Resource Conservation and Recovery Act of 1976, as amended] RCRA hazardous", "RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris").

This road map is designed to be a quick reference and a summary of a very complex regulatory evaluation process conducted by DOE for all DFF&O and non-DFF&O anticipated waste streams.

Key:

The 4 Major Material Origin Categories:

1) Material Origin Category #1: **Building Contents**

2) Material Origin Category #2: **Building Structures**

3) Material Origin Category #3: **Contaminated Fill** from four PORTS contaminated sources (residual soil defined in the DFF&O; deferred unit soil/closure of the firing range; targeted plume soil; and targeted landfill excavation)

4) Material Origin Category #4: Additional Ohio Consent Decree **Contaminated Environmental Media** needing removal after fill needs are met

The 12 Major Regulatory Waste Types:

1) RAD Free: RCRA Hazardous (Listed or Characteristic) – CAMU Ineligible

2) RAD Free: RCRA Hazardous (Listed or Characteristic) – CAMU Eligible

3) RAD Free: RCRA Non Hazardous Toxic Substances Control Act of 1976 (TSCA) contaminated materials (polychlorinated biphenyl [PCB] wastes)

4) RAD Free: RCRA Non-Hazardous Construction Demolition Debris

5) RAD Free: RCRA Non-Hazardous Solid Wastes

6) RAD Contaminated: RCRA Hazardous (Listed or Characteristic) – CAMU Ineligible

7) RAD Contaminated: RCRA Hazardous (Listed or Characteristic) – CAMU Eligible

8) RAD Contaminated: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)

9) RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris

10) RAD Contaminated: RCRA Non-Hazardous Solid Wastes

11) Nuclear Products in Inventory

12) Non-Waste Materials Considered as Potential Recycle Materials

Note: All quantities are in cubic yards.

CAMU INELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
1. Building Contents								
1.1	RAD Free: RCRA Hazardous (Listed or Characteristic) And RAD Free: RCRA Non-Hazardous Solid Wastes (only the daily trash component)	As generated wastes: -RCRA Wastes in Containers (e.g., RCRA Storage or Satellite Accumulation Areas) and -RCRA Hazardous Lab Chemicals from on-Site laboratory operations, both generated during industrial operations, and -Solid waste generated as daily trash during industrial operations	0	354	Waste was/is generated during process operations and will be removed from the building in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released or disposed on Site, but sent to appropriate off-Site permitted disposal facilities.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	No
1.6	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	RAD contaminated containerized wastes and above-grade tanks and materials Incidental MLLW generated during operations of RCRA-permitted area	0	114	Waste was/is generated during process operations and will be removed from the building in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released or disposed on Site, but sent to appropriate off-Site permitted disposal facilities.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	No

CAMU INELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
2. Building Structures								
2.1	RAD Free: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No
2.6	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No
3. Contaminated Fill								
3.1	RAD Free: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No
3.6	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No

CAMU INELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
4. Contaminated Environmental Media								
4.1	RAD Free: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No
4.6	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	N/A	N/A	N/A	No

CAMU = Corrective Action Management Unit
D&D = decontamination and decommissioning
MLLW = mixed low-level (radioactive) waste
N/A = not applicable
RAD = radiological
RCRA = Resource Conservation and Recovery Act of 1976, as amended
RI/FS = Remedial Investigation/Feasibility Study

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
1. Building Contents								
1.2	RAD Free: RCRA Hazardous (Listed or Characteristic)	Universal Wastes. Lead Circuit Boards While the category is CAMU-eligible, DOE currently plans to manage all waste in this category for off-Site disposal at a permitted TSDF	0	The volume of this waste is included with the RAD Free: RCRA Hazardous in Waste Type 1.1 above.	Waste is generated during D&D activities in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released and is managed in compliance prior to disposal.	N/A. There is no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on- or off-Site disposal.	Yes
1.3	RAD Free: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes
1.4	RAD Free: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
1. Building Contents (continued)								
1.5	RAD Free: RCRA Non-Hazardous Solid Wastes	Dry transformers, misc. equipment, unrecycled office furniture and cabinets	6,676	3,491	Waste is generated during D&D activities in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes
1.7	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	PPE IDW and D&DDW This waste has not been quantified but will be an insignificant volume	0 (minimal)	0	Waste is generated during D&D activities in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes
1.8	RAD Contaminated: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	Empty PCB contaminated lube oil tanks, PCB collection system, and empty PCB transformers and IDW and D&DDW	14,335	4,460	Waste is generated during D&D activities in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
1. Building Contents (continued)								
1.9	RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes
1.10	RAD Contaminated: RCRA Non-Hazardous Solid Wastes	Process equipment and piping, RAD contaminated items, transite/steel cell housing, material generated during removal and processing of components	362,662	74,547 (Note: this off-Site volume includes the DOE commitment to ship the compressors and converters from Building X-326 off Site for disposal.)	Waste is generated during D&D activities in preparation for structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal. This waste category includes non-hazardous waste.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes
2. Building Structures								
2.2	RAD Free: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	TBD	TBD	TBD	Yes
2.3	RAD Free: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
2. Building Structures (continued)								
2.4	RAD Free: RCRA Non-Hazardous Construction Demolition Debris	Misc. concrete structures, slab/below-grade concrete, miscellaneous clean structures and buildings	17,474	14,546	Waste is generated during D&D activities as a part of structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes
2.5	RAD Free: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes
2.7	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	None Anticipated	0	0	TBD	TBD	TBD	Yes
2.8	RAD Contaminated: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	Ductwork, PCB Spills/Stained Concrete	18,484	0	Waste is generated during D&D activities as a part of structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
2. Building Structures (continued)								
2.9	RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris	Building structures, exterior transite, conduit, catwalks, ventilation systems, slab/below grade concrete, water lines, fire suppression systems	765,555	21,288	Waste is generated during D&D activities as a part of structure demolition.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during D&D activities for on-Site disposal.	Yes
Note: During the demolition process, (similar to X-770, a completed project at PORTS) this stream may be commingled with the on-Site portion of the TSCA waste stream, changing volumes from Item 2.9 into Item 2.8 as the OSDC can accept TSCA-regulated waste. Segregation of these streams would be of no added benefit.								
2.10	RAD Contaminated: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
3. Contaminated Fill								
3.2	RAD Free: RCRA Hazardous (Listed or Characteristic)	Lead-contaminated Soil from the Firing Range	13,000	1	Soil contamination in this category comes from a firing range which remains active as of August 2014. When deactivated, Corrective Action will be conducted to remediate soil contamination generating this waste. The soil contamination is not the result of disposal.	Soil contamination in this category comes from a firing range which remains active as of August 2014. When deactivated, Corrective Action will be conducted to remediate soil contamination. Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste is not released on Site and is managed in compliance prior to on-Site disposal.	N/A. There was no on-Site disposal or any release of this waste category. Waste is newly generated during Consent Decree Corrective Action activities for on-Site disposal.	Yes
3.3	RAD Free: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes
3.4	RAD Free: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
3. Contaminated Fill (continued)								
3.5	RAD Free: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes
3.7	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	- Residual Soil from Utility/Below Grade Structures - TCE Contaminated Plume Soils - TCE Contaminated Deferred Unit Soils - TCE Contaminated Landfill non-soils - TCE Contaminated Landfill soils	53,303 1,494,230 710,000 223,000 345,000	0	Waste is generated during D&D activities for the associated structure demolition and other regulatory authorities coordinated with D&D activities for the associated structure, and during landfill actions.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste that has caused the contamination was released on Site prior to and shortly after RCRA rules in November 1980. Corrective Actions for all contamination has been implemented under the Consent Decree, but a final remedy for 7-Unit Groundwater Plume has not yet been selected by Ohio EPA. All waste generated in this category will be managed in compliance prior to on-Site disposal.	The contamination in this category was released on Site before the land disposal requirements of 3745-270 in December 1989.	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
3. Contaminated Fill (continued)								
3.8	RAD Contaminated: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes
3.9	RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes
3.10	RAD Contaminated: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
4. Contaminated Environmental Media								
4.2	RAD Free: RCRA Hazardous (Listed or Characteristic)	TBD based on completion of the RFI/CMS	TBD	0	Waste is generated during Consent Decree Corrective Action. Waste that has caused the contamination in this category was released on Site prior to and shortly after RCRA rules in November 1980.	Waste is newly generated and evaluated at the time of generation to determine proper waste management requirements. Waste that has caused the contamination in this category was released on Site prior to and shortly after RCRA rules in November 1980. Corrective Actions have been implemented under the Consent Decree, but a final remedy for 7-Unit Groundwater Plume has not yet been selected by Ohio EPA. All waste generated in this category will be managed in compliance prior to on-Site disposal.	The contamination in this category was released on Site before the land disposal requirements of 3745-270 in December 1989.	Yes
4.3	RAD Free: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
4. Contaminated Environmental Media (continued)								
4.4	RAD Free: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes
4.5	RAD Free: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes
4.7	RAD Contaminated: RCRA Hazardous (Listed or Characteristic)	TBD based on completion of the RFI/CMS	TBD	0	Waste is generated during Consent Decree Corrective Action. Waste that has caused the contamination in this category was released on Site prior to and shortly after RCRA rules in November 1980.	(see Note in 4.2)	The contamination in this category was released on Site before the land disposal requirements of 3745-270 in December 1989.	Yes
4.8	RAD Contaminated: RCRA Non-Hazardous TSCA contaminated materials (PCB wastes)	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU ELIGIBLE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS - On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
4. Contaminated Environmental Media (continued)								
4.9	RAD Contaminated: RCRA Non-Hazardous Construction Demolition Debris	None Anticipated	0	0	TBD	TBD	TBD	Yes
4.10	RAD Contaminated: RCRA Non-Hazardous Solid Wastes	None Anticipated	0	0	TBD	TBD	TBD	Yes

CAMU = Corrective Action Management Unit
CMS = Corrective Measures Study
D&D = decontamination and decommissioning
D&DDW = D&D derived waste
DOE = U.S. Department of Energy
IDW = investigation derived waste
N/A = not applicable
Ohio EPA = Ohio Environmental Protection Agency
OSDC = on-Site disposal cell
PCB = polychlorinated biphenyl
PORTS = Portsmouth Gaseous Diffusion Plant
PPE = personnel protection equipment
RAD = radiological
RCRA = Resource Conservation and Recovery Act of 1976, as amended
RFI = RCRA Facility Investigation
RI/FS = Remedial Investigation/Feasibility Study
TBD = to be determined if waste is found during project execution
TCE = trichloroethene
TSCA = Toxic Substances Control Act of 1976
TSDF = transfer, storage, and disposal facility

NON WASTE								
Item No.	**Regulatory Waste Type**	**Examples**	**Estimated Quantities in RI/FS – On Site**	**Estimated Quantities in RI/FS - Off Site**	**3745-57-72(D)(1) - Description of Origin of Waste, and Description of Timing and Circumstances of Disposal/Release**	**3745-57-72(D)(2) – Was Waste Identified as Hazardous at the Time of Disposal/Release?**	**3745-57-72(D)(3) – Did Disposal/Release Occur Before or After Land Disposal Requirements of Chapter 3745-270?**	**3745-57-72(A)(1) - Is the Waste CAMU-Eligible?**
1. Building Contents								
1.11	Nuclear Products in Inventory	Containerized materials in storage.	0	0	N/A	N/A	N/A	N/A
1.12	Material available for Recycle	Dry type transformers, miscellaneous equipment, office equipment	0	55,000	N/A	N/A	N/A	N/A
2. Building Structures								
2.11	Nuclear Products in Inventory	None Anticipated	0	0	N/A	N/A	N/A	N/A
2.12	Material available for Recycle	Structural steel, copper wire, concrete	0	55,000	N/A	N/A	N/A	N/A
3. Contaminated Fill								
3.11	Nuclear Products in Inventory	None Anticipated	0	0	N/A	N/A	N/A	N/A
3.12	Material available for Recycle	None Anticipated	0	0	N/A	N/A	N/A	N/A
4. Contaminated Environmental Media								
4.11	Nuclear Products in Inventory	None Anticipated	0	0	N/A	N/A	N/A	N/A
4.12	Material available for Recycle	None Anticipated	0	0	N/A	N/A	N/A	N/A

CAMU = Corrective Action Management Unit
N/A = not applicable
RI/FS = Remedial Investigation/Feasibility Study

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APPENDIX D: IDENTIFICATION OF PRINCIPAL HAZARDOUS CONSTITUENTS

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ACRONYMS

COPC	chemicals of potential concern
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DOE	U.S. Department of Energy
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
HI	hazard index
Ohio EPA	Ohio Environmental Protection Agency
PHC	principal hazardous constituent
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
TCE	trichloroethene

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D.1 INTRODUCTION

Appendix D presents the information to identify the chemicals of potential concern (COPCs) at the Portsmouth Gaseous Diffusion Plant (PORTS), develop a principal hazardous constituent (PHC) limit for each COPC based on a future exposure scenario for an outdoor worker, screen existing soil data against the calculated PHC limits to identify COPCs that exceed the PHC limit, and estimate the soil volumes associated with the COPCs that exceed the PHC limit. Information generated from this screening process will be used to evaluate Corrective Action Management Unit treatment strategies for the proposed waste disposal alternatives.

D.1.1 SELECTION OF COPCS

The COPCs for PORTS have been compiled and evaluated in the *Methods for Conducting Human Health Risk Assessments and Risk Evaluations at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (U.S. Department of Energy [DOE] 2013). COPCs in the risk document are based on chemicals used in historic PORTS operations and the known chemicals in soil and groundwater contamination areas; other COPCs may be added as the remediation process progresses. Calculation of the PHC threshold value was performed for those COPCs in the risk document that also appear in the Resource Conservation and Recovery Act of 1976, as amended (RCRA) D- and F-listed tables (Table D.1). Carcinogenic COPCs in Table D.1 are identified by italicized text.

Table D.1. COPCs in the PORTS Risk Document that Appear in the RCRA D- and F-listed Tables

Acetone	Dichloroethylene 1,2-cis-	Trichloroethylene
Benzene	Dichloroethylene, 1,2-trans-	Trichlorofluoromethane
Carbon Disulfide	*Dinitrotoluene 2,4-*	*Vinyl Chloride*
Carbon Tetrachloride	Endrin	Xylene
Chlorodane, alpha	*Heptachlor*	*Arsenic*
Chlorodane, gamma	*Heptachlor Epoxide*	Barium
Chlorobenzene	*Hexachlorobenzene*	Cadmium
Chloroform	*Hexachlorobutadiene*	Chromium(III)
Cresol, p-	*Lindane*	*Chromium(VI)*
Dichlorobenzene, 1,4-	Methoxychlor	Cyanide
Dichlorodifluoromethane	Methylene Chloride	Lead
Dichloroethane, 1,1-	*Nitrobenzene*	Mercury, Elemental
Dichloroethane, 1,2-	Tetracholorethylene	Mercury, Inorganic Salts
Dichloroethylene, 1,1-	Trichloroethane, 1,1,1-	Selenium
Dichloroethylene, 1,2-	Trichloroethane, 1,1,2-	Silver

D.1.2 EXPOSURE SCENARIO, PARAMETERS, AND LIMITS

The outdoor worker is the reasonable maximum exposure scenario for evaluating threats to human health from residual contaminant levels remaining in the soil after remedial actions because the future land use for PORTS is designated as industrial. Receptor exposure pathways applicable to soil media include ingestion of soil, inhalation of particulate suspended by wind, and dermal absorption. Exposure parameters for the outdoor worker (Table D.2) reflect the U.S. Environmental Protection Agency (EPA) 2014a recommended values. Chemical-specific slope factors, reference doses, absorption factors, and volatilization factors for the COPCs are provided in the PORTS risk document (DOE 2013).

Table D.2. Exposure Parameters for the Outdoor Worker Scenario

Exposure Parameters			Value	Units
IRS	=	ingestion rate of soil	100	mg/day
EF	=	exposure frequency	225	days/yr
ED	=	exposure duration	25	yrs
ET	=	exposure time	8	hrs/day
BW	=	body weight	80	kg
AT_c	=	averaging time - cancer	25,550	days
AT_n	=	averaging time - noncancer	9,125	days
SA	=	skin surface available for contact	3,470	cm^2/day
AF	=	adherence factor	0.12	mg/cm^2
ABS	=	absorption factor	COC specific	unitless
PEF	=	particulate emission factor	1.24E+09	m^3/kg

PEF applies to a 0.5 acre exposure area

COC = contaminant of concern

For the PHC calculations (Section D.1.3), an excess lifetime cancer risk (ELCR) of 10^{-3} will be used for chemicals classified as carcinogens and a hazard index (HI) of 10 will be used for non-carcinogens. These proposed ELCR and HI limits for PHCs are defined in the Federal Register (Volume 65, #163, 22 August 2000, Part III, Section G, Paragraph e).

D.1.3 PHC THRESHOLD VALUES

Threshold values for the PHCs were calculated using the equations and chemical-specific slope factors, reference doses, absorption factors and volatilization factors provided in the PORTS risk document. The starting point is Appendix B of the risk document, where soil screening levels are tabulated for the COPCs identified in Table D.1 at an ELCR of 10^{-6} and HI of 0.1. For the COPCs in Table D.1, values from Table 2 of Appendix B of the PORTS risk document are listed in Table D.3. Using the EPA 2014a recommended exposure parameters for an outdoor worker (Table D.2), and equations and chemical-specific values in the PORTS risk methods document, the values in Table 2 of Appendix B of the PORTS risk document were updated to account for the EPA 2014a exposure parameters (Table D.3). PHC threshold values were calculated by multiplying the EPA 2014a updated values by 1,000 for carcinogens and by 100 for non-carcinogens. Calculated PHC values appear in the last two columns of Table D.3.

Final adjustments to the present COPC list and PHC threshold values in Table D.3 were made after reviewing screening results and removing COPCs that had no detects or those with a few detects that are orders-of-magnitude below the PHC limit; and after considering regulatory input from the Ohio Environmental Protection Agency (Ohio EPA).

Several notes apply to this short list of COPCs and PHC limits (Table D.4):

- Total chromium results for soil samples will be compared to the PHC limit for chromium (VI).
- Lead was added to the COPCs and the PHC limit is based on the EPA soil screening level of 800 mg/kg (EPA 2014b) for an industrial use scenario.
- The PHC limit for elemental mercury is the value recommended by Ohio EPA.

Table D.3. Derivation of PHC Limits for Ports COPCs – Outdoor Worker Exposure Scenario

All Values in mg/kg	DOE 2013 PORTS Risk Document[a]		EPA 2014 Exposure Values[b]		PHC Threshold Values[c]	
	Carcinogen ELCR = 10^{-6}	Noncarcinogen HI = 0.1	Carcinogen ELCR = 10^{-6}	Noncarcinogen HI = 0.1	Carcinogen ELCR = 10^{-3}	Noncarcinogen HI = 10
Acetone	---	7.49E+04	---	8.25E+04	---	1.00E+06
Arsenic	2.65E+00	---	3.34E+00	---	3.34E+03	---
Barium	---	2.11E+04	---	2.39E+04	---	1.00E+06
Benzene	7.33E+00	---	7.45E+00	---	7.45E+03	---
Cadmium	---	8.85E+01	---	1.09E+02	---	1.09E+04
Carbon Disulfide	---	5.11E+02	---	5.14E+02	---	5.14E+04
Carbon Tetrachloride	4.25E+00	---	4.29E+00	---	4.29E+03	---
Chlordane, alpha	7.19E+00	---	8.90E+00	---	8.90E+03	---
Chlordane, gamma	7.19E+00	---	8.90E+00	---	8.90E+03	---
Chlorobenzene	---	1.95E+02	---	1.97E+02	---	1.97E+04
Chloroform	2.09E+00	---	2.09E+00	---	2.09E+03	---
Chromium(III)	---	1.70E+05	---	1.95E+05	---	1.00E+06
Chromium(VI)	6.16E+00	---	7.01E+00	---	7.01E+03	---
Cresol, p-	---	6.84E+03	---	9.16E+03	---	9.16E+05
Cyanide	---	2.61E+00	---	2.63E+00	---	2.63E+02
Dichlorobenzene, 1,4-	1.72E+01	---	1.73E+01	---	1.73E+04	---
Dichlorodifluoromethane	---	5.49E+01	---	5.49E+01	---	5.49E+03
Dichloroethane, 1,1-	2.32E+01	---	2.34E+01	---	2.34E+04	---
Dichloroethane, 1,2-	3.01E+01	---	3.04E+00	---	3.04E+03	---
Dichloroethylene 1,2-cis-	---	2.27E+02	---	2.60E+02	---	2.60E+04
Dichloroethylene, 1,1-	---	1.49E+02	---	1.49E+02	---	1.49E+04
Dichloroethylene, 1,2-	---	1.02E+03	---	1.17E+03	---	1.17E+05
Dichloroethylene, 1,2-trans-	---	9.52E+01	---	9.56E+01	---	9.56E+03
Dinitrotoluene 2,4-	6.13E+00	---	8.23E+00	---	8.23E+03	---
Endrin	---	2.05E+01	---	2.75E+01	---	2.75E+03
Heptachlor	4.26E-01	---	5.70E-01	---	5.70E+02	---
Heptachlor Epoxide	2.10E-01	---	2.82E-01	---	2.82E+02	---
Hexachlorobenzene	1.20E+00	---	1.60E+00	---	1.60E+03	---
Hexachlorobutadiene	2.46E+01	---	3.29E+01	---	3.29E+04	---
Lead	---	---	---	---	---	---
Lindane	2.29E+00	---	2.83E+00	---	2.83E+03	---
Mercury, Elemental	---	---	---	---	---	---
Mercury, Inorganic Salts	---	3.41E+01	---	3.88E+01	---	3.88E+03
Methoxychlor	---	3.42E+02	---	4.58E+02	---	4.58E+04
Methylene Chloride	---	3.85E+02	---	4.14E+02	---	4.14E+04
Nitrobenzene	3.42E+01	---	3.41E+01	---	3.41E+04	---
Selenium	---	5.68E+02	---	6.49E+02	---	6.49E+04
Silver	---	5.68E+02	---	6.49E+02	---	6.49E+04
Tetrachloroethylene	---	5.77E+01	---	5.83E+01	---	5.83E+03
Trichloroethane, 1,1,1-	---	5.36E+03	---	5.39E+03	---	5.39E+05
Trichloroethane, 1,1,2-	---	9.56E-01	---	9.56E-01	---	9.56E+01
Trichloroethylene	---	2.80E+00	---	2.82E+00	---	2.82E+02

Table D.3. Derivation of PHC Limits for Ports COPCs – Outdoor Worker Exposure Scenario (Continued)

All Values in mg/kg	DOE 2013 PORTS Risk Document[a]		EPA 2014 Exposure Values[b]		PHC Threshold Values[c]	
	Carcinogen ELCR = 10^{-6}	Noncarcinogen HI = 0.1	Carcinogen ELCR = 10^{-6}	Noncarcinogen HI = 0.1	Carcinogen ELCR = 10^{-3}	Noncarcinogen HI = 10
Trichlorofluoromethane	---	4.76E+02	---	4.78E+02	---	4.78E+04
Vinyl Chloride	2.11E+00	---	2.24E+00	---	2.24E+03	---
Xylene	---	3.83E+02	---	3.84E+02	---	3.84E+04

[a]DOE 2013 values from Appendix B, Table 2 of DOE 2013.
[b]EPA 2014 values update DOE 2013 values using EPA 2014a revised exposure parameters for body weight (80 kg), skin surface area (3,470 cm^2) and soil adherence factor (0.12 mg/cm^2).
[c]PHC threshold values derived by multiplying EPA 2014a values by 1,000 for carcinogens and by 100 for non-carcinogens. For acetone, barium and chromium (III), the PHC calculation exceeded 1E+06 mg/kg (100 percent) and values were defaulted to 1E+06.

DOE = U.S. Department of Energy
ELCR = excess lifetime cancer risk
EPA = U.S. Environmental Protection Agency
HI = hazard index
PHC = principal hazardous constituent
PORTS = Portsmouth Gaseous Diffusion Plant

Table D.4. Short list of COPCs and PHC Limits for Soil at PORTS

Outdoor Worker SSLs (mg/kg)	PHC Limit ELCR = 10^{-3} HI = 10
COPC	
Arsenic	3,340
Chromium (total)	7,010
Chromium (VI)	7,010
Dichloroethylene, 1,1-	14,900
Dichloroethylene, 1,2-cis-	26,000
Dichloroethylene, 1,2-trans-	9,560
Lead	800
Mercury (inorganic salts)	3,880
Mercury (elemental)	497
Tetrachloroethylene	5,830
Trichloroethylene	282
Vinyl Chloride	2,240

Italicized text indicates PHC limit is for carcinogenic properties.

COPC = chemical of potential concern
ELCR = excess lifetime cancer risk
HI = Hazard Index
PHC = principal hazardous constituent
SSL = site screening level

D.2 PHC SCREENING PROCESS

D.2.1 SOIL DATA

D.2.1.1 Historical Soil Data Set

The historical soil data set is defined as data collected after January 1991 that is associated with a quality assurance sampling and analysis plan. This data set covers actions under the Consent Decree and *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation*

and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto (DFF&O) and has 152,937 results for the 45 COPCs listed in Table D.3. Information covered under the Consent Decree is shown simply to convey the entire snapshot of present soil sample results at PORTS. Locations for the reported results are shown on Figure D.1.

A comparison of the 152,937 results to the PHC limits in Table D.3 yielded the following metrics for each COPC: number of results, number of detected results, number above the PHC limit, percent above the PHC limit, minimum result, maximum result, PHC limit, and the ratio of maximum detect to PHC limit (Table D.5). Presently, trichloroethene (TCE) is the only COPC with soil results above its PHC limit (red dots on Figure D.1). As soil remediation activities progress, additional COPCs could be defined as PHCs.

D.2.1.2 Residual Soil Data Set

The residual soil data set (a subset of the historical soil data set) applies only to remedial actions covered under the DFF&O, and includes data collected after January 1991 that is associated with a quality assurance sampling and analysis plan. Sample locations for this data set are provided as shown on Figure D.2 and indicate that a portion of the TCE results that exceed the PHC limit are captured in the residual data set and the rest are within the X-701B plume area.

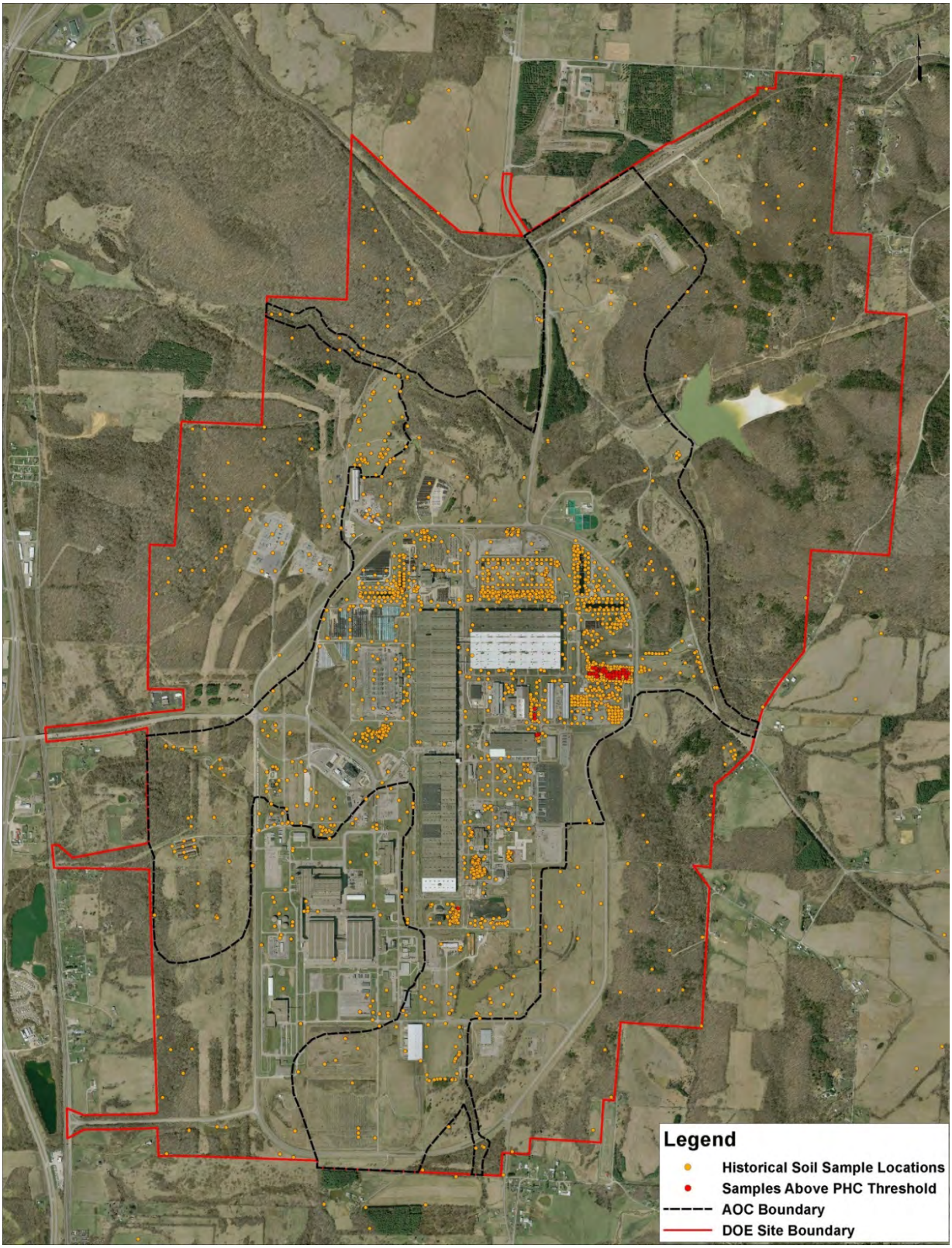

Figure D.1. Sample Locations for the Historical Soil Data Set

Table D.5. Results for Soil Screening of Historical Data Set against PHC Limits

COPC	Number of Results	Number of Detects	Number above PHC Limit	Percent above PHC Limit	Minimum Detection (mg/kg)	Maximum Detection (mg/kg)	PHC Limit (mg/kg)	Ratio of Maximum over PHC Limit
Acetone	4,505	1,796	0	0	1.86E-03	8.80E+02	1.00E+06	8.80E-04
Arsenic	4,907	4,772	0	0	6.60E-03	4.70E+02	3.34E+03	1.41E-01
Barium	4,794	4,774	0	0	2.90E+00	1.30E+03	1.00E+06	1.30E-03
Benzene	3,134	42	0	0	4.70E-04	1.90E+01	7.45E+03	2.55E-03
Cadmium	4,781	2,650	0	0	1.47E-02	4.94E+03	1.09E+04	4.52E-01
Carbon Disulfide	2,973	38	0	0	4.50E-04	1.70E+00	5.14E+04	3.31E-05
Carbon Tetrachloride	3,045	56	0	0	9.60E-04	7.89E-01	4.29E+03	1.84E-04
Chlordane, alpha	2,045	20	0	0	7.55E-05	2.70E-02	8.90E+03	3.03E-06
Chlordane, gamma	2,045	21	0	0	2.27E-04	8.20E-02	8.90E+03	9.21E-06
Chlorobenzene	3,061	20	0	0	2.00E-03	1.70E+01	1.97E+04	8.64E-04
Chloroform	3,113	94	0	0	4.60E-04	5.50E+00	2.09E+03	2.63E-03
Chromium (total)	5,455	5,424	0	0	1.20E+00	6.05E+03	1.00E+06	6.05E-03
Chromium (III)	884	863	0	0	2.29E+00	5.67E+01	1.00E+06	5.67E-05
Chromium (VI)	884	87	0	0	1.32E-01	2.30E+01	7.01E+03	3.28E-03
Cresol, p-	631	1	0	0	8.50E-01	8.50E-01	9.16E+05	9.28E-07
Cyanide	2,022	276	0	0	6.67E-02	2.71E+01	2.63E+02	1.03E-01
Dichlorobenzene, 1,4-	3,547	5	0	0	2.00E-03	3.80E-01	1.73E+04	2.20E-05
Dichlorodifluoromethane	1,049	0	0	0	--	--	5.49E+03	--
Dichloroethane, 1,1-	5,558	577	0	0	2.40E-04	9.73E+01	2.34E+04	4.16E-03
Dichloroethane, 1,2-	5,082	70	0	0	7.50E-04	1.00E+00	3.04E+03	3.29E-04
Dichloroethylene 1,2-cis-	5,172	915	0	0	2.42E-04	3.42E+02	2.60E+04	1.32E-02
Dichloroethylene, 1,1-	5,810	805	0	0	6.00E-04	2.40E+02	1.49E+04	1.61E-02
Dichloroethylene, 1,2-	1,221	456	0	0	1.00E-03	8.50E+01	1.17E+05	7.28E-04
Dichloroethylene, 1,2-trans-	4,776	212	0	0	4.20E-04	2.51E+00	9.56E+03	2.62E-04
Dinitrotoluene, 2,4-	2,393	0	0	0	--	--	8.23E+03	--
Endrin	2,192	6	0	0	1.70E-04	1.00E-01	2.75E+03	3.64E-05
Heptachlor	2,193	1	0	0	8.66E-05	8.66E-05	5.70E+02	1.52E-07
Heptachlor Epoxide	2,193	23	0	0	1.02E-04	4.72E-03	2.82E+02	1.67E-05
Hexachlorobenzene	2,444	0	0	0	--	--	1.60E+03	--
Hexachlorobutadiene	2,946	23	0	0	7.00E-04	6.30E-01	3.29E+04	1.92E-05
Lead	4,828	4,791	0	0	1.10E+00	4.50E+02	8.00E+02	5.63E-01
Lindane	2,193	2	0	0	8.81E-05	2.41E-04	2.83E+03	8.51E-08
Mercury, Elemental	4,767	2,790	0	0	2.90E-03	2.08E+02	4.97E+02	4.19E-01
Mercury, Inorganic Salts	4,767	2,790	0	0	2.90E-03	2.08E+02	3.88E+03	5.35E-02
Methoxychlor	2,193	5	0	0	8.08E-04	1.00E-01	4.58E+04	2.18E-06
Methylene Chloride	5,155	1,630	0	0	5.40E-04	6.00E+02	4.14E+04	1.45E-02
Nitrobenzene	2,393	2	0	0	1.60E+00	1.90E+00	3.41E+04	5.58E-05
Selenium	4,391	857	0	0	1.10E-01	9.50E+01	6.49E+04	1.46E-03
Silver	4,718	1,180	0	0	1.40E-02	1.10E+02	6.49E+04	1.70E-03
Tetrachloroethylene	4,836	377	0	0	5.00E-04	9.00E+01	5.83E+03	1.54E-02
Trichloroethane, 1,1,1-	3,742	802	0	0	5.40E-04	1.20E+04	5.39E+05	2.23E-02
Trichloroethane, 1,1,2-	3,050	237	0	0	5.40E-04	6.10E+00	9.56E+01	6.38E-02
Trichloroethylene	8,152	4,206	108	1.32	2.20E-04	1.10E+05	2.82E+02	3.90E+02
Trichlorofluoromethane	1,691	55	0	0	1.00E-03	7.89E-01	4.78E+04	1.65E-05
Vinyl Chloride	5,085	75	0	0	6.10E-04	1.70E+00	2.24E+03	7.59E-04
Xylene	888	58	0	0	6.60E-04	5.50E+01	3.84E+04	1.43E-03

COPC = chemical of potential concern PHC = principal hazardous constituent

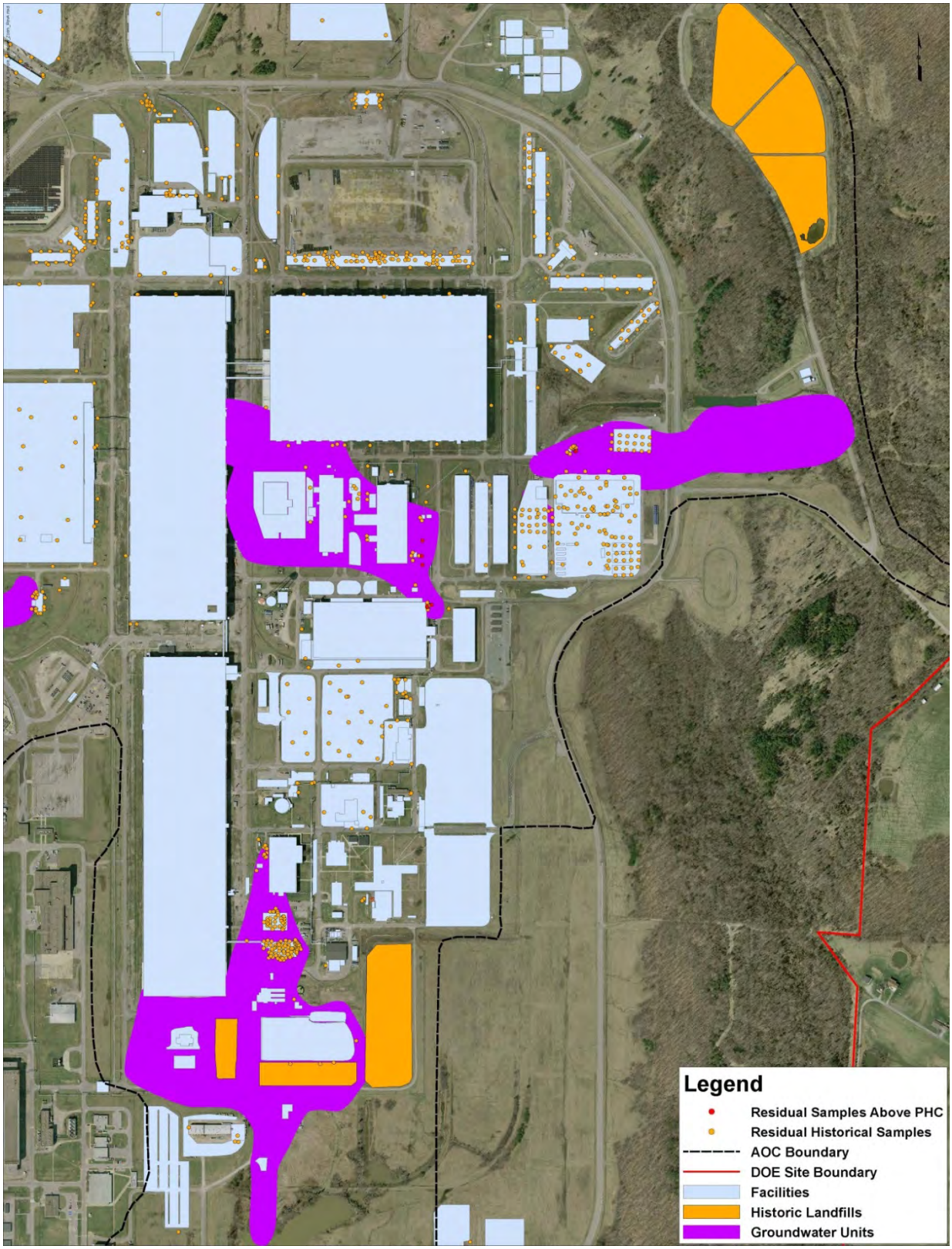

Figure D.2. Sample Locations for the Residual Soil Data Set

D.2.2 SCREENING RESULTS

D.2.2.1 Identified PHC

Table D.5 results show, at this point in the soil remediation process, that the only COPC to exceed its PHC limit is TCE with 108 of 8,125 results (1.33 percent) above the PHC limit of 282 mg/kg. The maximum TCE value (110,000 mg/kg) is 390 times greater than the PHC limit.

D.2.2.2 PHC Distribution and Estimated Soil Volume

Figure D.3 shows the distribution of the 108 soil samples that exceed the PHC limit for TCE and the corresponding soil volume associated with these samples (gold pattern, which is partially overlain by green and purple areas). Most of the samples are associated with 52 locations in the high-concentration zone of the X-701B TCE groundwater plume, and the remaining samples are tied to six locations in the TCE plume emanating from the northeast corner of Building X-720. The volume of soil impacted by TCE that exceeds the PHC limit is estimated using the surface area that circumscribes the data points and extending this area downward until the deepest sample point is captured (cookie-cutter approach). Soil volume estimates derived with the cookie-cutter approach (Figure D.3) will overestimate the actual volume of impacted soil because the extent of subsurface contamination is shaped like an inverted funnel.

Soil volumes that correspond to samples that exceed a TCE level of 500 and 5,000 mg/L are shown by the green and purple patterns (Figure D.3). Approximately one-half of the total PHC volume corresponds to samples that exceed 500 mg/kg. The estimated volume for samples that exceed 5,000 mg/kg is less than 1 percent of the PHC volume.

Figure D.3. Soil Volumes for TCE-contaminated Areas that Have Samples Greater than the PHC Limit

D.3 REFERENCES

DOE 2013, *Methods for Conducting Human Health Risk Assessments and Risk Evaluations at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio*, DOE/PPPO/03-0127&D7, U.S. Department of Energy, Piketon, OH, December.

EPA 2014a, Technical Review Workgroup Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soils, OSWER 9200.2-142, U.S. Environmental Protection Agency.

EPA 2014b, *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors*, OSWER Directive 9200-1-120, U.S. Envrionmental Protection Agency, Feburary 6, 2014

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APPENDIX E: ADJUSTED TREATMENT STANDARD

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ACRONYMS

AOC	area of contamination
CAMU	Corrective Action Management Unit
D&D	decontamination and decommissioning
DFF&O	*The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto*
DNAPL	dense non-aqueous phase liquid
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FRTR	Federal Remediation Technologies Roundtable
HDPE	high-density polyethylene
IRM	Interim Remedial Measure
OAC	*Ohio Administrative Code*
Ohio EPA	Ohio Environmental Protection Agency
OSDC	on-Site disposal cell
PHC	principal hazardous constituent
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RI/FS	Remedial Investigation/Feasibility Study
TCA	trichloroethane
TCE	trichloroethene
UTS	universal treatment standard
VOC	volatile organic compound

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Appendix E develops the appropriate treatment standard for trichloroethene (TCE)-contaminated soil. TCE was identified in Appendix D as the sole principal hazardous constituent (PHC) requiring development of a Corrective Action Management Unit (CAMU) treatment standard.

The treatment standards required under *Ohio Administrative Code (OAC)* 3745-57-72 (E)(4)(d) or that can be justified under *OAC* 3745-57-72 (E)(4)(d) are determined in consideration of the site's geological data, on-Site disposal cell (OSDC) design, and previous Portsmouth Gaseous Diffusion Plant (PORTS) experience in TCE treatment, associated costs, and technical difficulties encountered during those treatment efforts. A recommendation is made based on the comparison of the results of the evaluations.

E.1 MINIMUM TREATMENT REQUIREMENTS

TCE-contaminated soils are expected to be generated during decontamination and decommissioning (D&D) or soil remediation. Unless TCE-contaminated soils can be placed in a CAMU, the soils would be subject to the treatment requirements of *OAC* 3745-270. In order for TCE-contaminated soils to be placed in a disposal CAMU designated by the Ohio Environmental Protection Agency (Ohio EPA) Director, PHCs must be treated to the standards specified in *OAC* 3745-57-72(E)(4)(d) or (E)(4)(e). Soil treatment could be implemented in situ during excavation in the area of contamination (AOC) or ex situ in a storage and/or treatment CAMU.

Based on the PORTS PHC screening results presented in Appendix D of this Site-wide Waste Disposition Evaluation Project (Waste Disposition) Remedial Investigation/Feasibility Study (RI/FS) Supplement, TCE is the only known contaminant in soil which exceeds a PHC screening value at PORTS. Most of the identified PHC screening value exceedances are located in the western portion of the X-701B TCE plume area as shown in Figure D.3. There are also two other locations, one under the X-720 and the other just east of the X-700 buildings, with TCE as a PHC in soil. Soils at these two locations must be excavated as an integral part of the remedial action of the below-grade building structures, sump, and associated utilities of X-720 and X-700 and are considered residual soil as defined in *The April 13, 2010 Director's Final Findings and Orders for Removal Action and Remedial Investigation and Feasibility Study and Remedial Design and Remedial Action, including the July 16, 2012 Modification thereto* (DFF&O). Any soil which must be excavated and is not residual soil as defined by the DFF&O will be under the regulatory authority of the Consent Decree or other authorities. The six locations exceeding TCE PHC conditions under the X-720 are located above the groundwater table.

The information below evaluates the treatment standards required for TCE in these soils for disposal in the potential OSDC, if selected and designated as a CAMU in compliance with *OAC* 3745-57-72.

E.1.1 *OAC* 3745-270-48 STANDARD

The universal treatment standard (UTS) for TCE-contaminated nonwastewater wastes, as specified in *OAC* 3745-270-48, is 6.0 mg/kg, measured by an analysis of grab samples. This standard is not applicable to CAMU-eligible soils to be generated and placed in the potential OSDC during D&D and soil remediation at PORTS under Alternative 2 of the Waste Disposition RI/FS report, if the OSDC is designated as a CAMU by the Ohio EPA director.

E.1.2 *OAC* 3745-57-72(E)(4)(d) CAMU TREATMENT STANDARD

Under (E)(4)(d), treatment must achieve 90 percent reduction in total PHC concentrations but not lower than 10 times the UTS (i.e., 60 mg/kg for TCE-contaminated soil).

Figure E.1 shows a histogram of all 108 TCE soil data above the PHC threshold value of 282 mg/kg (as described in Appendix D). Figures E.2, E.3, and E.4 show histograms of the TCE soil data under X-720/X-700 (11 data points) (U.S. Department of Energy [DOE)] 2001, DOE 2010), in X-701B (96 data points) plume area, and in X-720 alone (six data points), respectively, above the PHC threshold value of 282 mg/kg. (Data in the bottom of the X-701B impoundment was collected by Geraghty & Miller and Science Applications International Corporation and documented in an internal document that presented concentrations of TCE in soils from the bottom of the pond to the top of Sunbury Shale. The objective of the sampling was to identify any zones of dense non-aqueous phase liquid (DNAPL) pockets in the vertical sequence within the pond boundary.) A single data point is located near X-231A/B, which is not included in the above-mentioned statistics, except in Figure E.1.

To achieve 90 percent reduction in total PHC concentrations, a treatment target range of about 250 to 700 mg/kg would be required. This is based on the assumption that each result greater than the PHC threshold is associated with an equal volume of soil. The treatment standard, as applied on a regulatory unit basis, would only vary within a limited range of treatment values. However, using these unit specific standards in relation to disposal into the CAMU doesn't have technical merit based on the small differences in toxicity reduction between units. For cases such as PORTS, the U.S. Environmental Protection Agency (EPA) anticipated that selecting a site-wide alternative treatment standard using the zone of reasonable treatment values (See 28556 Federal Register / Vol. 63, No. 100 / Tuesday, May 26, 1998 / Rules and Regulations and Amendments to the Corrective Action Management Unit Rule, 65 FR 51080, Tuesday, August 22, 2000) is sufficient for demonstrating treatment. Therefore, collectively, the 10^{th} percentile rank is approximately 500 mg/kg, resulting in a site-wide treatment target of about 500 mg/kg, which would be required to achieve 90 percent reduction in PHC concentrations.

Based on the information presented above, it is logical to assume that regardless of the future regulatory decisions and authorizations for DFF&O residual soil or Consent Decree soil at PORTS, if excavated, a treatment target close to 500 mg/kg for TCE-contaminated soil would be required to satisfy the 90 percent reduction in PHC concentrations under *OAC* 3745-57-72(E)(4)(d) prior to disposal in the potential OSDC, if selected and designated as a CAMU. Under this scenario, a total of 29,000 cy of soil would need to be treated, as shown in Figure D.3. However, DOE has concluded, as described in more detail below, that it is not cost effective to achieve this treatment target at PORTS to support placement of D&D wastes in the potential OSDC. DOE believes an adjusted standard under (E)(4)(e) is appropriate based upon the following analysis.

OAC 3745-57-72(E)(4)(d) Treatment Standards Technical Feasibility and Cost Evaluation

Due to the well-known geological characteristics of Minford clay such as very fine grain, low effective porosity, low permeability, high plastic index, and high water holding capacity, large scale treatment of TCE-contaminated Minford clay soils at PORTS, either in situ or ex situ, to reduce concentrations from well over 5,000 mg/kg (e.g., 15,000 mg/kg measured in vadose zone under X-720) down to 500 mg/kg of TCE at the pace necessary to support D&D waste placement in the potential OSDC may not be feasible. This section reviews the lessons learned from previous soil remediation efforts involving treatment of TCE-contaminated soils at PORTS and other sites and demonstrates that efforts by DOE to meet the *OAC* 3745-57-72 (E)(4)(d) treatment standards are not technically feasible or economically reasonable.

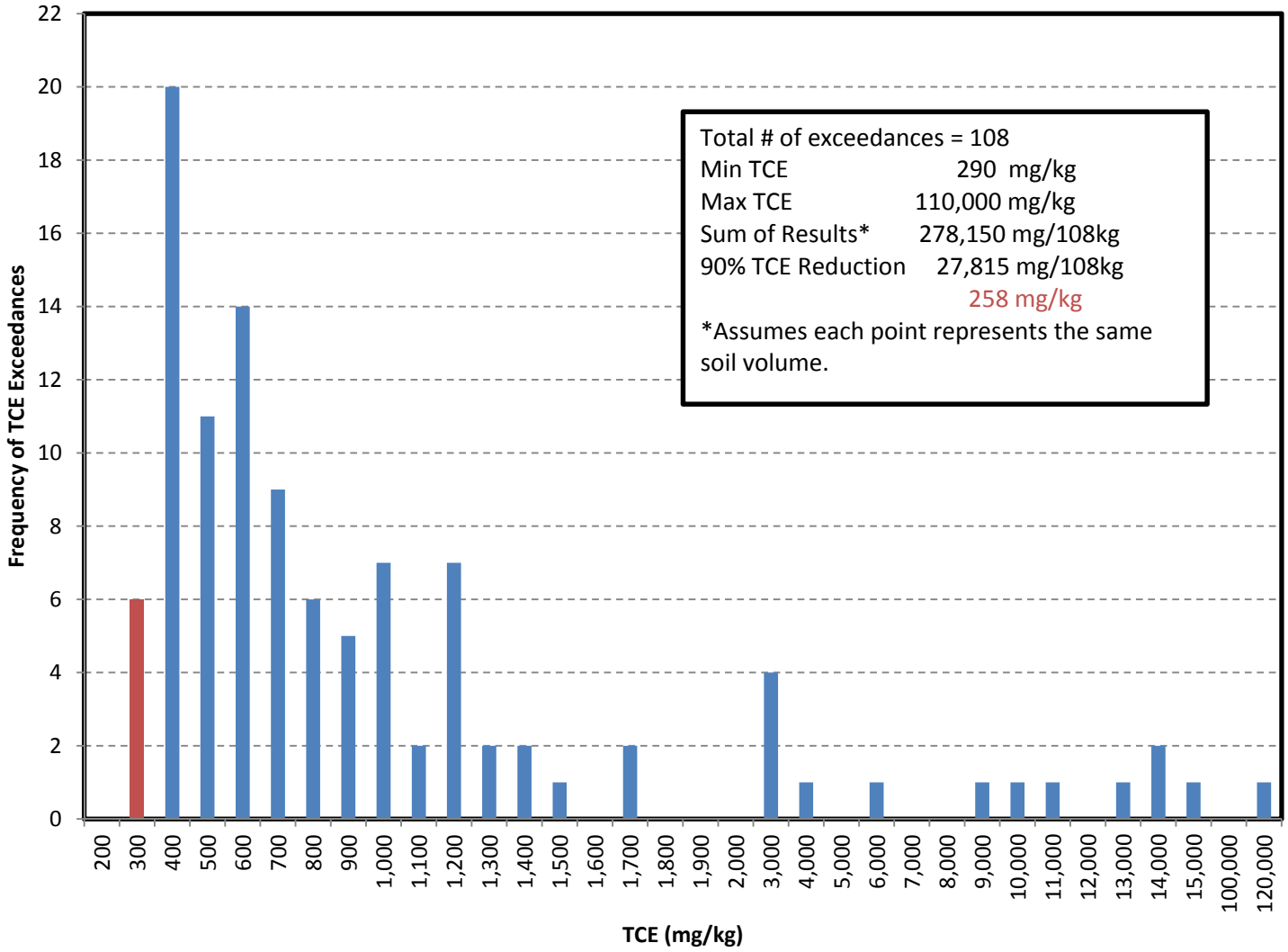

Figure E.1. Histogram of Site-wide TCE PHC Threshold Exceedances

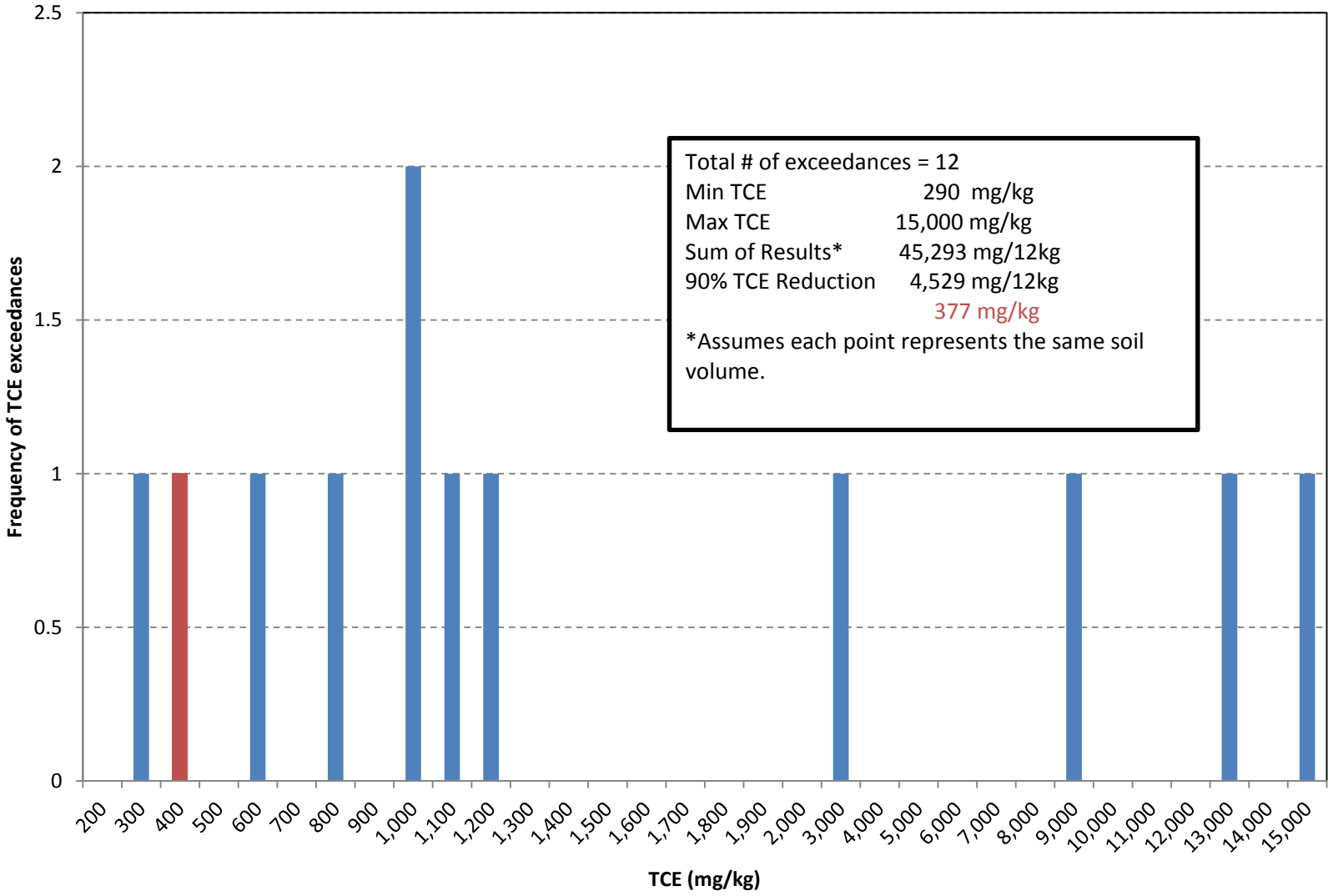

Figure E.2. Histogram of Residual Soils X-720/X-700/X-701E TCE PHC Threshold Exceedances

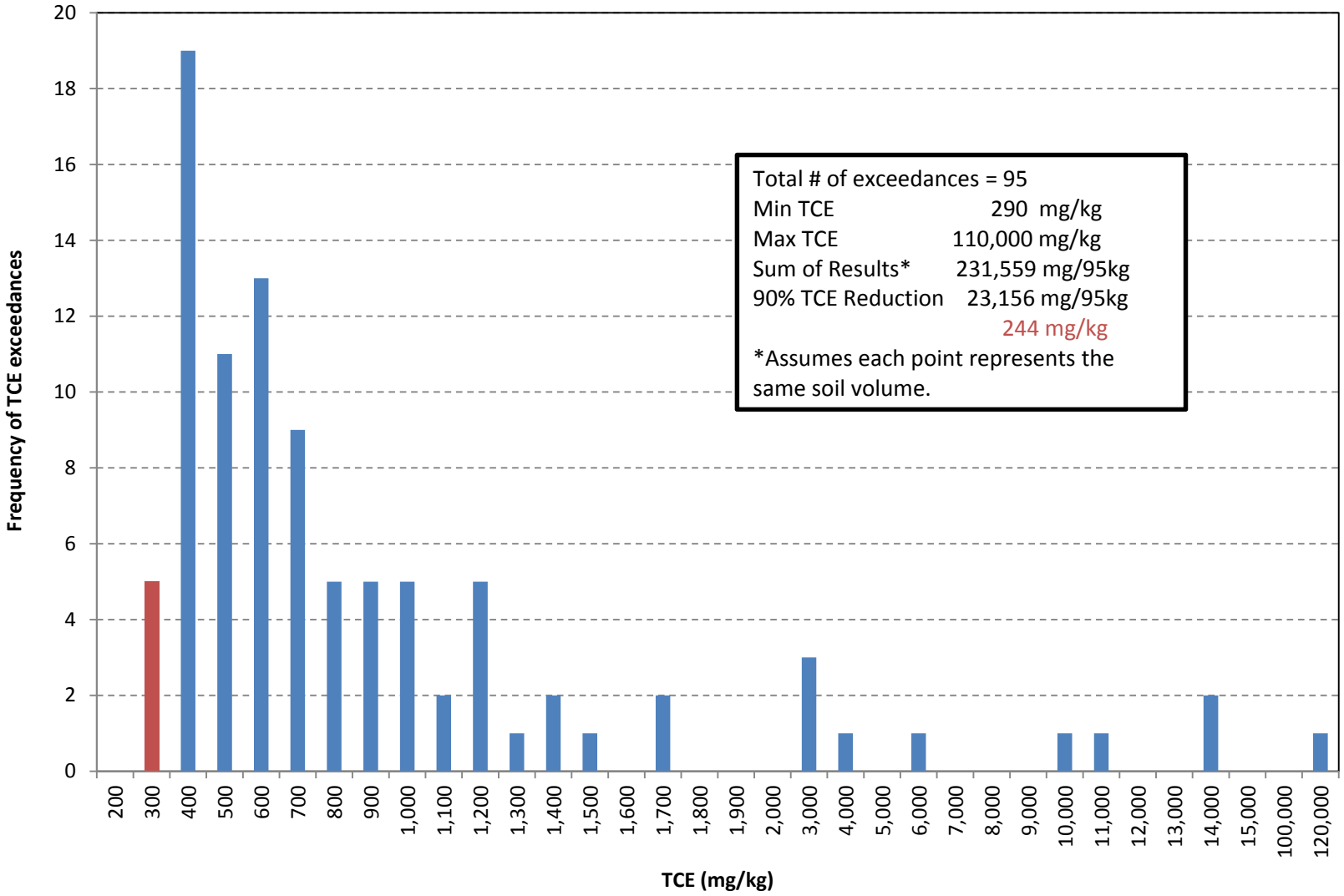

Figure E.3. Histogram of X-701B TCE PHC Threshold Exceedances

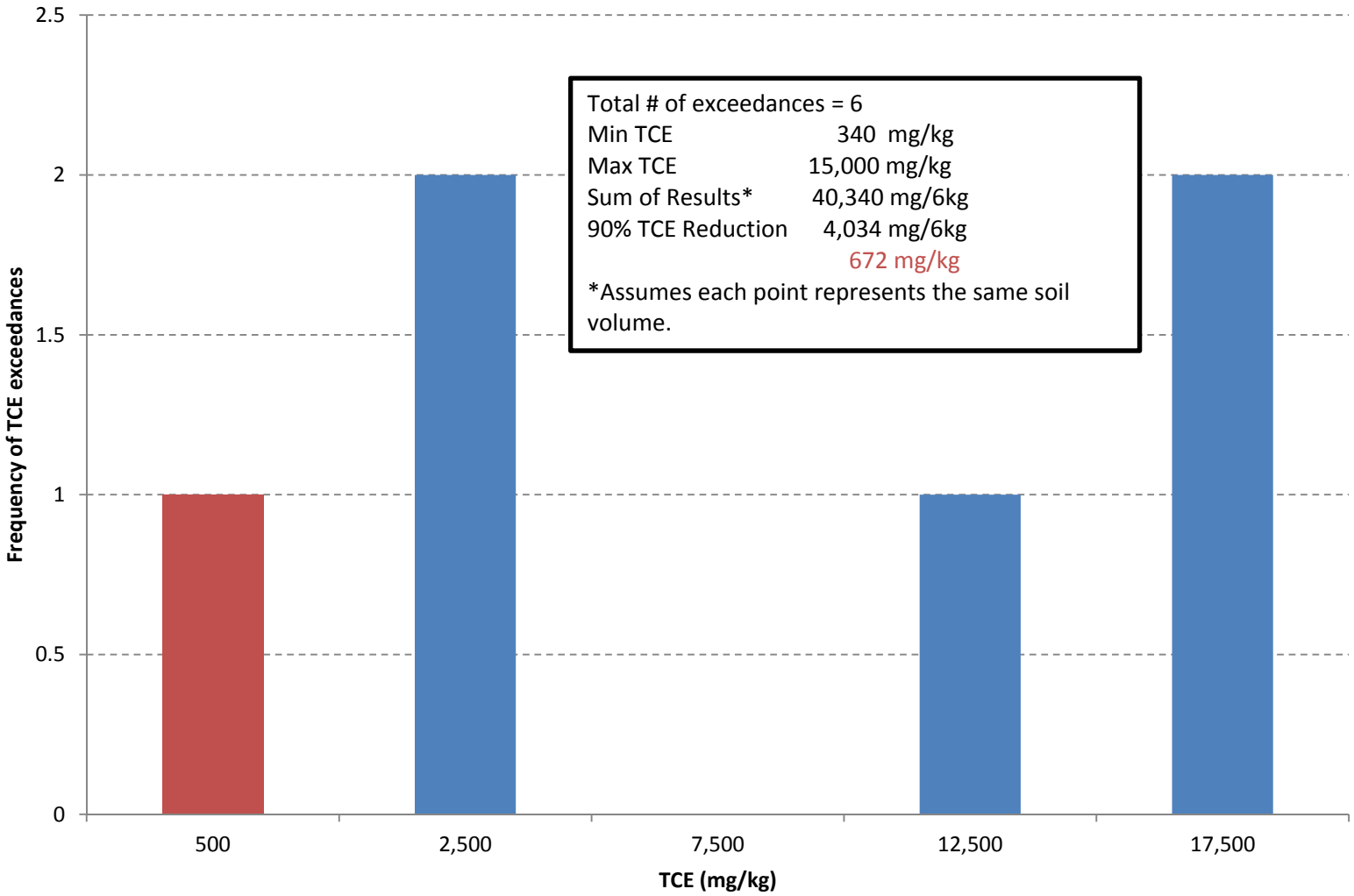

Figure E.4. Histogram of X-720 TCE PHC Threshold Exceedances

E.1.3 TECHNOLOGIES AND EFFECTIVENESS

The Federal Remediation Technologies Roundtable (FRTR) was formed to build a collaborative atmosphere among federal agencies involved in hazardous waste site cleanup. The FRTR brings together federal cleanup program managers and other remediation community representatives to:

- Share information and learn about technology-related efforts of mutual interest
- Discuss future directions of the national site remediation programs and their impact on the technology market
- Interact with similar state and private industry technology development programs
- Form partnerships to pursue subjects of mutual interest.

FRTR members/agencies include the EPA, DOE, U.S. Department of Defense, U.S. Department of the Interior, and National Aeronautics and Space Administration.

The FRTR has identified several ex situ soil treatment technologies as viable candidates for treating contaminated soils at Federal sites. The main advantage of ex situ treatment is that it generally requires shorter time periods than in situ treatment, and there is more certainty about the uniformity of treatment because of the ability to homogenize, screen, and continuously mix the soil. Ex situ treatment, however, requires excavation of soils, leading to increased costs and engineering for equipment, possible permitting, material handling and worker protection measures.

The FRTR identified ex situ soil treatment technologies include: thermal desorption, oxidation/reduction, and gravity separation. DOE has experience with each of these technologies at PORTS, attempted historically, without success, for the treatment of contaminated soils. As presented below, there are limitations and implementation issues associated with each of these technologies that need to be considered.

Enhanced Soil Mixing With Thermal Desorption & Oxidation/Reduction

Beginning in 1992, Enhanced Soil Mixing was conducted at the X-231B to evaluate the technical and cost effectiveness of using this technology for the removal of volatile organic compounds (VOCs). The results are summarized in *Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies* (EPA 542-R-97-009), *In Situ Enhanced Soil Mixing* (DOE/EM-0289), and *In Situ Treatment of Contaminated Clay Soils* (ERP-TI/92-359). Although the technology demonstration was conducted in situ, the results are applicable to ex situ treatment of similar soil horizons.

X-231B was used from 1976 to 1983 for treatment and disposal of waste oils and degreasing solvents, and these contributed to contamination of soil and shallow groundwater with VOCs. Thirteen VOCs were identified in the soil, including TCE, trichloroethane (TCA), 1,2-dichloroethylene, and methylene chloride, at concentrations ranging from several hundred to several thousand µg/kg. The site consists of relatively low permeability soils with elevated clay content.

The following four technologies were demonstrated at X-231B: vapor extraction with ambient air stripping, vapor extraction with hot air stripping, hydrogen peroxide injection, and grout injection for solidification/stabilization. Three demonstration soil columns were completed for each of the four technologies. The 12 soil columns were each 10 ft in diameter and 15 ft deep. One additional

column was treated by hot air stripping to a depth of 22 ft, and a second additional column was used for a tracer study.

Soil mixing with hot air (thermal) stripping was selected as the remedial option for the site, and cleanup and closure was completed in 1994. 628 soil columns at a depth of 22 ft were treated during remediation.

Unfortunately, the cost and schedule impacts for all of these technologies were high, and as a result, they have not been considered effective for future full-scale soil treatment at DOE sites. The estimated treatment efficiency, production rate, and full scale unit cost for remediation ranged from a rate between 15 to 45 cy/hr with a cost range of $45 to $60/cy.

Enhanced Gravity Separation – Vadose Zone Soils

The X-701B was constructed with the plant and used as an unlined 200-ft by 50-ft retention basin for the neutralization and settling of metal-bearing waste water, solvent-contaminated solutions, and acidic wastewater. Most of the waste discharged to the pond originated at the X-700 Chemical Cleaning Facility and the X-705 Decontamination Building. Wastes received by the holding pond included nitric acid and chromic acid. Also discharged to the pond were TCE and TCA, both of which were typically co-contaminated with technetium and uranium. The pond was in use from 1954 until 1988.

An X-701B Interim Remedial Measure (IRM) was initiated in 2009 and completed in 2011. The purpose of the project was to perform mixed oxidant treatment of TCE-contaminated soils within the large, high concentration groundwater plume that originated from X-701B. The results of the IRM are summarized in *Completion Report for the X-701B Solid Waste Management Unit Interim Remedial Measure – Oxidant Mixing at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2011).

During the IRM, the targeted soils for treatment were super-saturated and overlaid by non-Resource Conservation and Recovery Act of 1976, as amended (RCRA)-regulated vadose zone soils composed of Minford silt and clay and approximately 10 ft to 12 ft in depth. Like X-231B, these soils have a relatively low permeability and elevated clay content. Dewatering of the vadose zone soils is discussed in this section, and dewatering of the targeted saturated soils is discussed in the section below.

In order to proceed with the desired treatment, the vadose zone soils were removed and stored at a nearby location and allowed to gravity dewater in preparation for replacement following completion of the IRM. The area of treatment for the IRM was approximately 4.75 acres, and the vadose zone soils totaled approximately 76,710 cy. These soils were above the water table of the plume, and so were not super-saturated except for the portion of the layer which was in direct interface with the water table. The properties of these soils caused them to be significantly above optimum moisture for replacement and compaction. Consideration was given to this over-wet condition when stockpiling the soils at the storage location, and a location was selected which provided positive drainage to allow the soils to naturally release free liquid via gravity. Additionally, the surface of the stockpile was ripped with a bulldozer as weather conditions permitted to allow exposure to the sun and wind for drying. The pile was always resealed at the end of the day shift to prevent resaturation from precipitation.

When the IRM had progressed to a point in the spring of 2011 where the vadose zone soils could be replaced over the oxidant treated soils, it was apparent that gravity drainage had been successful in removing the free liquids from the stockpiled soils. The outer limits of the stockpile were partially dry, while the inner portions of the pile were still above optimum moisture content, which required drying techniques to be implemented for the purposes of this remedy. Additionally, a wet spring complicated drying efforts. Initially, the soils were spread in 6-in. to 8-in. lifts on the placement area, and processing of the material was begun using a rotary tiller. The results of this method were unsatisfactory due to the limited speed and size of the tiller, which didn't allow adequate drying prior to resealing at the end of shift. The tiller was then used in combination with a bulldozer windrowing the material to expose more surfaces to the air. This process yielded better results, but additional speed of processing was needed to keep the project on schedule.

An agricultural tractor and disc were brought in to more quickly turn the soil in support of the bulldozer. This was done on both the placed soil lift and the surface of the stockpile, which provided two simultaneous drying platforms. The result was that although treatment costs increased, efficiency was greatly enhanced, enabling the project to move forward between periods of wet weather.

Therefore, it was demonstrated by this IRM that free liquids can be drained from Minford soils in the vadose zone using gravity separation. However, achievement of optimum moisture content for placement purposes requires enhanced gravity separation with the application of extensive soil mixing/drying techniques. Although the unit cost for this treatment was not tracked, it was accomplished over approximately a 2-month period, primarily with equipment already at the worksite, and with approximately 800 man-hours of additional labor.

Enhanced Gravity Separation – Saturated Zone Soils

The excavation and treatment of targeted contaminated soils within the X-701B IRM was conducted on a cell-by-cell basis with a total of 81 cells. A combination of open excavation with laid-back slopes and shoring panels was used to remove, treat, and replace the saturated soils in each cell which were a mixture of Minford and Gallia. Within each cell, excavation of the soils progressed with removal of the top 10 ft of non-regulated soils as addressed in the previous section, followed by the middle soils (approximately 20 ft) which were excavated and spread out on the contaminated land surface within the treatment zone for gravity drainage and treatment.

The bottom 1 to 2 ft of the Gallia sand and gravel and the top of the Sunbury shale in each cell were then tilled in place with a tilling/cutting attachment mounted on the end of a long-reach excavator. After approximately 10 to 20 minutes of tilling, Modified Fenton's Reagent was slowly applied to the soils for approximately an additional 1 to 2 hours while the tilling was continued. To achieve the desired results, the tilling and treatment process was repeated several times for some cells.

Following the tilling and treatment process, each cell was backfilled with the middle soils that had been previously excavated as described above. Prior to backfilling, the middle soils were processed with a rotary tiller/cutting attachment, and simultaneously mixed with granular sodium persulfate and hydrated lime. The application of hydrated lime was sometimes repeated multiple times in order to dry the soil to a point where placement was possible. In some cases, extensive tilling was required prior to placement.

In general, gravity drainage of the middle soils within the treatment area was successful in removing free liquids; however, the middle saturated soils remained well above optimum moisture content, and often remained well above optimum moisture content after extensive and costly measures had been taken to process them.

The targeted saturated soils for the IRM totaled approximately 167,500 cy, and the IRM took approximately 17 months to complete. The unit cost for treatment of the saturated soils was not tracked; however, the overall cost of the entire X-701B IRM was on the order of $50 million. It has been estimated that overall, the drying and treatment of the saturated zone soils was roughly an order of magnitude more costly and time consuming than the vadose zone soils. The total cost for treatment of all IRM soils (vadose zone and saturated) was approximately $205/cy in unescalated dollars.

E.1.4 EXPERIENCE AT PIKE SANITATION LANDFILL

Experience with the Minford soil at Pike Sanitation Landfill has shown that it tends to hold together very well. It is difficult to reduce the moisture from within the soil matrix as it is "sticky" in nature. The key to removing the moisture is repeated working of the soil to create as large of a surface area as possible to expedite the evaporation of moisture from the soil. This information was provided by Ohio EPA technical staff overseeing operation of the facility and some of PORTS technical staff members' actual working experience at the facility.

E.1.5 POTENTIAL COST AND DURATION TO ACHIEVE (E)(4)(D) STANDARD FOR TCE

Based on the historical costs with escalation (i.e., up to $250/cy) and production rates (i.e., 15 to 20 cy/hour) from previous soil treatment efforts at PORTS, it is expected that it may take at least $5 million and 60 weeks to achieve the 500 mg/kg target for 29,000 cy of TCE-contaminated soil with concentrations above 500 mg/kg (See Figure D.3). This cost and schedule duration would be in addition to the normal cost and duration for excavating and handling the soil.

None of the previous efforts at X-701B actually recovered TCE-free product, which is expected to be located in the weathered Sunbury shale. Any future efforts will need to more thoroughly locate, recover, and dispose of this significant continuous source of groundwater contamination. Additional cost would be required to treat excavated Sunbury shale to 500 mg/kg from concentrations in soil of more than 10,000 mg/kg.

Based on the experience with these technologies at PORTS, and considering the additional cost and schedule impacts, use of these technologies is not considered feasible to support using the contaminated fill in the OSDC. The acquisition of soil for fill must reasonably match the generation of D&D waste to be placed in the potential OSDC. The production rate of fill soil with treatment of TCE to achieve 500 mg/kg will be far below the rate required to support active D&D waste placement rate in the potential OSDC.

A storage and treatment CAMU would likely also need to be constructed with double liner and leachate collection system in compliance with *OAC* 3745-57-72(F) to treat the TCE-contaminated soil from X-720 and X-700 in order to separate the treatment operation from the D&D activities. This will require double or triple handling of the excavated soil. The more significant radiological contaminations in X-720 and X-700 areas may increase the unit cost by a factor of two to accommodate additional radiological protections for workers conducting the treatment. The production rate will also be further reduced.

Overall, the cost to achieve the (E)(4)(d) standard for TCE PHC soils at PORTS is likely to be up to an extra $10 million, along with an additional hotel load cost and 2 years of effort. With that comes the added short-term risk to the worker, as described in the main text of this Supplement. This standard, if implemented, will significantly delay the D&D schedule by taking away funding from D&D or OSDC construction activities for expensive soil treatments. Even with additional funding it may not support the D&D schedule. For example, soil will not be available from the X-701B plume area in time to support initial X-326 D&D waste placement in the OSDC, which is the first process building planned to be

demolished at PORTS. Therefore DOE may be forced to use clean fill to place X-326 D&D wastes in the OSDC in order to keep D&D activities on track, if this standard is imposed.

E.2 *OAC* 3745-57-72(E)(4)(e) ADJUSTED STANDARD

The *OAC* 3745-57-72(E)(4)(e) allows considerations of specific factors and benefits to justify adjusted standards that are practical, more timely, less risk to workers, protective in the disposal CAMU, and cost-effective. This section presents detailed soil geological characteristics at PORTS and provides technical justifications to a proposed adjusted standard for TCE PHC soils identified in Appendix D.

E.2.1 PHYSICAL CHARACTERISTICS OF SOIL WITH PHC

Prior to the Pleistocene glaciations, the Teays River and its tributaries were the dominant drainage systems in Ohio. The Teays River flowed southeast to northwest passing approximately 3 miles north of the location now occupied by PORTS. The Portsmouth River, a tributary of the Teays River, flowed north across the plant site location between bluffs of Cuyahoga shale. The Portsmouth River downcut through the Cuyahoga and into the Sunbury (shale) and Berea (sandstone) Formations and deposited fluvial silty sands and gravels of the Gallia member of the Teays Formation. About 1 million years ago, a glacier advancing from the north blocked the northwestward flow of the Teays River that resulted in the creation of Lake Tight, which filled the valleys of the Teays River and its tributaries, including the Portsmouth River. Lacustrine silt and clay (Minford member of the Teays Formation), indicative of low-energy conditions, were deposited on the lake bottom overlaying the meandering stream deposits of the Gallia. As a result the unconsolidated sediments of the Teays Formation are divided into two members: the Minford clay and silt and the Gallia sand and gravel.

E.2.1.1 Minford Clay and Silt

The basal 10 to 15 ft of the Minford commonly consist of relatively clean silt, perhaps reflecting shallow lake levels and reworked sediment or possibly Portsmouth River over-bank deposits. Above this silt layer lays a series of laminated clays that may represent sediments deposited as the glacial Lake Tight grew deeper and more extensive. The Minford averages 20 to 30 ft in thickness at the PORTS facility. The upper clay unit averages 16 ft in thickness, is reddish-brown, silty, and plastic, and contains traces of sand in some locations. The lower silt unit averages 7 ft in thickness, is yellow-brown, semi-plastic, and contains varying amounts of clay and very fine sand. A former study (Law Engineering 1978) estimated the silt content in the Minford as a whole at approximately 33 percent. Based on data presented in this study, the following observations were noted:

- The Minford overall consists of about 67 percent clay and 33 percent silt.
- Minford soils have an in situ moisture range of 3 to 12 percent above optimum moisture content.
- In general, clay soils have an affinity to produce capillary action (i.e., tend to absorb moisture) up to the liquid limit. The in situ moisture content of Minford soils range from 1.6 to 36 percent below their liquid limits with an average of 15.4 percent below. Therefore, Minford soils will not readily release water.

The dry bulk density of most soils varies within the range of 1.1 to 1.6 g/cm^3 (Hillel 1980). Based on PORTS geology, the Minford could be described as a clay loam or silty clay loam. The typical dry density value for clay loam and silt loam soil types is 1.28 g/cm^3 (Linsley et al. 1982; Poffijn 1988). The typical total porosity ranges for clays are 0.40 to 0.70 (Freeze and Cherry 1979) and 0.34 to 0.57 with an

arithmetic mean of 0.42 (McWorter and Sunada 1977), whereas the total porosity of silts ranges from 0.34/0.35 to 0.50/0.51 (Freeze and Cherry 1979; McWorter and Sunada 1977) with an arithmetic mean of 0.45. In naturally porous systems such as subsurface soil, where the flow of water is caused by the composition of capillary, molecular, and gravitational forces, the effective porosity can be approximated by the specific yield, or drainage porosity, which is defined as the ratio of the volume of water drained by gravity from a saturated representative sample of the soil to the total volume of the sample. The effective porosity of clays ranges from 0.01 to 0.18 with an arithmetic mean of 0.06, whereas the effective porosity of silts ranges from 0.01 to 0.39 with an arithmetic mean of 0.20 (McWorter and Sunada 1977).

Using the representative values for dry density, total porosity, and effective porosity of clays and silts, the theoretical moisture content by weight for the Minford at 100 percent saturation (i.e., all void space filled with water) ranges from 24.7 to 27.3 percent ($M\%_{SATWT}$). Based on 1,205 data points across PORTS, including background, the average moisture content by weight of the Minford vadose zone (0 to 10 ft below ground surface [bgs]) is 16.4 percent ($M\%_{AVGMinford}$). Therefore, on average, the Minford is at 60.1 to 66.4 percent (pore) saturation. Assuming that all available water within the effective porosity zone (clays = 0.06) is drained while maintaining the clay-bound pore zone at full hydration, the resultant "dry/drained" moisture content ($M\%_{DRYWT}$) would be 22.0 to 24.5 percent with a (pore) saturation level of 88.9 to 89.9 percent. At this effective porosity (0.06), the Minford vadose zone would already be considered "dry" and nearly impossible to dewater in a short duration by gravitational means alone. If an effective porosity of 0.20 (for silts) is considered, the "dry/drained" moisture content would range from 14.7 to 17.2 percent and the saturation level would be 59.4 to 63.2 percent.

Where there are pockets of clean silt, the free liquid will be able to drain out. However, the addition of relatively small amounts of clay will reduce the ability of the clayey silts to drain. Again, little to no benefit would be realized by gravitational draining of the Minford vadose zone at an average moisture content ($M\%_{AVGMinford}$) of 16.4 percent.

In addition to the relatively high moisture content (i.e., close to 60 to 66 percent saturation) in Minford clay in the vadose zone and difficulties in previous soil treatment efforts, the high TCE PHC concentrations measured under X-720 building (Figure E.5) above the groundwater table further demonstrate that Minford clay does not release moisture and associated contaminations by gravity drain effectively. Significant amounts of TCE stay in the vadose zone clay even long after the sources of TCE were removed from inside the X-720.

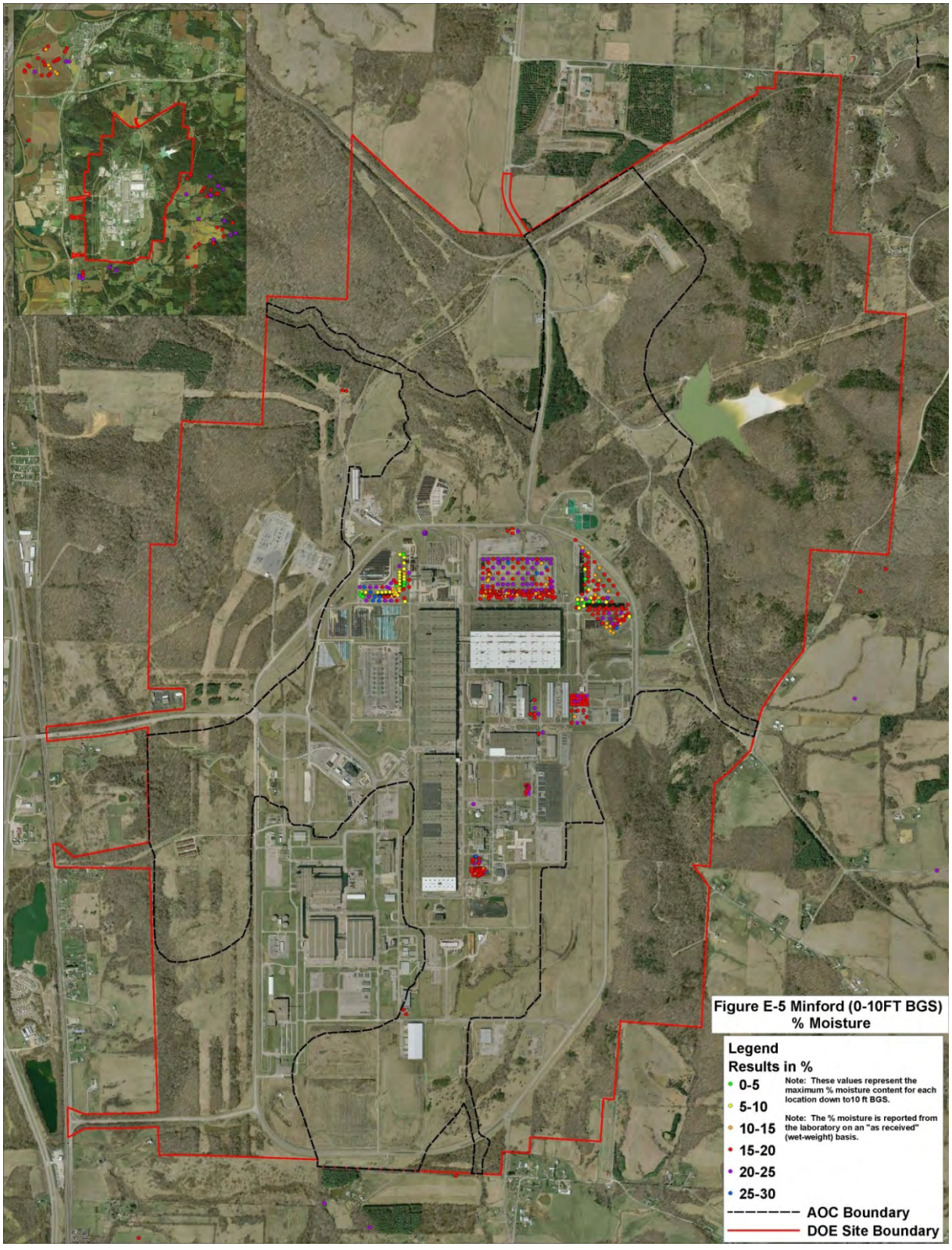

Figure E.5. Minford Percent Moisture at 0 to 10 ft below ground surface

E.2.1.2 Gallia Sand and Gravel

The Gallia averages 3 to 4 ft in thickness at PORTS and is characterized by poorly sorted, silty, clayey medium to coarse sand or gravel with the primary constituent varying between sand and gravel. A former study (Law Engineering 1978) indicated that the Gallia had an average clay content of 30 percent. The combination of post-Gallia erosion and modern stream deposition over already variable Gallia thickness has resulted in irregular thicknesses across the site.

Based on site geology, the Gallia could be described as a clay loam to loam to sandy clay loam. The typical dry density values for these soil types are 1.28 g/cm^3, 1.36 g/cm^3, and 1.44 g/cm^3 (sandy loam), respectively (Linsley et al. 1982; Poffijn 1988). In general, total porosity values for unconsolidated materials lie in the range of 0.25 to 0.70. Coarse-textured soils such as gravel and sand tend to have a lower total porosity than fine-textured soils such as silts and clays. As a comparison, the typical total porosity ranges for (coarse) sand are 0.25 to 0.50 (Freeze and Cherry 1979) and 0.31 to 0.46 with an arithmetic mean of 0.39 (McWorter and Sunada 1977), whereas the total porosity of clays are 0.40 to 0.70 (Freeze and Cherry 1979) and 0.34 to 0.57 with an arithmetic mean of 0.42 (McWorter and Sunada 1977). Soil analysis of a sample from PORTS (proposed X-737 site) of the Gallia member indicated the porosity at 37.9 percent (Ogden Environmental and Energy Services 1994). The typical effective porosity of (coarse) sand ranges from 0.18 to 0.43 with an arithmetic mean of 0.30, whereas the effective porosity of silts ranges from 0.01 to 0.39 with an arithmetic mean of 0.20. An effective porosity of 0.30 is normally used to characterize hydrogeological properties of the Gallia at PORTS.

Using the site-specific Gallia values for dry density and effective porosity and representative values for total porosity of various soil types, the theoretical moisture content by weight for the Gallia at 100 percent saturation (i.e., all void space filled with water) ranges from 20.8 to 24.7 percent ($M\%_{SATWT}$). Based on 237 data points for the Gallia, the average moisture content by weight of the Gallia is 17.6 percent ($M\%_{AVGGallia}$). Therefore, on average, the Gallia is approximately at 71.2 to 84.5 percent (pore) saturation. Assuming that all available water within the effective porosity zone (Gallia = 0.30) is drained, the resultant "dry/drained" moisture content ($M\%_{DRYWT}$) would be 5.2 to 8.6 percent with a (pore) saturation level of 25.0 to 34.7 percent. If an effective porosity of 0.20 (for silts) is considered, the "dry/drained" moisture content would range from 11.1 to 14.7 percent and the saturation level would be 53.1 to 59.4 percent. Therefore, some benefit could be realized by gravitational draining of the Gallia zone at an average moisture content ($M\%_{AVGGallia}$) of 17.6 percent.

E.2.2 PROPOSED ADJUSTED STANDARD

Considering the observed physical characteristics of known soil with TCE PHC or potential soil with TCE as a PHC, the estimated efforts required and short-term impacts and/or risks to workers to achieve (E)(4)(d) standard site wide, and the robust OSDC design (see the Intermediate Design Package), an adjusted treatment standard under (E)(4)(e) for TCE PHC in soil at PORTS is justified, if contaminated soil is to be excavated, field dewatered, and then used as engineered fill in the potential OSDC. Alternative 2 will require substantial amounts of soil that will be used as fill material. Fill material is critical to the management of wastes in the potential OSDC because it is used to structurally support D&D wastes and provide a buffer to protect the liner that contains leachate that will be generated. On-site borrow soil consisting of contaminated residual soils andaquifer materials has an added benefit of remediating contaminated soils that would serve as source for continued groundwater contamination and impact future use of the site. Other alternatives would still offer containment of contaminated groundwater but source areas containing TCE DNAPL do not have to be removed to accomplish these goals. Therefore the use of residual soil as fill and, potentially, highly contaminated aquifer material, offers an opportunity to significantly enhance the scope of remediation and benefit the site for future use.

However, this comes at a cost in time and money, if soils must be treated to the treatment standard of 500 mg/kg as demonstrated in Appendix E.

An adjusted standard for TCE PHC soil of: (1) excavating, field dewatering to no free liquid, and (2) limiting the remaining representative TCE concentration to less than 5,000 mg/kg is proposed. This adjusted standard satisfies multiple factors listed in *OAC* 3745-57-72(E)(4)(e) to be considered by the Ohio EPA Director. If approved, this adjusted standard would ensure that the contaminated fill option for the potential OSDC under the Alternative 2 could be implemented safely and cost effectively.

In order to achieve the proposed adjusted treatment standard, temporary storage and treatment CAMUs under *OAC* 3745-57-72 (C) and (F) may need to be constructed close to major excavation sites for conducting additional dewatering or other treatment operations, if sufficient dewatering could not be achieved at the excavation sites or the remaining TCE concentrations are higher than 5,000 mg/kg for certain soil types. As demonstrated in subsequent sections in this appendix, these soils will mainly consist of the high-clay content Minford Formation. Gravity drainage of these soils can occur, but may take years to reach the water content that is adequate to be used as fill. However, the treatment and storage CAMU operation will consolidate soils with varying properties including clay and water content. The act of consolidation has a beneficial effect of treating soils by mixing and also breaking the soils apart to facilitate better drainage and capture of contaminated water and potentially DNAPL. Other treatment technologies can be attempted if characterization of these consolidated soils proves that the treatment was ineffective. These technologies if necessary will be identified in future area-specific design documents for excavation and corresponding requests for designation of treatment and storage CAMUs. Therefore, soil may also be further treated in these CAMUs to lower remaining TCE concentrations to below 5,000 mg/kg or be packaged for off-Site shipment, if necessary. Currently, DOE does not plan to stage or treat bulk contaminated soil at the Impacted Material Transfer Area (IMTA) by the potential OSDC, although it will also be constructed and designated as a CAMU for staging primarily D&D waste as explained on Page 18 of the main text.

E.2.2.1 TCE Levels Protective of Geomembrane Liners

The proposed 5,000 mg/kg ceiling concentration is only about one third to one half of theoretical conditions indicating presence of TCE free product in Minford type of clay soils. Consequently, the treatment of residual soils, and other contaminated soils, will assure that no DNAPL is placed in the potential OSDC. Therefore by applying this limit as a safeguard would ensure that the liner materials will not be exposed to excessive TCE free product if the volume of TCE contaminated soil that is anticipated is used as engineered fill in the potential OSDC.

E.2.2.2 Dewatering To No Free Liquid and Separation of TCE-Free Product

At a minimum for saturated soils, soils containing TCE PHC will need to be dewatered to remove free liquid like any other material prior to placement or disposal in the potential OSDC. TCE-free product must be separated from the collected free liquid and properly handled and disposed of off Site. If the soils do not have free liquid, there would be no need for dewatering. However, by breaking up the in situ soil structure, the excavation process will facilitate reduction of moisture content, free up potentially trapped TCE free product from both saturated and unsaturated soils, and prepare the excavated soils for characterization, transportation to, and subsequent placement in the potential OSDC. DOE is contemplating that by consolidating and potentially amending contaminated unsaturated soils treatment will also be affected. This is necessary because of the geotechnical requirements for moisture content that is necessary for placement in the potential OSDC.

In accordance with *OAC* 3745-57-72(A)(3)(a), the placement of bulk or non-containerized liquid hazardous waste or free liquids contained in hazardous waste (whether or not sorbents have been added) in any CAMU is prohibited except where placement of such wastes facilitates the remedy selected for the waste. The dewatering effort will be conducted first in situ during excavation by gravity drain. Sufficient run on controls will be implemented around the excavation areas. Groundwater may also be pumped around the deeper excavation areas to lower groundwater table during the full duration of excavation. Water that is collected during these activities will be treated in one of the existing groundwater treatment facilities that are designed to handle TCE. If necessary, soil dewatered in the AOC may require additional treatment in a storage and treatment CAMU near the excavation site.

TCE concentrations in Gallia soil may be reduced to some degree by gravity drain, if no TCE-free product is present at the location. Significant reduction of TCE concentrations in Gallia soil could be expected, if free product is present initially at the location. Reduction of TCE concentrations in excavated Minford clay from vadose zone is not expected. As shown in Figure D.3, about 450 cy of soil may still have TCE concentrations over 5,000 mg/kg (the level considered conservatively protective of the liner) after dewatering. After excavation and dewatering, the remaining levels of TCE in Minford clay soil are estimated to be, on the average, over 5,000 mg/kg, but could be as high as 15,000 mg/kg (see Figure E.4) in some of the most significant TCE source areas at PORTS, primarily those areas associated with facilities that stored and/or used large quantity of TCE for many decades such as Building X-720. Therefore, additional steps may be required in these areas to achieve the proposed ceiling of 5,000 mg/kg following any required field dewatering and a best-effort to separate TCE-free product from the excavated soil. These steps may include additional treatment or shipping the soil off Site for disposal.

Additional soil with concentrations over 5,000 mg/kg may need to be excavated from the top weathered portion of the Sunbury formation underlying the Gallia soil in the X-701B area, where significant amount of TCE-free product may be present. It is DOE's desire to remove as much TCE-free product from this formation as practical during soil excavation, in order to shorten remaining groundwater remediation durations after soil excavation in this area. Therefore, dewatering and additional treatment of the excavated Sunbury shale would also likely be required.

E.2.2.3 Regulatory Justifications

The following section is a summary of the regulatory justifications that are presented in the main text of this Supplement. The proposed adjusted standard for TCE PHC soil of (1) excavating, dewatering soil to no free liquid and (2) a ceiling limit for representative TCE concentration of 5,000 mg/kg satisfies multiple factors listed in *OAC* 3745-57-72(E)(4)(e) to be considered by Ohio EPA Director. Most importantly, the proposed adjusted standard is more protective of human health and the environment than the (E)(4)(d) standard because a shorter remedial duration and a more complete soil remediation can be accomplished in parallel with the D&D activities at PORTS.

a) Support D&D and waste placement (E)(4)(e)(i)

As pointed out in Section E.1.5 of this appendix, the (E)(4)(d) standard is impractical to support the D&D waste placement in the potential OSDC due to the required treatment duration and associated high cost. Implementation of the proposed adjusted standard, on the other hand, will be able to support the D&D project at PORTS with normal soil excavation equipment and processes used in large-scale soil remediation without significant delays.

b) Reduced short-term risk to workers (E)(4)(e)(iv)

This adjusted standard will result in no extra chemical or radiological exposures experienced by the field workers as opposed to the lengthy soil treatment processes necessary to achieve the standard under

(E)(4)(d). The proposed adjusted standard under (E)(4)(e) will only require soil excavation, dewatering, characterization, and transportation activities normally conducted in a large scale soil remediation. Only a manageable amount of contaminated soil may require further treatment and/or be disposed of off Site.

c) Accelerated cleanup and protective end state (E)(4)(e)(iii)

The estimated volume of contaminated soil that may require additional thermal and/or chemical treatment is reduced from 29,000 cy to 450 cy or less. The savings in cost and time are very significant (i.e., close to $10 million and 2 years). The savings will be used to accelerate more D&D activities and shorten the overall project duration at PORTS. That will better protect the workers, the public, and the environment from potential short-term impacts. This is consistent with the views of the affected local community toward an accelerated cleanup to achieve a protective end state and reuse of the land at PORTS.

d) OSDC protectiveness (E)(4)(e)(v)(*b*)

If selected, the OSDC will provide long-term protection by constructing the CAMU at a location with the best geological conditions at PORTS and will exceed all regulatory engineering design requirements, including double liners and leachate collection requirements for a normal RCRA hazardous waste landfill. Waste acceptance criteria-compliant D&D wastes and fill will be placed in a very controlled manner to ensure long-term stability of the entire waste layer and the final cover system. The OSDC is required to be protective for 1,000 years by the DFF&O.

Applying the 5,000 mg/kg ceiling limit after dewatering as an adjusted treatment standard for TCE contaminated soil in all three major TCE PHC areas in the zone of reasonable treatment values (see Figure D.3), instead of the treatment standard of 500 mg/kg will reduce the amount of soil potentially needing further treatment to a more manageable quantity. This will facilitate a more thorough soil remediation of remaining TCE source areas in groundwater plumes at PORTS. Consequently, the groundwater remediation will be significantly accelerated as a result of removal of all significant TCE sources and DNAPL. This adjusted treatment standard will also allow the pace of soil characterization, excavation, and processing from these areas to keep up with the expected building waste placement rate in the potential OSDC by reducing the time required for characterization and treatment of TCE PHC soil. Following the proposed adjusted treatment standard, the contaminated soil could be processed, placed, and contained within the robust OSDC and safely isolated from the environment.

E.3 SUMMARY

The requirements of *OAC* 3745-57-72 were followed to propose an adjusted treatment standard for TCE PHC contaminated soils to be excavated during D&D and soil remediation at PORTS as identified in Appendix D. After evaluating all the available soil data and the limitations associated with historical soil treatment efforts collected or conducted in the last 20 plus years at PORTS, a protective and cost-effective adjusted standard under (E)(4)(e) is proposed. When all factors are considered, and after cost-effective treatment (i.e., excavation and dewatering), the soil waste will be placed in a disposal CAMU that is protective of human health and the environment.

The proposed adjusted standard for TCE PHC contaminated soil, considered as an option for engineered fill in the potential OSDC under Alternative 2, of: (1) excavating, dewatering to no free liquid, and (2) a ceiling limit for remaining representative TCE concentration of 5,000 mg/kg satisfies multiple factors listed in *OAC* 3745-57-72(E)(4)(e) to be considered by the Ohio EPA Director. The proposed adjusted standard is protective of the public and the environment under the *OAC* 3745-57-72(E)(4)(d) standard. As an added benefit, it will support an accelerated overall cleanup mission at PORTS. This conclusion is

valid for both the residual soils and soils produced under other regulatory authorities with TCE as a PHC because the determining factors are the robustness of the potential OSDC design and physical properties of the Minford clay soil, both of which are independent of the label of residual soil versus other soils.

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