

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11096

EVENT NAME: Pajarito (TA-54) MY2017 Q2

SAMPLE ID: CAPA-17-129185

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	OK	11/19/2017	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	OK	1137	MEDIA:	UA	1
PRS ID:	NA	OK	SAMPLE TECH CODE:	OK	GSP
LOCATION ID:	R-41 S2	OK	FIELD PREP:	UF	OK
LOCATION TYPE:	NA	↓	FIELD QC TYPE:	REG	↓
TOP DEPTH:	↓	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES <input checked="" type="radio"/> NO <input type="radio"/> NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	✓	NA
NA	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	NA

SAMPLE COMMENTS: Sampled 40' from running diesel generator

LOCATION COMMENTS: NA

FIELD PARAMETERS:

Dissolved Oxygen	6.20	mg/L	Flow (in gpm)	2.67	GPM	Oxidation-Reduction Potential	160.3	mV
pH	8.10	SU	Specific Conductance	158.8	uS/cm	Temperature	20.1	deg C
Turbidity	0.1	NTU						

COLLECTED BY (PRINT): Katrina Tow

RELINQUISHED BY (Printed Name) Wayne Sanchez (Signature) <i>Wayne Sanchez</i>	Date/Time 11/19/17 1239	RECEIVED BY (Printed Name) M. Montoya (Signature) <i>M. Montoya</i>	Date/Time 11/19/17 1239
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 12/29/2016

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11096

EVENT NAME: Pajarito (TA-54) MY2017 Q2

SAMPLE ID: CAPA-17-129212

WORK ORDER: NA

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
Date Collected (MM/DD/YYYY):	OK	1/19/17	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):	↓	1137	MEDIA:	NA	1
PRS ID:	NA	ws 1/19/17 OK	SAMPLE TECH CODE:	NA	GSP
LOCATION ID:	R-41 S2	↓	FIELD PREP:	UF	OK
LOCATION TYPE:	NA	↓	FIELD QC TYPE:	FD	↓
TOP DEPTH:	↓	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	↓	↓	EXCAVATED:		YES <u>NO</u> / NA

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
↓	WSP-LL-H-3	1 LITER POLY	1	NONE	↓	NA

SAMPLE COMMENTS: Sampled 40' from running diesel generator

LOCATION COMMENTS: NA

FIELD PARAMETERS:

WS 1/19/17

Dissolved Oxygen	_____	mg/L	Flow (in gpm)	_____	GPM	Oxidation-Reduction Potential	_____	mV
pH	_____	SU	Specific Conductance	_____	uS/cm	Temperature	_____	deg C
Turbidity	_____	NTU						

COLLECTED BY (PRINT):

D Jaramillo

RELINQUISHED BY (Printed Name) Wayne Sanchez (Signature) <i>Wayne Sanchez</i>	Date/Time 1/19/17 1239	RECEIVED BY (Printed Name) M. Martinez (Signature) <i>M. Martinez</i>	Date/Time 1/19/17 1239
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date: 01/18/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2017-935

1. Distribution Of Samples In EDD.

SDG	Analytical Method	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks
ARS1-17-00244	Generic:Low_Level_Tritium	1	1			

SDG	Analytical Method	Analysis Lot ID	Prep Lot ID	Regular Samples	Field Duplicates	Trip Blanks	Field Blanks	Equipment Blanks	Method Blanks	Matrix Spikes	Matrix Spike Dups	Analytical Spikes	Post-Digestion Spikes	Lab Control Samples	Lab Control Sample Dups	Blank Spike	Blank Spike Dups	Lab Duplicates	Storage Blanks	Preparation Blanks	Reagent Blanks
ARS1-17-00244	Generic:Low_Level_Tritium	ARS1-B17-	ARS1-B17-	1	1				1					1	1						

2. Distribution Of Analytes In EDD.

Analytical Method	Analytical Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spiked Compounds	TICS
Generic:Low_Level_Tritium	RAD	CAPA-17-129185	ARS1-B17-00350-04	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	CAPA-17-129212	ARS1-B17-00350-05	FD	1	0	0	0
Generic:Low_Level_Tritium	RAD	LCS	ARS1-B17-00350-01	LCS	0	0	1	0
Generic:Low_Level_Tritium	RAD	LCSD	ARS1-B17-00350-02	LCSD	0	0	1	0
Generic:Low_Level_Tritium	RAD	MB	ARS1-B17-00350-03	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

DATA VALIDATION REPORT

6. Any surrogate recoveries outside the control limits?

No.

7. Any MS/MSD recoveries or RPDs outside the control limits?

No.

8. Any LCS/LCSD or BS/BSD recoveries or RPDs outside the control limits?

LCS Lab Sample	LCSD Lab	Analytical Method	Parameter Name	Lab Lot ID	Analysis	Sample Matrix	LCS Spike Recovery	LCSD Spike Recovery	Upper Limit	Lower Limit	Upper Rejection Limit	Lower Rejection Limit	RPD	RPD Limit
ARS1-B17-00350-01	ARS1-B17-00350-02	Generic:Low_Level_Tritium	Tritium	ARS1-B17-00350	04-03-2017	W	63.000	60.000	120.00	80.000		10	3.6287	

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

DATA VALIDATION REPORT

Location ID	COC Number	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detect Flag	Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent	Analysis Lot ID	Validation Status Code	Use Flag
R-41 S2	2017-935	CAPA-17-129185	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	0.182	pCi/L	0.182	pCi/L	1.601	0.474	W	01/19/2017		ARS1-B17-00350	VAL	Y
R-41 S2	2017-935	CAPA-17-129212	FD	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	R5	N	0.082	pCi/L	0.082	pCi/L	1.987	0.584	W	01/19/2017		ARS1-B17-00350	VAL	Y

Reason Code

Description

R5 Analyte is not detected because the amount reported is less than the MDC.

14. Usable Result Count.

Field Sample ID	Location ID	Sample Purpose	Analytical Method	No. Unuseable Records	Total Records
CAPA-17-129185	R-41 S2	REG	Generic:Low_Level_Tritium	0	1
CAPA-17-129212	R-41 S2	FD	Generic:Low_Level_Tritium	0	1



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Request Number: 2017-935



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American Radiation Services Analytical Reports

for

**Los Alamos National Laboratory
Request: 2017-935**

Original COC

COC/Lab Request #:
2017-935
Page 1 of 1

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American Radiation Services Analytical Reports

for

**Los Alamos National Laboratory
Request: 2017-935**

Case Narrative



ARS International, LLC

Laboratory Analysis Report

ARS1-17-00244

Prepared for:

Los Alamos National Laboratory

**Keith Greene
PO Box 1663
MS M992
Los Alamos, NM 87545**

kgreene@lanl.gov

**Phone: 505-665-9966
Fax: 505-665-9972**

A handwritten signature in cursive script, appearing to read 'Susan Geese', written over a horizontal line.

Project Manager Review

A handwritten signature in cursive script, appearing to read 'R. J. Smith', written over a horizontal line.

Management Review

Notes: ARS International, LLC assumes no liability for the use or the interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

**Project Manager
ProjectManagers@amrad.com**

**Phone: 225.381.2991
Fax: 225.381.2996**





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April 6, 2017

LANL
Keith Greene
PO Box 1663 MS M992
Los Alamos, NM 87545

LANL Request Number: **2017-935**
ARS SDG: **ARS1-17-00244**
Project : **ADEP**

Dear Mr. Greene;

On January 27, 2017, ARS International received two (2) water samples to be analyzed for Low Level Tritium.

Samples were counted using the appropriate counting equipment and QA/QC for this type of analysis. Results of the analysis and QA/QC are attached in the data package.

If you have any questions please do not hesitate to call at 225.381.2991 or email LANL@amrad.com.

Sincerely,

Susan Leese
Project Manager
ARS International



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**PROJECT SAMPLE IDENTIFICATION
CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs**
Subcontract (LANL Agreement Number) 250953

Request Number	LANL PROJECT SAMPLE ID NUMBER	American Radiation Services SAMPLE ID NUMBER(S)
2017-935	CAPA-17-129185	ARS1-17-00244-001
2017-935	CAPA-17-129212	ARS1-17-00244-002

SAMPLE RECEIPT

The sample was received in good condition and was screened for radioactive contamination as per procedure ARS-062 "Sample Receiving". Sample was checked in with a 40-day turnaround, per latest contract modification.

ANALYTICAL METHODS

Tritium analyses were performed using ARS-040, "Tritium Assay in Water Samples Using Electrolytic Enrichment".

ANALYTICAL RESULTS

LCS/LCSD recoveries were below the accepted range of 80-120%; per client, data was released.

American Radiation Services Project Manager/Laboratory Director's Comments:

"I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this sample data package and the computer-readable EDD, as applicable, submitted on diskette or by modem, has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature."

"I certify that this electronic image and all hardcopies produced from this image accurately represent the data and are in compliance with the LANL specific requirements, both technically and for completeness, other than the conditions detailed above or in the sample data package narrative. Release, by submission through email, the data contained in this electronic image and the computer-readable EDD (as applicable), has been authorized by the laboratory Manager/Technical Director or the Manager's designee."


Signature

Laboratory Management, ARS International

Title

4-12-17
Date

Notes (Case Narrative):

Comments:

- 1.0) All MDA/MDC values are calculated on a sample specific basis.
- 2.0) Soil and Sludge analysis are reported on a wet basis or an as received basis unless otherwise indicated.
- 3.0) Data in this report are within the limits of uncertainty specified in the reference method unless otherwise specified.
- 4.0) Modified analysis procedures are procedures that are modified to meet the certain specifications. An example may be the use of a water method to analyze a solid matrix due to the lack of an officially recognized procedure for the analysis of the solid matrix. Modified analyses are indicated by the subsequent addition of "m" to the procedure number (i.e. 900.0M).
- 5.0) Total activity is actually total gamma activity and is determined utilizing the prominent gamma emitters from the naturally occurring radioactive decay chains and other prominent radioactive nuclides. Total activity may be lower than the actual total activity due to the extent of secular equilibrium achieved in the various decay chains at the time of analysis. The total activity is not representative of nuclides that emit solely alpha or beta particles.
- 6.0) Ra-228 is determined via secular equilibrium with its daughter, Actinium 228 (Gamma Spectroscopy only).
- 7.0) U-238 is determined via secular equilibrium with its daughter, Thorium 234 (Gamma Spectroscopy only).
- 8.0) All gamma spectroscopy was performed utilizing high purity germanium detectors (HPGe).
- 9.0) ARS makes every attempt to match sample density to calibrated density; however, in some cases, it is not practical or possible to do so and data results may be affected (Gamma Spectroscopy only).
- 10.0) Gamma spectroscopy results are calculated values based on the ORTEC® GammaVision ENV32 Analysis Engine.
- 11.0) ACLASS DOD and ISO 17025 certification applies only to the following analytes and methods: Gross Alpha and Gross Beta (EPA 900, SM7110B&C, SW846 9310); Radium 226 (EPA 903, EPA 903.1, SM 7500 Ra-B, SW846 9315); Radium 228 (EPA 904, SM 7500 Ra-B SW846 9320); Iodine-131(EPA 901.1); Uranium by ICPMS (EPA 200.8); Strontium 89/90 (EPA 905, Eichrom SRW01, HASL 300 Sr-03-RC); Tritium (EPA 906, EPA 906M); Gamma Emitters (EPA 901.1, SM7120B, HASL 300 Ga-01-R); Americium-241, Curium 242/244, Plutonium 239/240 and 241, Thorium 228/230/232, Uranium 234/233 and 238 (Eichrom ACW03 VBS); Lead 210 (HASL 300 Pb-01-RC, Eichrom OTW01); Polonium 210 (HASL 300 Po-01-RC, HASL 300 Po-02-RC); Technetium-99 (Eichrom TCW02, Eichrom TCS01M).

Method References:

- 1.0) EPA 600/4-80-032; Prescribed Procedures for the Measurements of Radioactivity in Drinking Water, August 1980.
- 2.0) Standard Methods for the Examination of Water and Wastewater (On-Line Edition)
- 3.0) EPA SW-846; Test Methods for Evaluating Solid Waste, (On-Line edition)
- 4.0) EPA 600/4-79-020; Methods for Chemical Analysis of Water and Waste, March 1983.
- 5.0) HASL 300; The Procedures Manual of the Environmental Measurements Laboratory, Volume I, 28th Edition February, 1997.

Definitions:

CRDL	Contract Required Detection Limit
CSU	Combined Standard Uncertainty
DLC	Decision Level Concentration (ANSI N42.23) or critical level
DO	Duplicate Original
DUP	Method Duplicate
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
MDA	Minimum Detectable Activity
MDC	(Minimum Detectable Concentration) minimum concentration of the analyte that ARS can detect utilizing the specific analysis
MBL	Method Blank
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
NP	Not Provided
NR	Not Referenced
LOD	Limit of Detection
LOQ	Limit of Quantitation

Data Qualifiers:

B	The analyte is found in both the associated method blank and the sample. This flag indicates probable blank contamination.
D	Sample analysis accomplished through dilution.
J	The reported result is an estimated value above the limit of detection but outside of quantitation range (e.g., matrix interference was observed).
Q	One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).
U	Activity is below the MDC, MDA, MDL, or LOD
N	The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.
*	LCS/LCSD or MS/MSD fails RPD criteria.
S	Spike
SC	Subcontracted out to another qualified laboratory
H	Holding time exceeded

LELAP Cert# 01949

NELAP Cert# E87558

ARS-059-010
Revision: 9.1
Revision Date: 03-14-2017



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Low Level Tritium by Low Level Liquid Scintillation Counting



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1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-17-00244

Client Sample ID: CAPA-17-129185

Sample Collection Date: 01/19/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-935

ARS Sample ID: ARS1-17-00244-001

Date Received: 01/27/17

Report Date: 04/06/17

Radiochemistry

Analysis Description	Analysis Results	1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	0.182	0.474	1.601	0.772	3.221	U	pCi/L	ARS-040	04/04/17 12:07	SWHITE	N/A

Project Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

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ARS Sample Delivery Group: ARS1-17-00244

Client Sample ID: CAPA-17-129212

Sample Collection Date: 01/19/17

Sample Matrix: Aqueous

Percent Solids: N/A

Request or PO Number: 2017-935

ARS Sample ID: ARS1-17-00244-002

Date Received: 01/27/17

Report Date: 04/06/17

Radiochemistry

Analysis Description	Analysis Results	1s	MDC	DLC	CRDL	Qual	Analysis Units	Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	0.082	0.584	1.987	0.958	3.221	U	pCi/L	ARS-040	04/04/17 16:18	SWHITE	N/A

Project Manager Review

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QC Results Report

Sample Delivery Group: ARS1-17-00244

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B17-00350	LCS	H3	16.498	2.581	1.534	26.002		pCi/L	ARS-040	4/3/17 21:33	SWHITE	63	80%-120%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B17-00350	MBL	H3	0.320	0.406	1.352	NA	U	pCi/L	ARS-040	4/3/17 21:33	SWHITE

Sample RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-B17-00350	LCSD	H3	16.498	2.581	15.910	2.492		pCi/L	ARS-040	4/3/17 21:33	SWHITE	0.12	< 1

Sample DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-B17-00350	LCSD	H3	16.498	2.581	15.910	2.492		pCi/L	ARS-040	4/3/17 21:33	SWHITE	0.33	< 3

Project Manager Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of ARS International.

LELAP Certificate# 01949

NELAP Certificate # E87558



QC Evaluation

Method: ARS-040

Batch ID: ARS1-B17-00350

SDG's: ARS1-17-00244

LCS LCSD	<div style="border: 1px solid black; padding: 2px;">16.4980</div> <div style="border: 1px solid black; padding: 2px;">15.9100</div>	CSU (2s) CSU-D (2s)	<div style="border: 1px solid black; padding: 2px;">5.0580</div> <div style="border: 1px solid black; padding: 2px;">4.8840</div>	
<p>DER = $\frac{\text{abs}(LSC-LSCD)}{\text{sqr}((2s \text{ CSU}/2)^2 + ((2s \text{ CSU-D}/2)^2) \text{ at } 2 \text{ sigma}} =$ DER <3</p>				
<p>DER= $\frac{0.588}{3.515566} =$ <div style="border: 1px solid black; padding: 2px;">0.167256</div> < 3</p>				
<p>% RPD= $\frac{\text{ABS}(LCS - LCSD)}{(LCS+LCSD)/2} =$ RPD <25%</p>				
<p>%RPD= $\frac{0.588}{16.204} =$ <div style="border: 1px solid black; padding: 2px;">3.628734</div> < 25%</p>				
The RPD shall be less than 25% or other client-applied criteria				
<p>RER= $\frac{\text{abs}((LCS-LCSD))}{(CSU)+(CSD) \text{ at } 2 \text{ sigma}} =$ <1</p>				
<p>RER = $\frac{0.588}{9.9420} =$ <div style="border: 1px solid black; padding: 2px;">0.059143</div> <1</p>				
Blank Information				
	Act	CSU(2s)	MDA	Act>MDA
AM-241				
U-234				
U-235				
U-238				
Pu-238				
Pu-239/240				
Th-228				
Th-230				
Th-232				
H3	0.32	0.796	1.352	
Ra-226				
Ra-228				
Total U				
Pb-210				
Po-209				
Sr-90				
TC-99				
NI-63				

*MDA should be below RDL

*Blank activity must be below MDA

*Blank activity must be < 1.65*CSU

ACT =

0.32

CSU =

0.796

Is ACT < 1.65*CSU?

YES



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Low Level Tritium by Low Level Liquid Scintillation Counting Laboratory Records

Analytical Batch Report

Analysis Batch ID ARS1-B17-00350											
Method		ARS-040		Analysis		LSC-A-022		Matrix		AQ	
Description		Low Level Tritium by Electrolytic Enrichment									
ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Prep Code	Client ID	Group Name	Lab Deadline
ARS1-B17-00350-01	LCS	B-23154									
ARS1-B17-00350-02	LCSD	B-23155									
ARS1-B17-00350-03	MBL										
ARS1-B17-00350-04	TRG				ARS1-17-00244	001	1		CAPA-17-129185	STD	03/05/17
ARS1-B17-00350-05	TRG				ARS1-17-00244	002	1		CAPA-17-129212	STD	03/05/17

LCS Report
Analytical Batch: ARS1-B17-00350

Blind ID	ABatch Sample ID	Blind Group	Std ID	Isotope	Exp Addition (g)	Expected Value (pCi/g)	Empty Wt (g)	Gross Wt (g)	Net Wt (g)	Expected Value CT (pCi/g)	Mid Point Count Date	Known Value (pCi)	User ID	Mod Date
B-23154	ARS1-B17-00350-01	B-H3	S-0318	H-3	5	2.67473	17.0763	22.0519	4.9756	2.64972	04/03/2017	13.18393	JBYRD	02/01/2017
B-23155	ARS1-B17-00350-02	B-H3	S-0318	H-3	5	2.67473	17.2009	22.1851	4.9842	2.64931	04/04/2017	13.20469	JBYRD	02/01/2017

5.8824 dpm/g @ 4/3/17 21:33
SRL
4/5/17

Expected Value Calculations

ARS Batch Number: ARS1-B17 - 00350

LCS CALCULATED EXPECTED VALUE = 26.002 Range 19.502 - 32.503

Enter these Values	Current ACT	5.8824
	NetWt	4.9756
	Aliquot	0.5070

Standards Report
LCS Report
Procedural Data Report

LCSD CALCULATED EXPECTED VALUE = 26.361 Range 19.771 - 32.952

Enter these Values	Current ACT	5.8824
	NetWt	4.9842
	Aliquot	0.5010

Standards Report
LCS Report
Procedural Data Report



LSC Instrument Data Transfer Report

\\PACKARD3170_NEW\Results\ARS\Low Low Level Tritium

Batch Sample ID Non-BKG Samples Transferred Samples Eligible To Save

INTERNATIONAL				ARS1-B17-00350			5			5			LSC 2		
LIMS Batch Sample ID	LSC P#	LSC PID	LSC S#	LSC SMP_ID	LSC Count Date	LSC CPMA	LSC SSE	LSC EFF	LSC Count Dur	Analysis Batch	LIMS SDG	LIMS Run			
BKG	48		1	BACKGROUND	04/03/17 17:22	1.03	209.84	25.4100	240.00	ARS1-B17-00350					
ARS1-B17-00350-01	48		2	B17-00350-01	04/03/17 21:33	4.44	218.47	26.1400	240.00	ARS1-B17-00350					
ARS1-B17-00350-02	48		3	B17-00350-02	04/04/17 01:44	4.35	221.79	26.4100	240.00	ARS1-B17-00350					
ARS1-B17-00350-03	48		4	B17-00350-03	04/04/17 05:55	1.11	216.60	25.9900	240.00	ARS1-B17-00350					
ARS1-B17-00350-04	48		5	B17-00350-04	04/04/17 10:06	1.07	219.23	26.2100	240.00	ARS1-B17-00350	ARS1-17-00244	1			
ARS1-B17-00350-05	48		6	B17-00350-05	04/04/17 14:18	1.05	218.97	26.1800	240.00	ARS1-B17-00350	ARS1-17-00244	1			

ARS-040 Calculation Results			
ARS1-B17-00350			
ACF	1		
UCF	2.22		
Sys Error	0.15		

AnalysisCode	ABatchSampleID	Initial_Mass_sample.g	Mass_Na2O2_added.g	Final_mass_electrolyzed_sample_NaOH.g	Mass_equivalent_NaOH.g	Final_Mass_Electrolyzed_sample.g	VolumeFactor_X	Enrichment_Factor_Y
LSC-A-022	ARS1-B17-00350-01	507.030	2.000	12.860	2.052	10.808	0.021	36.262
LSC-A-022	ARS1-B17-00350-02	500.990	2.000	12.710	2.052	10.658	0.021	36.332
LSC-A-022	ARS1-B17-00350-03	494.140	2.000	10.870	2.052	8.818	0.018	43.017
LSC-A-022	ARS1-B17-00350-04	520.540	2.000	13.950	2.052	11.898	0.023	33.910
LSC-A-022	ARS1-B17-00350-05	401.280	2.000	12.650	2.052	10.598	0.026	29.513

ARS-040 Calculation Results			
ARS1-B17-00350			
ACF	1		
UCF	2.22		
Sys Error	0.15		

AnalysisCode	ABatchSampleID	Average	Sample_CPM	Bkg_CPM	tsIE	Detector_Eff_decimal	Aliquot	AliqUnits	Activity_reference_date	Start_Date_of_Count	Sample_Count	Duration_min
LSC-A-022	ARS1-B17-00350-01	4.435	4.435	1.032	218.470	0.261	0.01005	L	10/24/2016	4/3/2017		240.000
LSC-A-022	ARS1-B17-00350-02	4.354	4.354	1.032	221.790	0.264	0.01005	L	10/24/2016	4/4/2017		240.000
LSC-A-022	ARS1-B17-00350-03	1.107	1.107	1.032	216.600	0.260	0.00948	L	3/1/2017	4/4/2017		240.000
LSC-A-022	ARS1-B17-00350-04	1.068	1.068	1.032	219.230	0.262	0.01013	L	1/19/2017	4/4/2017		240.000
LSC-A-022	ARS1-B17-00350-05	1.045	1.045	1.032	218.970	0.262	0.00939	L	1/19/2017	4/4/2017		240.000

ARS-040 Calculation Results			
ARS1-B17-00350			
ACF	1		
UCF	2.22		
Sys Error	0.15		

AnalysisCode	ABatchSampleID	Total_Bkg_Count	Duration_min	DF	Sample_Activity_Conc	Standard_Counting_Uncertainty	CU_1	CSU_1	CU_1_96	CSU_1_96	NDC	DLC	ActivityReportUnits
LSC-A-022	ARS1-B17-00350-01		240.000	0.97536	16.498	0.732	0.732	2.581	1.434	5.058	1.534	0.740	pCi
LSC-A-022	ARS1-B17-00350-02		240.000	0.97536	15.910	0.717	0.717	2.492	1.406	4.884	1.515	0.731	pCi
LSC-A-022	ARS1-B17-00350-03		240.000	0.99478	0.320	0.403	0.403	0.406	0.791	0.796	1.352	0.652	pCi
LSC-A-022	ARS1-B17-00350-04		240.000	0.98851	0.182	0.473	0.473	0.474	0.928	0.929	1.601	0.772	pCi
LSC-A-022	ARS1-B17-00350-05		240.000	0.98851	0.082	0.584	0.584	0.584	1.145	1.145	1.987	0.958	pCi

ARS-040 Calculation Results			
ARS1-B17-00350			
ACF	1		
UCF	2.22		
Sys Error	0.15		

AnalysisCode	ABatchSampleID	AliquotReportUnits	UserID	ModDate
LSC-A-022	ARS1-B17-00350-01	L	AMRAD\SWHITE	4/5/2017
LSC-A-022	ARS1-B17-00350-02	L	AMRAD\SWHITE	4/5/2017
LSC-A-022	ARS1-B17-00350-03	L	AMRAD\SWHITE	4/5/2017
LSC-A-022	ARS1-B17-00350-04	L	AMRAD\SWHITE	4/5/2017
LSC-A-022	ARS1-B17-00350-05	L	AMRAD\SWHITE	4/5/2017

Assay Definition-

Assay Description:
 Low Level H3

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\ARS\Low Low Level Tritium 3\20170403_1713
 Raw Results Path: C:\Packard\Tricarb\Results\ARS\Low Low Level Tritium 3\20170403_1713\20170403_1713.results
 RTF File Name: C:\Packard\Tricarb\Results\ARS\Low Low Level Tritium 3\20170403_1713\Report1.rtf
 Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\Low Low Level Tritium 3\20170403_1713\LLH3 Results.csv
 Assay File Name: C:\Packard\Tricarb\Assays\Low Low Level Tritium 3.lsa

Count Conditions-

Nuclide: H-3 LL

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10

Count Time (min): 240.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1
 Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	2.0	18.6	0.50
B	0.0	2000.0	0.00
C	0.0	2000.0	0.00

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 200

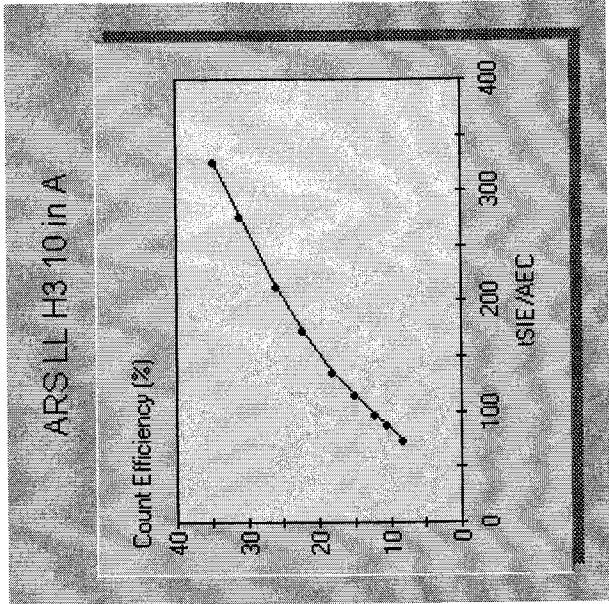
Half Life-

Half Life Correction: Off
 Regions Half Life

Units Reference Date Reference Time

A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 10/29/2014
Date Modified:
ARS LL H3 10 in A

tSIE/AEC	Count Efficiency (%)
326.10	34.75
276.09	30.85
214.12	25.79
173.96	22.27
135.91	18.02
115.60	15.00
98.47	12.21
88.00	10.55
74.82	8.24

4/4/2017 6:20:45 PM

Protocol# 48 - Low Low Level Tritium 3.lsa

P#	S#	SMPL_ID	CPMA	DPMI	tSIE	Eff	Nucl	In A	Count	Time	DATE	TIME	MESSAGES
48	1	BACKGROUN	1.032	4.061	209.84			25.41	240.00		4/3/2017	5:22:11 PM	
48	2	B17-00350-01	4.435	16.964	218.47			26.14	240.00		4/3/2017	9:33:20 PM	
48	3	B17-00350-02	4.354	16.485	221.79			26.41	240.00		4/4/2017	1:44:39 AM	
48	4	B17-00350-03	1.107	4.259	216.60			25.99	240.00		4/4/2017	5:55:48 AM	
48	5	B17-00350-04	1.068	4.075	219.23			26.21	240.00		4/4/2017	10:06:55 AM	
48	6	B17-00350-05	1.045	3.990	218.97			26.18	240.00		4/4/2017	2:18:04 PM	

Procedure Data											
ABatch Sample ID	Client ID	Parent	Tare Wt of Electrolysis Cell & Electrodes	Tare Wt Reservoir	Gross Weight of Sample Reservoir	Wt Sodium Peroxide	Gross Sample Added	Electrolysis Start Date & Time	Start AMP	Start Bath (C)	Electrolysis End Date/Time
ARS1-B17-00350-01			315.9400	218.2300	725.2600	2.0000	507.0300	3/1/2017 1:10:00 PM	5.0000	2.0000	3/30/2017 3:50:00 PM
ARS1-B17-00350-02			312.0000	207.7700	708.7600	2.0000	500.9900	3/1/2017 1:25:00 PM	5.0000	2.0000	3/30/2017 4:10:00 PM
ARS1-B17-00350-03			324.9100	215.3700	709.5100	2.0000	494.1400	3/1/2017 1:35:00 PM	5.0000	2.0000	3/30/2017 4:40:00 PM
ARS1-B17-00350-04	CAPA-17-129185		325.1500	202.3700	722.9100	2.0000	520.5400	3/1/2017 12:50:00 PM	5.0000	2.0000	3/29/2017 9:25:00 AM
ARS1-B17-00350-05	CAPA-17-129212		316.3900	226.1700	627.4500	2.0000	401.2800	3/1/2017 1:00:00 PM	5.0000	2.0000	3/29/2017 10:25:00 AM

ARS-040

ARS International
Baton Rouge Laboratory

Procedure Data		Client ID	Parent	End Bath (C)	End Wt of Cell + Resv + Sample	Gross Sample Recovered	Enrichment Factor	Tare Wt Cryo- distill flask	Gross Wt flask + Sample	Recovered Water	Tare Weight of LSC Vial	Vial + Sample
ABatch Sample ID												
ARS1-B17-00350-01				2.0000	547.0300	12.8600	39.4269	97.1600	108.2300	11.0700	6.6300	16.6800
ARS1-B17-00350-02				2.0000	532.4800	12.7100	39.4170	123.0400	133.3600	10.3200	6.6100	16.6600
ARS1-B17-00350-03				2.0000	551.1500	10.8700	45.4591	118.5400	127.3500	8.8100	6.5300	16.0100
ARS1-B17-00350-04	CAPA-17-129185			2.0000	541.4700	13.9500	37.3147	109.7400	121.6000	11.8600	6.4200	16.5500
ARS1-B17-00350-05	CAPA-17-129212			2.0000	555.2100	12.6500	31.7217	103.6100	112.9700	9.3600	6.5000	15.8900

Procedure Data									
ABatch Sample ID	Client ID	Parent	Net Sample	Gross Wt Vial + Dead Water If used	Net Dead Water Added	Tare Wt b/f Cocktail	Gross Wt Vial + Cocktail	Net Wt of Cocktail Added	User ID
ARS1-B17-00350-01			10.0500	16.6800	0.0000	16.6800	26.7000	10.0200	SWHITE
ARS1-B17-00350-02			10.0500	16.6600	0.0000	16.6600	26.7900	10.1300	SWHITE
ARS1-B17-00350-03			9.4800	16.6400	0.6300	16.6400	26.7300	10.0900	SWHITE
ARS1-B17-00350-04	CAPA-17-129185		10.1300	16.5500	0.0000	16.5500	26.6700	10.1200	SWHITE
ARS1-B17-00350-05	CAPA-17-129212		9.3900	16.6100	0.7200	16.6100	26.6600	10.0500	SWHITE

ARS-040

ARS International
Baton Rouge Laboratory

Reagent Amounts				
ABatch Sample ID	Client ID	14.2.12 DISTILLAT - Ionize & add O to electrolysis - Sodium Peroxide (granular) Reagent Grade (g)	14.3.22 DISTILLATION - Add scint cocktail - Ultima Gold LLT Reagent Grade (mL)	User ID
ARS1-B17-00350-01		2.00	10.00	SWHITE
ARS1-B17-00350-02		2.00	10.00	SWHITE
ARS1-B17-00350-03		2.00	10.00	SWHITE
ARS1-B17-00350-04	CAPA-17-129185	2.00	10.00	SWHITE
ARS1-B17-00350-05	CAPA-17-129212	2.00	10.00	SWHITE

Reagent Tracking	
Procedure Section	Reagent ID
14.2.12 DISTILLAT - Ionize & add O to electrolysis	R16-00810
14.3.22 DISTILLATION - Add scint cocktail	R16-00057

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
3-20-17	09:00	B17-00466-04 ⁰⁰⁴⁶⁶⁻²⁸⁻¹⁷ 04	B17-00466-04 ⁰⁰⁴⁶⁶⁻²⁸⁻¹⁷ 04	0858	SW
		05	B17-00466		SW
		06			SW
		07			SW
		08			SW
		09			SW
		10			SW
		11			SW
3-20-17	10:05	SNC 5	QA	QA	SW
4-3-17	11:44	SNC 5	QA	QA	SW
4-3-17	17:10	Background	B17-00350	1713	SW
		B17-00350-01			SW
		02			SW
		03			SW
		04			SW
		05			SW
		SNC 5	QA	QA	SW

Reviewed By: SW Date: 4-5-17
Initials



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Low Level Tritium

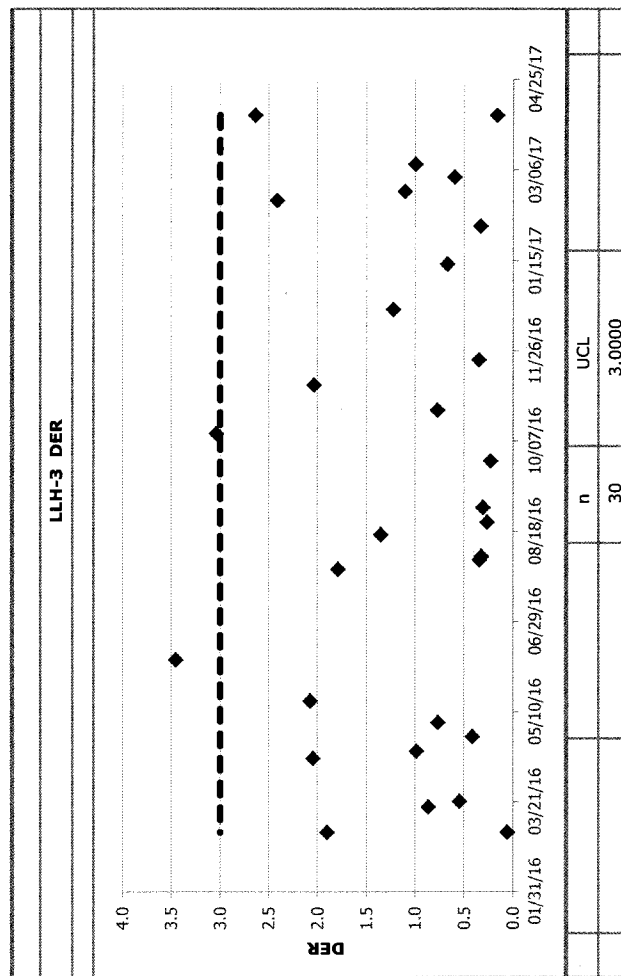
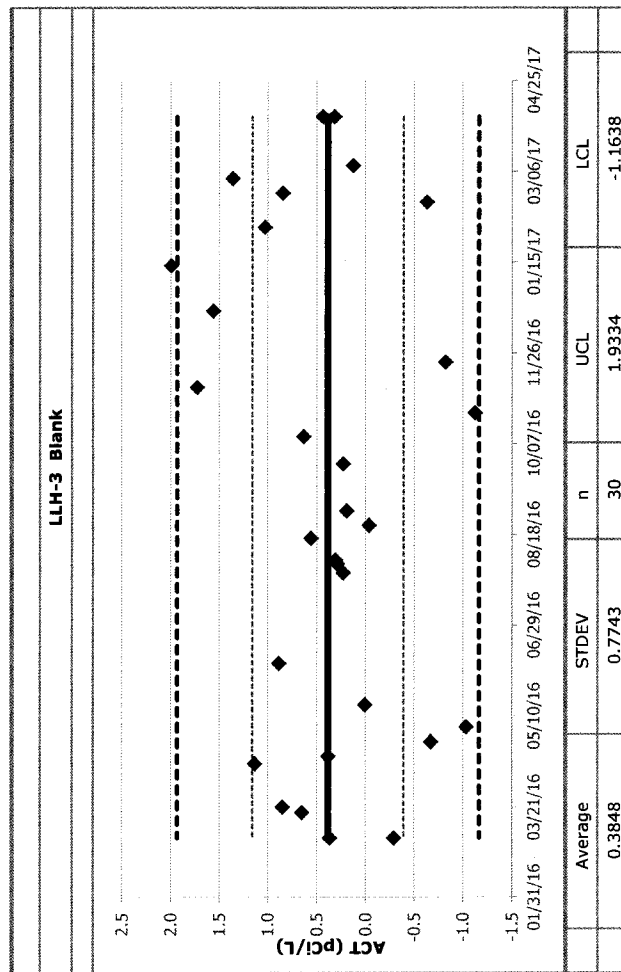
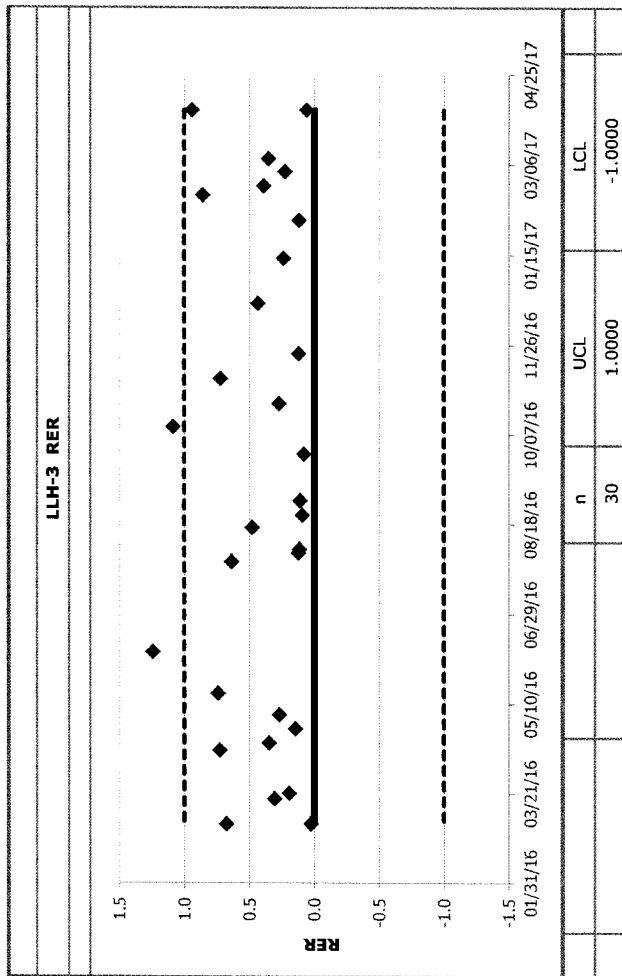
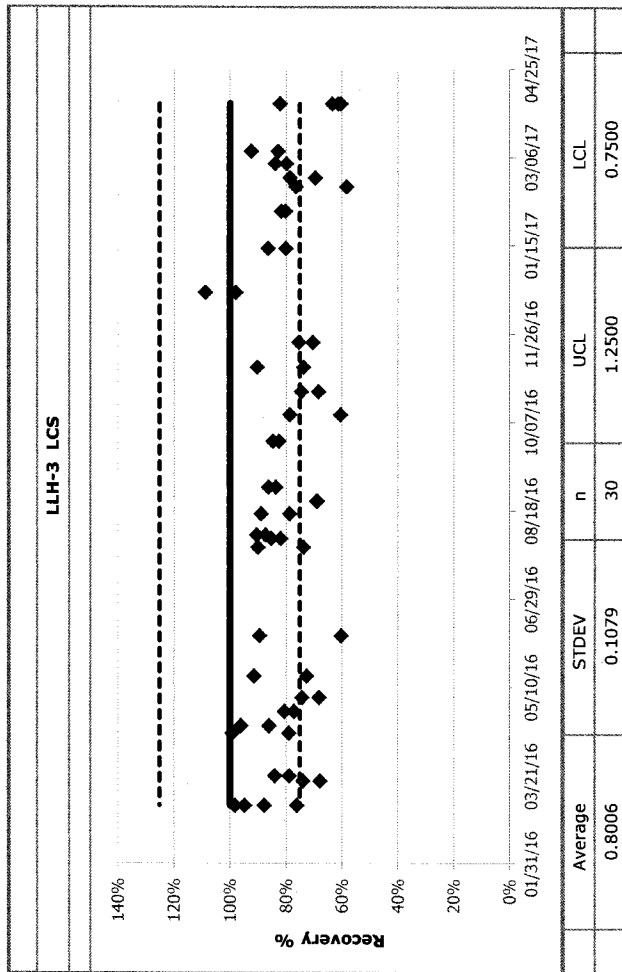
by

Low Level Liquid

Scintillation Counting

Control Charts

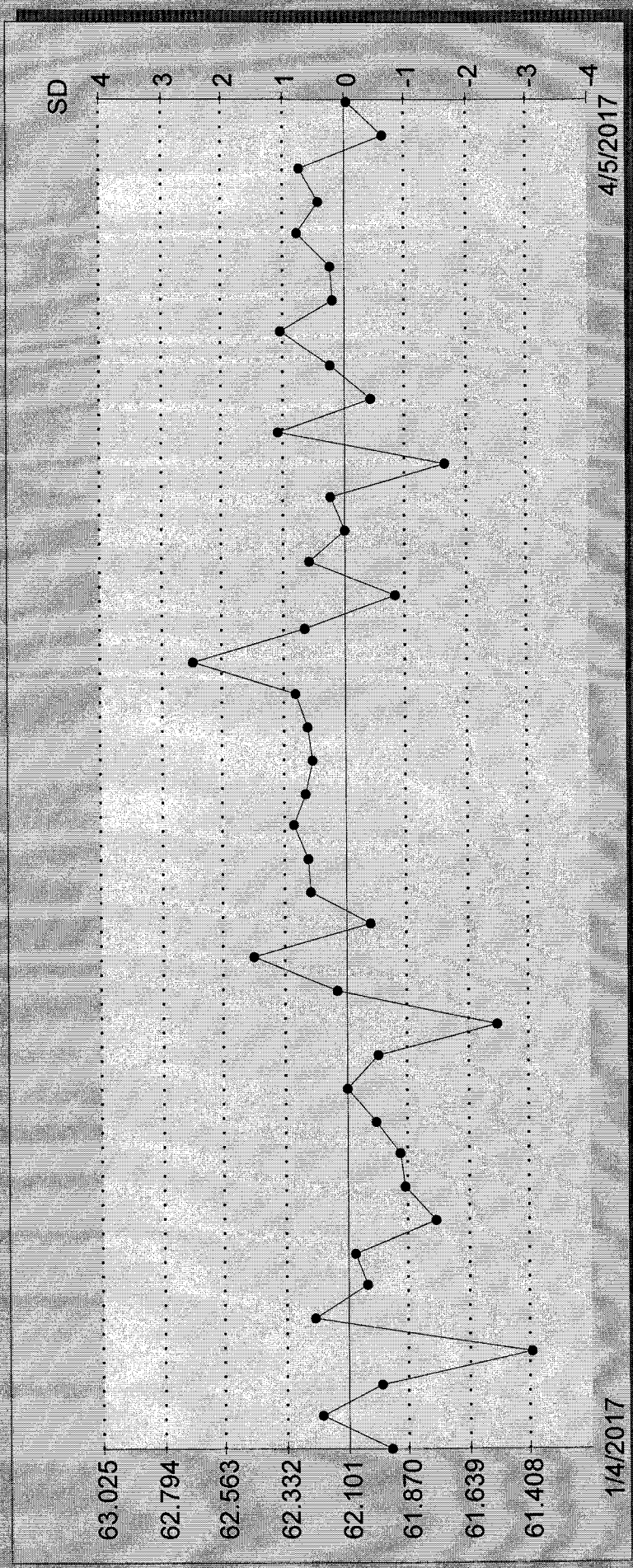
QC Chart



3H Efficiency : 2343
Total # pts : 42
Valid # pts : 62.10
Mean : 62.10
SD : 0.23

Date	Value	Valid Pt
Jan 04, 2017	61.94	X
Jan 04, 2017	62.20	X
Jan 04, 2017	61.97	X
Jan 04, 2017	61.41	X
Jan 04, 2017	62.22	X
Jan 04, 2017	62.03	X
Jan 06, 2017	62.07	X
Jan 10, 2017	61.76	X
Jan 10, 2017	61.88	X
Jan 10, 2017	61.90	X
Jan 12, 2017	61.99	X
Jan 14, 2017	62.10	X
Jan 17, 2017	61.98	X
Jan 18, 2017	61.53	X
Jan 24, 2017	62.13	X
Jan 27, 2017	62.45	X
Jan 30, 2017	62.01	X
Feb 16, 2017	62.24	X
Feb 20, 2017	62.24	X
Feb 21, 2017	62.30	X
Feb 22, 2017	62.25	X
Feb 22, 2017	62.23	X
Feb 23, 2017	62.24	X
Feb 23, 2017	62.29	X
Mar 06, 2017	62.67	X
Mar 08, 2017	62.25	X
Mar 10, 2017	61.91	X
Mar 11, 2017	62.23	X
Mar 14, 2017	62.09	X
Mar 15, 2017	62.15	X
Mar 16, 2017	61.72	X
Mar 20, 2017	62.35	X
Mar 23, 2017	62.00	X
Mar 23, 2017	62.16	X
Mar 23, 2017	62.34	X
Apr 03, 2017	62.15	X
Apr 04, 2017	62.15	X
Apr 04, 2017	62.15	X
Apr 04, 2017	62.28	X
Apr 05, 2017	62.19	X
Apr 05, 2017	62.27	X
Apr 05, 2017	61.95	X
Apr 05, 2017	62.09	X

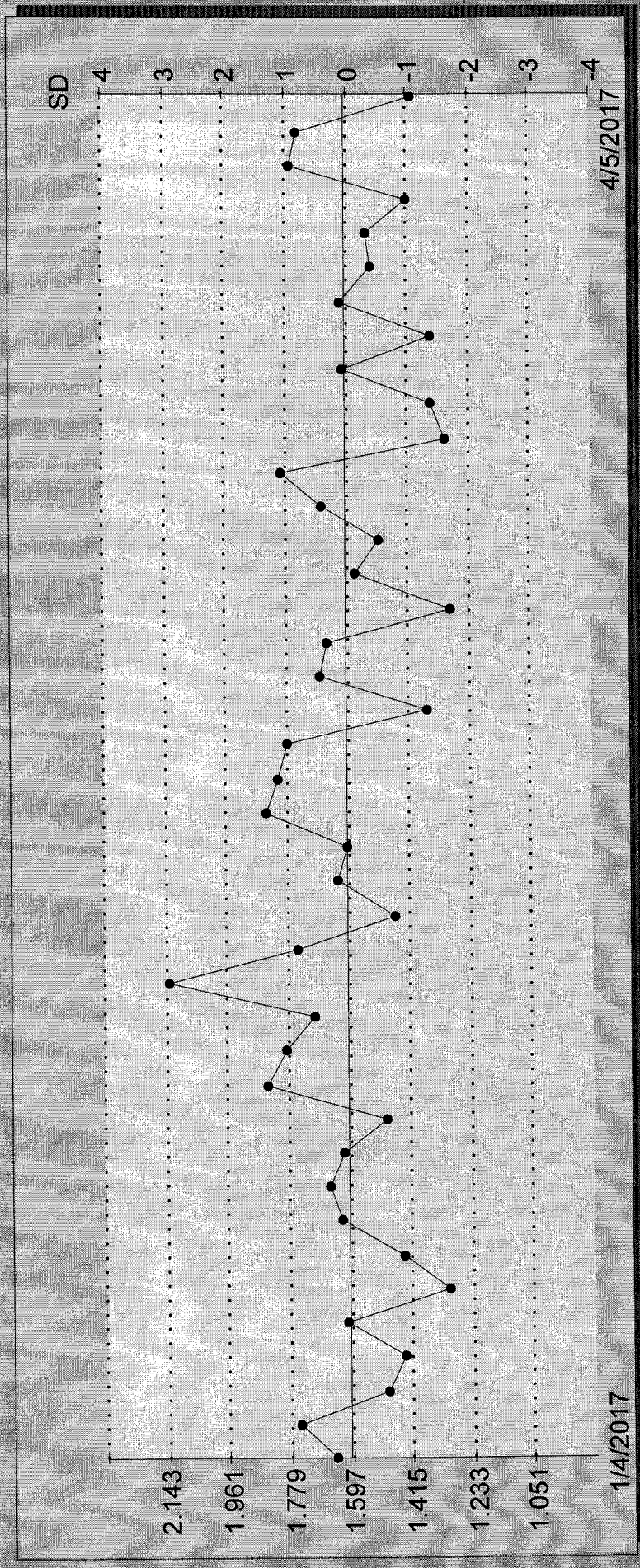
3H Efficiency : 2343
Total # pts : 42
Valid # pts : 62.10
Mean : 0.23
SD



3H Background
Total # pts : 2295
Valid # pts : 41
Mean : 1.60
SD : 0.18

Date	Value	Valid Pt
Jan 04, 2017	1.64	X
Jan 04, 2017	1.75	X
Jan 04, 2017	1.48	X
Jan 04, 2017	1.44	X
Jan 04, 2017	1.61	X
Jan 04, 2017	1.30	X
Jan 06, 2017	1.44	X
Jan 10, 2017	1.62	X
Jan 10, 2017	1.65	X
Jan 10, 2017	1.62	X
Jan 12, 2017	1.49	X
Jan 14, 2017	1.84	X
Jan 17, 2017	1.78	X
Jan 18, 2017	1.70	X
Jan 24, 2017	2.13	X
Jan 27, 2017	1.75	X
Jan 30, 2017	1.46	X
Feb 16, 2017	1.63	X
Feb 20, 2017	1.60	X
Feb 21, 2017	1.84	X
Feb 22, 2017	1.80	X
Feb 22, 2017	1.78	X
Feb 23, 2017	1.36	X
Feb 23, 2017	1.68	X
Mar 06, 2017	1.65	X
Mar 08, 2017	1.29	X
Mar 10, 2017	1.57	X
Mar 11, 2017	1.50	X
Mar 14, 2017	1.67	X
Mar 15, 2017	1.79	X
Mar 16, 2017	1.30	X
Mar 20, 2017	1.34	X
Mar 23, 2017	1.61	X
Apr 03, 2017	1.34	X
Apr 04, 2017	1.61	X
Apr 04, 2017	1.52	X
Apr 04, 2017	1.54	X
Apr 05, 2017	1.41	X
Apr 05, 2017	1.76	X
Apr 05, 2017	1.74	X
Apr 05, 2017	1.40	X

3H Background
Total # pts : 2295
Valid # pts : 41
Mean : 1.60
SD : 0.18





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Tritium- Screening by Low Level Liquid Scintillation Counting



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**American Radiation Services
Analytical Reports**

for

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**Tritium-Screening
by
Low Level Liquid
Scintillation Counting
Samples**

Procedures: ARS-060 ARS-040 Section 14.1 Tritium Screen in Clean Water without Distillation

ARS File ID Numbers: ARS1-17-00244
ARS Batch ID: ARS1-B17-00212

Sample ID:	COUNT TIME	CPMA	Background CPMA	Eff Nucl In A	Aliquot (grams)	ACTIVITY units	MDA	Sample Must be analyzed as LSC-A-001
1	B17-00212-04	120	1.301	1.722	23.94	-79.215	pCi/L 132.8905	NO
2	B17-00212-05	120	1.216	1.722	23.99	-95.010	pCi/L 132.6136	NO
3						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
4						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
5						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
6						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
7						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
8						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
9						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
10						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
11						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
12						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
13						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
14						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
15						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
16						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
17						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
18						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
19						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
20						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
21						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
22						#DIV/0!	pCi/L #DIV/0!	#DIV/0!
23						#DIV/0!	pCi/L #DIV/0!	#DIV/0!



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Tritium-Screening by Low Level Liquid Scintillation Counting Laboratory Records

Analytical Batch Report

Analysis Batch ID ARS1-B17-00212											
Method		ARS-054		Analysis		LSC-A-021		Matrix		AQ	
Description Low Level Tritium Screening											
ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Prep Code	Client ID	Group Name	Lab Deadline
ARS1-B17-00212-01	LCS										
ARS1-B17-00212-02	LCSD										
ARS1-B17-00212-03	MBL										
ARS1-B17-00212-04	TRG				ARS1-17-00244	001	1		CAPA-17-129185	STD	03/05/17
ARS1-B17-00212-05	TRG				ARS1-17-00244	002	1		CAPA-17-129212	STD	03/05/17

Procedure Data

ABatch Sample ID	Client ID	Parent	ICOC ID	Aliquot 1 Vol/Wt	Aliquot 1 Units	Aliquot 2 Vol/Wt	Aliquot 2 Units	User ID
ARS1-B17-00212-01								SWHITE
ARS1-B17-00212-02								SWHITE
ARS1-B17-00212-03								SWHITE
ARS1-B17-00212-04	CAPA-17-129185		256378	0.0100 L				SWHITE
ARS1-B17-00212-05	CAPA-17-129212		256379	0.0100 L				SWHITE

Assay Definition-

Assay Description:

LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20170203_1807

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20170203_1807\20170203_1807.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20170203_1807\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20170203_1807\LLH3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\Low Level H3_3.lsa

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 120.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

Regions	LL	UL	2Sigma % Terminator
A	2.0	18.6	0.50
B	0.0	2000.0	0.00
C	0.0	2000.0	0.00

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Half Life-

Half Life Correction: Off

Regions Half Life

Units

Reference Date

Reference Time

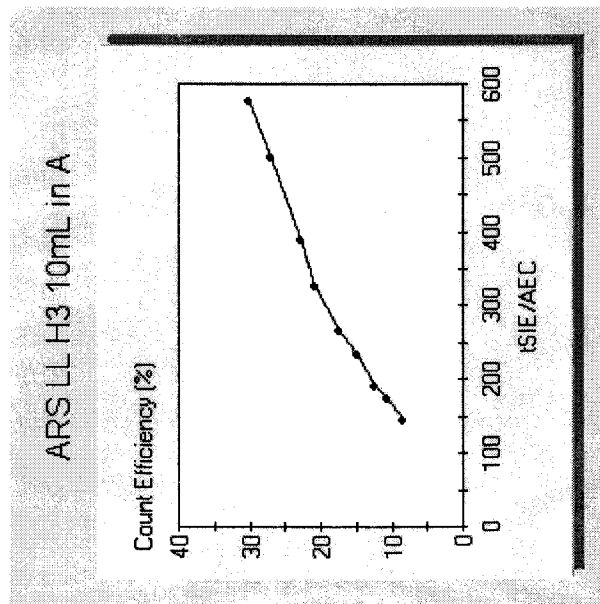
Luminescence Correction: Off

Heterogeneity Monitor: Off

Delay Before Burst (nsec): 75

A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 08/23/2014	
Date Modified:	
ARS LL H3 10mL in A	
tSIE/AEC	Count Efficiency (%)
579.14	30.08
502.50	27.05
390.30	22.96
328.76	20.79
269.84	17.56
235.00	14.99
193.53	12.42
175.30	10.70
145.76	8.35

P#	S#	SMPL_ID	CPMA	DPM1	TSIE	Eff Nucl	In A	Count	Time	DATE	TIME	MESSAGES
10	1	BACKGROUND	1.722	7.19	417.69		23.96	120.00		2/3/2017	6:15:57 PM	
10	2	B17-00212-04	1.301	5.43	417.32		23.94	120.00		2/3/2017	8:25:45 PM	
10	3	B17-00242-05	1.216	5.07	418.60		23.99	120.00		2/3/2017	10:35:31 PM	

B17-00212-04
 B17-00242-05

B17-00212-04
 B17-00242-05

Reagent Amounts

ABatch Sample ID	Client ID	14.1.5 OPTIONAL AQ W/O DIST - Add scint cocktail - Ultima Gold LLT Reagent Grade (mL)	User ID
ARS1-B17-00212-04	CAPA-17-129185	10.00	SWHITE
ARS1-B17-00212-05	CAPA-17-129212	10.00	SWHITE

Reagent Tracking

Procedure Section

14.1.1.5 OPTIONAL AQ W/O DIST - Add scint cocktail

Reagent ID

R16-00055

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
1-27-17	19:00	BK-02099-06	BK-02099	1109	SL
		07			SL
		08			SL
		09			SL
		10			SL
		11			SL
		12			SL
		13			SL
		14			SL
		15			SL
		16			SL
1-27-17		17			SL
		18			SL
		19			SL
1-31-17	14:50	SNC 9	QA	QA	SL
2-3-17	16:30	SNC 9	QA	QA	SL
		Background	B17-00212	1807	SL
		B17-00212-04			SL
		DS			SL
		3-6-17			SL

late entry

original entry correct

Low Level Tritium pH Checks

[illegible]

ARS-040-001.r0_06072013



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for

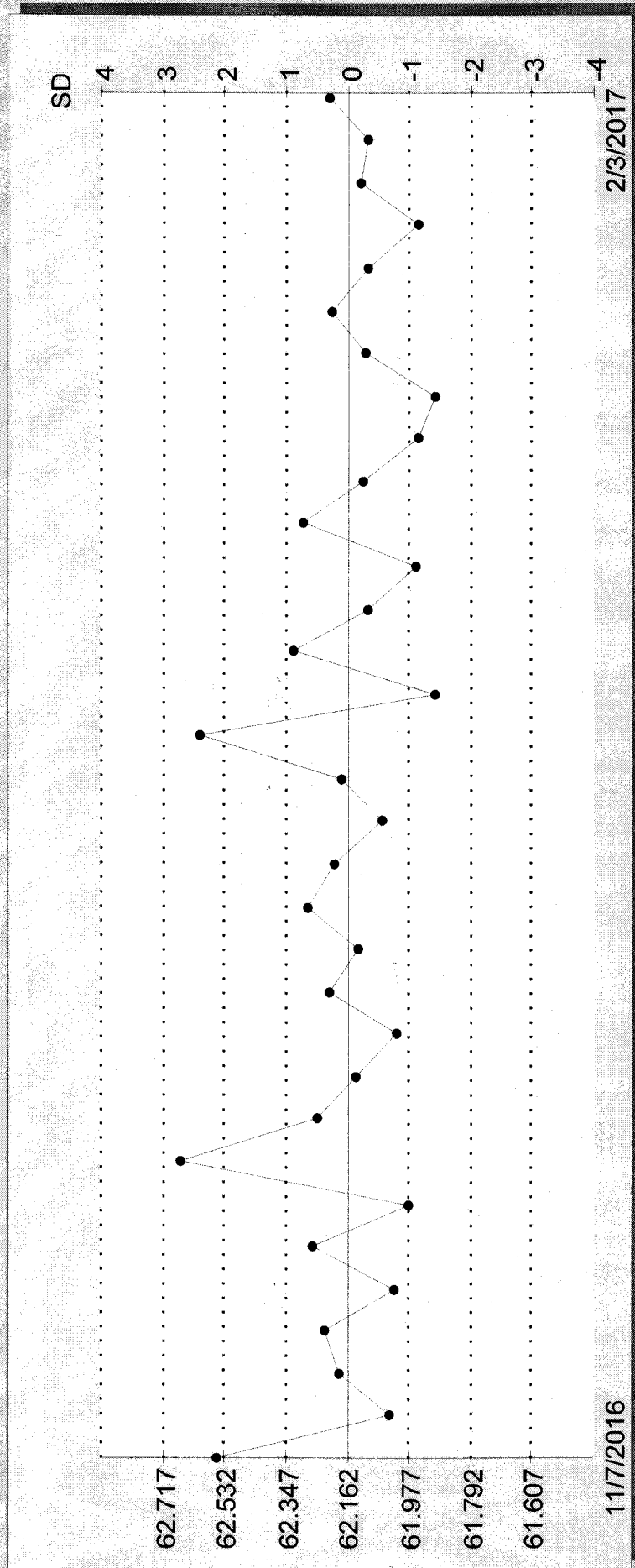
Los Alamos National Laboratory

Tritium-Screening by Low Level Liquid Scintillation Counting Control Charts

3H Efficiency
Total # pts : 6416
Valid # pts : 33
Mean : 62.16
SD : 0.18

Date	Value	Valid Pt
Nov 07, 2016	62.55	X
Nov 09, 2016	62.03	X
Nov 14, 2016	62.19	X
Nov 15, 2016	62.23	X
Nov 15, 2016	62.02	X
Nov 18, 2016	62.26	X
Nov 18, 2016	61.98	X
Nov 20, 2016	62.67	X
Nov 21, 2016	62.25	X
Nov 24, 2016	62.13	X
Nov 28, 2016	62.01	X
Dec 07, 2016	62.21	X
Dec 12, 2016	62.13	X
Dec 16, 2016	62.28	X
Dec 21, 2016	62.20	X
Dec 22, 2016	62.06	X
Dec 27, 2016	62.18	X
Dec 29, 2016	62.61	X
Jan 04, 2017	61.90	X
Jan 05, 2017	62.32	X
Jan 05, 2017	62.10	X
Jan 05, 2017	61.95	X
Jan 05, 2017	62.29	X
Jan 05, 2017	62.12	X
Jan 05, 2017	61.95	X
Jan 05, 2017	61.90	X
Jan 09, 2017	62.11	X
Jan 12, 2017	62.21	X
Jan 27, 2017	62.10	X
Jan 29, 2017	61.95	X
Jan 30, 2017	62.12	X
Feb 03, 2017	62.10	X
Feb 03, 2017	62.22	X

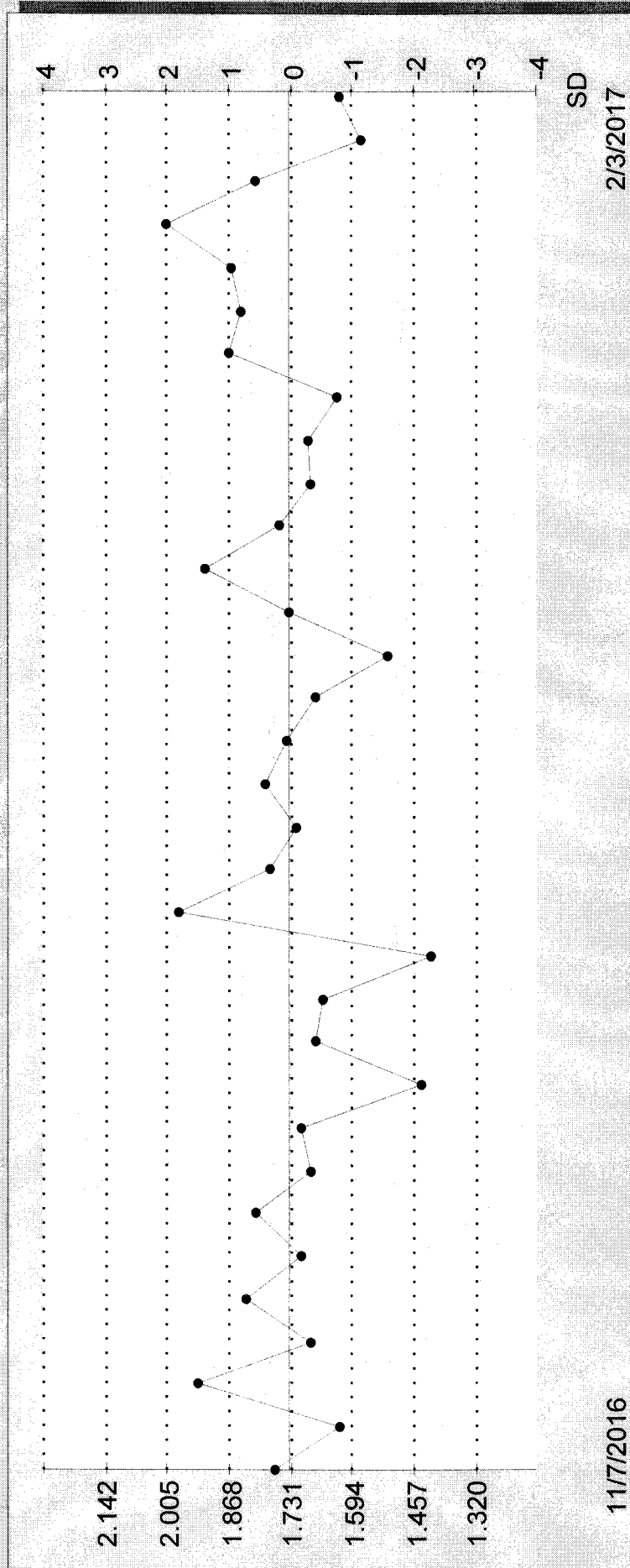
3H Efficiency
Total # pts : 6416
Valid # pts : 33
Mean : 62.16
SD : 0.18



3H Background
 Total # pts : 6337
 Valid # pts : 33
 Mean : 1.73
 SD : 0.14

Date	Value	Valid Pt
Nov 07, 2016	1.76	X
Nov 09, 2016	1.62	X
Nov 14, 2016	1.93	X
Nov 15, 2016	1.68	X
Nov 15, 2016	1.83	X
Nov 18, 2016	1.71	X
Nov 18, 2016	1.81	X
Nov 20, 2016	1.69	X
Nov 21, 2016	1.70	X
Nov 24, 2016	1.44	X
Nov 28, 2016	1.67	X
Dec 07, 2016	1.66	X
Dec 12, 2016	1.42	X
Dec 16, 2016	1.98	X
Dec 21, 2016	1.77	X
Dec 22, 2016	1.72	X
Dec 27, 2016	1.79	X
Dec 29, 2016	1.74	X
Jan 04, 2017	1.67	X
Jan 05, 2017	1.52	X
Jan 05, 2017	1.73	X
Jan 05, 2017	1.92	X
Jan 05, 2017	1.76	X
Jan 05, 2017	1.68	X
Jan 05, 2017	1.69	X
Jan 05, 2017	1.63	X
Jan 09, 2017	1.87	X
Jan 12, 2017	1.84	X
Jan 27, 2017	1.86	X
Jan 29, 2017	2.00	X
Jan 30, 2017	1.81	X
Feb 03, 2017	1.58	X
Feb 03, 2017	1.62	X

3H Background
Total # pts : 6337
Valid # pts : 33
Mean : 1.73
SD : 0.14





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**Low Level Liquid
Scintillation Counting**

**Calibration
Information**



QUALITY CONTROL PROGRAM
AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS
ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE 10/24/2016 20:42 date counted
 STANDARD REFERENCE # S-0318

Principal Radionuclide

H-3

ENTER -->

Half Life, Years

1.232E+01

OR -->

Half Life, Days

4.4998E+034.4998E+03Radionuclide H-3Dilution Reference Date 10/24/2016 14:38

Dilution Activity 2.72 pCi per gram ==> dpm/g 6.03
 Verif. Date Decay Corrected 2.72 pCi per gram ==> dpm/g 6.03

Minimum of 3 Required

Trial ID	Sample Counts	Count Time (min)	Detector	Efficiency	Bkg. (cpm)	Net Weight	Decay Corrected Activity Result (dpm/g)	Decay Corrected Activity Result (pCi/g)
S-0318-V1	19.36	1	LSC	0.3005	10.09	5.008	6.16	2.77
S-0318-V2	19.04	1	LSC	0.3009	10.09	4.977	5.98	2.69
S-0318-V3	19.21	1	LSC	0.3010	10.09	4.985	6.08	2.74
S-0318-V4	18.99	1	LSC	0.3015	10.09	4.995	5.91	2.66
S-0318-V5	19.03	1	LSC	0.3008	10.09	5.020	5.92	2.67

10% Max

PASS

Standard Deviation percent of known concentration

5% Max

PASS

Target Activity

% Diff

Average

Two Sigma Uncertainty

6.01 2.710.21 0.091.78% 1.78%6.03 2.72-0.34% -0.34%Verification Expiration Date: October 24, 2017Prepared & Counted By Jacob ByrdDate: 10/24/2016 20:42Verified & Approved By [Signature]Date: 10-31-16QC Approval [Signature]Date: 10-31-16**S-0318****H-3**Verified 10/24/16**SL****Expires** 10/24/17**Manufacturer** NIST SRM 4927F**Sol Matrix** H2O**Ref No** NIST SRM 4927F**Tech** Unknown**Parent ID** S-0316**RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY**

Q:\QAO\QA Assistant Folder\01 Documenting\01 Documentation\04 Standards\01 Standards\Standard Verification
 Calculation(without plating recovery)

ARS-038

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data	
Planning		Parent Solution Reference #	NIST SRM 4927F	
Planning Comments	Create a H-3 LCS Standard	Parent Solution #	S-0316	
Target dpm/g (on dil. date)	6	Parent Principal Radionuclide	H-3	Half Life (Days) 4499.8000000
Target Final volume mL	2000	Parent Reference Date	08/10/2016 14:49	
Appx mass g of Parent Sol'n	5.091121556	Parent Certified Act	2384.430444	Certi Act/Vol Units dpm g
Appx vol mL of Parent Sol'n	5.1003021	Parent Cert Act Uncert 1 Sigma	0.0036	
Expected Addition for Analysis g	5	Parent Sp. Gravity G/ML	0.9982	
Standards Preparation / Dilution		Parent Supplier	NIST SRM 4927F	
Secondary Solution #	S-0318	Parent Date Recvd	01/02/00	
Dilution Date (New Ref Date)	10/24/2016 14:38	Parent Received By	Unknown	
Ampoule, Empty (g)		Parent Cert Exp Date		
Ampoule /Solution Gross (g)		Parent Matrix	H2O	
Net Wt Removed (g)		Certified dpm/g At Ref Date	2384.430444	
Transfer Container, empty (g)	17.3192	Certified dpm/g on 10/24/2016 14:38	2357.044488	
Container Plus Solution (g)	22.4163	Parent Comments	Intermediate level H-3 standard for creating LCS solutions and matrix spikes. Dilution performed as stated above by Jacob Byrd-JPB 08/10/2016	
Net Wt Transferred (g)	5.0971			
DPM Xferred on 10/24/2016 14:38	12014.09146			
Diluent/matrix	Deionized H2O	Parent Tech	Unknown	
Diluent Density Cont, empty (g)		Is_Primary	FALSE	
Test Mass of 5 mL of Diluent (g)		Is_LCS	TRUE	
Diluent Density Test - (g/mL)		Is_Tracer	FALSE	
Dilution Empty Container Mass (g)	402.37	Is_Calib	FALSE	
Dilution Full Cont g (if measured)	2394.73			
Dilution Final Volume mL (if measured)	2000			
Final Dilution Density (g/mL)	0.99618			
Final Dilution Measured Mass g	1992.36			
Comments	H3 LCS intermediate standard. Dilution performed as stated above by Jacob Byrd, JPB 10/24/2016.			
Final Dilution dpm/g	6.030080637			
Final Dil New Ref Date/Time	10/24/2016 14:38			

Assay Definition

Assay Description:
 H3 Normal Lvl
 Assay Type: DPM (Single)
 Report Name: Report1
 Output Data Path: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl 2\20161024_1817
 Raw Results Path: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl 2\20161024_1817\20161024_1817.results
 RTF File Name: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl 2\20161024_1817\H3 Results.rtf
 Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl 2\20161024_1817\H3 Results.csv
 Assay File Name: C:\Packard\Tricarb\Assays\H3 Normal Lvl 2.1sa

Count Conditions

Nuclide: Standard H3
 Quench Indicator: tSIE/AEC
 External Std Terminator (sec): 0.5 2s%
 Pre-Count Delay (min): 0.00
 Quench Set:
 Low Energy: PE UG STD H3
 Count Time (min): 240.00
 Count Mode: Normal
 Assay Count Cycles: 1
 #Vials/Sample: 1
 Repeat Sample Count: 1
 Calculate % Reference: Off

Background Subtract

Background Subtract: Off
 Low CPM Threshold: Off
 2 Sigma % Terminator: On - Any Region

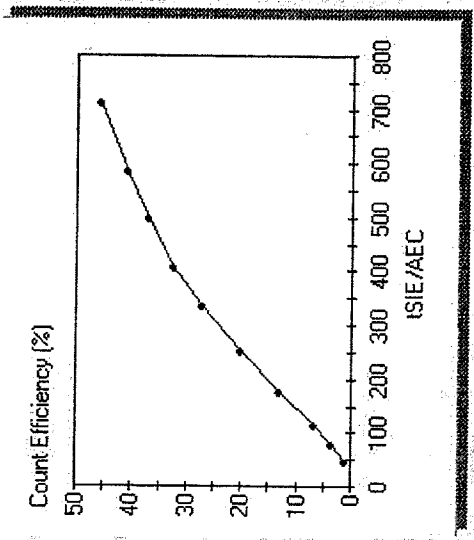
Regions	LL	UL	2Sigma % Terminator
A	2.0	18.6	0.50
B	0.0	2000.0	0.00
C	0.0	2000.0	0.00

Count Corrections

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

Cycle 1 Results
 Quench Curve Block Data

PE UG STD H3 in A



Date Acquired: 08/19/2016
 Date Modified:
 PE UG STD H3 in A

tSIE/AEC	Count Efficiency (%)
713.96	45.87
587.32	40.89
498.20	36.92
407.51	32.24
337.27	26.99
254.20	20.17
178.24	13.10
115.35	6.77
80.47	3.53
47.41	1.20

P#	S#	SMPL ID	CPMA	DPMI	tSIE	Eff Nucl In A	Count Time	DATE	TIME	MESSAGES
----	----	---------	------	------	------	---------------	------------	------	------	----------

11	1	BACKGROUND	10.09	33.20	382.76	30.39	240.00	10/24/2016	6:17:40 PM
11	2	S-0318-V1	19.36	64.42	378.23	30.05	240.00	10/24/2016	10:42:16 PM
11	3	S-0318-V2	19.04	63.28	378.71	30.09	240.00	10/25/2016	3:06:46 AM
11	4	S-0318-V3	19.21	63.84	378.83	30.10	240.00	10/25/2016	7:31:20 AM
11	5	S-0318-V4	18.99	62.98	379.57	30.15	240.00	10/25/2016	11:55:54 AM
11	6	S-0318-V5	19.03	63.26	378.58	30.08	240.00	10/25/2016	4:20:23 PM

S-0318 Verification Weights

Tech:	JPB
Pipette:	FJ15820
Scale ID:	12332539
Standard ID:	S-0318

Sample ID	Std. Weight(g)
S-0318-V1	5.008
S-0318-V2	4.9772
S-0318-V3	4.9847
S-0318-V4	4.9946
S-0318-V5	5.0201



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Report Compilation Checklist

ARS SDG: 17-00244Client Name: LANLSample Matrix: AQ**LEVEL 1 COMPONENTS**

	1st Reviewer			
1) Cover Page Complete and Accurate (see ARS-059)?	Yes	No	N/A	
2) Technical Review Checklist(s) Complete and Accurate?	Yes	No	N/A	
3) Case Narrative Complete and Accurate (see ARS-059)? <small>Include subcontractor name and information</small>	Yes	No	N/A	
4) Form 1s Present for all Samples and Tests? <small>Note: Ensure original Subcontract Forms 1s included if applicable.</small>	Yes	No	N/A	
5) Client Specific Components are Present and Complete?	Yes	No	N/A	

LEVEL 2 COMPONENTS

	1st Reviewer			
6) Batch Quality Control Report is Present and Accurate? <small>Include subcontractor QC reports if applicable</small>	Yes	No	N/A	
7) DQO Report is Present and Accurate?	Yes	No	N/A	
8) Client Specific Batch QC Components are Present and Complete?	Yes	No	N/A	

LEVEL 3 COMPONENTSEnsure all original subcontractor information is included, if applicable

	1st Reviewer			
9) Efficiencies are Present?	Yes	No	N/A	
10) Calibrations are Present?	Yes	No	N/A	
11) Backgrounds are Present?	Yes	No	N/A	
12) Spectrum Analysis is Present?	Yes	No	N/A	
13) Spectral Plots are Present?	Yes	No	N/A	
14) Plateaus are Present?	Yes	No	N/A	
15) Control Charts are Present?	Yes	No	N/A	
16) Other:	Yes	No	N/A	

LEVEL 4 COMPONENTSEnsure all original subcontractor information is included, if applicable

	1st Reviewer			
17) Preparation Raw Data Present and Complete?	Yes	No	N/A	
18) Instrument Raw Data Present and Complete?	Yes	No	N/A	
19) Calibration Certificates Present?	Yes	No	N/A	
20) Copies of Log Book Pages Present?	Yes	No	N/A	
21) Sample Receiving Documentation Present?	Yes	No	N/A	
22) LIMS Reports Present?	Yes	No	N/A	
23) Applicable Correspondence Present?	Yes	No	N/A	
24) Other:	Yes	No	N/A	

[Signature]
Report Generator Signature

3-4-6-17
Date SCR
4-6-17

[Signature]
Management Review Signature

4-12-17
Date



LSC Technical Review Checklist

ARS SDG ARS1-17-00244

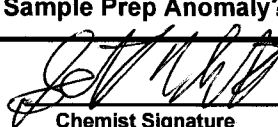
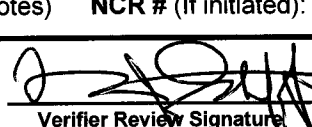
Sample Matrix: AQ Aliquot (Circle One): Dry As ~~Received~~ Filtered Other: _____

Required QC Samples (Mark all that apply): ~~Blank~~ ~~LCS~~ ~~LSD~~ Sample Dup MS MSD


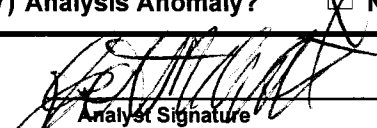
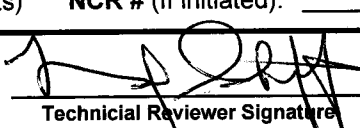
ARS A. Batch ID(s): Batch A: B17-00350 Batch B: N/A Batch C: N/A

Test Method(s): LSC-A-022 N/A N/A

A. RADIOCHEMICAL PREPARATION REVIEW

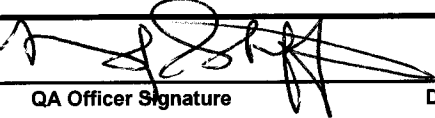
	Chemist Review	Verifier Review	
1) 100% of Manual Transcriptions Verified?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
2) 100% of Manual Calculations Verified?	Yes No N/A	Yes No <u>N/A</u>	
3) Blank Composition/Configuration Matches Calibration?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
4) Deviations from procedure are documented and verified?	Yes No N/A	Yes No <u>N/A</u>	
5) Appropriate Cocktail Selected?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
6) Sample Prep Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____			
 Chemist Signature	<u>4-3-17</u> Date	 Verifier Review Signature	<u>4-3-17</u> Date

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review	
1) Calibrations Valid and Current?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
2) Backgrounds Valid and Current?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
3) Source Checks Completed and Acceptable?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
 QA Officer Signature		<u>4-5-17</u> Date	
	Analyst Review	Technical Review	
4) Background Checks Complete and Acceptable?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
5) 100% of Manually Entered Parameters Verified Accurate?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
6) Appropriate QC samples initiated at required frequency?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
6) Test/Sample Specific Parameters (See ARS-059 for details)			
a) Analysis Parameters Checked and Correct and Peak Shapes are Acceptable?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
b) Spectra show no Evidence of Interferences?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
c) Sample Quench for All Samples within Range of Quench Curve?	<u>Yes</u> No N/A	<u>Yes</u> No N/A	
7) Analysis Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Comments) NCR # (If initiated): _____			
 Analyst Signature	<u>3-5-17</u> Date	 Technical Reviewer Signature	<u>4-5-17</u> Date

LSC Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review			QA Officer Review		
1) Activity + 3xCSU a Negative Number?	Yes	No	N/A	Yes	No	N/A
2) RDL Criteria are Met?	Yes	No	N/A	Yes	No	N/A
3) Method Blank Criterion Met?	Yes	No	N/A	Yes	No	N/A
4) LCS/LCD Criteria Met?	Yes	No	N/A	Yes	No	N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes	No	N/A	Yes	No	N/A
6) MS/MSD Criteria Met?	Yes	No	N/A	Yes	No	N/A
7) Batch QC Anomaly? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (See Tech Notes) <i>narrative</i> NCR # (If initiated): _____						
<i>SDR</i> Project Manager Signature		<i>4-6-17</i> Date		 QA Officer Signature		<i>4-12-17</i> Date

GENERAL COMMENTS

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.



LSC Technical Review Checklist

ARS SDG ARS1-17-00244

Sample Matrix: AQ Aliquot (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Mark all that apply): Blank LCS LCSD Sample Dup MS MSD

ARS A. Batch ID(s): Batch A: B17-00212 Batch B: N/A Batch C: N/A

Test Method(s): LSC-A-021 N/A N/A

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Verifier Review		
1) 100% of Manual Transcriptions Verified?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2) 100% of Manual Calculations Verified?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3) Blank Composition/Configuration Matches Calibration?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
4) Deviations from procedure are documented and verified?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
5) Appropriate Cocktail Selected?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
6) Sample Prep Anomaly?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____					
<div>Chemist Signature <u>[Signature]</u> Date <u>2-3-17</u></div> <div>Verifier Review Signature <u>[Signature]</u> Date <u>2-3-17</u></div>						

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations Valid and Current?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2) Backgrounds Valid and Current?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3) Source Checks Completed and Acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
<div>QA Officer Signature <u>[Signature]</u> Date <u>4-12-17</u></div>						
	Analyst Review			Technical Review		
4) Background Checks Complete and Acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
5) 100% of Manually Entered Parameters Verified Accurate?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
6) Appropriate QC samples initiated at required frequency?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) Analysis Parameters Checked and Correct and Peak Shapes are Acceptable?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
b) Spectra show no Evidence of Interferences?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
c) Sample Quench for All Samples within Range of Quench Curve?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
7) Analysis Anomaly?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Comments) NCR # (If initiated): _____					
<div>Analyst Signature <u>[Signature]</u> Date <u>3-6-17</u></div> <div>Technical Reviewer Signature <u>[Signature]</u> Date <u>2-6-17</u></div>						

DQO Report for SDG

ARS1-17-00244

Analysis Code	Prep Type	Units	Aliquot	Prep Code	Procedure	Count Time			
LSC-A-021	WRAD	pCi	L	N/A	ARS-054				
LSC-A-022	H-3	Analyte		RDL	LCS LL/UL	MS LL/UL	Rdy LL/UL	Grav LL/UL	RPD
				0	75/125	60/140	30/110	40/110	25
LSC-A-022	WRAD	pCi	L	N/A	ARS-040				
	Enriched H-3	Analyte		RDL	LCS LL/UL	MS LL/UL	Rdy LL/UL	Grav LL/UL	RPD
				3.221 pCi/L	80/120	60/140	30/110	40/110	25

Legend: Blue - RDL source was client profile. Green - RDL source was analyte library.

Analysis Code	Fraction	Units	Group	Aliquot	Conductivity	Analyte Count
LSC-A-021	001	pCi		L	N/A	1
LSC-A-021	002	pCi	Group	L	N/A	1
LSC-A-022	001	pCi	Group	L	N/A	1
LSC-A-022	002	pCi	Group	L	N/A	1

SDG Report - Samples and Containers

SDG Specific Data					
SDG	ARS1-17-00244		TAT Days	28	Project Type
Sample Count	2	Rpt Level	4	Date Received	1/27/2017
Client	Los Alamos National Laboratory		Client Deadline	2/24/2017	PO Number
Client Code	114		Internal Deadline	2/23/2017	Job Number
Profile Number	PN-00094		Lab Deadline	2/21/2017	Job Location
Temperature (C)			Comments		
			Environmental		
			2017-935		
			ADEP		

Samples and Containers Checked In Thus Far													
FR	Name	Matrix	Start Date	End Date	Disp	Hold	Arch	Storage	Conductivity	Comments			
001	CAPA-17-129185	AQ	1/19/2017 11:37 AM	1/19/2017 11:37 AM	H	90	5	M6					
	IC_ID	Cnt	Volume (mL)	Container Type	pH Orig	pH Final	CPM	uR Hr	Stor VOA	Head	AF Units	AF Rate	AF Mins
	255984	1	1000.00	HDP Bottle			90	15	N	N/A			
002	CAPA-17-129212	AQ	1/19/2017 11:37 AM	1/19/2017 11:37 AM	H	90	5	M6					
	IC_ID	Cnt	Volume (mL)	Container Type	pH Orig	pH Final	CPM	uR Hr	Stor VOA	Head	AF Units	AF Rate	AF Mins
	255985	1	1000.00	HDP Bottle			90	15	N	N/A			

SDG Report - Analysis Assignments

SDG	ARS1-17-00244	Sample Count	2
Client	Los Alamos National Laboratory	Analysis Count	2-4

Sample Count Totals Per Analysis			
Analysis Code	Analysis Description	Samples Count	
LSC-A-021	Low Level Tritium Screen in (Aqueous)	2	
LSC-A-022	Low Level Tritium by Enrichment Process in (Aqueous [AQ])	2	

Analyses Assigned Per Fraction		
Fraction	Analysis Code	X = Assigned
001	LSC-A-021	X
001	LSC-A-022	X
002	LSC-A-021	X
002	LSC-A-022	X

ARS FILE TRACKING SHEET

SDG: ARS1-17-00244

Task	Date / Time	Initials
Date & Time Samples Received	01-27-17 09:14	KEL
ICOC Initiated/Storage Location: <u>M6</u>	01-27-17 09:57	KEL
Technical Checks Performed	<i>See Match</i>	
Report Written / EDD Generated <u>4-5-17/1303/SOL</u>	<u>4-6-17/1107</u>	<u>SOL</u>
Report / EDD Reviewed for accuracy and completeness	<u>4-12-17/1400</u>	<i>[Signature]</i>
Quality Assurance Checks Performed on Report	<i>[Signature]</i>	<i>[Signature]</i>
Management Checks Performed on Report	<i>[Signature]</i>	<i>[Signature]</i>
<i>Preliminary Report Scan</i>		
Report E-mailed/Faxed		
Invoice Completed Invoice #: _____		
Requires Report Mailed Yes / No		
Requires Original COC mailed Yes / No		
Report Reviewed and Imaged		

EDD
 Loaded
 4-5-17
 SOL

SPECIAL REQUIREMENTS

Requirement	Yes	No
3 Hour Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
24 Hour Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
48 Hour Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Day Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5 Day Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10 Day Rush	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Standard Oil/Gas Client (5 Day)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Standard Turnaround	<input type="checkbox"/>	<input checked="" type="checkbox"/>

NOTES

LANL

SDG: ARS 1-157 - CC 244

SHIPPING CONTAINER

Good Condition ☒ Yes ☐ No
Radioactive ☐ Yes ☒ No
UN2910 ☐ Yes ☒ No
Sec. Seals ☐ Yes ☒ No
Seals Intact ☐ Yes ☐ No ☒ N/A
Air Bill ☐ Yes ☒ No

COC PRESENT WITH SAMPLES

COC ☒ Yes ☐ No

SAMPLE CONTAINER(S)

Good Condition ☒ Yes ☐ No
 Sec. Seals ☐ Yes ☒ No
 Seal Intact ☐ Yes ☐ No ☒ N/A
 Marked Radioactive ☐ Yes ☒ No
 # Samples Rcv 2
 Matrix AF AQ BI

External and Internal Surveys

Exposure Rate Meter:	<u>M3 250816</u>	Serial No.:	<u>RN 20034</u>	Calibration Due Date:	<u>5/23/17</u>
Count Rate Meter:	<u>M3 237983</u>	Serial No.:	<u>PR165363</u>	Calibration Due Date:	<u>2/3/17</u>
Background Exposure Rate ($\mu\text{R/hr}$)	<u>15</u>	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd)	<u>15</u>	$\mu\text{R/hr}$	
Background Count Rate (cpm)	<u>90</u>	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd)	<u>90</u>	cpm	
		Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd)	<u>90</u>	cpm	

Acceptance Limits

$$<500 \mu R/hr \quad <100 \text{ cpm/cm}^2$$

pH ≤ 2 is Acceptable

[illegible]

Surveyors'
Name:

Date/Time Surveyed:

09/4
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עלויות וזכויות

LA

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Special Instructions: