

Tuesday, February 09, 2010

**LOS ALAMOS**  
**NATIONAL LABORATORY**

ATTN: Valerie Davis

General Engineering Laboratories, Inc., Charleston, SC.  
2040 Savage Rd  
Charleston, SC 29407

Please analyse the enclosed samples  
according to the schedule indicated:

SHIP DATE: 2/9/2010  
TURNAROUND/REPORT DUE: 3/11/2010  
TURNAROUND REQ'D: 30 Days

RAD SCREENING: Yes, Below Background  
LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:

Signature:



These Samples are on:  
LANL Request Number: 10-1705  
Per Agreement Number: 126310011  
Project Cost Code: MR3A05529E00

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
EPA:906.0		1	RE15-10-8179	R	2/5/2010	
		1	RE15-10-8180	R	2/5/2010	
		1	RE15-10-8181	R	2/5/2010	
		1	RE15-10-8182	R	2/5/2010	
		1	RE15-10-8183	R	2/5/2010	
		1	RE15-10-8184	R	2/5/2010	
		1	RE15-10-8185	R	2/5/2010	
		1	RE15-10-8210	R	2/5/2010	

Tuesday, February 09, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1705

**LOS ALAMOS**

REQUEST NUMBER: 10-1705

**NATIONAL LABORATORY**

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/11/2010

General Engineering Laboratories, Inc.,  
Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
RE15-10-8185	1	POLY	H3	Ice	R
RE15-10-8183	1	POLY	H3	Ice	R
RE15-10-8179	1	POLY	H3	Ice	R
RE15-10-8184	1	POLY	H3	Ice	R
RE15-10-8180	1	POLY	H3	Ice	R
RE15-10-8181	1	POLY	H3	Ice	R
RE15-10-8182	1	POLY	H3	Ice	R
RE15-10-8210	1	POLY	H3	Ice	R

Relinquished By:

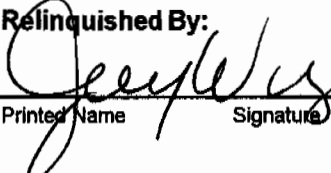
Date

Time

Received By:

Date

Time

 2/9/10 1400

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Printed Name

Signature

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8179

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:		QBT3	
TIME COLLECTED (HH:MM)		09:50		SUB-MEDIA:		TUFF 1	
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:		HA	
LOCATION ID:	15-610816	OK		FIELD QC TYPE:		NA	
LOCATION TYPE:	GENERIC	OK		FIELD PREP:		NA	
TOP DEPTH:	0	79.0 ft		SAMPLE USAGE:		INV	
BOTTOM DEPTH:	0	80.0 ft		SCREEN/PORT DESC:		NA	
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA		NO/NA	
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO/NA		NO/NA	
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: -90°		BOREHOLE DIRECTION: NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice		
1		Metals+ClO4+CN	500 ML POLY	Ice		
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None		

## SAMPLE DESC:

Light gray, moderately to non-indurated, non welded, devitrified  
dig, ash flow tuff

## SAMPLE COMMENTS:

N/A

## LOCATION DESC:

7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 20 dpm  
Beta/Gamma = 643 dpm

PID  $\frac{\text{Ambient Reading}}{0} = 0$  ppm

COLLECTED BY (PRINT)

J. MAIN

REVIEWED BY (PRINT)

Larry A. Lopez

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>A. Goumas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sheri Sherwood (Signature) <i>Sheri Sherwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8180

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:		QBT3	
TIME COLLECTED (HH:MM)		10:20		SUB-MEDIA:		TUFF 1	
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:		HA	
LOCATION ID:	15-610816	OK		FIELD QC TYPE:		NA	
LOCATION TYPE:	GENERIC	OK		FIELD PREP:		NA	
TOP DEPTH:	0	94.0 ft		SAMPLE USAGE:		INV	
BOTTOM DEPTH:	0	95.0 ft		SCREEN/PORT DESC:		NA	
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA		NA	
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO/NA		NA	
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: -90°		BOREHOLE DIRECTION: NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	ARM 2/5/10 8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+ClO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

## SAMPLE DESC:

Light gray, non indurated, non welded, de vitrified, dry  
ash flow tuff

## SAMPLE COMMENTS:

NA

## LOCATION DESC:

7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 23.1 dpm

Beta/Gamma = 1410 dpm

10 Ambient Reading 0 ppm

COLLECTED BY (PRINT)

L. Lopez

REVIEWED BY (PRINT)

Riley E.

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>[Signature]</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) <i>[Signature]</i> (Signature) <i>[Signature]</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8181

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:		QBT3	
TIME COLLECTED (HH:MM)		10:50		SUB-MEDIA:		TUFF 1	
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:		HA	
LOCATION ID:	15-610816			FIELD QC TYPE:		NA	
LOCATION TYPE:	GENERIC			FIELD PREP:		NA	
TOP DEPTH:	0	109.0 ft		SAMPLE USAGE:		INV	
BOTTOM DEPTH:	0	110.0 ft		SCREEN/PORT DESC:		NA	
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA			
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES (NO) / NA			
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: -90°		BOREHOLE DIRECTION: NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+ClO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

SAMPLE DESC:

Light gray, non-indurated, nonwelded, texturified, dry, ash flow tuff

SAMPLE COMMENTS:

LOCATION DESC:

7c-1

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha =  $\frac{10 \text{ } \mu\text{Rm}}{27 \text{ dpm}}$  2/5/10  
 Beta/Gamma = 2700 dpm

PID  $\frac{\text{Ambient Reading}}{0} = \text{ppm}$

COLLECTED BY (PRINT)

L. Lopez

REVIEWED BY (PRINT)

Riley Evans

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>A. Goumas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sheri Sherwood (Signature) <i>Sheri Sherwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8182

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:	QBT3		QBT 2
TIME COLLECTED (HH:MM)	12M 2/5/10 11	12:50		SUB-MEDIA:	TUFF 1		OK
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:	HA		CBS
LOCATION ID:	15-610816			FIELD QC TYPE:	NA		OK
LOCATION TYPE:	GENERIC			FIELD PREP:	NA		OK
TOP DEPTH:	0	124.0 ft		SAMPLE USAGE:	INV		OK
BOTTOM DEPTH:	0	125.0 ft		SCREEN/PORT DESC:	NA		
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA			
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		WATER FLOWING: YES/NO/NA
BOREHOLE: YES/NO/NA				BOREHOLE DECLINATION:	-90°		BOREHOLE DIRECTION: NA

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	12M 2/5/10 8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+ClO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

## SAMPLE DESC:

Light pinkish gray, moderately to strongly indurated, slightly welded, devitrified, dry, ash flow tuff. *moderately welded, devitrified, dry, ash flow tuff 2/5/10*

## SAMPLE COMMENTS:

NA

## LOCATION DESC:

7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 10 dpm  
Beta/Gamma = 1053 dpm

PID  $\frac{\text{Ambient Reading}}{\text{Reading}} = 0$  ppm

COLLECTED BY (PRINT)

L. Lopez

REVIEWED BY (PRINT)

R. J. Egan

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>A. Goumas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sherrill Sherwood (Signature) <i>Sherrill Sherwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8183

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:	QBT3	1RM	2/5/10 OK QBT 2
TIME COLLECTED (HH:MM)		12:45		SUB-MEDIA:	TUFF 1		OK
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:	HA		CBS
LOCATION ID:	15-610816			FIELD QC TYPE:	NA		OK
LOCATION TYPE:	GENERIC			FIELD PREP:	NA		
TOP DEPTH:	0	139.0 ft		SAMPLE USAGE:	INV		
BOTTOM DEPTH:	0	140.0 ft		SCREEN/PORT DESC:	NA		
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA			
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		
				WATER FLOWING: YES/NO/NA			
BOREHOLE:	YES/NO/NA			BOREHOLE DECLINATION:	-90°		
				BOREHOLE DIRECTION:	NA		

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+ClO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

## SAMPLE DESC:

Light brownish gray moderately to strongly indurated, slightly welded, phenocryst-rich, devitrified, dry, ash flow tuff

## SAMPLE COMMENTS:

NA

## LOCATION DESC:

17 RM 2/5/10 7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 3 dpm  
Beta/Gamma = 1680 dpm

PID  $\frac{\text{Ambient Reading}}{\text{Reading}}$  ppm

COLLECTED BY (PRINT)

L. Lopez

REVIEWED BY (PRINT)

J. MARIN

RELINQUISHED BY (Printed Name) A. Gomas (Signature) <i>A. Gomas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) <i>Pheniferwood</i> (Signature) <i>Pheniferwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8184

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:	QBT3		QBT 2
TIME COLLECTED(HH:MM)		13:30		SUB-MEDIA:	TUFF 1		OK
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:	HA		CBS
LOCATION ID:	15-610816			FIELD QC TYPE:	NA		OK
LOCATION TYPE:	GENERIC			FIELD PREP:	NA		
TOP DEPTH:	0	154.0 ft		SAMPLE USAGE:	INV		
BOTTOM DEPTH:	0	155.0 ft		SCREEN/PORT DESC:	NA		
FIELD MATRIX:	R	OK		EXCAVATED: YES <input checked="" type="radio"/> NO <input type="radio"/> NA			
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		WATER FLOWING: YES <input checked="" type="radio"/> NO <input type="radio"/> NA
BOREHOLE:	<input checked="" type="radio"/> YES / NO / NA	BOREHOLE DECLINATION:	-90°	BOREHOLE DIRECTION:	NA		

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	1RM 2/5/10 8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+CIO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

## SAMPLE DESC:

Light brownish gray, moderately indurated, non welded, devitrified  
dry, arch flow tuff

## SAMPLE COMMENTS:

1RM 2/5/10 Sample contains 1 cm thick clay fracture fill

## LOCATION DESC:

7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 2.4 dpm  
Beta/Gamma = 1397 dpm

PID  $\frac{\text{Ambient Reading}}{0} = 0$  ppm

COLLECTED BY (PRINT)

REVIEWED BY (PRINT) J. Marin

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>Alexander</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sherriff Newwood (Signature) <i>Sherriff Newwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8185

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA:		QBT3	
TIME COLLECTED (HH:MM)		14:14		SUB-MEDIA:		TUFF 1	
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE:		HA	
LOCATION ID:	15-610816			FIELD QC TYPE:		NA	
LOCATION TYPE:	GENERIC			FIELD PREP:		NA	
TOP DEPTH:	0	169.0 ft		SAMPLE USAGE:		INV	
BOTTOM DEPTH:	0	170.0 ft		SCREEN/PORT DESC:		NA	
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA		NA	
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO/NA		NA	
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: -90°		BOREHOLE DIRECTION: NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	322/110 8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+ClO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

SAMPLE DESC:

light brownish gray, moderately indurated, non welded, devitrified  
dry, ash flow tuff

SAMPLE COMMENTS:

Thin fractures and iron oxide stain in sample

LOCATION DESC:

7c-1

FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 20 dpm  
Beta/Gamma = 1397 dpm

PID  $\frac{\text{Ambient}}{\text{Reading}} = \frac{0}{0}$  ppm

COLLECTED BY (PRINT)

REVIEWED BY (PRINT) J. MARIN

RELINQUISHED BY (Printed Name) A. Gargas (Signature) <i>A. Gargas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sherri Sherwood (Signature) <i>Sherri Sherwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

**SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY**

EVENT ID: 2503

EVENT NAME: 4th Qtr. FY09 - SWMU 15-007(c) - Threemile Canyon

SAMPLE ID: RE15-10-8210

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		02/05/2010		MEDIA: QBT3		QBT1	
TIME COLLECTED (HH:MM)		14:50		SUB-MEDIA: TUFF.1		OK	
PRS ID:	15-007(c)	OK		SAMPLE TECH CODE: HA		CBS	
LOCATION ID:	UNK	15-610816		FIELD QC TYPE: NA		OK	
LOCATION TYPE:	GENERIC	OK		FIELD PREP: NA			
TOP DEPTH:	0	181.5 ft		SAMPLE USAGE: INV			
BOTTOM DEPTH:	0	182.5 ft		SCREEN/PORT DESC: NA			
FIELD MATRIX:	R	OK		EXCAVATED: YES/NO/NA			
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO/NA			
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: -90°		BOREHOLE DIRECTION: NA			

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Normal	8082+NMED-HEXP	250 ML AMBER GLASS	Ice	Y	
1		H3	500 ML POLY	Ice	Y	
1		Metals+CIO4+CN	500 ML POLY	Ice	Y	
1		RADVANA+B+G	1 EA 8 IN RESEALABLE POLY BAG	None	Y	

## SAMPLE DESC:

Light brownish gray, slightly indurated, non welded, deiritrified  
dry, ash flow tuff

## SAMPLE COMMENTS:

ATA 1RM 2/5/10 Sample contains 1.0 cm thick clay fracture fill.

## LOCATION DESC:

7c-1

## FIELD SCREENING/MEASUREMENT RESULTS:

Alpha = 24 dpm

Beta/Gamma = 1377 dpm

PID  $\frac{\text{Ambient}}{\text{Reading}} \frac{0}{0}$  ppm

COLLECTED BY (PRINT)

L. Lopez

REVIEWED BY (PRINT)

J. Marin

RELINQUISHED BY (Printed Name) A. Goumas (Signature) <i>A. Goumas</i>	Date/Time 2.5.10 1625	RECEIVED BY (Printed Name) Sherris Sherwood (Signature) <i>Sherris Sherwood</i>	Date/Time 2/5/10 1625
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## Rad Screening Data Release Form

The Following samples were received at the Field Support Facility (FSF) without screening data (list sample number):

REIS - 10 - 8177  
8180  
8181  
8182  
8183  
8184  
8185  
8210

WS+IS 10 - 11621  
11620

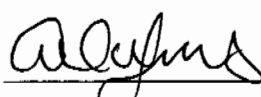
These samples will not be shipped until radiological screening data documentation arrives at the FSF. I understand that it is my responsibility to ensure this information arrives at the FSF in a timely manner. If holding times are missed because screening data does not arrive, I will pick up the samples.

.....  
The following samples do not require rad screening data for the reasons stated (list sample numbers):

WS+IS - 10 - 11625  
11626

Reason: QC of samples

.....  
Print Last Name Gammis

Signature 

Date 2.5.10

## DATA VALIDATION COVER SHEET

5119-1

## Data Validation Cover Sheet

Records Use only



## Section I.

REQUEST NUMBER: 10-1705 VALIDATION DATE: 3/26/10 LAB CODE: GEL

CONTRACT LABORATORY NAME: GEL Laboratories LLC

VALIDATOR: Larry Fukui ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- |  |  |   |  |
|--|--|---|--|
| <input type="checkbox"/> TPH-GRO                 | <input type="checkbox"/> HIGH EXPLOSIVES           | <input type="checkbox"/> DIOXIN FURANS          | <input type="checkbox"/> LCMSMS PERCHLORATES |
| <input type="checkbox"/> TPH-DRO                 | <input type="checkbox"/> METALS                    | <input type="checkbox"/> PCB CONGENERS          | <input type="checkbox"/> ORGANOCHLORINE      |
| <input type="checkbox"/> GENERAL CHEMISTRY       | <input checked="" type="checkbox"/> RADIOCHEMISTRY | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | PESTICIDES/POLYCHLORINATED BIPHENYLS         |
| <input type="checkbox"/> OTHER (DESCRIBE): _____ |  |   |  |

## Section II. Completeness Check

- | YES                                 | NO                       | N/A                                 | (CHECK ONE)                 | YES                                 | NO                       | N/A                                 | (CHECK ONE)              |
|-------------------------------------|--------------------------|-------------------------------------|-----------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 1. CHAIN-OF-CUSTODY FORM(S) | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 6. RAW/BSS DATA          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 2. CASE NARRATIVE           | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 7. QUALITY CONTROL FORMS |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | 3. SAMPLE RESULT FORMS      | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 8. QUANTITATION REPORTS  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 4. SAMPLE CHROMATOGRAMS     | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 9. TICS FORMS            |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. STANDARD CHROMATOGRAMS   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 10. TICS MASS SPECTRA    |

Comments/problems noted (include information about requests for further information submitted to the contract laboratory and agreed-upon date of resolution and contract laboratory point of contact):

1. It should be noted that an MS was not analyzed for tritium. However, an LCS was analyzed and met acceptance criteria, thus, no sample data were qualified.
2. It should be noted that the matrix QC parent sample was from another LANL RN. No sample results were qualified as a result.


Reviewed by: Susan Ball

Level: I


Date: 3/26/10

VALIDATOR'S SIGNATURE: \_\_\_\_\_


DATE: 3/26/10

RAD ANALYTICAL DATA VALIDATION CHECKLIST	
<b>5119-2</b>  <b>Rad Analytical Data Validation Checklist</b>	Records Use only  

Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ, R9	J-, R9
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. The holding time was >2 times the applicable holding time requirement.	R, R9a	J-, R9a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. The results for the affected analytes are considered not detected (U) because the associated sample concentration was less than or equal to the MDC.	U, R5	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. The analyte should be regarded as rejected because spectral interferences prevent positive identification of the analytes.	R, R5a	R, R5a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. The MDC and/or TPU documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R5b	J-, R5b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. The results for the affected analytes should be regarded as not detected (U) because the associated sample concentration was less than 3X the 1 sigma TPU.	U, R11	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. The sample result is ≤5X the concentration of the related analyte in the method blank.	U, R4	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5X.	N/A	J, R4a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. The sample result is ≤5X the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.	U, R4d	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. Required method blank information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R4e	R, R4e
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. The tracer is <10%R. Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	R, R3	R, R3

RAD ANALYTICAL DATA VALIDATION CHECKLIST	
<b>5119-2</b>  <b>Rad Analytical Data Validation Checklist</b>	Records Use only  

Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. The tracer is < the Lower Acceptance Level (LAL) but $\geq 10\%R$ . Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	UJ, R3a	J-, R3a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13. The Tracer%R value is > the Upper Acceptance Limit (UAL). Follow the external laboratory limits located within the associated data package. Tracer%R is not applicable for Gamma Spectroscopy.	N/A	J+, R3b
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14. Required tracer information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. Tracer%R is not applicable for Gamma Spectroscopy.	R, R3d	R, R3d
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	15. The LCS percent recovery was <10%. Follow the external laboratory limits located within the associated data package.	R, R12	R, R12
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	16. The LCS percent recovery was < the LAL but >10%. Follow the external laboratory limits located within the associated data package.	UJ, R12a	J-, R12a
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	17. The LCS percent recovery was > the UAL. Follow the external laboratory limits located within the associated data package.	N/A	J+, R12b
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	18. The LCS documentation is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R12c	R, R12c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19. Associated duplicate sample has DER or RER > the analytical laboratory's acceptance limits.	R, R10	J, J10
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	20. The duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R6	R, R6

RAD ANALYTICAL DATA VALIDATION CHECKLIST	
<b>5119-2</b>  <b>Rad Analytical Data Validation Checklist</b>	Records Use only  

Yes No N/A				Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	21. The associated matrix spike recovery was <10%. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	R, R6	R, R6
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	22. The associated matrix spike recovery was <10%. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	UJ, R6a	J-, R6a
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	23. The associated matrix spike recovery was above the UAL. Follow the external laboratory limits. MS/MSD is not applicable to Gamma Spectroscopy.	UJ, R6b	J+, R6b
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24. Required matrix spike information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information. If LCS information is present, do not Reject. Qualify data based on LCS information. MS/MSD is not applicable to Gamma Spectroscopy.	R, R6c	R, R6c
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	25. Duplicate, dilution, or reanalysis.	UJ, R88	J, R88
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	26. The LANL project chemist identified quality deficiencies in the reported data that require further qualification. This code can ONLY be used and/or under advisement by the LANL project chemist.	UJ, R, R19	J, R, R19
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Quantification of data via data validation did not occur based on Quality Control requirements in this procedure. Adhere to the external laboratory qualifiers found within the Form I analytical data summary sheets generated by the external laboratory.	U, U_LAB	J, J_LAB NQ, NQ

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8185  
Sample ID: 246681001  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.23E+05	200	+/-8590	250	pCi/L		KXK2	02/22/10	2155	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- BD Results are either below the MDC or tracer recovery is low
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- M M if above MDC and less than LLD
- M Matrix Related Failure
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8183  
Sample ID: 246681002  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>											
<i>H3 "As Received"</i>											
Tritium		1.58E+05	215	+/-11000	250	pCi/L		KXK2	02/22/10	2307 953111	1

#### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

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  - B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8179  
Sample ID: 246681003  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.81E+05	348	+/-19700	250	pCi/L		KXK2	02/23/10	0117	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

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  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8184  
Sample ID: 246681004  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>											
<i>H3 "As Received"</i>											
Tritium		1.63E+05	218	+/-11400	250	pCi/L		KXK2	02/23/10	0205 953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

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  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

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Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8180  
Sample ID: 246681005  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.03E+05	313	+/-14200	250	pCi/L		KXK2	02/23/10	0259	953111	1

#### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

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> Result is greater than value reported

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B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.

BD Results are either below the MDC or tracer recovery is low

C Analyte has been confirmed by GC/MS analysis

D Results are reported from a diluted aliquot of the sample

F Estimated Value

H Analytical holding time was exceeded

J Value is estimated

M M if above MDC and less than LLD

M Matrix Related Failure

N/A RPD or %Recovery limits do not apply.

ND Analyte concentration is not detected above the detection limit

NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

R Sample results are rejected

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

The above sample is reported on an "as received" basis.

LMF  
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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8181  
Sample ID: 246681006  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.04E+05	234	+/-14200	250	pCi/L		KXX2	02/23/10	0406	953111	1

**The following Analytical Methods were performed**

Method	Description
1	GL-RAD-A-002

**Notes:**

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  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

LMF  
3/26/10

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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8182  
Sample ID: 246681007  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.00E+05	328	+/-14000	250	pCi/L		KXK2	02/23/10	0450	953111	1

#### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

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  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

LMF  
3/26/10

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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8210  
Sample ID: 246681008  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.25E+05	200	+/-8750	250	pCi/L		KXK2	02/23/10	0602	953111	1

#### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

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  - > Result is greater than value reported
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  - BD Results are either below the MDC or tracer recovery is low
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  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

LMF  
3/26/10

Tuesday, February 09, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1705

LOS ALAMOS

REQUEST NUMBER: 10-1705

NATIONAL LABORATORY

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/11/2010

General Engineering Laboratories, Inc.,  
Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

246681°/.

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
RE15-10-8185	1	POLY	H3	Ice	R
RE15-10-8183	1	POLY	H3	Ice	R
RE15-10-8179	1	POLY	H3	Ice	R
RE15-10-8184	1	POLY	H3	Ice	R
RE15-10-8180	1	POLY	H3	Ice	R
RE15-10-8181	1	POLY	H3	Ice	R
RE15-10-8182	1	POLY	H3	Ice	R
RE15-10-8210	1	POLY	H3	Ice	R

Relinquished By:

Date

Time

Received By:

Date

Time

Printed Name

Signature

2/9/10

1400

Printed Name

Signature

Patricia Dover-Dent

P. Dover-Dent

2/10/10

08:50

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Printed Name

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Printed Name

Signature



**NATIONAL LABORATORY**

**Charleston, SC 29407**

**Project Cost Code: MR3A05529E00**

**TURNAROUND REQ'D: 30 Days**

**LAB REQUEST COMMENTS:**

**Signature:**

CNTNR SAMPLE ID

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:306.0	1	RE15-10-8179	R	2/5/2010	
		1	RE15-10-8180	R	2/5/2010	
		1	RE15-10-8181	R	2/5/2010	
		1	RE15-10-8182	R	2/5/2010	
		1	RE15-10-8183	R	2/5/2010	
		1	RE15-10-8184	R	2/5/2010	
		1	RE15-10-8185	R	2/5/2010	
		1	RE15-10-8210	R	2/5/2010	

Final Page of REQUEST NUMBER 10-1705



February 16, 2010

[www.gel.com](http://www.gel.com)

Ms. Joylene Valdez  
Los Alamos National Laboratory  
PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm111  
Los Alamos, New Mexico 87545

Re: LANL ER Project  
Work Order: 246681  
SDG: 10-1705

Dear Ms. Valdez:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on February 10, 2010, and analyzed for Radiochemistry. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

Valerie Davis  
Project Manager

Purchase Order: 72733-001-09  
Chain of Custody: 10-1705  
Enclosures

**Los Alamos National Laboratory (72733-001-09)**  
**LANL ER Project**  
**Work Order #: 246681**  
**SDG: 10-1705**

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# Case Narrative

**Case Narrative for  
Los Alamos National Laboratory (72733-001-09)  
LANL ER Project  
Workorder #: 246681  
SDG # : 10-1705**

**February 16, 2010**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary**

**Sample receipt** The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on February 10, 2010 for analysis. The samples were prepared/analyzed within the required holding time. Shipping container temperatures were checked, documented, and within specifications. The samples were screened according to GEL Standard Operating Procedure. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. The containers for radiochemistry were received at 9,10,14C temperatures. Shipping container temperature was within specification (0 - 6C).

**Sample Identification** The laboratory received the following samples:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
246681001	RE15-10-8185
246681002	RE15-10-8183
246681003	RE15-10-8179
246681004	RE15-10-8184
246681005	RE15-10-8180
246681006	RE15-10-8181
246681007	RE15-10-8182
246681008	RE15-10-8210

**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package** The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.

*Valerie Davis*

Valerie Davis  
Project Manager

**List of current GEL Certifications as of 16 February 2010**

<b>State</b>	<b>Certification</b>
Arizona	AZ0668
Arkansas	88-0651
CLIA	42D0904046
California – NELAP	01151CA
Colorado	GEL
Connecticut	PH-0169
Dept. of Navy	NFESC 413
EPA Region 5	WG-15J
Florida – NELAP	E87156
Georgia	E87156 (FL/NELAP)
Georgia DW	967
Hawaii	N/A
ISO 17025	2567.01
Idaho	SC00012
Illinois – NELAP	200029
Indiana	C-SC-01
Kansas – NELAP	E-10332
Kentucky	90129
Louisiana – NELAP	03046
Maryland	270
Massachusetts	M-SC012
Nevada	SC00012
New Jersey – NELAP	SC002
New Mexico	FL NELAP E87156
New York – NELAP	11501
North Carolina	233
North Carolina DW	45709
Oklahoma	9904
Pennsylvania – NELAP	68-00485
South Carolina	10120001/10120002
Tennessee	TN 02934
Texas – NELAP	T104704235-07B-TX
U.S. Dept. of Agriculture	S-52597
Utah – NELAP	GEL
Vermont	VT87156
Virginia	00151
Washington	C1641

# **Chain of Custody and Supporting Documentation**



Tuesday, February 09, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1705

LOS ALAMOS

REQUEST NUMBER: 10-1705

NATIONAL LABORATORY

ATTN: Valerie Davis

TURNAROUND/REPORT DUE: 3/11/2010

General Engineering Laboratories, Inc.,  
Charleston, SC.

TURNAROUND REQ'D: 30

2040 Savage Rd

Charleston, SC 29407

LAB REQUEST COMMENTS:

246681°/.

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
RE15-10-8185	1	POLY	H3	Ice	R
RE15-10-8183	1	POLY	H3	Ice	R
RE15-10-8179	1	POLY	H3	Ice	R
RE15-10-8184	1	POLY	H3	Ice	R
RE15-10-8180	1	POLY	H3	Ice	R
RE15-10-8181	1	POLY	H3	Ice	R
RE15-10-8182	1	POLY	H3	Ice	R
RE15-10-8210	1	POLY	H3	Ice	R

Relinquished By:	Date	Time	Received By:	Date	Time
<i>Geoffrey W. [Signature]</i>	2/9/10	1400	<i>Patricia D. [Signature]</i>	2/10/10	08:50
Printed Name	Signature		Printed Name	Signature	

Printed Name	Signature	Printed Name	Signature
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Printed Name	Signature	Printed Name	Signature
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Received for DISPOSAL By:	Date	Time	Remarks:

Printed Name	Signature
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Tuesday, February 09, 2010

**LOS ALAMOS  
NATIONAL LABORATORY**

**ATTN: Valerie Davis**

**General Engineering Laboratories, Inc., Charleston, SC.**

2040 Savage Rd

**Charleston, SC 29407**

**These Samples are on:**

LANL Request Number: 10-1705

Per Agreement Number: 126310011

Project Cost Code: MR3A05529E00

**Please analyse the enclosed samples according to the schedule indicated:**

SHIP DATE: 2/9/2010

**TURNAROUND/REPORT DUE: 3/11/2010**

**TURNAROUND REQ'D: 30 Days**

**RAD SCREENING: Yes, Below Background**

**LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

**Signature:**

CNTNR SAMPLE ID

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA906.0	1	RE15-10-8179	R	2/5/2010	
		1	RE15-10-8180	R	2/5/2010	
		1	RE15-10-8181	R	2/5/2010	
		1	RE15-10-8182	R	2/5/2010	
		1	RE15-10-8183	R	2/5/2010	
		1	RE15-10-8184	R	2/5/2010	
		1	RE15-10-8185	R	2/5/2010	
		1	RE15-10-8210	R	2/5/2010	



Laboratories LLC

## SAMPLE RECEIPT &amp; REVIEW FORM

Client: LANL		SDG/ARCOC/Work Order: 10-1705	
Received By: Patricia Dover-Dent		Date Received: February 10, 2009	
Suspected Hazard Information	Yes	No	*If Counts > x2 area background on samples not marked "radioactive", contact the Radiation Safety Group of further investigation.
COC/Samples marked as radioactive?		X	Maximum Counts Observed*: 40 CPM
Classified Radioactive II by RSO?		X	
COC/Samples marked containing PCBs?		X	
Shipped as a DOT Hazardous?		X	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		X	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	X			Circle Applicable: seals broken damaged container leaking container other (describe)
2 Samples requiring cold preservation within 0 ≤ 6 deg. C?	X			Preservation Method: ice bags blue ice dry ice none other (describe) 1-3,5&6 9-10,14C
3 Chain of custody documents included with shipment?	X			
4 Sample containers intact and sealed?	X			Circle Applicable: seals broken damaged container leaking container other (describe)
5 Samples requiring chemical preservation at proper pH?		X		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?		X		Sample ID's and containers affected:
7 Are Encore containers present?			X	(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	X			Id's and tests affected:
9 Sample ID's on COC match ID's on bottles?	X			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?			X	Sample ID's affected: time written on containers, not on COC
11 Number of containers received match number indicated on COC?	X			Sample ID's affected:
12 COC form is properly signed in relinquished/received sections?	X			

## Comments: FEDEX#S

7209 7849 9710 1C	7209 7849 9753 5C	7209 7849 9694 10C
7209 7849 9786 1C	7209 7849 9812 5C	7209 7849 9650 10C
7209 7849 9775 1C	7209 7849 9823 6C	7209 7849 9640 14C
7209 7849 9709 1C	7209 7849 9731 5C	
7209 7849 9742 2C	7209 7849 9720 6C	
7209 7849 9558 1C	7209 7849 9661 6C	
7209 7849 9683 3C	7209 7849 9764 9C	
7209 7849 9536 2C	7209 7849 9672 6C	



ORIGIN ID: SAFA (606) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TAGO BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 6B010AMR2A05100YDO

SHIP DATE: 09FEB10  
ACTMGT: 64.8 LB MAN  
CAD: 0014176/CAFE2449

BILL SENDER

LOS ALAMOS NATL LAB  
TAGO BLDG 1237 DPU 03

CAD: 0014176/CAFE2449

LOS ALAMOS, NM 87545  
UNITED STATES US

BILL SENDER

VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 6B010AARDW01503500

0014176/CAFE2449

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Express



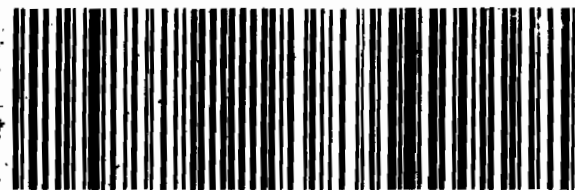
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156148-04/NRIT V3 0809

1 of 2

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0201

MM MASTER MM

WED - 10FEB A1  
PRIORITY OVERNIGHT

29407  
SC-US  
CHS

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Part # 156148 434 NRIT V3 0809

ORIGIN ID: SAFA (606) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TAGO BLDG 1237 DPU 03  
LOS ALAMOS, NM 87545  
UNITED STATES US

VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 6B010AMR3A0532VA00

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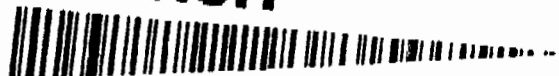


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CHS

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1 of 2

TRKH 7209 7849 9683

0201

MM MASTER MM

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LOS ALAMOS NM 87645  
UNITED STATES US

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ACTWGT: 49.8 LB MAN  
CAD: 0014176/CAFE2449

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ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87645  
UNITED STATES US

SHIP DATE: 09FEB10  
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VALEIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: 6B010AMR3A05528E00



6  
VALEIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: 6B010AMR3A0532VA00



2 of 2  
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PRIORITY OVERNIGHT

29407  
SC-US  
CHS

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ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

SHIP DATE: 09FEB10  
ACTWGT: 50.8 LB MAN  
CAD: 0014176/CAFE2449

LOS ALAMOS, NM 87645  
UNITED STATES US

BILL SENDER

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VALEIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: 6B010AMR1A015AGWNO



ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

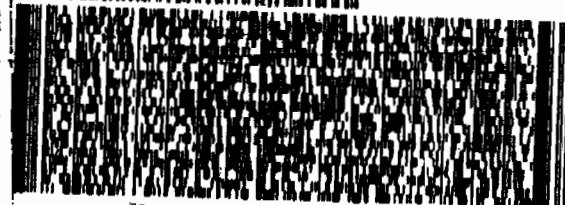
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VALEIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407  
(843) 556-8171  
REF: 6B010AMR3A0532VA00



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WED - 10FEB A1  
PRIORITY OVERNIGHT

29407  
SC-US  
CHS

XX CHSA





ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 09FEB10  
ACTWGT: 58.0 LB MAN  
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ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 09FEB10  
ACTWGT: 58.0 LB MAN  
CAD: 0014176/CAFE2449

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° VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

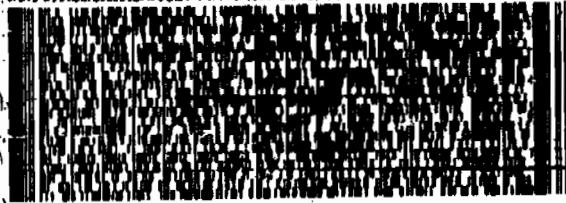
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° VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 6B010AMR3A0532VA00



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2 of 2  
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PRIORITY OVERNIGHT

29407  
SC-US  
CHS

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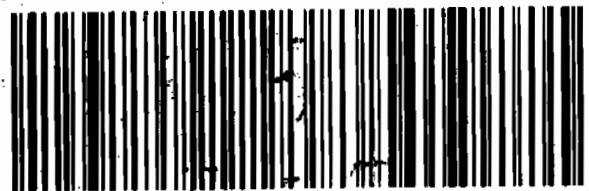
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WED - 10FEB A1  
PRIORITY OVERNIGHT

29407  
SC-US  
CHS

XX CHSA



ORIGIN ID: SAFA (505) 665-9968  
JOYLENE VALDEZ  
LOS ALAMOS NATL LAB  
TA00 BLDG 1237 DPU 03

LOS ALAMOS, NM 87545  
UNITED STATES US

SHIP DATE: 09FEB10  
ACTWGT: 57.0 LB MAN  
CAD: 0014176/CAFE2449

BILL SENDER

° VALERIE DAVIS  
GENERAL ENGINEERING LAB  
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 6B010AMR3A0532VA00



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2 of 3  
MPS# 7209 7849 9640

Matr# 7209 7849 9639 0201

WED - 10FEB A1  
PRIORITY OVERNIGHT

29407  
SC-US  
CHS

XX CHSA



# **Data Review Qualifier Flag Definition Sheet**

## Data Review Qualifier Definitions

Qualifier      Explanation

- \*    A quality control analyte recovery is outside of specified acceptance criteria
- \*\*   Analyte is a surrogate compound
- <    Result is less than value reported
- >    Result is greater than value reported
- ^    RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
- A    The TIC is a suspected aldol-condensation product
- B    Target analyte was detected in the associated blank
- B    Metals-Either presence of analyte detected in the associated blank, or  
MDL/IDL < sample value < PQL
- BD   Results are either below the MDC or tracer recovery is low
- C    Analyte has been confirmed by GC/MS analysis
- D    Results are reported from a diluted aliquot of the sample
- d    5-day BOD-The 2:1 depletion requirement was not met for this sample
- E    Organics-Concentration of the target analyte exceeds the instrument calibration range
- E    Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- H    Analytical holding time was exceeded
- h    Preparation or preservation holding time was exceeded
- J    Value is estimated
- N    Metals-The Matrix spike sample recovery is not within specified control limits
- N    Organics-Presumptive evidence based on mass spectral library search to make a tentative  
identification of the analyte (TIC). Quantitation is based on nearest internal standard  
response factor
- N/A   Spike recovery limits do not apply. Sample concentration exceeds spike concentration  
by 4X or more
- ND   Analyte concentration is not detected above the reporting limit
- UI   Gamma Spectroscopy-Uncertain identification
- X    Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y    QC Samples were not spiked with this compound
- Z    Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

# RADIOLOGICAL ANALYSIS

**Radiochemistry Case Narrative  
Los Alamos National Laboratory (LANL)  
SDG 10-1705**

**Method/Analysis Information**

**Product:** H3  
**Analytical Method:** GL-RAD-A-002  
**Analytical Batch Number:** 953111

<b>Sample ID</b>	<b>Client ID</b>
246681001	RE15-10-8185
246681002	RE15-10-8183
246681003	RE15-10-8179
246681004	RE15-10-8184
246681005	RE15-10-8180
246681006	RE15-10-8181
246681007	RE15-10-8182
246681008	RE15-10-8210
1202042933	Method Blank (MB)
1202042934	246557001(RE15-10-8363) Sample Duplicate (DUP)
1202042935	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 18.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solution(s) for these analyses are NIST traceable and used before the expiration date(s).

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:****Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 246557001 (RE15-10-8363). The QC was from LANL work order 246557.

**QC Information**

All of the QC samples met the required acceptance limits.

**CSU**

The blank result is less than 1.65 times the CSU.

**Technical Information:****Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:****Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

Additional comments were not required for this sample set.

**Blank Decision Level**

The blank result is less than the decision level.

**Qualifier information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

**Review Validation:**

GEL requires all analytical data to be verified by a qualified data validator. In addition, all data designated for CLP or CLP-like packaging will receive a third level validation upon completion of the data package.

The following data validator verified the information presented in this case narrative:

Reviewer/Date: *Pamela Walker 3/1/10*

# SAMPLE DATA SUMMARY

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

### Certificate of Analysis Report for

LANL010 Los Alamos National Laboratory (72733-001-09)

Client SDG: 10-1705 GEL Work Order: 246681

**The Qualifiers in this report are defined as follows:**

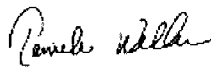
- \* Indicates that a quality control analyte recovery is outside of specified acceptance criteria.
- \*\* Indicates the analyte is a surrogate compound.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the detection limit.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.

Reviewed by





# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8185  
Sample ID: 246681001  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.23E+05	200	+/-8590	250	pCi/L		KXK2	02/22/10	2155	953111	1

### The following Analytical Methods were performed

Method	Description
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1	GL-RAD-A-002
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#### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

\*\* Analyte is a surrogate compound

< Result is less than value reported

> Result is greater than value reported

A The TIC is a suspected aldol-condensation product

B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.

BD Results are either below the MDC or tracer recovery is low

C Analyte has been confirmed by GC/MS analysis

D Results are reported from a diluted aliquot of the sample

F Estimated Value

H Analytical holding time was exceeded

J Value is estimated

M M if above MDC and less than LLD

M Matrix Related Failure

N/A RPD or %Recovery limits do not apply.

ND Analyte concentration is not detected above the detection limit

NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

R Sample results are rejected

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

UI Gamma Spectroscopy--Uncertain identification

X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

Y QC Samples were not spiked with this compound

^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

h Preparation or preservation holding time was exceeded

## GEL LABORATORIES LLC

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### Certificate of Analysis

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TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8185  
Sample ID: 246681001

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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The above sample is reported on an "as received" basis.

# GEL LABORATORIES LLC

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## Certificate of Analysis

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Address : PO Box 1663  
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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8183  
Sample ID: 246681002  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.58E+05	215	+/-11000	250	pCi/L		KXK2	02/22/10	2307	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

- \*\* Analyte is a surrogate compound
  - < Result is less than value reported
  - > Result is greater than value reported
  - A The TIC is a suspected aldol-condensation product
  - B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8179  
Sample ID: 246681003  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.81E+05	348	+/-19700	250	pCi/L		KXK2	02/23/10	0117	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

#### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

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  - > Result is greater than value reported
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  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
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Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8184  
Sample ID: 246681004  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.63E+05	218	+/-11400	250	pCi/L		KXK2	02/23/10	0205	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

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  - BD Results are either below the MDC or tracer recovery is low
  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8180  
Sample ID: 246681005  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.03E+05	313	+/-14200	250	pCi/L		KXK2	02/23/10	0259	953111	1

### The following Analytical Methods were performed

Method	Description
J	GL-RAD-A-002

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

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  - C Analyte has been confirmed by GC/MS analysis
  - D Results are reported from a diluted aliquot of the sample
  - F Estimated Value
  - H Analytical holding time was exceeded
  - J Value is estimated
  - M M if above MDC and less than LLD
  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8181  
Sample ID: 246681006  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.04E+05	234	+/-14200	250	pCi/L		KXK2	02/23/10	0406	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

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  - H Analytical holding time was exceeded
  - J Value is estimated
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  - M Matrix Related Failure
  - N/A RPD or %Recovery limits do not apply.
  - ND Analyte concentration is not detected above the detection limit
  - NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - R Sample results are rejected
  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.

# GEL LABORATORIES LLC

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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8182  
Sample ID: 246681007  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		2.00E+05	328	+/-14000	250	pCi/L		KXX2	02/23/10	0450	953111	1

### The following Analytical Methods were performed

Method	Description
1	GL-RAD-A-002

### Notes:

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- \*\* Analyte is a surrogate compound
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  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
  - UI Gamma Spectroscopy--Uncertain identification
  - X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
  - h Preparation or preservation holding time was exceeded
- The above sample is reported on an "as received" basis.



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## Certificate of Analysis

Company : Los Alamos National Laboratory  
Address : PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico 87545  
Contact: Ms. Joylene Valdez  
Project: LANL ER Project

Report Date: February 25, 2010

Client Sample ID: RE15-10-8210  
Sample ID: 246681008  
Matrix: R  
Collect Date: 05-FEB-10  
Receive Date: 10-FEB-10  
Collector: Client

Project: LANL01004  
Client ID: LANL010

Parameter	Qualifier	Result	DL	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Liquid Scintillation Analysis</b>												
<i>H3 "As Received"</i>												
Tritium		1.25E+05	200	+/-8750	250	pCi/L		KXK2	02/23/10	0602	953111	1

### The following Analytical Methods were performed

Method	Description
--------	-------------

1	GL-RAD-A-002
---	--------------

### Notes:

TPU is calculated at the 67% confidence level (1-sigma).

The Qualifiers in this report are defined as follows :

- \*\* Analyte is a surrogate compound
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  - ND Analyte concentration is not detected above the detection limit
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  - U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
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  - Y QC Samples were not spiked with this compound
  - ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
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# QUALITY CONTROL DATA

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: March 5, 2010

Page 1 of 2

Client : Los Alamos National Laboratory  
PO Box 1663  
TA-03, SM271, Drop Pt. 02U, Rm  
Los Alamos, New Mexico  
Contact: Ms. Joylene Valdez  
Workorder: 246681

Parmname	NOM	Sample	Qual	QC	Units	RER	REC%	Range	Anlst	Date	Time
Rad Liquid Scintillation											
Batch	953111										
QC1202042934	246557001	DUP									
Tritium		U	102	U	99.3	pCi/L	0.0113	(0-1)	KXK2	02/23/10	20:02
		TPU:	+/-55.5		+/-55.2						
QC1202042935	LCS										
Tritium		5550			5650	pCi/L		102 (80%-120%)		02/23/10	21:39
		TPU:			+/-495						
QC1202042933	MB										
Tritium				U	2.17	pCi/L				02/23/10	18:26
		TPU:			+/-52.9						

### Notes:

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- A The TIC is a suspected aldol-condensation product
- B For General Chemistry and Organic analysis the target analyte was detected in the associated blank.
- BD Results are either below the MDC or tracer recovery is low
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- D Results are reported from a diluted aliquot of the sample
- F Estimated Value
- H Analytical holding time was exceeded
- J Value is estimated
- M M if above MDC and less than LLD
- M Matrix Related Failure
- N/A RPD or %Recovery limits do not apply.
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- UI Gamma Spectroscopy--Uncertain identification
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y QC Samples were not spiked with this compound
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
- h Preparation or preservation holding time was exceeded

## GEL LABORATORIES LLC

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### QC Summary

Workorder: 246681

Page 2 of 2

Parmname	NOM	Sample Qual	QC	Units	RER	REC%	Range	Anlst	Date Time
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N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

\*\* Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# RAW DATA

# Radiochemistry Batch Checklist, Rev10

Batch# 953111 Product: H<sup>3</sup> Date: 2-24-10

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required)			NA
If activity less 10* MDA/ MDC, error is 150% or less of sample activity. If greater 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.			
If duplicate activities are less 5* MDA/ MDC, then RPD is 100% or less. If greater 5* MDA/ MDC, then RPD 20% or less. If below the MDA/ MDC, the RPD is 0%.	✓		
Or meets the client's required RER acceptance criteria.			
Tracer yield is 15-125% . Carrier yield 25-125%.			NA
Or meets the client's contract acceptance criteria.			
Method blank is less than the RDL/ LLD.	✓		
(If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.	✓		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% or meets the client's contract acceptance criteria.	✓		
No blank spaces on data forms.	✓		
All line outs Initialed and dated.	✓		
No transcription errors are apparent.			
Aux data is correct.			NA
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly statused.	✓		
QC data entered into QC database and batch is in REVW	✓		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.			NA
Batch Data Exception Reports (DER) second reviewed and disposition verified to be completed.			NA
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	✓		

GEL Laboratories, LLC

RADchecklistrev10, revised 1/13/2010

Primary Review Performed By: [Signature]

Secondary Review Performed By: [Signature] 2/24/10

LANL 2-26-10

# Tritium Que Sheet

05-MAR-10

Batch #: 953111

Analyst: KKK @ 3-5-10 First Client Due Date 26-FEB-10 Internal Due Date: 16-FEB-10

Spike Isotope: Hydrogen-3

Spike Code: 0134-K

Expiration Date: 3/27/10

Vol: 0.1

LCS Isotope: Hydrogen-3

LCS Code: 0134-K

Expiration Date: 3/27/10

Vol: 0.1

Prep Date: 2/18/10 Initials: KKG Pipet ID: 2970968 Witness: AW 2/22/10

recopied by @ 3-5-10

Sample ID	Client Samp ID	Type	Hazard Code	Min CRDL	Matrix	Client	Sample Date	Aliquot in vial (mL)	LSC Rack #	Dist Bkg #	Vol added for Dist (mL)	Initial Sample Aliquot (mL)	Final We (g)	Total Moisture Dist (mL)
-----------	----------------	------	-------------	----------	--------	--------	-------------	----------------------	------------	------------	-------------------------	-----------------------------	--------------	--------------------------

246537001-1	RE15-10-8363	SAMPLE		.25 pCi/mL SOIL	LANL010		03-FEB-10	10	58-2	1		416.08	388.27	77.81
246681001-1	RE15-10-8185	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	10	58-3	2		562.66	519.11	43.55
246681002-1	RE15-10-8183	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	10	58-4	3		414.93	401.39	13.53
246681003-1	RE15-10-8179	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	6.5	79-1	4		536.52	525.63	10.89
246681004-1	RE15-10-8184	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	10	79-2	5		367.35	353.94	13.41
246681005-1	RE15-10-8180	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	6.5	79-3	6		525.63	516.38	9.25
246681006-1	RE15-10-8181	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	10	79-4	7		597.90	585.64	12.26
246681007-1	RE15-10-8182	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	6	79-5	8		397.46	389.91	7.55
246681008-1	RE15-10-8210	SAMPLE		.25 pCi/mL SOIL	LANL010		05-FEB-10	10	79-6	9		436.04	417.61	18.43
246837001-1	RE15-10-7992	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-7	10		519.90	472.59	47.31
246837002-1	RE15-10-7991	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-8	11		131.11	93.22	37.89
246837003-1	RE15-10-7990	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-9	12		497.20	457.92	39.28
246837004-1	RE15-10-7987	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-10	13		328.75	315.66	13.09
246837005-1	RE15-10-7988	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-11	14		426.01	386.82	39.19
246837006-1	RE15-10-7989	SAMPLE		.25 pCi/mL SOIL	LANL010		08-FEB-10	10	79-12	15		394.79	316.67	78.12
247033002-1	WST15-10-8940	SAMPLE		.25 pCi/mL SOIL	LANL010		11-FEB-10	10	0-1	16		578.71	549.41	35.30
1202042933-1	MB for batch 953111	MB		.25 pCi/mL SOIL	QC ACCOUNT			10	0-2	17		20.00	0	20.00
1202042934-1	DUP	DUP		.25 pCi/mL SOIL	QC ACCOUNT			10	0-3	1		416.06	388.27	77.81
1202042935-1	LCS for batch 953111	LCS		.25 pCi/mL SOIL	QC ACCOUNT			10	42-1	18		20.00	0	20.00

Bkg Rack #: 58-1

Comments:

Bkg prepared with dead water? Yes/No

Instrument Used (circle as appropriate): LS6000 (Red) 7065155, LS6500 (Blue) 7067083, LS6500 (Gold) 7070506, LS6500 (Green) 7067404, Wallac (Yellow) 4140127, LS6000 (Brown) 7060655, Wallac (Pink) 2200082, Wallac (White) 4140299, Purple 7069123, Silver 7060656, Orange DG06095168

Calibration Used: Ecosciint Ultra (10 mL sample/13 mL Ecosciint Ultra)  
Data Reviewed By: AW 2-24-10

GEL Laboratories LLC, Radiochemistry Division

Page 1 of 1

T953111

## Tritium Solid

Filename : H3VAC.XLS  
File type : Excel  
Version # : 1.2.6

Spike SN :  
Spike Exp Date :  
Spike Activity (dpm/ml):  
Spike Volume Added:

LCS SN :  
LCS Exp Date :  
LCS Activity (dpm/ml):  
LCS Volume Added:

Batch : 953111  
Analyst : KXK2  
Prep Date : 2/18/2010

H-3 Abundance : 1  
Method Uncertainty : 0.0691  
Geometry: 10mL DW/13mL  
Eoschint Ultra

Procedure Code : LSC\_VH3S  
Paramname : Tritium  
Required MDC : 250 pCi/L  
Half-life of Tritium : 12.32 years

Pipet, 0.1 ml Sidev : +/- ml  
Pipet, 0.5 ml Sidev : +/- ml  
Pipet, 1.0 ml Sidev : +/- ml  
Pipet, 5.0 ml Sidev : +/- ml

Sample Characteristics		Wet Sample Weight (g)	Total Moisture L	Sample Allquot in Vial L	Sample Allquot Sidev. L	Dry Sample Weight (g)	% Moisture of Sample	Rig number	Sample Date/Time
Pos.	Sample ID								
1	246557001.1	416.08	0.0778	0.0100	2.5729E-05	338.27	18.70%	1	2/3/2010 12:00
2	246681001.1	582.66	0.0436	0.0100	2.5729E-05	519.11	7.74%	2	2/5/2010 12:00
3	246681002.1	414.92	0.0135	0.0100	2.5729E-05	401.39	3.26%	3	2/5/2010 12:00
4	246681003.1	536.52	0.0109	0.0065	2.5729E-05	525.63	2.03%	4	2/5/2010 12:00
5	246681004.1	367.35	0.0134	0.0100	2.5729E-05	353.94	3.65%	5	2/5/2010 12:00
6	246681005.1	525.63	0.0093	0.0065	2.5729E-05	516.39	1.78%	6	2/5/2010 12:00
7	246681006.1	597.90	0.0123	0.0100	2.5729E-05	585.64	2.05%	7	2/5/2010 12:00
8	246681007.1	397.46	0.0076	0.0060	2.5729E-05	388.91	1.90%	8	2/5/2010 12:00
9	246681008.1	436.04	0.1184	0.0100	2.5729E-05	317.61	27.16%	9	2/5/2010 12:00
10	246837001.1	519.90	0.0473	0.0100	2.5729E-05	472.59	9.10%	10	2/8/2010 12:00
11	246837002.1	131.11	0.0379	0.0100	2.5729E-05	93.22	28.90%	11	2/8/2010 12:00
12	246837003.1	487.20	0.0393	0.0100	2.5729E-05	457.92	7.90%	12	2/8/2010 12:00
13	246837004.1	328.75	0.1131	0.0100	2.5729E-05	215.66	34.40%	13	2/8/2010 12:00
14	246837005.1	426.01	0.0392	0.0100	2.5729E-05	386.82	9.20%	14	2/8/2010 12:00
15	246837006.1	294.78	0.0781	0.0100	2.5729E-05	216.67	28.50%	15	2/8/2010 12:00
16	247033002.1	578.71	0.0353	0.0100	2.5729E-05	543.41	6.10%	16	2/11/2010 12:00
17	1202042833.1	20.00	0.0200	0.0100	2.5729E-05	0.00	100.00%	17	2/18/2010 0:00
18	1202042834.1	416.08	0.0778	0.0100	2.5729E-05	338.27	18.70%	1	2/3/2010 12:00
19	1202042835.1	20.00	0.0200	0.0100	2.5729E-05	0.00	100.00%	18	2/18/2010 0:00



Count raw Data			Background			Calibration Data			Detector			Backgrounds		
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Count Time (min.)	Count Start Date/Time	Sample Decay	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Error (cpm/dpm)	Rack Position #	Count Start Date/Time
1	58-2	95	735.21	3.3	95	2/22/2010 20:19	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2086	0.00792	58-1	2/22/2010 18:42
2	58-3	70.5833	733.4	563.47	95	2/22/2010 21:55	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2058	0.00792	58-1	2/22/2010 18:42
3	58-4	54.5667	735.56	733.74	95	2/22/2010 23:07	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2091	0.00792	58-1	2/22/2010 18:42
4	79-1	48.9667	736.01	852.34	95	2/23/2010 1:17	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2097	0.00792	58-1	2/22/2010 18:42
5	79-2	63.1	734.86	765.06	95	2/23/2010 2:05	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2080	0.00792	58-1	2/22/2010 18:42
6	79-3	65.85	734.2	607.04	95	2/23/2010 2:59	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2070	0.00792	58-1	2/22/2010 18:42
7	79-4	42.1167	736.97	955.28	95	2/23/2010 4:08	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2111	0.00792	58-1	2/22/2010 18:42
8	79-5	71.5167	735.01	556.78	95	2/23/2010 4:50	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2083	0.00792	58-1	2/22/2010 18:42
9	79-6	68.7167	734.91	579.91	95	2/23/2010 6:02	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2081	0.00792	58-1	2/22/2010 18:42
10	79-7	95	735.76	4.58	95	2/23/2010 7:12	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2084	0.00792	58-1	2/22/2010 18:42
11	79-8	95	735.61	3	95	2/23/2010 8:48	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2082	0.00792	58-1	2/22/2010 18:42
12	79-9	95	735.81	8.81	95	2/23/2010 10:25	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2084	0.00792	58-1	2/22/2010 18:42
13	79-10	95	734.86	3.96	95	2/23/2010 12:01	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2080	0.00792	58-1	2/22/2010 18:42
14	79-11	95	735.26	4.4	95	2/23/2010 13:37	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2086	0.00792	58-1	2/22/2010 18:42
15	79-12	95	734.96	4.85	95	2/23/2010 15:14	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2082	0.00792	58-1	2/22/2010 18:42
16	0-1	95	735.26	3.73	95	2/23/2010 16:50	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2086	0.00792	58-1	2/22/2010 18:42
17	0-2	95	734.96	2.84	95	2/23/2010 18:26	0.998	LSCYELLOW	8/21/2009	8/31/2010	0.2082	0.00792	58-1	2/22/2010 18:42
18	0-3	95	735.71	3.29	95	2/23/2010 20:02	0.997	LSCYELLOW	8/21/2009	8/31/2010	0.2063	0.00792	58-1	2/22/2010 18:42
19	42-1	15	736.52	29.19	95	2/23/2010 21:39	0.999	LSCYELLOW	8/21/2009	8/31/2010	0.2105	0.00792	58-1	2/22/2010 18:42

## Notes:

- 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the Batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

Pos	Results		Critical Level	Required MDC	MDC	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	1 SIGMA Counting Uncertainty	1 SIGMA Total Prop. Uncertainty	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
	Decision Level	pCi/L															
1	123.2044	86.9833	250	180.8077	250	101.8173	0.541	0.470	0.254	55.0291	55.4841	SAMPLE					
2	135.1700	95.4312	250	200.1896	250	123032.4636	0.010	580.640	2.831	621.1961	8591.3922	SAMPLE					
3	143.8314	101.5462	250	214.9693	250	157697.9323	0.010	730.910	3.671	793.0498	11026.7561	SAMPLE					
4	231.6377	163.5382	250	348.2363	250	281444.0638	0.011	849.510	4.264	1412.5083	19689.1418	SAMPLE					
5	145.8194	102.9498	250	218.1662	250	163321.2429	0.010	752.220	3.775	819.5828	11404.4063	SAMPLE					
6	211.1452	149.0703	250	313.4782	250	202785.7159	0.011	604.210	3.046	1022.2582	14187.4181	SAMPLE					
7	155.2212	109.5875	250	234.4124	250	203745.3277	0.010	952.450	4.766	1019.4568	14226.9278	SAMPLE					
8	221.8185	156.6058	250	328.3751	250	200242.3074	0.011	553.950	2.786	1010.5382	14016.6485	SAMPLE					
9	134.7272	95.1186	250	199.7128	250	126253.1242	0.010	577.080	2.910	631.6361	8746.4057	SAMPLE					
10	122.6371	86.5829	250	179.9752	250	377.3616	0.160	1.750	0.279	60.2236	65.7088	SAMPLE					
11	122.7688	86.6758	250	180.1885	250	34.6973	1.457	0.170	0.248	53.4759	53.5369	SAMPLE					
12	122.5863	86.5540	250	179.9154	250	1289.0682	0.059	5.980	0.350	75.4553	117.2776	SAMPLE					
13	123.4321	87.1441	250	181.1419	250	246.2473	0.237	1.130	0.267	58.0228	60.4847	SAMPLE					
14	123.0791	86.8949	250	180.6239	250	339.7674	0.176	1.570	0.276	59.7021	64.2209	SAMPLE					
15	123.3457	87.0831	250	181.0151	250	438.0996	0.141	2.020	0.284	61.6652	68.8013	SAMPLE					
16	123.0248	86.8566	250	180.5442	250	194.6851	0.292	0.900	0.263	56.8434	58.4383	SAMPLE					
17	123.1879	86.9576	250	180.7541	250	2.1657	24.430	0.010	0.244	52.9084	52.9087	MB					
18	122.7852	86.6874	250	180.1925	250	99.3119	0.552	0.460	0.254	54.7971	55.2319	246557001.1	DUP	2.5%	0.0113	5553.0214	101.7%
19	233.2633	164.6859	250	372.2107	250	5846.1678	0.054	28.360	1.406	301.0778	486.2643	LCS					

DATE	2/18/2010	INITIALS	KXK2	BATCH NUMBER	953111				
Sample #	Flask Wt (g)	Sample Wet (g)	Flask & Sample Wet (g)	% Moisture of Sample (Balance Interface using % Moisture Batch)	Total Moisture in Sample (mL)	Sample Dry (g)	Flask & Sample Dry (g)	mLs aliquoted into LSC vial	Collection Tube Number
246577001	200	416.08	616.08	0.187	77.81	338.27	538.27	10	
246681001	200	562.66	762.66	0.077	43.55	519.11	719.11	10	
246681002	200	414.92	614.92	0.033	13.53	401.39	601.39	10	
246681003	200	536.52	736.52	0.020	10.89	525.63	725.63	6.5	
246681004	200	367.35	567.35	0.037	13.41	353.94	553.94	10	
246681005	200	525.63	725.63	0.018	9.25	516.38	716.38	6.5	
246681006	200	597.90	797.90	0.021	12.26	585.64	785.64	10	
246681007	200	397.46	597.46	0.019	7.55	389.91	589.91	6	
246681008	200	436.04	636.04	0.272	118.43	317.61	517.61	10	
246837001	200	519.90	719.90	0.091	47.31	472.59	672.59	10	
246837002	200	131.11	331.11	0.289	37.89	93.22	293.22	10	
246837003	200	497.20	697.20	0.079	39.28	457.92	657.92	10	
246837004	200	328.75	528.75	0.344	113.09	215.66	415.66	10	
246837005	200	426.01	626.01	0.092	39.19	386.82	586.82	10	
246837006	200	294.79	494.79	0.265	78.12	216.67	416.67	10	
247033002	200	578.71	778.71	0.061	35.30	543.41	743.41	10	
MB	200	20.00	220.00	1.000	20.00	0.00	200.00	10	
DUP	200	416.08	616.08	0.187	77.81	338.27	538.27	10	
LCS	200	20.00	220.00	1.000	20.00	0.00	200.00	10	

## H-3

PROTOCOL : 10 H-3 95 mln  
DATE : 2010/02/22  
TIME : 18:42  
ID : P10AS246

## H-3

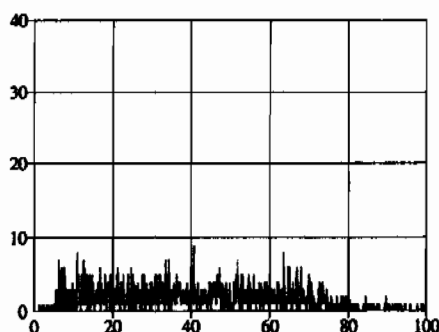
Wallac 1414 WinSpectral v1.40 S/N 4140127

Counting mode : DPM  
Quench index : SQP(E)  
Isotope(s) : H3  
H3 = ,12.43 y  
Protocol name : H-3 95 mln  
Counting time : 5700  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 0.00  
Minimum cpm : 0.00 Checking time: 10  
Sp. library of isotope H3 : Wallac  
Vial type : Diffuse  
Liquid system : HiSafe  
Advanced modes : Chemillum  
Output to Display :  
POS,DPM1,CPMw2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,DATE,  
TIME,CPMw1,CPM,CPM1,CTIME  
Additions to Display : Listing,Header,Spectrum  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

## Total activity:

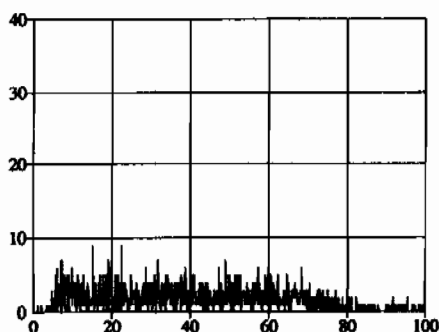
H3 4861.0 DPM 0.081 kBq

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
58	1	95.00	741.45	2/22/2010 6:42 PM

/ Counts  
Chem/ Counts  
Beta

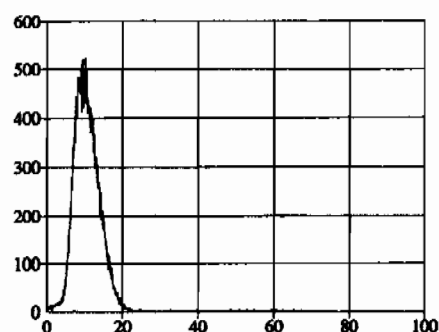
Gross_B_CPM	LUMEX
3.60	0.00
Lumex_CPM	DPM
0.80	10.90

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
58	2	95.00	735.21	2/22/2010 8:19 PM

/ Counts  
Chem/ Counts  
Beta

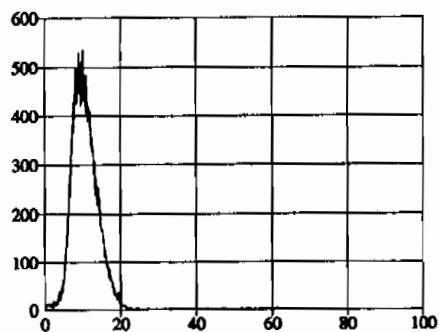
Gross_B_CPM	LUMEX
3.90	0.00
Lumex_CPM	DPM
0.60	13.10

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
58	3	70.58	733.40	2/22/2010 9:55 PM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
564.10	0.00
Lumex_CPM	DPM
0.60	2118.70

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
58	4	54.57	735.56	733.74 2/22/2010 11:07 PM

/ Counts  
ChemGross\_B\_CPM  
734.30LUMEX  
0.00/ Counts  
BetaLumex\_CPM  
0.50DPM  
2718.40

PROTOCOL : 10 H-3 95 min  
DATE : 2010/02/23  
TIME : 01:16  
ID : P10AS247

H-3

Wallac 1414 WinSpectral v1.40 S/N 4140127

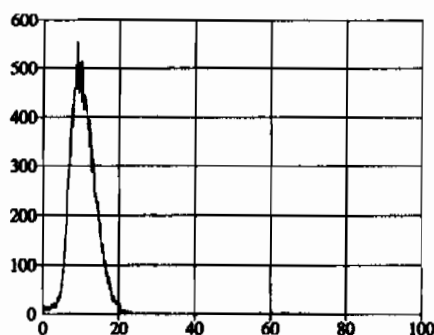
Counting mode : DPM  
Quench index : SQP(E)  
Isotope(s) : H3  
H3 = ,12.43 y  
Protocol name : H-3 95 min  
Counting time : 5700  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 0.00  
Minimum cpm : 0.00 Checking time: 10  
Sp. library of Isotope H3 : Wallac  
Vial type : Diffuse  
Liquid system : HiSafe  
Advanced modes : Chemilum  
Output to Display :  
POS,DPM1,CPMw2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,DATE,  
TIME,CPMw1,CPM,CPM1,CTIME  
Additions to Display : Listing,Header,Spectrum  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

Total activity:

H3 16053.0 DPM 0.268 kBq

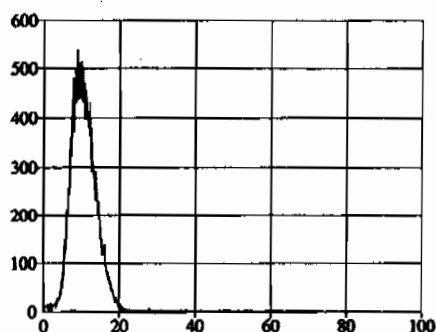
## H-3

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	1	46.97	736.01	2/23/2010 1:17 AM

/ Counts  
Chem/ Counts  
Beta

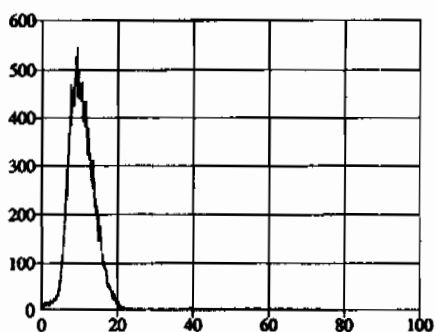
Gross_B_CPM	LUMEX
853.20	0.00
Lumex_CPM	DPM
0.80	3123.40

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	2	53.10	734.86	2/23/2010 2:05 AM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
756.00	0.00
Lumex_CPM	DPM
0.90	2796.90

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	3	65.65	734.20	2/23/2010 2:59 AM

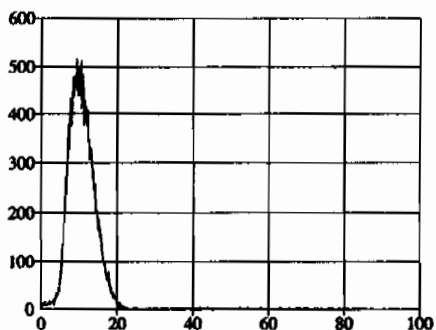
/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
607.80	0.00
Lumex_CPM	DPM
0.80	2271.80



## H-3

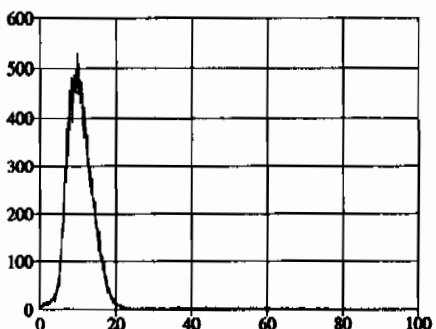
Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	4	42.12	736.97	2/23/2010 4:06 AM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
956.10	0.00

Lumex_CPM	DPM
0.80	3508.80

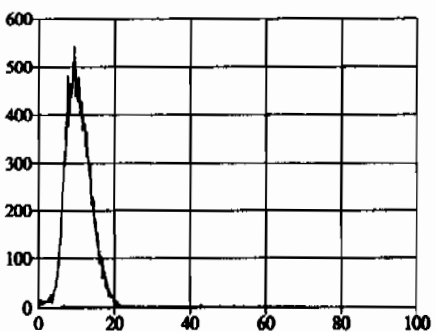
Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	5	71.52	735.01	2/23/2010 4:50 AM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
557.50	0.00

Lumex_CPM	DPM
0.80	2054.80

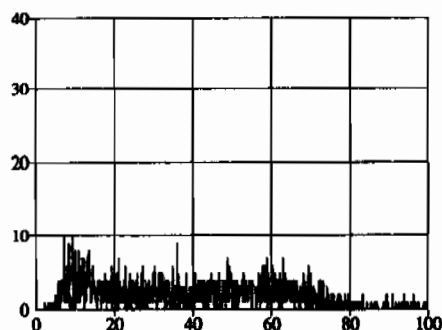
Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	6	68.72	734.91	2/23/2010 6:02 AM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
580.60	0.00

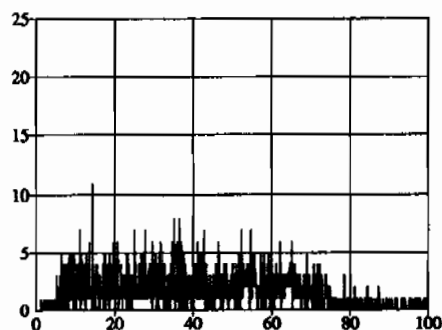
Lumex_CPM	DPM
0.70	2148.20

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	7	95.00	735.76	4.58 2/23/2010 7:12 AM



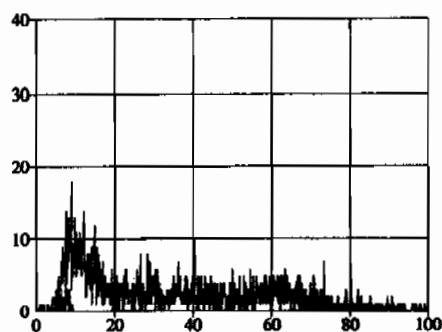
Gross_B_CPM	LUMEX
5.40	0.00
Lumex_CPM	DPM
0.80	17.50

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	8	95.00	735.61	3.00 2/23/2010 8:49 AM



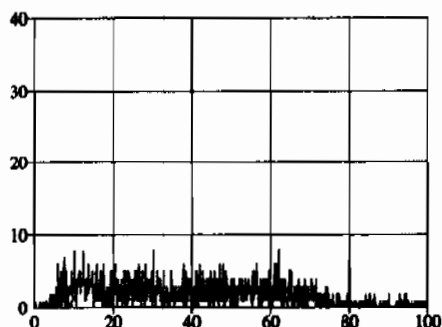
Gross_B_CPM	LUMEX
3.60	0.00
Lumex_CPM	DPM
0.60	11.60

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79	9	95.00	735.81	8.81 2/23/2010 10:25 AM



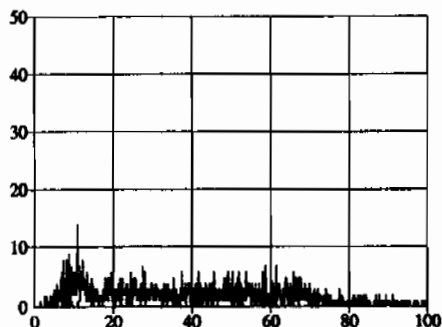
Gross_B_CPM	LUMEX
9.30	0.00
Lumex_CPM	DPM
0.50	31.70

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79 10	95.00	734.86	3.96	2/23/2010 12:01 PM

/ Counts  
Chem/ Counts  
Beta

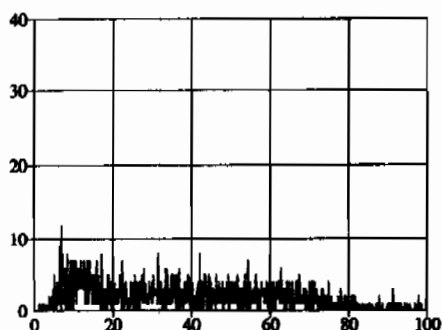
Gross_B_CPM	LUMEX
4.50	0.00
Lumex_CPM	DPM
0.50	15.10

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79 11	95.00	735.26	4.40	2/23/2010 1:37 PM

/ Counts  
Chem/ Counts  
Beta

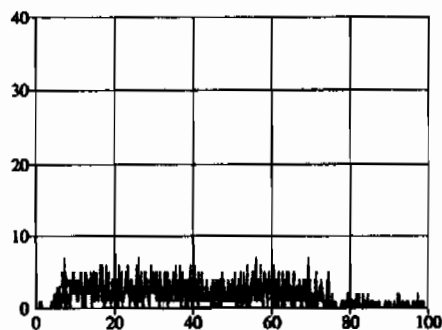
Gross_B_CPM	LUMEX
5.00	0.00
Lumex_CPM	DPM
0.60	16.90

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
79 12	95.00	734.96	4.85	2/23/2010 3:14 PM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
5.50	0.00
Lumex_CPM	DPM
0.70	18.70

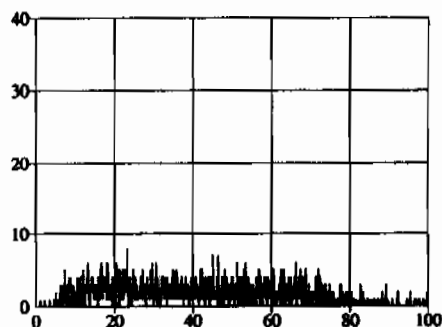
Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
0 1	95.00	735.26	3.73	2/23/2010 4:50 PM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
4.30	0.00

Lumex_CPM	DPM
0.50	14.20

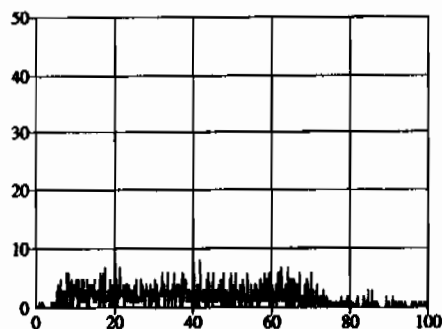
Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
0 2	95.00	734.96	2.84	2/23/2010 6:26 PM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
3.20	0.00

Lumex_CPM	DPM
0.30	10.90

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
0 3	95.00	735.71	3.29	2/23/2010 8:02 PM

/ Counts  
Chem/ Counts  
Beta

Gross_B_CPM	LUMEX
3.60	0.00

Lumex_CPM	DPM
0.30	12.70

## H-3

PROTOCOL : 13 H-3 15 min  
DATE : 2010/02/23  
TIME : 21:39  
ID : P13AS311

H-3

Wallac 1414 WinSpectral v1.40 S/N 4140127

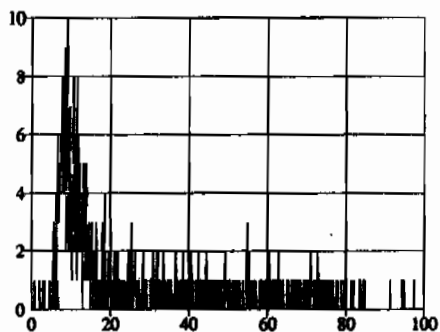
Counting mode : DPM  
Quench index : SQP(E)  
Isotope(s) : H3  
H3 = ,12.43 y  
Protocol name : H-3 15 min  
Counting time : 900  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 2.00  
Minimum cpm : 0.00 Checking time: 10  
Sp. library of isotope H3 : Wallac  
Vial type : Diffuse  
Liquid system : HiSafe  
Advanced modes : Chemilum  
Output to Display :  
POS,DPM1,CPMW2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,DATE,  
TIME,CPMW1,CPM,CPM1,CTIME  
Additions to Display : Listing,Header,Spectrum  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

Total activity:

H3 106.9 DPM 0.002 kBq

# H-3

Rack_position	Count_Time(min)	Quench_number	H-3_CPM	Run_Date
42 1	15.00	736.52	29.19	2/23/2010 9:39 PM



Counts  
Chem

Gross_B_CPM	LUMEX
29.50	0.00

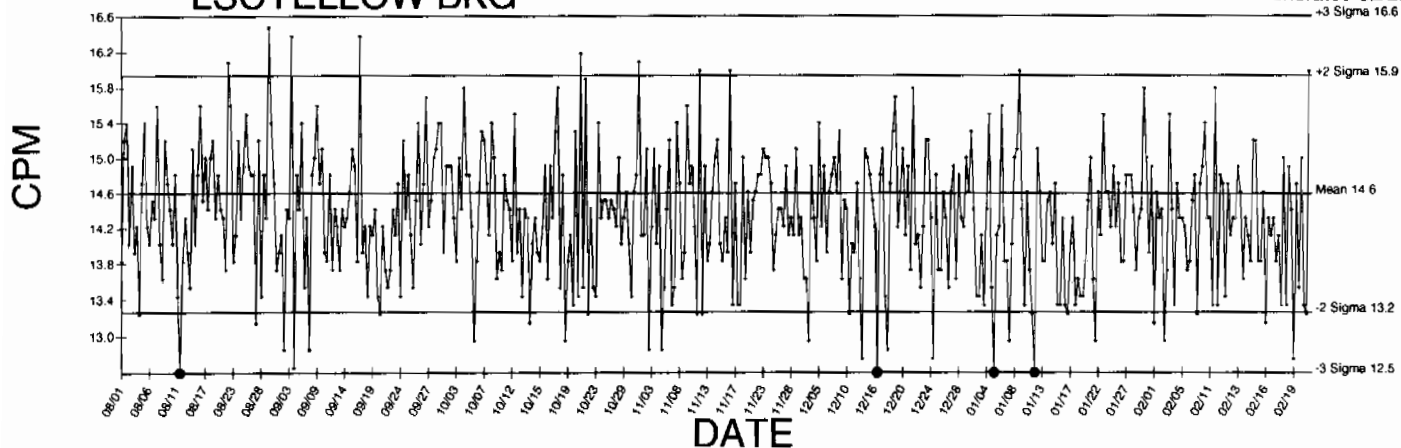
Counts  
Beta

Lumex_CPM	DPM
0.30	106.90

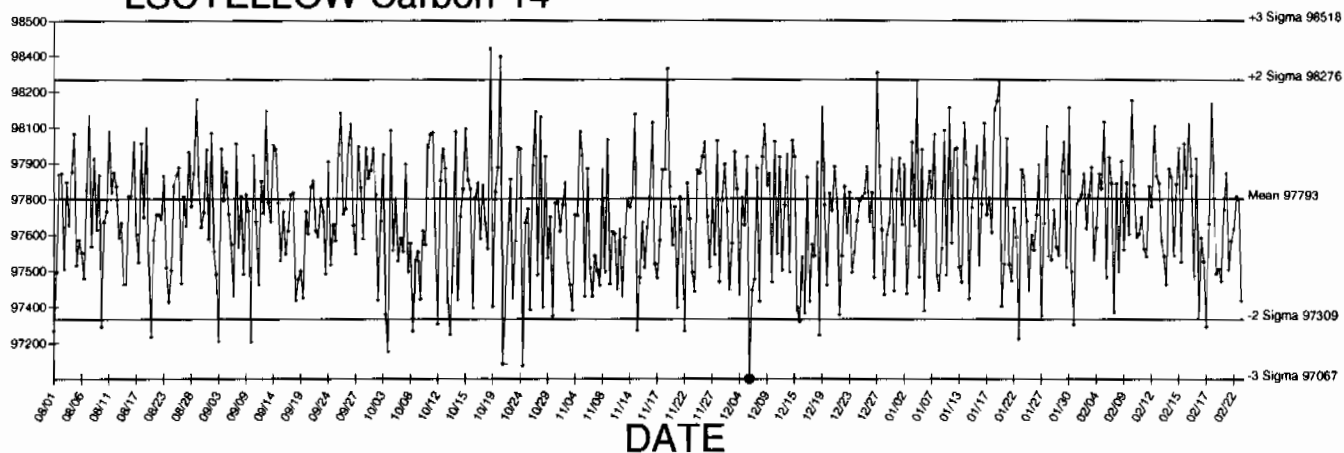
# BACKGROUND AND EFFICIENCY DATA

# LSCYELLOW BKG

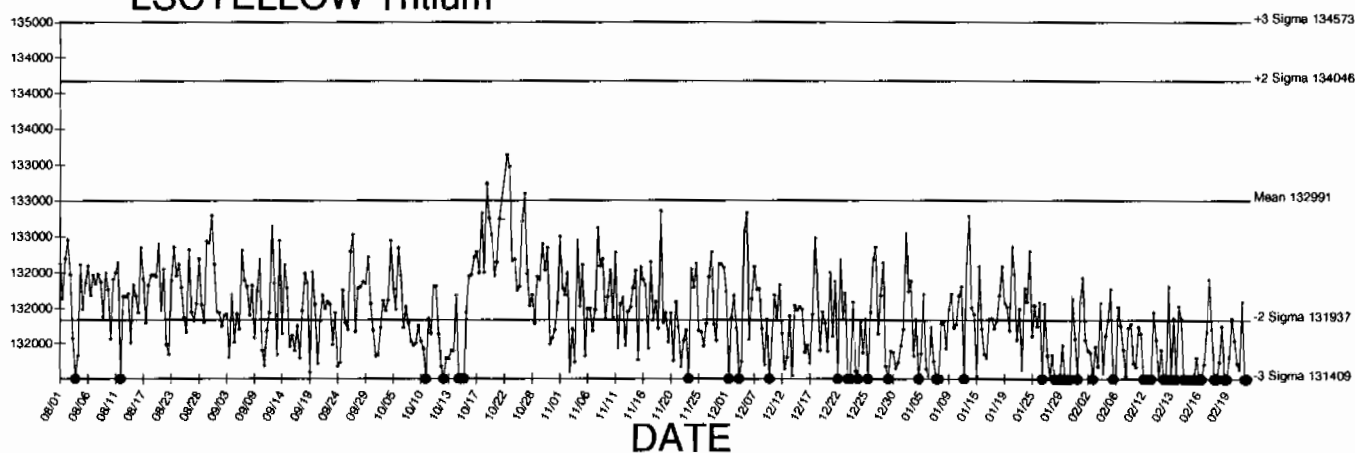
Generated 02/23/2010



# LSCYELLOW Carbon-14



# LSCYELLOW Tritium



● Denotes Outlier



# STANDARDS DATA

0134



CALIBRATION  
No. 0146

**Description** Radionuclide: TRITIUM (HYDROGEN-3) Product code: TRY-64  
Chemical form: water Batch: 111

**Measurement** Reference time: 1200 GMT on 1 March 1996  
Radioactive concentration of tritium: 488.0 kilobecquerels per gram of water  
which is equivalent to: 13.19 microcuries per gram of water  
or:  $2.93 \times 10^7$  disintegrations per minute per gram of water

**Method of Measurement**

This reference material was calibrated by direct comparison with a standard of tritium-labelled water obtained from the National Institute of Standards and Technology, USA.

**Accuracy** The OVERALL UNCERTAINTY of the result quoted above is estimated to be less than  $\pm 2.5\%$

This estimate of uncertainty was calculated in accordance with the recommendations of the International Commission on Radiation Units and Measurements (ICRU Report 12). The limits of uncertainty were taken as the arithmetic sum of the uncertainty due to random variations, calculated at the 99.7% confidence level, and the estimated systematic uncertainties.

**Purity** No radioactive impurities were detected. (Impurities with total activity greater than 0.001% of the activity of the tritium would have been detected).

**Physical Data** Half-life of tritium:  $12.43 \pm 0.11$  years  
Maximum beta energy of tritium: 18.6 keV

**Remarks:** The S.I. unit of radioactivity is the becquerel.

1 becquerel (Bq) = 1 nuclear transformation per second, therefore  
1 curie (Ci) =  $3.7 \times 10^{10}$  becquerels exactly.

Useful conversion factors are:

1 microcurie ( $\mu\text{Ci}$ ) =  $3.7 \times 10^4$  Bq = 37 kilobecquerels (kBq)  
1 kilobecquerel (kBq) = 27.027 nanocuries (nCi)

This product meets the quality assurance requirements of NRC Regulatory Guide 4.15 for achieving implicit NIST (NBS) traceability as defined in NCRP58 (1985).

Approved  
signatory

*W. F. Case*  
Page 54 of 58  
W.F. Case

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0134	Isotope:	Tritium
Prepared By:	Angela Johnson	Prepared By:	Angela Johnson
Carrier Conc:	DI WATER	Prep Date:	02/21/2001
Reference Date:	03/01/1996	Verification Date:	09/10/2008
Ampoule Mass (g):	5 g	Expiration Date:	03/27/2010
Uncertainty:	+/- 2.5 %	Primary Code:	0134-A
LogBook No:	RC S 023 061	Dilution(mL):	100 mL
		Mass of Parent(g):	3.3659 g
		Density(g/mL):	1.0004
		Balance ID:	38080204

## Calculations Converting parent activity to dpm/mL/dpm/g

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(3.3659 \text{ g}) * (488 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 985535.5200 \text{ dpm/mL}$
$(3.3659 \text{ g}) * (488 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0004 \text{ g/mL}) / (100 \text{ mL}) = 985180.3116 \text{ dpm/g}$

## Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
07/20/2004	Amanda Fehr	5.86	1000	0134-H	5773.1566 dpm/mL	07/25/2006	07/25/2007
12/20/2005	Amanda Fehr	5.5451	1000	0134-I	5462.92 dpm/mL	12/20/2006	12/20/2007
07/11/2007	Daniel Roy	5.5863	1000	0134-J	5503.5128 dpm/ml	07/29/2008	07/29/2009
03/25/2009	Mary Aders	5.4917	1000	0134-K	5410.3147 dpm/ml	03/27/2009	03/27/2010

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for H-3 Standard 0134-K

M. Aders	Isotope	Detector CPM	BKG CPM	NET CPM	Detector Eff Mass. Used (mL)	Source DPM/mL
4/9/2009	0134-K N1	1097.2000	54.0000	1043.2000	1.0000	2741.3089
	0134-K N2	1073.2000	54.0000	1019.2000	1.0000	2678.242955
	0134-K N3	1085.2000	54.0000	1031.2000	1.0000	2709.776428
Mean Value (Counting) =	2709.776428		104.954429	Pass	Average =	2709.776428
Stddev =	31.53347278		0.01163693	Rule 3 (Pass/Fail)		

Certificate Value = 2581.88 dpm/mL  
 Lower Limit = 2846.709482 dpm/mL  
 Upper Limit = 2772.843373 dpm/mL  
 Rule 1 Pass/Fail Fail  
 Two sigma = 63.06694556 dpm/mL  
 10 % of Mean = 270.9776428 dpm/mL  
 Rule 2 (Pass/Fail) Pass

\*exception taken due to full recovery of standard

## Verification Rules

- Rule 1 = The certificate value (NOT including any uncertainty) shall lie within the 95% confidence interval determined from the mean and two sigma standard deviation of the three measurements
- Rule 2 = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.
- Rule 3 = The determined mean value shall be within 10% of the certificate value.

The analyst prepared three standard verification sources for H-3 source 0134-K by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. Ten mL of Ecosint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 1 mL of DI water and 10 mL of Ecosint Ultra liquid scintillation cocktail. The standard verification vials and Background source were dark adapted for two hours and counted on Silver for H-3 source standard verification. The H-3 efficiency calibration which was used for verification calculations was performed on 4/9/09 using 0020-A (H-3). Calibration data is recorded in this logbook under H-3 0020. Each verification source calculation was performed as follows:

$$\text{Source dpm/g} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency, (cpm/dpm), and
- D = mass used for standard verification.

Reference RAD SOP M-001

Handwritten:  
 Amanda J. Fehr 4/9/09

# RUNLOGS

# Instrument Run Log

**Instrument Type: LSC**

**Batch ID: 953111**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
246557001	SAMPLE	KXK2	LSCYELLOW	22-FEB-10 20:19	DONE		
246681001	SAMPLE	KXK2	LSCYELLOW	22-FEB-10 21:55	DONE		
246681002	SAMPLE	KXK2	LSCYELLOW	22-FEB-10 23:07	DONE		
246681003	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 01:17	DONE		
246681004	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 02:05	DONE		
246681005	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 02:59	DONE		
246681006	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 04:06	DONE		
246681007	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 04:50	DONE		
246681008	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 06:02	DONE		
246837001	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 07:12	DONE		
246837002	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 08:49	DONE		
246837003	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 10:25	DONE		
246837004	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 12:01	DONE		
246837005	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 13:37	DONE		
246837006	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 15:14	DONE		
247033002	SAMPLE	KXK2	LSCYELLOW	23-FEB-10 16:50	DONE		
1202042933	MB	KXK2	LSCYELLOW	23-FEB-10 18:26	DONE		
1202042934	DUP	KXK2	LSCYELLOW	23-FEB-10 20:02	DONE		
1202042935	LCS	KXK2	LSCYELLOW	23-FEB-10 21:39	DONE		