

Monday, March 14, 2011

REQUEST NUMBER: 11-1611

**LOS ALAMOS
NATIONAL LABORATORY**

ATTN: Danny Coleman

American Radiation Services - Primary
1726 Wooddale Court
Baton Rouge, LA 70806

These Samples are on:

LANL Request Number:11-1611

Per Agreement Number:63641-001-10

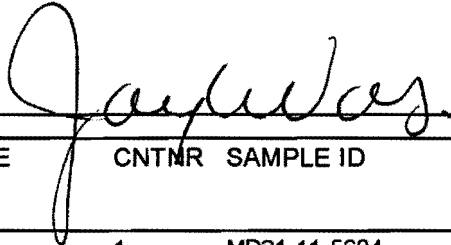
Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples
according to the schedule indicated:

SHIP DATE: 3/14/2011**TURNAROUND/REPORT DUE: 4/13/2011****TURNAROUND REQ'D: 30 Days****RAD SCREENING: Not Required****LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

Signature:



PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-11-5604	GAS	3/10/2011	
		1	MD21-11-5609	GAS	3/10/2011	

Final Page of REQUEST NUMBER 11-1611

Monday, March 14, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-1611C

LOS ALAMOS

REQUEST NUMBER: 11-1611

NATIONAL LABORATORY

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 4/13/2011

American Radiation Services - Primary

TURNAROUND REQ'D: 30

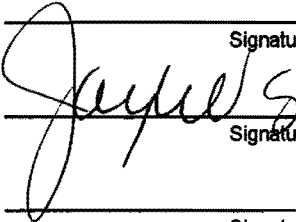
1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

1 of 1

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-5604	1	SILICA GEL TUBE	H3	None	GAS
MD21-11-5609	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:	Date	Time	Received By:	Date	Time
	3/14/11	1400			
Signature			Signature		
Signature			Signature		
Signature			Signature		

Received for DISPOSAL By:	Date	Time	Remarks:
Signature			

11C

11C

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3396

EVENT NAME: Pore Gas Sampling - MDA T - CU 21-016(a)-99

SAMPLE ID: MD21-11-5604

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		3/10/11		MEDIA:	NA		
TIME COLLECTED (HH:MM)		14:20		SUB-MEDIA:	OTHER		
PRS ID:	21-018(a)-99	ok		SAMPLE TECH CODE:	VOST		
LOCATION ID:	21-24524W	ok		FIELD QC TYPE:	NA		
LOCATION TYPE:	BH	ok		FIELD PREP:	NA		
TOP DEPTH:	300	ok		SAMPLE USAGE:	INV		
BOTTOM DEPTH:	305	ok		SCREEN/PORT DESC:			
FIELD MATRIX:	GAS	ok		EXCAVATED: YES/NO/NA	NA		
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		
BOREHOLE: YES/NO/NA	NA			BOREHOLE DECLINATION:	NA		
				BOREHOLE DIRECTION:	90°		

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1		H3	1 EA SILICA GEL TUBE	None		NA
1		TO15	6 LITER SUMMA CANISTER	None		NA

SAMPLE DESC:

column # 21 initial wt 610.48g Final wt = 602.17g
 silica wt 150.29g vapor wt = 16.67g
 3/9/11 3/10/11 627.15g

SAMPLE COMMENTS:

weather data @

LOCATION DESC:

NA

FIELD SCREENING/MEASUREMENT RESULTS:

atm O₂ 20.9% CO₂ 440 ppm
 sub atm O₂ 20.9% CO₂ 3650 ppm

COLLECTED BY (PRINT) R. Smith & M. Giorgi

REVIEWED BY (PRINT) M. Borg

RELINQUISHED BY (Printed Name) M. Borg (Signature) M. Borg	Date/Time 3/10/11 15:40	RECEIVED BY (Printed Name) M. Borg (Signature) M. Borg	Date/Time 3/10/11 15:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3396

EVENT NAME: Pore Gas Sampling - MDA T - CU 21-016(a)-99

SAMPLE ID: MD21-11-5609

WORK ORDER:

AS PLANNED		AS COLLECTED		AS PLANNED		AS COLLECTED	
DATE COLLECTED(MM/DD/YYYY):		3/10/11		MEDIA:	NA		
TIME COLLECTED (HH:MM)		14:20		SUB-MEDIA:	OTHER		
PRS ID:	21-018(a)-99	ok		SAMPLE TECH CODE:	YOST		
LOCATION ID:	21-24524W	ok		FIELD QC TYPE:	ED		
LOCATION TYPE:	BH	ok		FIELD PREP:	NA		
TOP DEPTH:	0	300.0 ft bgs		SAMPLE USAGE:	QC		
BOTTOM DEPTH:	0	305.0 ft bgs		SCREEN/PORT DESC:	port 5FD		
FIELD MATRIX:	GAS	ok		EXCAVATED: YES/NO/NA	NA		
COMPOSITE TYPE:	NA			COMPOSITE TIME INTERVAL:	NA		
BOREHOLE: YES/NO/NA	YES			BOREHOLE DECLINATION:	NA		
				BOREHOLE DIRECTION:	90°		

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1		H3	1 EA SILICA GEL TUBE	None		NA
1		TO15	6 LITER SUMMA CANISTER	None	no 3/9/11	Not collected

SAMPLE DESC: QC Sample of MD21-11-5604

column # 22 initial wt = 583.26g
silica wt = 149.30gFinal wt = 627.15 gm
vapor wt = 43.89 gm
18.91 gm

SAMPLE COMMENTS:

weather data

LOCATION DESC:

NA

FIELD SCREENING/MEASUREMENT RESULTS:

atm O₂ = 20.9%CO₂ 440 ppmsubatm O₂ = 20.9%CO₂ 3650 ppm

COLLECTED BY (PRINT) Ronitt M. Gorgu

REVIEWED BY (PRINT) MV Gorgu

RELINQUISHED BY (Printed Name) (Signature)	Date/Time 3/10/11 15:40	RECEIVED BY (Printed Name) (Signature)	Date/Time 3/10/11 15:40
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

DATA VALIDATION COVER SHEET**5119-1****Data Validation Cover Sheet**

Records Use only

**Section I.**REQUEST NUMBER: 11-1611 VALIDATION DATE: 05/17/2011 LAB CODE: ARSCONTRACT LABORATORY NAME: American Radiation ServicesVALIDATOR: Janis Kardatzke 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): tritium only | | | |

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 checked="" type="checkbox"/> | <input type="checkbox"/> | <input 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. An MS was not analyzed for tritium. However, an LCS was analyzed and met acceptance criteria, thus, no sample data were qualified.
2. A sample duplicate was not analyzed for tritium. However, an LCSD was analyzed and met the acceptance criteria, thus, no sample data were qualified.
3. It should be noted that the LCS/LCSD RER was hand-calculated using the 2-sigma TPU values and was found to be within specifications. No sample data were qualified.

Reviewed by: Mary Donovan Level: I Date: 05/17/11VALIDATOR'S SIGNATURE: DATE: 05/17/2011

RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2

Rad Analytical Data Validation Checklist

Records Use only



Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
				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

5119-2

Rad Analytical Data Validation Checklist

Records Use only



Yes No N/A (Check One)				Assign Qualifier Listed Below If Criterion = Yes	
				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 checked="" type="checkbox"/>	<input 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

5119-2

Rad Analytical Data Validation Checklist

Records Use only



Yes No N/A (Check One)				Assign Qualifier Listed Below If Criterion = Yes	
				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



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-11-00527
Client Sample ID: MD21-11-5604
Sample Collection Date: 03/10/11
Sample Matrix: Silica

Request or PO Number: 11-1611
ARS Sample ID: ARS1-11-00527-001
Date Received: 03/15/11
Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	32710.295	1724.530	221.448	108.850		pCi/L	ARS-054/EPA 906.0	05/05/11 13:26	BS	NA

NOTES: Project Cost Code MR8R032NFM00

Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-11-00527

Client Sample ID: MD21-11-5609

Sample Collection Date: 03/10/11

Sample Matrix: Silica

Request or PO Number: 11-1611

ARS Sample ID: ARS1-11-00527-002

Date Received: 03/15/11

Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	38195.903	2011.292	223.616	109.916		pCi/L	ARS-054/EPA 906.0	05/05/11 16:36	BS	NA

NOTES: Project Cost Code MR8R032NFM00

Project Manager Review

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

LELAP Certificate # 01949

NELAP Certificate # E87558

Monday, March 14, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-16110

LOS ALAMOS

REQUEST NUMBER: 11-1611

NATIONAL LABORATORY

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 4/13/2011

American Radiation Services - Primary

TURNAROUND REQ'D: 30

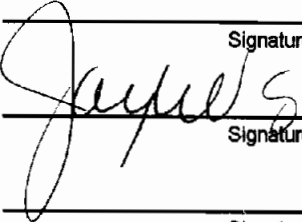
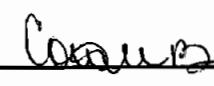
1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

1 of 1

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-5604	1	SILICA GEL TUBE	H3	None	GAS
MD21-11-5609	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:	Date	Time	Received By:	Date	Time
	3/14/11	1400		3-15-11	11:03
Signature			Signature		
Signature			Signature		
Signature			Signature		

Received for DISPOSAL By:	Date	Time	Remarks:
Signature			

Monday, March 14, 2011

REQUEST NUMBER: 11-1611

**LOS ALAMOS
NATIONAL LABORATORY**

ATTN: Danny Coleman

American Radiation Services - Primary
1726 Wooddale Court
Baton Rouge, LA 70806

These Samples are on:

LANL Request Number:11-1611

Per Agreement Number:63641-001-10

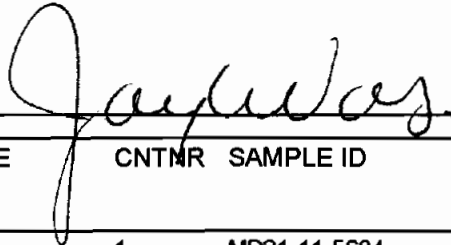
Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples
according to the schedule indicated:

SHIP DATE: 3/14/2011**TURNAROUND/REPORT DUE: 4/13/2011****TURNAROUND REQ'D: 30 Days****RAD SCREENING: Not Required****LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

Signature:



PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-11-5604	GAS	3/10/2011	
		1	MD21-11-5609	GAS	3/10/2011	

Final Page of REQUEST NUMBER 11-1611



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Request Number: 11-1611



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Request Number: 11-1611

Original COC

Monday, March 14, 2011

LOS ALAMOS
NATIONAL LABORATORY

REQUEST NUMBER: 11-1611

ATTN: Danny Coleman

These Samples are on:

American Radiation Services - Primary

LANL Request Number: 11-1611

1726 Wooddale Court

Per Agreement Number: 63641-001-10

Baton Rouge, LA 70806

Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples
according to the schedule indicated:

SHIP DATE: 3/14/2011

TURNAROUND/REPORT DUE: 4/13/2011

TURNAROUND REQ'D: 30 Days

RAD SCREENING: Not Required

LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:

Signature:

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
----------	-------------	-------	-----------	---------------	--------------	----------------------

EPA906.0	1	MD21-11-5604	GAS	3/10/2011		
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1	MD21-11-5609	GAS	3/10/2011			
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Final Page of REQUEST NUMBER 11-1611

Monday, March 14, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-16110

LOS ALAMOS

REQUEST NUMBER: 11-1611

NATIONAL LABORATORY

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 4/13/2011

American Radiation Services - Primary

TURNAROUND REQ'D: 30

1726 Wooddale Court

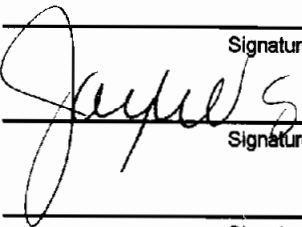
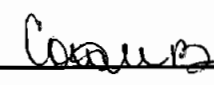
Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

1 of 1

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-5604	1	SILICA GEL TUBE	H3	None	GAS
MD21-11-5609	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By: Date Time Received By: Date Time

	Signature	3/14/11 1400	Signature		Signature	3-15-11/11.03
	Signature				Signature	
	Signature				Signature	

Received for DISPOSAL By: Date Time Remarks:

Signature



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

**Los Alamos National Laboratory
Request Number: 11-1611**

Case Narrative



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

May 6, 2011

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

Request Number: **11-1611**
LANL Sample ID: **MD21-11-5604; MD21-11-5609.**

Dear Mr. Greene;

On March 15, 2011, ARS International received two (2) Silica Gel samples to be analyzed for Tritium.

The samples were received in good condition. They were processed and counted using the appropriate counting equipment and QA/QC for this type of analysis. Results of the analysis and QA/QC are attached in the data package.

The client and QA/QC samples were counted with a count time sufficient to meet quality control parameters for counting equipment and were within acceptance criteria and statistical sound detection limits.

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

Sincerely,


Laboratory Management
ARS International



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

COVER PAGE

**PROJECT SAMPLE IDENTIFICATION
CROSS-REFERENCE
TO ARS SAMPLE LABORATORY IDs**
Subcontract (LANL Agreement Number) 63641-001-10

Request Number	LANL PROJECT SAMPLE ID NUMBER	American Radiation Services SAMPLE ID NUMBER(S)
11-1611	MD21-11-5604	ARS1-11-00527-001
11-1611	MD21-11-5609	ARS1-11-00527-002

ANALYTICAL METHODS

Tritium analyses were performed using EPA 906.0.

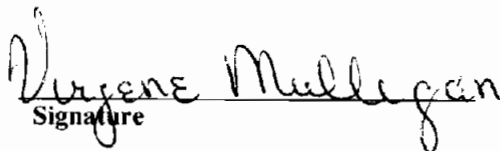
ANALYTICAL RESULTS

The result data that are flagged with "U" indicate that the activity is below the MDC.

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

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

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


Signature

Laboratory Management, ARS International
Title

5-6-11
Date



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

**American Radiation Services
Analytical Reports**

for

Los Alamos National Laboratory

**Tritium
by
Low Level Liquid
Scintillation Counting**



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-11-00527
Client Sample ID: MD21-11-5604
Sample Collection Date: 03/10/11
Sample Matrix: Silica

Request or PO Number: 11-1611
ARS Sample ID: ARS1-11-00527-001
Date Received: 03/15/11
Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	32710.295	1724.530	221.448	108.850		pCi/L	ARS-054/EPA 906.0	05/05/11 13:26	BS	NA

NOTES: Project Cost Code MR8R032NFM00


Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-11-00527

Client Sample ID: MD21-11-5609

Sample Collection Date: 03/10/11

Sample Matrix: Silica

Request or PO Number: 11-1611

ARS Sample ID: ARS1-11-00527-002

Date Received: 03/15/11

Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	38195.903	2011.292	223.616	109.916		pCi/L	ARS-054/EPA 906.0	05/05/11 16:36	BS	NA

NOTES: Project Cost Code MR8R032NFM00

Project Manager Review

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QC Results per Analytical Batch

Analytical Batch	ARS1-B11-01640
SDG	ARS1-11-00527
Analysis	Tritium (Aqueous)
Analysis Test Method	ARS-054/Liquid Scintillation Counter
Analysis Code	LSC-A-001
Report Units	pCi/L

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	Recovery (%):	> 80	< 120
Matrix Spike	Recovery (%):	> 75	< 125
Duplicate	Replicate Error Ratio (RER):	< 1	
	Duplicate Error Ratio (DER):	< 3	
	Relative Percent Difference (RPD %):	≤ 25	

Laboratory Control Sample				Analysis Date	05/02/11 19:14	Analysis Technician	BSTEFFENS	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	Expected Value	LCS Rec (%)	MDC	
ARS1-B11-01640-01	LCS	H-3	2460	160	2449	100	220	

Duplicate RER/DER/RPD				Analysis Date	05/02/11 22:23	Analysis Technician	BSTEFFENS	
Analyte	Result LCS	CSU LCS (1s)	Results LCSD	CSU LCSD (1s)	RER	DER	RPD	
H-3	2460	155	2440	155	0.03	0.09	0.8	

Method Blank		Analysis Date	05/03/11 01:31	Analysis Technician	BSTEFFENS	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	MDC	Qual
ARS1-B11-01640-03	MBL	H-3	-110	64	220	U

Susan Leese

Susan Leese

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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Tritium

by

Low Level Liquid Scintillation Counting

Samples



LSC Instrument Data Transfer Report

\\BACKRD3170_NEW1\Results\ARS11-3 Normal 31

Batch Sample ID
ARS1-B11-01640

Non-BKG Samples Transferred
23

Samples Eligible To Save
23

LSC 2

LIMS Batch Sample ID BKG	LSC P#	LSC PID	LSC SF	LSC SMP_LID	LSC Count Date	LSC CPMA	LSC ISTE	LSC EFF	LSC Count Dur	Analysis Batch	LIMS SQC	LIMS Run
ARS1-B11-01640-01	54		1	BACKGROUND	05/02/11 16:07	6.36	422.88	35.9200	180.00	ARS1-B11-01640		
ARS1-B11-01640-02	54		2	B11-01640-01	05/02/11 19:13	16.38	435.49	36.4800	180.00	ARS1-B11-01640		
ARS1-B11-01640-03	54		3	B11-01640-02	05/02/11 22:23	16.31	435.50	36.4800	180.00	ARS1-B11-01640		
ARS1-B11-01640-04	54		4	B11-01640-03	05/03/11 01:31	5.91	437.63	36.5700	180.00	ARS1-B11-01640		
ARS1-B11-01640-05	54		5	B11-01640-04	05/03/11 04:39	80.21	436.54	36.5300	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-06	54		6	B11-01640-05	05/03/11 07:48	40.15	439.73	36.6700	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-07	54		7	B11-01640-06	05/03/11 10:58	41.50	435.59	36.4900	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-08	54		8	B11-01640-07	05/03/11 14:07	96.14	433.67	36.4000	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-09	54		9	B11-01640-08	05/03/11 17:17	28.66	431.65	36.3100	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-10	54		10	B11-01640-09	05/03/11 20:26	23.59	435.20	36.4700	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-11	54		11	B11-01640-10	05/03/11 23:36	6.77	430.55	36.2600	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-12	54		12	B11-01640-11	05/04/11 02:45	7.45	427.76	36.1400	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-13	54		13	B11-01640-12	05/04/11 05:55	6.37	429.04	36.2000	180.00	ARS1-B11-01640	ARS1-11-00491	1
ARS1-B11-01640-14	54		14	B11-01640-13	05/04/11 09:04	6.20	424.17	35.9800	180.00	ARS1-B11-01640	ARS1-11-00622	1
ARS1-B11-01640-15	54		15	B11-01640-14	05/04/11 12:12	6.24	423.99	35.9700	180.00	ARS1-B11-01640	ARS1-11-00622	1
ARS1-B11-01640-16	54		16	B11-01640-15	05/04/11 15:20	6.82	418.05	35.7100	180.00	ARS1-B11-01640	ARS1-11-00622	1
ARS1-B11-01640-17	54		17	B11-01640-16	05/04/11 18:29	6.57	424.88	36.0100	180.00	ARS1-B11-01640	ARS1-11-00622	1
ARS1-B11-01640-18	54		18	B11-01640-17	05/04/11 21:39	6.80	434.82	36.4300	180.00	ARS1-B11-01640	ARS1-11-00526	1
ARS1-B11-01640-19	54		19	B11-01640-18	05/05/11 00:48	6.97	428.92	36.1900	180.00	ARS1-B11-01640	ARS1-11-00526	1
ARS1-B11-01640-20	54		20	B11-01640-19	05/05/11 03:58	7.29	406.85	35.0900	180.00	ARS1-B11-01640	ARS1-11-00526	1
ARS1-B11-01640-21	54		21	B11-01640-20	05/05/11 07:07	8.06	416.46	35.6400	180.00	ARS1-B11-01640	ARS1-11-00526	1
ARS1-B11-01640-22	54		22	B11-01640-21	05/05/11 10:16	7.01	400.48	34.6300	180.00	ARS1-B11-01640	ARS1-11-00527	1
ARS1-B11-01640-23	54		23	B11-01640-22	05/05/11 13:26	137.77	423.60	35.9600	180.00	ARS1-B11-01640	ARS1-11-00527	1
ARS1-B11-01640-24	54		24	B11-01640-23	05/05/11 16:35	158.32	419.18	35.7600	180.00	ARS1-B11-01640	ARS1-11-00527	1

Procedure	ARS-054
Variable	Value
Gross Count Rate	16.380000
Sample Count Minus	180.000000
BKG Count Rate	6.360000
BKG Count Minus	180.000000
Instrument Efficiency	0.364800
Sample Aliquot	5.037000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	5/2/11 7:14 PM
Count Date (t2)	5/2/11 7:14 PM
Activity Units = pCi --> Bq =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
ACT	2456.337093	2456.337093	OK
CU	87.132309	87.132309	OK
TPU	155.186549	155.186549	OK
MDA	218.090111	218.090111	OK
DL	107.199670	107.199670	OK
Net Count Rate	10.020000	10.020000	OK
D t 1 (t2 - t1)	0.000000	0.000000	OK
DF	1.000000	1.000000	OK
Sys Err	0.052280	0.052280	OK
K	0.004079	0.004079	OK
K MDA	0.734264	0.734264	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01640
Batch ID	ARS1-B11-01640-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	71
Instr Detector	P-54-S-2
Instr keV	
Version/Date	1.0 -- 11/18/2005

0 Variables Intact Test

OK

Reviewed by: SKH

Date: 5-6-11

Procedure	ARS-054
Variable	Value
Gross Count Rate	16.310000
Sample Count Mins	180.000000
BKG Count Rate	6.360000
BKG Count Mins	180.000000
Instrument Efficiency	0.364800
Sample Aliquot	5.027000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	5/2/11 10:23 PM
Count Date (t2)	5/2/11 10:23 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Half-life Days - Result Isotope	4499.800000
TPUF Calibration Factor	0.041330
TPUF Aliquoting Factor	0.020000
TPUF Yield Factor	0.000000
TPUF Decay Ingrowth Factor	0.025000
TPUF Analysis Factor	0.000000
TPUF Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L

Isotope	H-3		
Calculated Values	Excel		V/V
ACT	2444.029206	2444.029206	OK
CU	170.855471	170.855471	OK
TPU	303.165756	303.165756	OK
MDA	218.523949	218.523949	OK
DL	107.412918	107.412918	OK
Net Count Rate	9.950000	9.950000	OK
D t 1 (t2 - t1)	0.000000	0.000000	OK
DF	1.000000	1.000000	OK
Sys Err	0.052280	0.052280	OK
K	0.004071	0.004071	OK
K MDA	0.732806	0.732806	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01640
Batch ID	ARS1-B11-01640-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	71
Instr Detector	P-54 S-3
Instr keV	
Version/Date	1.0 -- 11/18/2005

0 Variables Intact Test

OK

Reviewed by: *SDH*

Date: *5-6-11*

15 of 64

Procedure	ARS-054
Variable	Value
Gross Count Rate	5.910000
Sample Count Min	180.000000
BKG Count Rate	6.360000
BKG Count Min	180.000000
Instrument Efficiency	0.365700
Sample Aliquot	5.044000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	5/3/11 1:31 AM
Count Date (t2)	5/3/11 1:31 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Half-life Days - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
ACT	-109.890336	-109.890336	OK
CU	124.965200	124.965200	OK
TPU	125.471490	125.471490	OK
MDA	217.251466	217.251466	OK
DL	106.787444	106.787444	OK
Net Count Rate	-0.450000	-0.450000	OK
D t 1 (t2 - t1)	0.000000	0.000000	OK
DF	1.000000	1.000000	OK
Sys Err	0.052280	0.052280	OK
K	0.004095	0.004095	OK
K MDA	0.737098	0.737098	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01640
Batch ID	ARS1-B11-01640-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	71
Instr Detector	P-54-S-4
Instr keV	
Version/Date	1.0 -- 11/18/2005

0 Variables Intact Test

OK

Reviewed by:

SAH

Date:

5-6-11

Procedure	ARS-054
Variable	Value
Gross Count Rate	137.770000
Sample Count Mins	180.000000
BKG Count Rate	6.360000
BKG Count Mins	180.000000
Instrument Efficiency	0.359600
Sample Aliquot	5.076000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	3/10/11 12:00 PM
Count Date (t2)	5/5/11 1:26 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days - Result Isotope	4499.800000
TPUF Calibration Factor	0.041330
TPUF Aliquoting Factor	0.020000
TPUF Yield Factor	0.000000
TPUF Decay Ingrowth Factor	0.025000
TPUF Analysis Factor	0.000000
TPUF Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L

Isotope	H-3		
Calculated Values	Excel	V/A	V/V
ACT	32710.294728	32710.294711	OK
CU	222.739368	222.739368	OK
TPU	1724.529925	1724.529924	OK
MDA	211.448805	211.448804	OK
DL	108.850204	108.850204	OK
Net Count Rate	131.410000	131.410000	OK
D t 1 (t2 - t1)	56.059722	56.059722	OK
DF	0.991402	0.991402	OK
Sys Err	0.052280	0.052280	OK
K	0.004017	0.004017	OK
K MDA	0.723130	0.723130	OK
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01640		
Batch ID	ARS1-B11-01640-22		
Analysis Code	LSC-A-001		
SDG	ARS1-11-00527		
Fraction	001		
Run Number	1		
Client	Los Alamos National Laboratory		
Client Profile	Keith Greene		
Client ID	ND21-11-5604		
Instr File Name	71		
Instr Detector	P-54-S-23		
Instr keV			
Version/Date	1.0 -- 11/18/2005		

0 Variables Intact Test OK

Procedure	ARS-054
Variable	Value
Gross Count Rate	158.320000
Sample Count Mins	180.000000
BKG Count Rate	6.360000
BKG Count Mins	180.000000
Instrument Efficiency	0.357600
Sample Aliquot	5.055000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	3/10/11 12:00 PM
Count Date (t2)	5/5/11 4:36 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days 1 - Result Isotope	4499.800000
TPUF Calibration Factor	0.041330
TPUF Aliquoting Factor	0.020000
TPUF Yield Factor	0.000000
TPUF Decay Ingrowth Factor	0.025000
TPUF Analysis Factor	0.000000
TPUF Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L

Isotope	Excel	VBA	V/V
Calculated Values			
ACT	38195.902859	38195.902838	OK
CD	240.420597	240.420597	OK
TPU	2011.292111	2011.292110	OK
MDA	223.616180	223.616180	OK
DL	109.915946	109.915946	OK
Net Count Rate	151.960000	151.960000	OK
D t 1 (t2 - t1)	56.191667	56.191667	OK
DF	0.991382	0.991382	OK
Sys Err	0.052280	0.052280	OK
K	0.003978	0.003978	OK
K MDA	0.716119	0.716119	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01640
Batch ID	ARS1-B11-01640-23
Analysis Code	LSC-A-001
SDG	ARS1-11-00527
Fraction	002
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-11-5609
Instr File Name	71
Instr Detector	P-54-S-24

Instr keV	
Version/Date	1.0 -- 11/18/2005

0 Variables Intact Test OK



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Tritium

by

**Low Level Liquid
Scintillation Counting**

**Laboratory
Records**

Analysis Batch Report



Analysis Batch ID ARS1-B11-01640

Method ARS-054
Description Tritium (Aqueous)

Analysis LSC-A-001

Matrix SI

Batch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-B11-01640-01	LCS	B-11644			ARS1-11-00491	001	1	MD21-11-5600	STD	04/05/11
ARS1-B11-01640-02	LCS	B-11644			ARS1-11-00491	002	1	MD21-11-5601	STD	04/05/11
ARS1-B11-01640-03	MBL	B-11645			ARS1-11-00491	003	1	MD21-11-5602	STD	04/05/11
ARS1-B11-01640-04	TRG				ARS1-11-00491	004	1	MD21-11-5603	STD	04/05/11
ARS1-B11-01640-05	TRG				ARS1-11-00491	005	1	MD21-11-5605	STD	04/05/11
ARS1-B11-01640-06	TRG				ARS1-11-00491	006	1	MD21-11-5606	STD	04/05/11
ARS1-B11-01640-07	TRG				ARS1-11-00491	007	1	MD21-11-5607	STD	04/05/11
ARS1-B11-01640-08	TRG				ARS1-11-00491	008	1	MD21-11-5608	STD	04/05/11
ARS1-B11-01640-09	TRG				ARS1-11-00491	009	1	MD21-11-5610	STD	04/05/11
ARS1-B11-01640-10	TRG				ARS1-11-00622	001	1	MD50-11-5957	STD	04/08/11
ARS1-B11-01640-11	TRG				ARS1-11-00622	002	1	MD50-11-5958	STD	04/08/11
ARS1-B11-01640-12	TRG				ARS1-11-00622	003	1	MD50-11-5959	STD	04/08/11
ARS1-B11-01640-13	TRG				ARS1-11-00622	004	1	MD50-11-5960	STD	04/08/11
ARS1-B11-01640-14	TRG				ARS1-11-00622	005	1	MD50-11-5961	STD	04/08/11
ARS1-B11-01640-15	TRG				ARS1-11-00622	006	1	MD50-11-5962	STD	04/08/11
ARS1-B11-01640-16	TRG				ARS1-11-00526	001	1	MD54-11-3767	STD	04/11/11
ARS1-B11-01640-17	TRG				ARS1-11-00526	002	1	MD54-11-3766	STD	04/11/11
ARS1-B11-01640-18	TRG				ARS1-11-00526	003	1	MD54-11-3768	STD	04/11/11
ARS1-B11-01640-19	TRG				ARS1-11-00527	001	1	MD21-11-5604	STD	04/11/11
ARS1-B11-01640-20	TRG				ARS1-11-00527	002	1	MD21-11-5609	STD	04/11/11
ARS1-B11-01640-21	TRG				ARS1-11-00527	002	1			
ARS1-B11-01640-22	TRG									
ARS1-B11-01640-23	TRG									

85817	85818	85819	85820	85821	85822	85823	85824	85825
11-00491-001-1	11-00491-002-1	11-00491-003-1	11-00491-004-1	11-00491-005-1	11-00491-006-1	11-00491-007-1	11-00491-008-1	11-00491-009-1
WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD

85826	85827	85828	85829	85830	85831	85832	85833	85834
11-00622-001-1	11-00622-002-1	11-00622-003-1	11-00622-004-1	11-00622-005-1	11-00622-006-1	11-00622-001-1	11-00526-002-1	11-00526-003-1
WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD	WRAD

85835	85836
11-00527-001-1	11-00527-002-1
WRAD	WRAD

LCS Report
Analytical Batch: ARS1-B11-01640

BinID	ASBch	ASBchSampleID	BinGroup	SUID	Isotope	Expectation	ExpectedValue	EmptyWT	GrossWT	NetWT	UsedID	ModDate	ExpectedValue_CT	MidpointCountRate	KnownValue
B-11644	ARS1-B11-01640	ARS1-B11-01640-01	B-H3	S-0247	H-3	5	2.454533971	0	1	1	BSTEFFENS	4/18/2011	2.449246341	5/2/2011	2.449246341
B-11645	ARS1-B11-01640	ARS1-B11-01640-02	B-H3	S-0247	H-3	5	2.454533971	0	1	1	BSTEFFENS	4/18/2011	2.449246341	5/2/2011	2.449246341

ARS-054

ID_31001_054	ABatch	ABatchSampleID	ClientID	Aliquott1	AliquotUnits1	IC_ID1	Aliquot2	AliquotUnits2	IC_ID2	UserID	ModDate
8443	ARSI-B11-01640	ARSI-B11-01640-01					5.037 g			BSTEFFENS	05/03/2011 10:19:34
8444	ARSI-B11-01640	ARSI-B11-01640-02					5.027 g			BSTEFFENS	05/03/2011 10:19:34
8445	ARSI-B11-01640	ARSI-B11-01640-03					5.044 g			BSTEFFENS	05/03/2011 10:19:34
8446	ARSI-B11-01640	ARSI-B11-01640-04					5.015 g			BSTEFFENS	05/03/2011 10:19:34
8447	ARSI-B11-01640	ARSI-B11-01640-05					5.03 g			BSTEFFENS	05/03/2011 10:19:34
8448	ARSI-B11-01640	ARSI-B11-01640-06					5.037 g			BSTEFFENS	05/03/2011 10:19:34
8449	ARSI-B11-01640	ARSI-B11-01640-07					5.04 g			BSTEFFENS	05/03/2011 10:19:34
8450	ARSI-B11-01640	ARSI-B11-01640-08					5.05 g			BSTEFFENS	05/03/2011 10:19:34
8451	ARSI-B11-01640	ARSI-B11-01640-09					5.06 g			BSTEFFENS	05/03/2011 10:19:35
8452	ARSI-B11-01640	ARSI-B11-01640-10					5.081 g			BSTEFFENS	05/03/2011 10:19:35
8453	ARSI-B11-01640	ARSI-B11-01640-11					5.094 g			BSTEFFENS	05/03/2011 10:19:35
8454	ARSI-B11-01640	ARSI-B11-01640-12					5.063 g			BSTEFFENS	05/03/2011 10:19:35
8455	ARSI-B11-01640	ARSI-B11-01640-13					5.03 g			BSTEFFENS	05/03/2011 10:19:35
8456	ARSI-B11-01640	ARSI-B11-01640-14					5.075 g			BSTEFFENS	05/03/2011 10:19:35
8457	ARSI-B11-01640	ARSI-B11-01640-15					5.054 g			BSTEFFENS	05/03/2011 10:19:35
8458	ARSI-B11-01640	ARSI-B11-01640-16					5.051 g			BSTEFFENS	05/03/2011 10:19:35
8459	ARSI-B11-01640	ARSI-B11-01640-17					5.069 g			BSTEFFENS	05/03/2011 10:19:35
8460	ARSI-B11-01640	ARSI-B11-01640-18					5.05 g			BSTEFFENS	05/03/2011 10:19:35
8461	ARSI-B11-01640	ARSI-B11-01640-19					5.033 g			BSTEFFENS	05/03/2011 10:19:35
8462	ARSI-B11-01640	ARSI-B11-01640-20					5.028 g			BSTEFFENS	05/03/2011 10:19:35
8463	ARSI-B11-01640	ARSI-B11-01640-21					5.007 g			BSTEFFENS	05/03/2011 10:19:35
8464	ARSI-B11-01640	ARSI-B11-01640-22					5.076 g			BSTEFFENS	05/03/2011 10:19:36
8465	ARSI-B11-01640	ARSI-B11-01640-23					5.055 g			BSTEFFENS	05/03/2011 10:19:36

Batch Result Verification Report

BatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU15	TPU25	MDA	DL	CU	CUS	CUS	ActivityReportUnits
ARS1-B11-01640-01				1-H-3		2456.337093	153.1865492	155.1865492	304.1656363	218.0901114	107.1996705	87.13230894	87.13230894	170.7793255	PC
ARS1-B11-01640-02				1-H-3		2444.029206	303.1657561	154.6764062	303.1657561	218.5239489	107.4129183	170.8554708	87.17115858	170.8554708	PC
ARS1-B11-01640-03				1-H-3		109.890336	125.47149	64.01606635	125.47149	217.2514664	106.7874443	124.9651997	63.75775494	124.9651997	PC
ARS1-B11-01640-04				1-H-3		8321.93042	452.7218584	452.7218584	887.3348424	219.1046617	108.4322707	171.962125	71.962125	337.0457651	PC
ARS1-B11-01640-05				1-H-3		8685.193665	471.6064159	471.6064159	924.3485752	219.8839242	107.698361	125.1909127	125.1909127	245.3741889	PC
ARS1-B11-01640-06				1-H-3		22232.07874	1177.212322	1177.212322	2307.336151	220.3008638	108.0813984	127.4464798	127.4464798	249.7951004	PC
ARS1-B11-01640-07				1-H-3		5524.950703	308.8245062	308.8245062	605.2960322	220.4140495	108.2863403	186.8642194	186.8642194	366.25387	PC
ARS1-B11-01640-08				1-H-3		4340.262838	248.407397	248.407397	486.878498	219.0178177	107.6556738	101.089678	101.089678	198.1357689	PC
ARS1-B11-01640-09				1-H-3		101.1033721	66.809977	66.809977	130.9475549	219.380243	107.8338198	66.60056208	66.60056208	130.5371017	PC
ARS1-B11-01640-10				1-H-3		268.9967099	69.78830671	69.78830671	136.7850812	219.5513943	107.9179472	68.35669504	68.35669504	133.9791222	PC
ARS1-B11-01640-11				1-H-3		MD21-11-5608	MD21-11-5610	MD21-11-5610	MD21-11-5610	MD21-11-5610	MD21-11-5610	MD21-11-5610	MD21-11-5610	MD21-11-5610	PC
ARS1-B11-01640-12				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-13				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-14				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-15				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-16				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-17				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-18				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-19				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-20				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-21				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-22				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC
ARS1-B11-01640-23				1-H-3		MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	MD21-11-5957	PC

Batch Result Verification Report

BatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	Aliq	SampleCollDate	MidPointCountDate	BP DL
ARSI-B11-01640-01		L				0.091	180	0.035333333	180	0.3648	5.037	5/6/2011	5/2/2011	24 of 64
ARSI-B11-01640-02		L				0.090611111	180	0.035333333	180	0.3648	5.027	5/6/2011	5/2/2011	
ARSI-B11-01640-03		L				0.032833333	180	0.035333333	180	0.3657	5.044	5/6/2011	5/3/2011	
ARSI-B11-01640-04	ARSI-11-00491	001				0.445611111	180	0.035333333	180	0.3653	5.015	3/9/2011	5/3/2011	
ARSI-B11-01640-05	ARSI-11-00491	002				0.223055556	180	0.035333333	180	0.3667	5.03	3/9/2011	5/3/2011	
ARSI-B11-01640-06	ARSI-11-00491	003				0.230555556	180	0.035333333	180	0.3649	5.037	3/9/2011	5/3/2011	
ARSI-B11-01640-07	ARSI-11-00491	004				0.534111111	180	0.035333333	180	0.364	5.04	3/9/2011	5/3/2011	
ARSI-B11-01640-08	ARSI-11-00491	005				0.159222222	180	0.035333333	180	0.3631	5.05	3/9/2011	5/3/2011	
ARSI-B11-01640-09	ARSI-11-00491	006				0.133277778	180	0.035333333	180	0.3626	5.06	3/9/2011	5/3/2011	
ARSI-B11-01640-10	ARSI-11-00491	007				0.037611111	180	0.035333333	180	0.3614	5.094	3/9/2011	5/3/2011	
ARSI-B11-01640-11	ARSI-11-00491	008				0.041388889	180	0.035333333	180	0.362	5.063	3/9/2011	5/4/2011	
ARSI-B11-01640-12	ARSI-11-00491	009				0.035388889	180	0.035333333	180	0.3596	5.07	3/22/2011	5/4/2011	
ARSI-B11-01640-13	ARSI-11-00622	001				0.034444444	180	0.035333333	180	0.3597	5.075	3/22/2011	5/4/2011	
ARSI-B11-01640-14	ARSI-11-00622	002				0.034666667	180	0.035333333	180	0.3571	5.054	3/22/2011	5/4/2011	
ARSI-B11-01640-15	ARSI-11-00622	003				0.037888889	180	0.035333333	180	0.3601	5.051	3/22/2011	5/4/2011	
ARSI-B11-01640-16	ARSI-11-00622	004				0.0365	180	0.035333333	180	0.3643	5.069	3/22/2011	5/5/2011	
ARSI-B11-01640-17	ARSI-11-00622	005				0.037777778	180	0.035333333	180	0.3619	5.05	3/22/2011	5/5/2011	
ARSI-B11-01640-18	ARSI-11-00526	001				0.036722222	180	0.035333333	180	0.3509	5.033	3/10/2011	5/5/2011	
ARSI-B11-01640-19	ARSI-11-00526	002				0.040444444	180	0.035333333	180	0.3564	5.026	3/10/2011	5/5/2011	
ARSI-B11-01640-20	ARSI-11-00526	003				0.044777778	180	0.035333333	180	0.3463	5.007	3/10/2011	5/5/2011	
ARSI-B11-01640-21	ARSI-11-00527	001				0.038944444	180	0.035333333	180	0.3596	5.076	3/10/2011	5/5/2011	
ARSI-B11-01640-22	ARSI-11-00527	002				0.765388889	180	0.035333333	180	0.3576	5.055	3/10/2011	5/5/2011	
ARSI-B11-01640-23	ARSI-11-00527	002				0.879555556	180	0.035333333	180					

Batch Result Verification Report

BatchSampleID	SDG	Fraction	BP	MDA	Sb	Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFile	DetectorID	InstrumentKey	NuclideAbd	TraceMeasACT
ARSI-B11-01640-01							2.22	1	16.38	6.36	10.02		71	P-54-S-2			
ARSI-B11-01640-02							2.22	1.96	16.31	6.36	9.95		71	P-54-S-3			
ARSI-B11-01640-03							2.22	1.96	5.91	6.36	-0.45		71	P-54-S-4			
ARSI-B11-01640-04	ARSI-11-00491	001					2.22	1	80.21	6.36	73.85		71	P-54-S-5			
ARSI-B11-01640-05	ARSI-11-00491	002					2.22	1	40.15	6.36	33.79		71	P-54-S-6			
ARSI-B11-01640-06	ARSI-11-00491	003					2.22	1	41.5	6.36	35.14		71	P-54-S-7			
ARSI-B11-01640-07	ARSI-11-00491	004					2.22	1	96.14	6.36	89.78		71	P-54-S-8			
ARSI-B11-01640-08	ARSI-11-00491	005					2.22	1	28.66	6.36	22.3		71	P-54-S-9			
ARSI-B11-01640-09	ARSI-11-00491	006					2.22	1	23.99	6.36	17.63		71	P-54-S-10			
ARSI-B11-01640-10	ARSI-11-00491	007					2.22	1	6.77	6.36	0.41		71	P-54-S-11			
ARSI-B11-01640-11	ARSI-11-00491	008					2.22	1	7.45	6.36	1.09		71	P-54-S-12			
ARSI-B11-01640-12	ARSI-11-00491	009					2.22	1	6.37	6.36	0.01		71	P-54-S-13			
ARSI-B11-01640-13	ARSI-11-00622	001					2.22	1	6.2	6.36	-0.16		71	P-54-S-14			
ARSI-B11-01640-14	ARSI-11-00622	002					2.22	1	6.24	6.36	-0.12		71	P-54-S-15			
ARSI-B11-01640-15	ARSI-11-00622	003					2.22	1	6.82	6.36	0.46		71	P-54-S-16			
ARSI-B11-01640-16	ARSI-11-00622	004					2.22	1	6.57	6.36	0.21		71	P-54-S-17			
ARSI-B11-01640-17	ARSI-11-00622	005					2.22	1	6.8	6.36	0.44		71	P-54-S-18			
ARSI-B11-01640-18	ARSI-11-00526	006					2.22	1	6.97	6.36	0.61		71	P-54-S-19			
ARSI-B11-01640-19	ARSI-11-00526	001					2.22	1	7.28	6.36	0.92		71	P-54-S-20			
ARSI-B11-01640-20	ARSI-11-00526	002					2.22	1	8.06	6.36	1.7		71	P-54-S-21			
ARSI-B11-01640-21	ARSI-11-00526	003					2.22	1	7.01	6.36	0.65		71	P-54-S-22			
ARSI-B11-01640-22	ARSI-11-00527	001					2.22	1	137.77	6.36	131.41		71	P-54-S-23			
ARSI-B11-01640-23	ARSI-11-00527	002					2.22	1	156.32	6.36	151.96		71	P-54-S-24			

Batch Result Verification Report

AbatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	HalfLife1	HalfLife2	HalfLife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	Delta1	Delta2
ARS1-B11-01640-01								4499.8			0.04133	0.02	0	0.025	0	0	0	0
ARS1-B11-01640-02								4499.8			0.04133	0.02	0	0.025	0	0	0	0
ARS1-B11-01640-03								4499.8			0.04133	0.02	0	0.025	0	0	0	0
ARS1-B11-01640-04								4499.8			0.04133	0.02	0	0.025	0	0	54.69375	0
ARS1-B11-01640-05								4499.8			0.04133	0.02	0	0.025	0	0	54.82569444	0
ARS1-B11-01640-06								4499.8			0.04133	0.02	0	0.025	0	0	54.95694444	0
ARS1-B11-01640-07								4499.8			0.04133	0.02	0	0.025	0	0	55.08888889	0
ARS1-B11-01640-08								4499.8			0.04133	0.02	0	0.025	0	0	55.22013889	0
ARS1-B11-01640-09								4499.8			0.04133	0.02	0	0.025	0	0	55.35208333	0
ARS1-B11-01640-10								4499.8			0.04133	0.02	0	0.025	0	0	55.48333333	0
ARS1-B11-01640-11								4499.8			0.04133	0.02	0	0.025	0	0	55.61458333	0
ARS1-B11-01640-12								4499.8			0.04133	0.02	0	0.025	0	0	55.74652778	0
ARS1-B11-01640-13								4499.8			0.04133	0.02	0	0.025	0	0	42.87777778	0
ARS1-B11-01640-14								4499.8			0.04133	0.02	0	0.025	0	0	43.00902778	0
ARS1-B11-01640-15								4499.8			0.04133	0.02	0	0.025	0	0	43.13888889	0
ARS1-B11-01640-16								4499.8			0.04133	0.02	0	0.025	0	0	43.27083333	0
ARS1-B11-01640-17								4499.8			0.04133	0.02	0	0.025	0	0	43.40208333	0
ARS1-B11-01640-18								4499.8			0.04133	0.02	0	0.025	0	0	43.53402778	0
ARS1-B11-01640-19								4499.8			0.04133	0.02	0	0.025	0	0	55.66527778	0
ARS1-B11-01640-20								4499.8			0.04133	0.02	0	0.025	0	0	55.79652778	0
ARS1-B11-01640-21								4499.8			0.04133	0.02	0	0.025	0	0	55.92847222	0
ARS1-B11-01640-22								4499.8			0.04133	0.02	0	0.025	0	0	56.05922222	0
ARS1-B11-01640-23								4499.8			0.04133	0.02	0	0.025	0	0	56.19166667	0

Batch Result Verification Report

AbatchSampleID	SOG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01640-01							1					0.052279718	0.004079245	0.734264041		BSTEFFENS	5/6/2011
ARS1-B11-01640-02							1					0.052279718	0.004071146	0.7328063		BSTEFFENS	5/6/2011
ARS1-B11-01640-03												0.052279718	0.004094992	0.737098484		BSTEFFENS	5/6/2011
ARS1-B11-01640-04	ARS1-11-00491	001										0.591610391			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-05	ARS1-11-00491	002										0.591590237			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-06	ARS1-11-00491	003										0.591570169			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-07	ARS1-11-00491	004										0.591550036			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-08	ARS1-11-00491	005										0.591529989			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-09	ARS1-11-00491	006										0.591509837			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-10	ARS1-11-00491	007										0.591489791			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-11	ARS1-11-00491	008										0.591469746			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-12	ARS1-11-00491	009										0.591449595			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-13	ARS1-11-00622	001										0.593416891			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-14	ARS1-11-00622	002										0.593396807			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-15	ARS1-11-00622	003										0.593376935			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-16	ARS1-11-00622	004										0.593356745			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-17	ARS1-11-00622	005										0.593336662			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-18	ARS1-11-00622	006										0.593316473			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-19	ARS1-11-00526	001										0.591462004			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-20	ARS1-11-00526	002										0.591441559			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-21	ARS1-11-00526	003										0.591421808			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-22	ARS1-11-00527	001										0.591401764			LSC-A-001	BSTEFFENS	5/6/2011
ARS1-B11-01640-23	ARS1-11-00527	002										0.591381614			LSC-A-001	BSTEFFENS	5/6/2011

Assay Definition-

Assay Description:
 H3 Normal Lvl

Assay Type: DPM (Single)

Report Name: Report1
 Output Data Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20110502_1602
 Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20110502_1602\20110502_1602.results
 RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20110502_1602\H3 Results.rtf
 Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20110502_1602\H3 Results.csv
 Assay File Name: C:\Packard\Tricarb\Assays\H-3 Normal 3.1sa

Count Conditions-

Nuclide: H-3 Normal

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: UG STD H-3

Count Time (min): 180.00

Count Mode: Normal

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Luminescence Correction: Off

Colored Samples: Off

Heterogeneity Monitor: Off

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off
 Regions Half Life

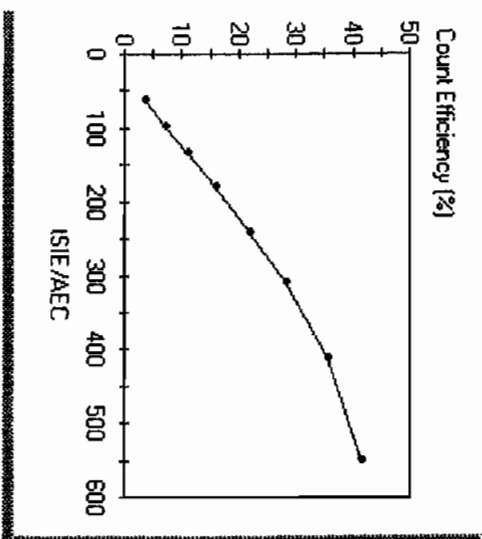
Units Reference Date Reference Time

A
 B
 C

29 of 64

Cycle 1 Results
 Quench Curve Block Data

UG STD H-3 in A



Date Acquired: 06/30/2010
 Date Modified:
 UG STD H-3 in A

tSIE/AEC	Count Efficiency (%)
551.03	41.58
411.38	35.42
310.08	28.09
241.32	21.90
178.11	15.75
132.72	11.03
96.52	6.92
63.58	3.36

S#	SMPL_ID	CPMA	DPML	tSIE	Eff Nucl	In A	Count	Time	DATE	TIME	MESSAGE\$
1	BACKGROUN	6.36	17.71	422.88		35.92	180.00	5/2/2011	4:07:03	PM	
2	B11-01640-01	16.38	44.91	435.49		36.48	180.00	5/2/2011	7:13:59	PM	
3	B11-01640-02	16.31	44.72	435.50		36.48	180.00	5/2/2011	10:23:14	PM	
4	B11-01640-03	5.91	16.16	437.63		36.57	180.00	5/3/2011	1:31:18	AM	
5	B11-01640-04	80.21	219.60	436.54		36.53	180.00	5/3/2011	4:39:00	AM	
6	B11-01640-05	40.15	109.48	439.73		36.67	180.00	5/3/2011	7:48:32	AM	
7	B11-01640-06	41.50	113.75	435.59		36.49	180.00	5/3/2011	10:58:02	AM	
8	B11-01640-07	96.14	264.11	433.67		36.40	180.00	5/3/2011	2:07:33	PM	
9	B11-01640-08	28.66	78.93	431.65		36.31	180.00	5/3/2011	5:17:04	PM	
10	B11-01640-09	23.99	65.80	435.20		36.47	180.00	5/3/2011	8:26:32	PM	
11	B11-01640-10	6.77	18.67	430.55		36.26	180.00	5/3/2011	11:36:00	PM	
12	B11-01640-11	7.45	20.62	427.76		36.14	180.00	5/4/2011	2:45:27	AM	
13	B11-01640-12	6.37	17.59	429.04		36.20	180.00	5/4/2011	5:55:02	AM	
14	B11-01640-13	6.20	17.23	424.17		35.98	180.00	5/4/2011	9:04:28	AM	
15	B11-01640-14	6.24	17.34	423.99		35.97	180.00	5/4/2011	12:12:40	PM	
16	B11-01640-15	6.82	19.09	418.05		35.71	180.00	5/4/2011	3:20:13	PM	
17	B11-01640-16	6.57	18.25	424.88		36.01	180.00	5/4/2011	6:29:40	PM	
18	B11-01640-17	6.80	18.68	434.42		36.43	180.00	5/4/2011	9:39:08	PM	
19	B11-01640-18	6.97	19.27	428.92		36.19	180.00	5/5/2011	12:48:36	AM	
20	B11-01640-19	7.28	20.74	406.85		35.09	180.00	5/5/2011	3:58:02	AM	
21	B11-01640-20	8.06	22.61	416.46		35.64	180.00	5/5/2011	7:07:29	AM	
22	B11-01640-21	7.01	20.25	400.48		34.63	180.00	5/5/2011	10:16:58	AM	
23	B11-01640-22	137.77	383.16	423.60		35.96	180.00	5/5/2011	1:26:27	PM	
24	B11-01640-23	158.32	442.71	419.18		35.76	180.00	5/5/2011	4:35:56	PM	

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
4-21-11	1623	B11-01513-03	B11-01513	2132	
↓	↓	B11-01513-04	↓	↓	
↓	↓	B11-01513-05	↓	↓	
↓	↓	B11-01513-06	↓	↓	
↓	↓	B11-01513-07	↓	↓	
↓	↓	B11-01513-08	↓	↓	
↓	↓	B11-01513-09	↓	↓	
↓	↓	B11-01513-10	↓	↓	
↓	↓	B11-01513-11	↓	↓	
↓	↓	B11-01513-12	↓	↓	
↓	↓	B11-01513-13	↓	↓	
↓	↓	B11-01513-14	↓	↓	
↓	↓	B11-01513-15	↓	↓	
↓	↓	B11-01513-16	↓	↓	
↓	↓	B11-01513-17	↓	↓	
↓	↓	B11-01513-18	↓	↓	
↓	↓	B11-01513-19	↓	↓	
↓	↓	B11-01513-20	↓	↓	
5-2-11	1421	SNC 117	QA	QA	
↓	1506	Background	B11-01646	1602	

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
5-2-11	1504	B11-01640-01	B11-01640	1602	<i>[Handwritten signature/initials running vertically down the right side of the table]</i>
↓	↓	B11-01640-02	↓	↓	
↓	↓	B11-01640-03	↓	↓	
↓	↓	B11-01640-04	↓	↓	
↓	↓	B11-01640-05	↓	↓	
↓	↓	B11-01640-06	↓	↓	
↓	↓	B11-01640-07	↓	↓	
↓	↓	B11-01640-08	↓	↓	
↓	↓	B11-01640-09	↓	↓	
↓	↓	B11-01640-10	↓	↓	
↓	↓	B11-01640-11	↓	↓	
↓	↓	B11-01640-12	↓	↓	
↓	↓	B11-01640-13	↓	↓	
↓	↓	B11-01640-14	↓	↓	
↓	↓	B11-01640-15	↓	↓	
↓	↓	B11-01640-16	↓	↓	
↓	↓	B11-01640-17	↓	↓	
↓	↓	B11-01640-18	↓	↓	
↓	↓	B11-01640-19	↓	↓	
↓	↓	B11-01640-20	↓	↓	

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
5-2-11	1500	B11-01640-21	B11-01640	1602	<i>[Signature]</i>
↓	L	B11-01640-22	↓	L	<i>[Signature]</i>
↓	L	B11-01640-23	↓	L	<i>[Signature]</i>
5-4-11	1632	Background	B11-01659	1941	<i>[Signature]</i>
↓	L	B11-01659-01	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-02	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-03	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-04	↓	L	<i>[Signature]</i>
↓	L	B11-01659-05	↓	L	<i>[Signature]</i>
↓	L	B11-01659-06	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-07	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-08	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-09	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-10	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-11	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-12	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-13	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-14	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-15	↓	L	<i>[Signature]</i>
↓	↓	B11-01659-16	↓	L	<i>[Signature]</i>



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Tritium

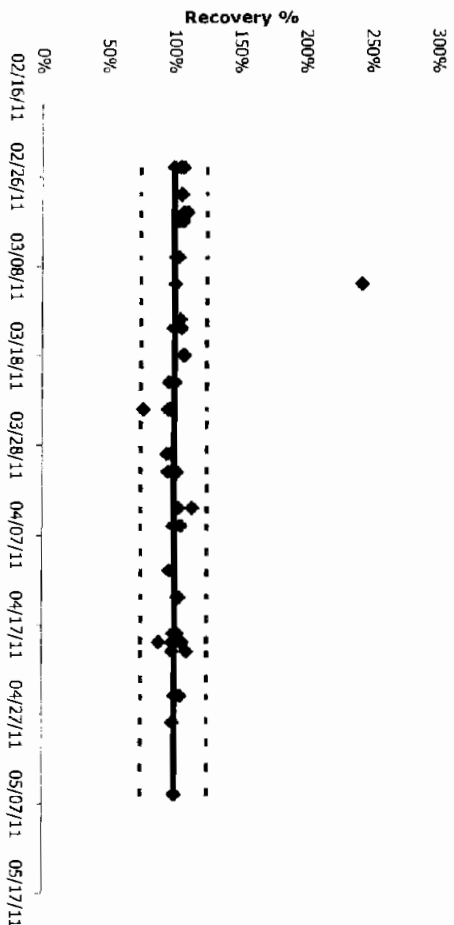
by

**Low Level Liquid
Scintillation Counting**

Control Charts

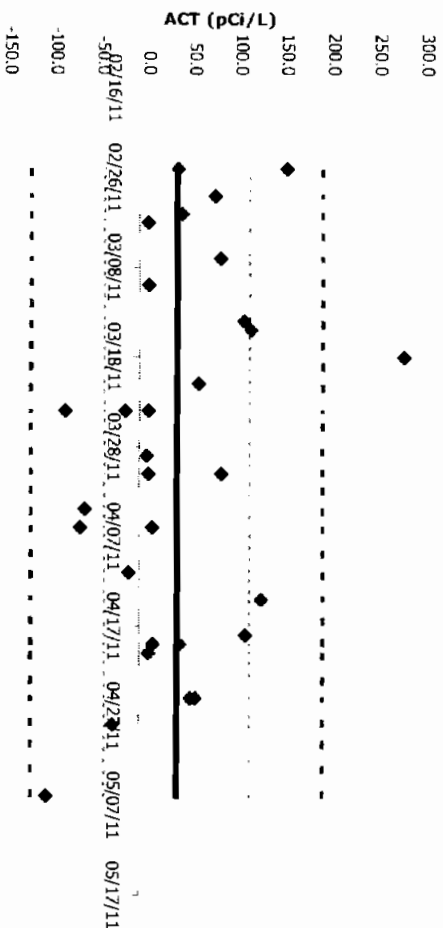
QC Chart

H-3 LCS



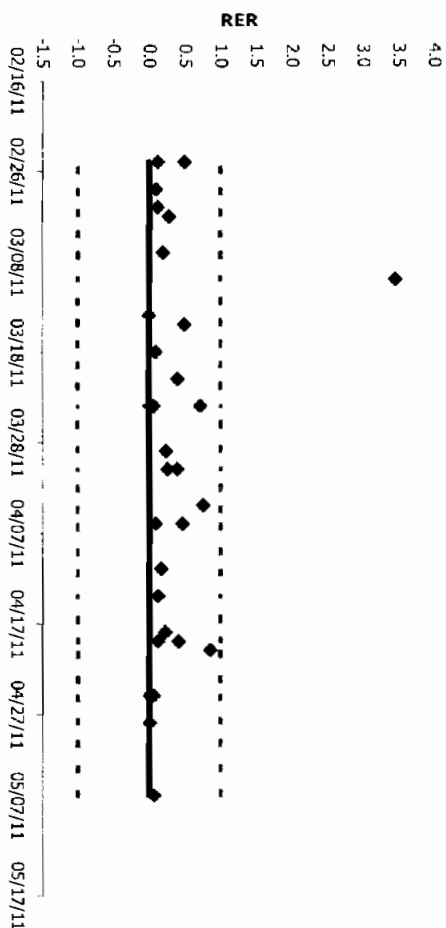
Average	STDEV	n	UCL	LCL
1.0367	0.1907	30	1.2500	0.7500

H-3 Blank



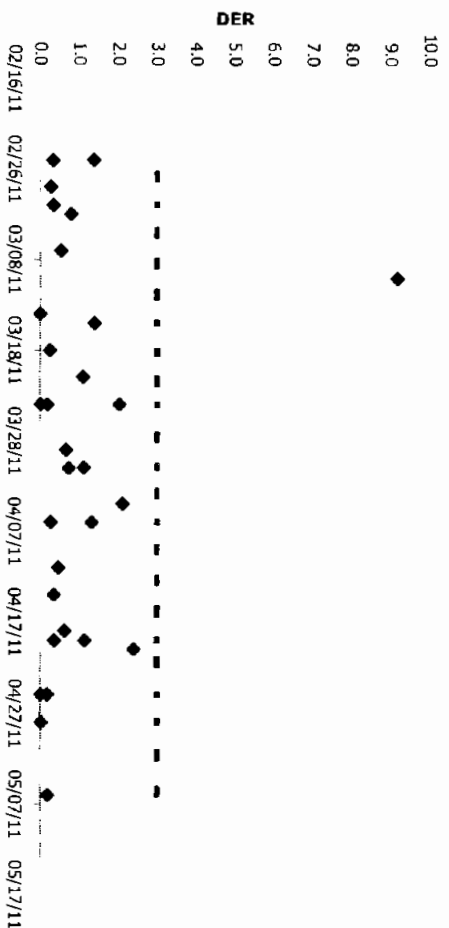
Average	STDEV	n	UCL	LCL
30.9399	78.9231	30	188.7861	-126.9063

H-3 RER



n	UCL	LCL
30	1.0000	-1.0000

H-3 DER



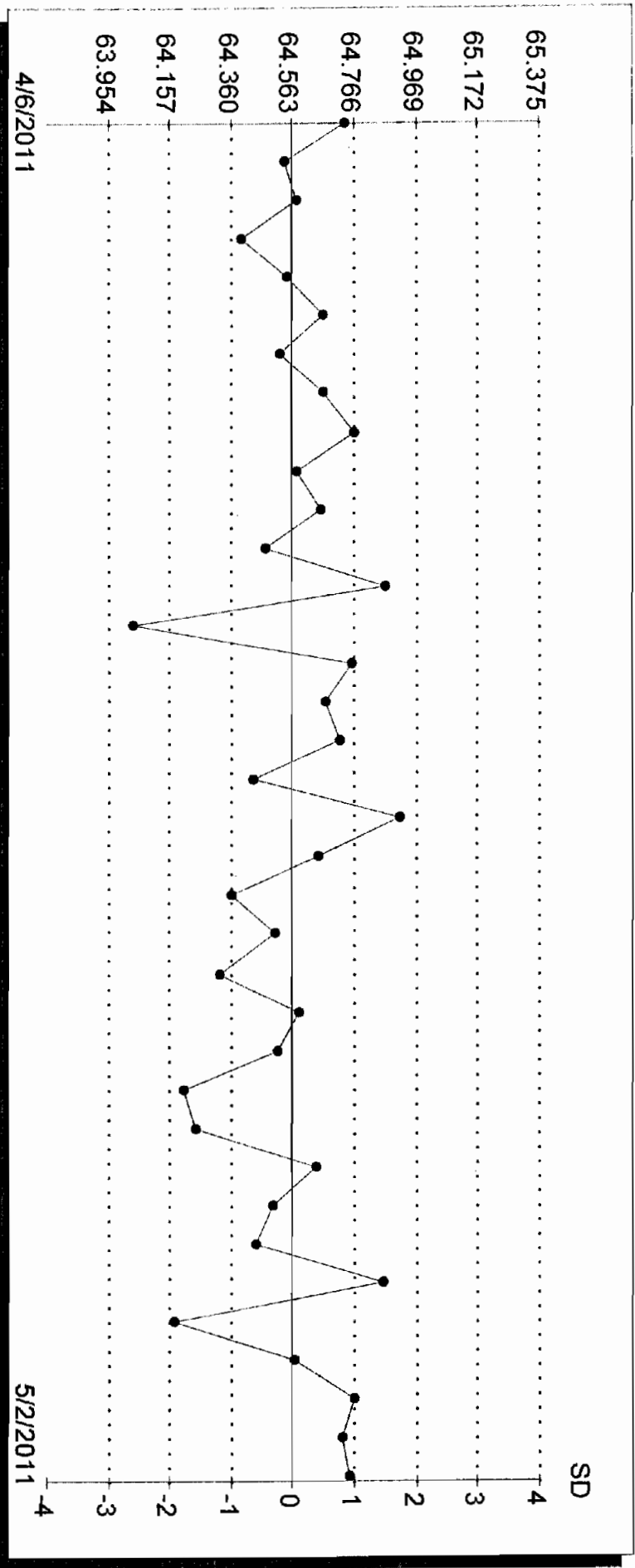
n	UCL
30	3.0000

3H Efficiency

Total # pts : 1605
Valid # pts : 36
Mean : 64.56
SD : 0.20

Date	Value	Valid Pt
Apr 06, 2011	64.74	X
Apr 10, 2011	64.54	X
Apr 16, 2011	64.58	X
Apr 19, 2011	64.39	X
Apr 25, 2011	64.54	X
Apr 30, 2011	64.67	X
Apr 30, 2011	64.52	X
Apr 30, 2011	64.66	X
Apr 30, 2011	64.76	X
Apr 30, 2011	64.58	X
Apr 30, 2011	64.66	X
Apr 30, 2011	64.47	X
Apr 30, 2011	64.87	X
Apr 30, 2011	64.03	X
Apr 30, 2011	64.76	X
May 01, 2011	64.67	X
May 01, 2011	64.72	X
May 01, 2011	64.44	X
May 01, 2011	64.92	X
May 01, 2011	64.65	X
May 01, 2011	64.36	X
May 01, 2011	64.50	X
May 01, 2011	64.32	X
May 01, 2011	64.58	X
May 01, 2011	64.51	X
May 01, 2011	64.20	X
May 01, 2011	64.24	X
May 01, 2011	64.64	X
May 01, 2011	64.50	X
May 02, 2011	64.44	X
May 02, 2011	64.86	X
May 02, 2011	64.17	X
May 02, 2011	64.57	X
May 02, 2011	64.76	X
May 02, 2011	64.73	X
May 02, 2011	64.75	X

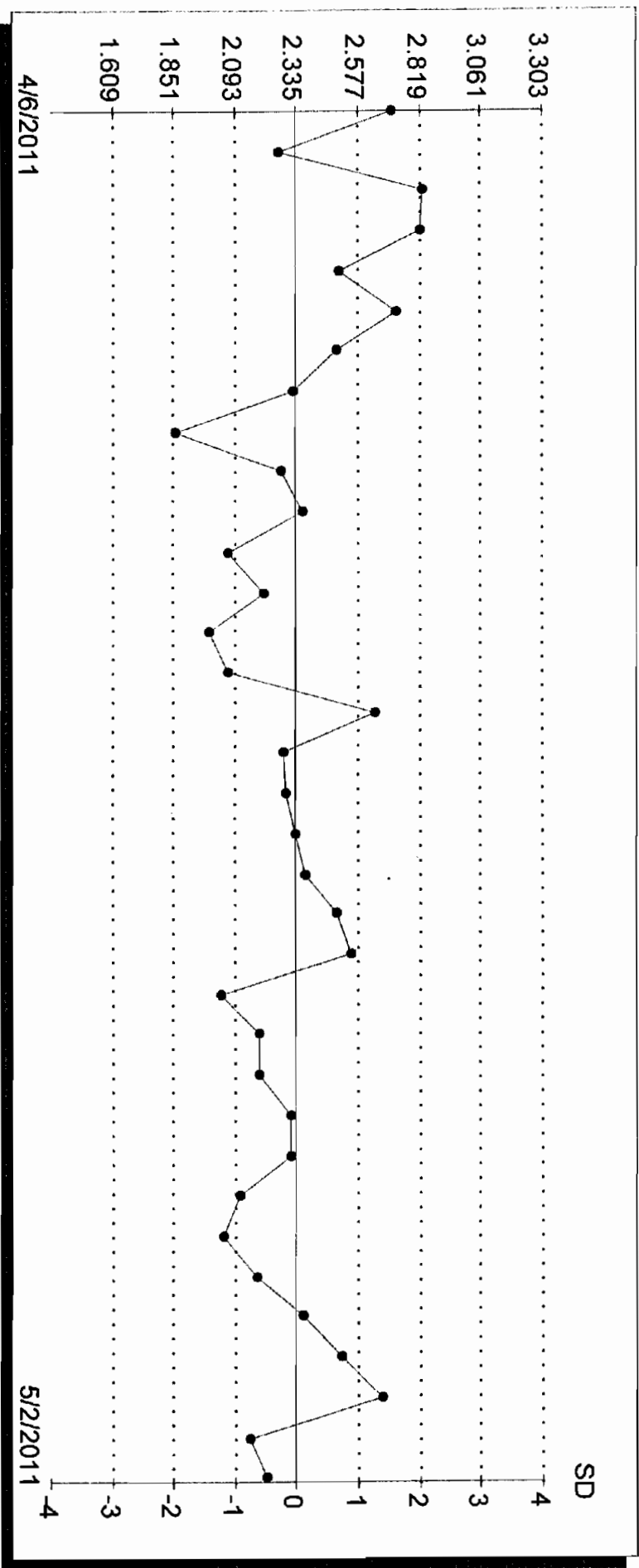
3H Efficiency : 1605
Total # pts : 36
Valid # pts : 64.56
Mean : 0.20
SD : 0.20



3H Background
Total # pts : 1566
Valid # pts : 35
Mean : 2.34
SD : 0.24

Date	Value	Valid Pt
Apr 06, 2011	2.70	X
Apr 10, 2011	2.27	X
Apr 16, 2011	2.84	X
Apr 19, 2011	2.82	X
Apr 25, 2011	2.50	X
Apr 30, 2011	2.73	X
Apr 30, 2011	2.49	X
Apr 30, 2011	2.32	X
Apr 30, 2011	1.86	X
Apr 30, 2011	2.27	X
Apr 30, 2011	2.36	X
Apr 30, 2011	2.07	X
Apr 30, 2011	2.20	X
Apr 30, 2011	1.99	X
Apr 30, 2011	2.07	X
May 01, 2011	2.64	X
May 01, 2011	2.29	X
May 01, 2011	2.29	X
May 01, 2011	2.29	X
May 01, 2011	2.34	X
May 01, 2011	2.37	X
May 01, 2011	2.49	X
May 01, 2011	2.55	X
May 01, 2011	2.04	X
May 01, 2011	2.19	X
May 01, 2011	2.19	X
May 01, 2011	2.31	X
May 01, 2011	2.32	X
May 01, 2011	2.12	X
May 01, 2011	2.05	X
May 02, 2011	2.18	X
May 02, 2011	2.36	X
May 02, 2011	2.51	X
May 02, 2011	2.67	X
May 02, 2011	2.15	X
May 02, 2011	2.22	X

3H Background : 1566
 Total # pts : 35
 Valid # pts : 2.34
 Mean : 0.24
 SD : 0.24





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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Low Level Liquid Scintillation Counting

Calibration Information

STD ID: S-0247

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data	
Planning		Parent Solution Reference #	NIST SRM 4927F	
Planning Comments	Create an H-3 LCS standard	Parent Solution #	S-0237	
Target dpm/g (on dll. date)	5.56	Parent Principal Radionuclide	H-3	Half Life (Days) 4499.8000000
Target Final volume mL	2000	Parent Reference Date	03/22/2010 10:10	
Appx mass g of Parent Sol'n	3.274623294	Parent Certified Act	3503.682716	Cert Act/Vol Units dpm g
Appx vol mL of Parent Sol'n	3.280528244	Parent Cert Act Uncert 1 Sigma	0.0036	
Expected Addition for Analysis g	5	Parent Sp. Gravity GMI	0.9982	
Standards Preparation / Dilution		Parent Supplier	NIST SRM 4927F	
Secondary Solution #	S-0247	Parent Date Recvd	01/02/00	
Dilution Date (New Ref Date)	10/11/2010 10:30	Parent Received By	Unknown	
Ampoule, Empty (g)		Parent Cert Exp Date		
Ampoule /Solution Gross (g)		Parent Matrix	H2O	
Net Wt Removed (g)		Certified dpm/g At Ref Date	3503.682716	
Transfer Container, empty (g)	1.7	Certified dpm/g on 10/11/2010 10:30	3395.81045	
Container Plus Solution (g)	4.994	Parent Comments	Intermediate level H-3 standard for creating LCS solutions and matrix spikes. Dilution performed as stated above by B Steffens. -BJS 3/22/10	
Net Wt Transferred (g)	3.294			
DPM Xferred on 10/11/2010 10:30	11185.79962			
Diluent/matrix	DI H2O	Parent Tech	Unknown	
Diluent Density Cont, empty (g)		Is_Primary	FALSE	
Test Mass of 5 mL of Diluent (g)		Is_LCS	TRUE	
Diluent Density Test - (g/mL)		Is_Tracer	FALSE	
Dilution Empty Container Mass (g)	473.96	Is_Calib	FALSE	
Dilution Full Cont g (if measured)	2467.85			
Dilution Final Volume mL (if measured)	2000			
Final Dilution Density (g/mL)	0.998945			
Final Dilution Measured Mass g	1993.89			
Comments	Stock H-3 LCS standard. Dilution performed as stated above by B Steffens. -BJS 10/11/10			
Final Dilution dpm/g	5.610038479			
Final Dil New Ref Date/Time	10/11/2010 10:30			

S-0247



H-3

Verified 10/13/10

SL

Expires 10/13/11

Manufacturer NIST SRM 4927F

Sol Matrix H2O

Ref No NIST SRM 4927F

Tech Unknown

Parent ID S-0237



RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY



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

VERIFICATION DATE **10/13/2010 20:18** date counted
 STANDARD REFERENCE # **S-0247**

Principal Radionuclide
H-3

ENTER --> Half Life, Years
1.232E+01

OR --> Half Life, Days
4.4898E+03
4.4898E+03

Radionuclide **H-3**

Dilution Reference Date **10/11/2010 10:30**

Dilution Activity **2.53** pCi per gram ==> dpm/g **5.61**
 Verif. Date Decay Corrected **2.53** pCi per gram ==> dpm/g **5.61**

Minimum of 3 Required

Trial ID	Sample Counts	Count Time (min)	Detector	Efficiency	Bkg. (cpm)	Net Weight	Decay Corrected Activity Result (dpm/g)	Decay Corrected Activity Result (pCi/g)
S-0247-V1	16.99	1	LSC	0.3440	6.86	5.017	5.87	2.64
S-0247-V2	16.76	1	LSC	0.3484	6.86	4.979	5.70	2.57
S-0247-V3	16.97	1	LSC	0.3465	6.86	4.972	5.87	2.64
S-0247-V4	16.76	1	LSC	0.3449	6.86	4.982	5.76	2.60
S-0247-V5	16.88	1	LSC	0.3433	6.86	4.980	5.86	2.64

		Average	5.81	2.62
		Two Sigma Uncertainty	0.15	0.07
10% Max	PASS	Standard Deviation percent of known concentration	1.35%	1.35%
		Target Activity	5.61	2.53
	5% Max	PASS	% Diff	3.66%
			3.66%	3.66%

Verification Expiration Date: **October 13, 2011**

Prepared & Counted By *B. J. Self*

Date: **10/13/2010 20:18**

Verified & Approved By *Dyane Mulligan*

Date: **10-14-10/1324**

QC Approval *[Signature]*

Date: **10-14-10/12:30**

STD ID: S-0031

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data			
Planning		Parent Solution Reference #	NIST SRM 4927F			
Planning Comments	Dilute intermediate level solution from SRM 4927F	Parent Solution #	9-0107			
Target dpm/g (on dil. data)	267000	Parent Principal Radionuclide	H-3	Half Life (Days)	4499.8000000	
Target Final volume mL	200	Parent Reference Date	09/03/1998 11:00			
Appx mass g of Parent Sol'n	2.093763934	Parent Certified Act	38082000	Cert Act/Vol Units	dpm	g
Appx vol mL of Parent Sol'n	2.097639505	Parent Cert Act Uncert 1 Sigma	0.0036			
Expected Addition for Analysis g		Parent Sp. Gravity G/Ml	0.9982			
Standards Preparation / Dilution		Parent Supplier	NIST SRM 4927F			
Secondary Solution #	S-0031	Parent Data Recvd	01/02/00			
Dilution Date (New Ref Date)	10/19/2005 00:00	Parent Received By	Unknown			
Ampoule, Empty (g)		Parent Cert Exp Date				
Ampoule /Solution Gross (g)		Parent Matrix	H2O			
Net Wt Removed (g)		Certified dpm/g At Ref Date	38082000			
Transfer Container, empty (g)	0	Certified dpm/g on 10/19/2005 00:00	25504307.09			
Container Plus Solution (g)	4.7574	Parent Comments	Primary for S-0029 - Information entered from dilution records - 4/18/2006 RTS			
Net Wt Transferred (g)	4.7574					
DPM Xferred on 10/19/2005 00:00	121334194.3					
Diluent/matrix	H2O		Parent Tech	Unknown		
Diluent Density Cont, empty (g)		Is_Primary	FALSE			
Test Mass of 5 ml of Diluent (g)		Is_LCS	TRUE			
Diluent Density Test - (g/mL)		Is_Tracer	FALSE			
Dilution Empty Container Mass (g)	1	Is_Calib	FALSE			
Dilution Full Cont g (If measured)	200.64					
Dilution Final Volume mL (If measured)	200					
Final Dilution Density (g/mL)	0.9982					
Final Dilution Measured Mass g	199.64					
Comments	S-0031 Intermediate dilution - Information entered from dilution records - 4/19/2006 RTS					
Final Dilution dpm/g	607764.9486					
Final Dil New Ref Date/Time	10/19/2005 00:00					



Add / Edit *Primary* Standards

Solution Reference #	NIST SRM 4927F		
Solution #	S-0107		
Principal Radionuclide	H-3	Half Life (Days)	4499.8000
Reference Date	09/03/98 11:00		
Certified Act	634700.0000	Cert. Act/Vol Units	Bq g
Cert Act Uncert 1 Sigma (fractional .03=3%)	0.0036		
Sp. Gravity G/MI	0.9982		
Supplier	NIST SRM 4927F		
Date Recvd	01/02/00		
Received By	Unknown		
Cert Exp Date			
Matrix	H2O		
Certified dpm/g At Reference Date	38082000		
Certified dpm/g On 10/15/2010 15:48	19261068.03		
Comments	Primary for S-0029 - Information entered from dilution records - 4/18/2006 RTS		
Primary Tech	Unknown		
Is_Primary	TRUE		
Is_LCS	TRUE		
Is_Tracer	FALSE		
Is_Calib	FALSE		

5-0031



National Institute of Standards & Technology

Certificate

Standard Reference Material 4927F Hydrogen-3 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive hydrogen-3, as water, in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

Radiological Hazard

The SRM ampoule contains hydrogen-3 with a total activity of approximately 3.2 MBq. Hydrogen-3 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains only distilled water. There is no chemical hazard. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65°C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2008.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, L.R. Karam, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas and M.P. Unterwieser of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by J.W.L. Thomas.

Bert M. Coursey, Chief
Ionizing Radiation Division

Gaithersburg, Maryland 20899
June 1999
Half-life and text revised October 2000

Nancy M. Trahey, Chief
Standard Reference Materials Program

PROPERTIES OF SRM 4927F

Certified values

Solution density	$(0.996 \pm 0.002) \text{ g} \cdot \text{mL}^{-1}$ at 20.0 °C [b]*
Radionuclide	Hydrogen-3
Reference time	1200 EST, 3 September 1998 1100 CST
Massic activity of the solution [c]	$634.7 \text{ kBq} \cdot \text{g}^{-1}$
Relative expanded uncertainty ($k=2$)	0.72% [d] [e]

Uncertified values

Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution mass	Approximately 5.0 g		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L ⁻¹)	Mass Fraction (g·g ⁻¹)
	H ₂ O ³ HHO	55 6 × 10 ⁻⁷	1.00 1 × 10 ⁻⁸
Radiological Properties:			
Radionuclidic impurities	None detected [f]		
Half lives used	Hydrogen-3: (4500 ± 8) d [g]		
Calibration method and measuring instrument(s)	4πβ gas counting of SRM 4927E using the NIST length-compensated internal gas proportional counters and intercomparison of SRMs 4927E/4927F using two 4πβ liquid-scintillation counting systems [h]		

NOTES

- [a] The Sievert is the SI unit for dose equivalent. See reference [1]. One μSv is equal to 0.1 mrem.
 Distance from Ampoule (cm): 1 30 100
 Approximate Dose Rate ($\mu\text{Sv/h}$): <0.1 (Not detectable)
- [b] The stated uncertainty is two times the standard uncertainty.
- [c] Massic activity is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].
- [d] The reported value, y , of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as $y = f(x_1, x_2, x_3, \dots, x_n)$, where f is a mathematical function derived from the assumed model of the measurement process.
- The value, x_i , used for each input quantity i has a standard uncertainty, $u(x_i)$, that generates a corresponding uncertainty in y , $u(y) = |\partial y / \partial x_i| \cdot u(x_i)$, called a component of combined standard uncertainty of y .
- The combined standard uncertainty of y , $u_c(y)$, is the positive square root of the sum of the squares of the components of combined standard uncertainty.
- The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ to obtain U , the expanded uncertainty of y .
- Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation $u_c(y)$, the unknown value of the massic activity is believed to lie in the interval $y \pm U$ with a level of confidence of approximately 95 percent.
- For further information on the expression of uncertainties, see references [2] and [3].
- [e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the massic response is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval $U/2$ to $2U$ (i.e., within a factor of 2 of the estimated value).
- [f] The estimated limit of detection for radionuclidic impurities is $300 \text{ Bq} \cdot \text{g}^{-1}$.
- [g] The stated uncertainty is the standard uncertainty. See reference [5].
- [h] Extensive gas-counting measurements were made on the SRM 4927E solution during 1998 and 1999. The SRM 4927F solution was intercompared with the SRM 4927E solution using liquid-scintillation counting.
- [i] Relative standard uncertainty of the input quantity x_i .



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Percent Moisture



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-11-00527
Client Sample ID: MD21-11-5604
Sample Collection Date: 03/10/11
Sample Matrix: Silica

Request or PO Number: 11-1611
ARS Sample ID: ARS1-11-00527-001
Date Received: 03/15/11
Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	11.299	NA	NA	NA		%	Percent Moisture	05/05/11 13:26	BS	NA

NOTES: Project Cost Code MR8R032NFM00

Project Manager Review

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

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ARS Sample Delivery Group: ARS1-11-00527
Client Sample ID: MD21-11-5609
Sample Collection Date: 03/10/11
Sample Matrix: Silica

Request or PO Number: 11-1611
ARS Sample ID: ARS1-11-00527-002
Date Received: 03/15/11
Report Date: 05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	11.464	NA	NA	NA		%	Percent Moisture	05/05/11 16:36	BS	NA

NOTES: Project Cost Code MR8R032NFM00

Project Manager Review

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

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for

Los Alamos National Laboratory

Percent Moisture Laboratory Records

AMERICAN RADIATION SERVICES
Port Allen, LA
PERCENT MOISTURE DETERMINATION IN SOILS

SDG Number **ARS1-11-00491, 00622, 00526, 00527**
 Client **LANL**

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD21-11-5600	ARS1-11-00491-001	612	446	166	15.186	5.015	9.14819277
MD21-11-5601	ARS1-11-00491-002	606	438	167	19.547	5.03	11.7047904
MD21-11-5602	ARS1-11-00491-003	607	428	179	15.199	5.037	8.49106145
MD21-11-5603	ARS1-11-00491-004	617	454	165	16.333	5.04	9.89878788
MD21-11-5605	ARS1-11-00491-005	607	443	165	16.378	5.05	9.92606061
MD21-11-5606	ARS1-11-00491-006	615	450	165	15.928	5.06	9.65333333
MD21-11-5607	ARS1-11-00491-007	605	450	154	10.955	5.081	7.11363636
MD21-11-5608	ARS1-11-00491-008	598	436	162	14.886	5.094	9.18888889
MD21-11-5610	ARS1-11-00491-009	601	447	154	8.502	5.063	5.52077922
MD50-11-5957	ARS1-11-00622-001	604	443	161	13.697	5.03	8.50745342
MD50-11-5958	ARS1-11-00622-002	601	443	157	10.123	5.075	6.44777707
MD50-11-5959	ARS1-11-00622-003	598	440	159	9.564	5.054	6.01509434
MD50-11-5960	ARS1-11-00622-004	606	442	164	18.137	5.051	11.0591463
MD50-11-5961	ARS1-11-00622-005	610	444	165	16.472	5.069	9.9830303
MD50-11-5962	ARS1-11-00622-006	602	441	161	15.059	5.05	9.35341615

MD54-11-3767	ARS1-11-00526-001	611	455	156	11.189	5.033	7.1724359
MD54-11-3766	ARS1-11-00526-002	628	455	172	21.497	5.028	12.4982558
MD54-11-3768	ARS1-11-00526-003	599	438	159	16.892	5.007	10.6238994
MD21-11-5604	ARS1-11-00527-001	629	461	168	18.983	5.076	11.2994048
MD21-11-5605	ARS1-11-00527-002	604	435	169	19.375	5.055	11.464497

Balance ID: 0102/H1331122173560P

Pipettor ID: FJ40469

Signature

Ry Stiff

Date

5-6-11

AMERICAN RADIATION SERVICES
Port Allen, LA
PERCENT MOISTURE DETERMINATION IN SOILS

SDG Number ARS1-11-00491, 00622, 00526, 00527
Client LANL

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD21-11-5600	ARS1-11-00491-001	612	446	166	15.186	5.015	#DIV/0!
MD21-11-5601	ARS1-11-00491-002	686	438	167	19.547	5.030	#DIV/0!
MD21-11-5602	ARS1-11-00491-003	687	428	179	15.199	5.037	#DIV/0!
MD21-11-5603	ARS1-11-00491-004	617	454	165	16.333	5.040	#DIV/0!
MD21-11-5605	ARS1-11-00491-005	687	443	165	16.378	5.050	#DIV/0!
MD21-11-5606	ARS1-11-00491-006	615	450	165	15.928	5.060	#DIV/0!
MD21-11-5607	ARS1-11-00491-007	605	450	154	10.955	5.081	#DIV/0!
MD21-11-5608	ARS1-11-00491-008	598	436	162	14.886	5.094	#DIV/0!
MD21-11-5610	ARS1-11-00491-009	601	447	154	8.502	5.063	#DIV/0!
MD50-11-5957	ARS1-11-00622-001	604	443	161	13.697	5.030	#DIV/0!
MD50-11-5958	ARS1-11-00622-002	601	443	157	10.123	5.075	#DIV/0!
MD50-11-5959	ARS1-11-00622-003	598	440	159	9.564	5.054	#DIV/0!
MD50-11-5960	ARS1-11-00622-004	606	442	164	18.137	5.051	#DIV/0!
MD50-11-5961	ARS1-11-00622-005	610	444	165	16.472	5.069	#DIV/0!
MD50-11-5962	ARS1-11-00622-006	602	441	161	15.059	5.050	#DIV/0!

LCS-5.037
LCSB-5.027
B1K-5.044

MD54-11-3767	AR51-11-00526-001	611	455	156	11.189	5.033	#DIV/0!
MD54-11-3766	AR51-11-00526-002	628	455	172	21.497	5.028	#DIV/0!
MD54-11-3768	AR51-11-00526-003	599	438	159	16.892	5.007	#DIV/0!
MD21-11-5604	AR51-11-00527-001	429	461	168	18.983	5.076	#DIV/0!
MD21-11-5605	AR51-11-00527-002	604	435	169	19.375	5.055	#DIV/0!

Balance ID: 0102/H1331122173560P

Pipettor ID: FJ40469

Signature



Date

5-3-11



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for

Los Alamos National Laboratory

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Report Compilation Checklist

ARS SDG: 11-00527 Client Name: LANL Sample Matrix: SI

LEVEL 1 COMPONENTS

	1st Reviewer		
1) Cover Page Complete and Accurate (see ARS-059)?	<input checked="" type="checkbox"/> Yes	No	N/A
2) Technical Review Checklist(s) Complete and Accurate?	<input checked="" type="checkbox"/> Yes	No	N/A
3) Case Narrative Complete and Accurate (see ARS-059)?	<input checked="" type="checkbox"/> Yes	No	N/A
4) Form 1s Present for all Samples and Tests?	<input checked="" type="checkbox"/> Yes	No	N/A
5) Client Specific Components are Present and Complete?	<input checked="" type="checkbox"/> Yes	No	N/A

LEVEL 2 COMPONENTS

	1st Reviewer		
6) Batch Quality Control Report is Present and Accurate?	<input checked="" type="checkbox"/> Yes	No	N/A
7) DQO Report is Present and Accurate?	<input checked="" type="checkbox"/> Yes	No	N/A
8) Client Specific Batch QC Components are Present and Complete?	<input checked="" type="checkbox"/> Yes	No	N/A

LEVEL 3 COMPONENTS

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

LEVEL 4 COMPONENTS

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

Susan Heek
Report Generator Signature

5-6-11
Date

24m
Management Review Signature

5-6-11
Date



LSC Technical Review Checklist

ARS SDG 11-00527Sample Matrix: SI Aliquot (Circle One): Dry As Received Filtered Other: _____Required QC Samples (Mark all that apply): Blank ☒ LOS ☒ LOSD ☒ Sample Dup MS MSDARS A. Batch ID(s): Batch A: B11-01640 Batch B: N/A Batch C: N/ATest Method(s): LSC-A-001 N/A N/A

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Verifier Review		
1) 100% of Manual Transcriptions Verified?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
2) 100% of Manual Calculations Verified?	Yes	No	<input checked="" type="radio"/> N/A	Yes	No	<input checked="" type="radio"/> N/A
3) Blank Composition/Configuration Matches Calibration?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
4) Deviations from procedure are documented and verified?	Yes	No	<input checked="" type="radio"/> N/A	Yes	No	<input checked="" type="radio"/> N/A
5) Appropriate Cocktail Selected?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
6) Sample Prep Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____						
<div style="display: flex; justify-content: space-between;"><div>Chemist Signature <u>[Signature]</u> Date <u>5-3-11</u></div><div>Verifier Review Signature <u>Jamaal Brown</u> Date <u>5-3-11</u></div></div>						

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations Valid and Current?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
2) Backgrounds Valid and Current?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
3) Source Checks Completed and Acceptable?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
<div style="display: flex; justify-content: space-between;"><div>QA Officer Signature <u>VHM</u></div><div>Date <u>5-6-11</u></div></div>						
	Analyst Review			Technical Review		
4) Background Checks Complete and Acceptable?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
5) 100% of Manually Entered Parameters Verified Accurate?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
6) Appropriate QC samples initiated at required frequency?	<input checked="" type="radio"/> Yes	No	N/A	<input checked="" type="radio"/> Yes	No	N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) Analysis Parameters Checked and Correct and Peak Shapes are Acceptable?	<input checked="" type="radio"/> Yes	No	N/A	Yes	No	N/A
b) Spectra show no Evidence of Interferences?	<input checked="" type="radio"/> Yes	No	N/A	Yes	No	N/A
c) Sample Quench for All Samples within Range of Quench Curve?	<input checked="" type="radio"/> Yes	No	N/A	Yes	No	N/A
7) Analysis Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Comments) NCR # (If initiated): _____						
<div style="display: flex; justify-content: space-between;"><div>Analyst Signature <u>[Signature]</u> Date <u>5-6-11</u></div><div>Technical Reviewer Signature <u>N/A</u> Date _____</div></div>						

DQO Report for SDG
ARS1-11-00527

Analysis Code	Group	Isotope	Activity Units	Aliquot Units	ProcessName	RDL	LCS_LL	LCS_UL	MS_LL	MS_UL	Rept_LL	Rept_UL	Grav_LL	Grav_UL	GER	RPD	Dilution	BlankCorrectionMethod	BlankCorrectionFactor	CountTime	AliquotDilution
LSC-A-001	STL	H-3	pCi	1	ARS-054	2.50E-02	80	120	75	125	30	110	40	110	1.00	25	FALSE	None	FALSE	9	9

SDG Report - Samples and Containers

SDG Specific Data			
SDG	ARS1-11-00527	TAI Days	30
Sample Count	Rpt Level	Date Received	3/15/2011
Client	Los Alamos National Laboratory	Client Deadline	4/13/2011
Client Code	114	Internal Deadline	4/13/2011
Profile Number	PN-00094	Lab Deadline	4/11/2011
Comments			
		Project Type	Environmental
		COC Number	11-1611
		PO Number	63641-001-10
		Job Number	MR8A032NFM00
		Job Location	

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Samples and Containers (→) Checked In Thus Far													
FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z
001	MD21-11-5604	SI	03/10/11 12:00 PM	03/10/11 12:00 PM	H	90	5	Q6		N	N/A		
→	IC ID	SI	03/10/11 12:00 PM	03/10/11 12:00 PM	H	90	20	Q6		N	N/A		
002	MD21-11-5609	SI	03/10/11 12:00 PM	03/10/11 12:00 PM	H	90	5	Q6		N	N/A		
→	IC ID	SI	03/10/11 12:00 PM	03/10/11 12:00 PM	H	90	20	Q6		N	N/A		

SDG Report - Analysis Assignments

Temp SDG	ARS1-11-00527	Sample Count	
Client	Los Alamos National Laboratory	Analysis Count	1-2

Samples Count Totals per Analysis		
Analysis Code	Analysis Description	Samples Count
LSC-A-001	Tritium in (Water [Aqueous, AQ, SI])	2

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

ARS FILE TRACKING SHEET

SDG: ARS1-11-00527

Task	Date / Time	Initials
Date & Time Samples Received	03-15-11/11:03	CWP
ICOC Initiated / Storage Location: <u>Q6</u>	03-15-11/12:37	CWP
Technical Checks Performed	See Batch	
Report Written / EDD Generated: _____ / _____ <div style="text-align: center; font-size: small;">Date/Time Initials</div>	5-6-11/1200	SDA
Quality Assurance Checks Performed on Report	5-6-11/1323	MM
Management Check Performed on Report		
Preliminary Report Sent		
Report E-mailed		
Report Faxed		
Report Reviewed		
Report Mailed		
Invoice Completed Invoice #: _____		
Report Imaged		

SPECIAL REQUIREMENTS

Requirement	Yes	No
3 Hour Rush		✓
24 Hour Rush		✓
48 Hour Rush		✓
Special Invoicing <small>see notes</small> Mgmt. Approval: _____		✓

NOTES:

SDG: ARSM100527

64 of 64