

Tuesday, September 20, 2011

REQUEST NUMBER: 11-3646

**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: 11-3646
Per Agreement Number: 63641-001-10
Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples
according to the schedule indicated:

SHIP DATE: 9/20/2011

TURNAROUND/REPORT DUE: 10/20/2011

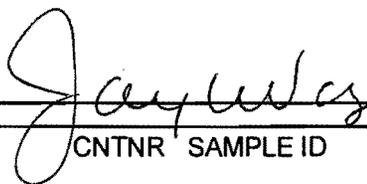
TURNAROUND REQ'D: 30 Days

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	MD21-11-26394	GAS	9/15/2011	

Tuesday, September 20, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-3646C

LOS ALAMOS

REQUEST NUMBER: 11-3646

NATIONAL LABORATORY

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 10/20/2011

American Radiation Services - Primary

TURNAROUND REQ'D: 30

1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-26394	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:	Date	Time	Received By:	Date	Time
Signature			Signature		
<i>Jay Williams</i>	9/20/11	1450			
Signature			Signature		
Signature			Signature		

Received for DISPOSAL By:	Date	Time	Remarks:
Signature			

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 3592

EVENT NAME: MDA V Pore Gas Sampling - CU 21-018(a)-99

SAMPLE ID: MD21-11-26394

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>	<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED(MM/DD/YYYY):		9/15/11	MEDIA:	NA
TIME COLLECTED (HH:MM)		1100	SUB-MEDIA:	OTHER
PRS ID: 21-018(a)-99		OK	SAMPLE TECH CODE: VOST	
LOCATION ID: UNK 21-24524W		OK	FIELD QC TYPE: FB	
LOCATION TYPE: GENERIC		OK	FIELD PREP: NA	
TOP DEPTH: 0		OK	SAMPLE USAGE: QC	
BOTTOM DEPTH: 0		OK	SCREEN/PORT DESC: FB	
FIELD MATRIX: GAS		OK	EXCAVATED: YES/NO (NA)	
COMPOSITE TYPE: NA			COMPOSITE TIME INTERVAL: NA	
BOREHOLE: YES/NO (NA)			WATER FLOWING: YES/NO (NA)	
BOREHOLE DECLINATION: M			BOREHOLE DIRECTION: NA	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1		H3	1 EA SILICA GEL TUBE	None	Y	NA
1		T015	6 LITER SUMMA CANISTER	None	<del style="text-align: center;">Y	to 8/19/11 Not collected, Not sampled for

SAMPLE DESC: QC Sample of MD21-11-26386
 Column # 12
 SAMPLE COMMENTS: Initial wt 576.84g, Final wt = 586.99g
 Silica 145.64g, DI = 10.15g
 NA weather @ 1055 T=55°F RH 77% PR=30.29 in

LOCATION DESC: NA

FIELD SCREENING/MEASUREMENT RESULTS: NA

COLLECTED BY (PRINT) R. Onstoff M Giorgii REVIEWED BY (PRINT) M Giorgii

RELINQUISHED BY (Printed Name) Rance Onstoff (Signature) Rance Onstoff	Date/Time 9/16/11 1500	RECEIVED BY (Printed Name) SHERI SHERWOOD (Signature) Sheri Sherwood	Date/Time 9/19/11 1700
RELINQUISHED BY (Printed Name) (Signature)	Date/Time 1700	RECEIVED BY (Printed Name) (Signature)	Date/Time

DATA VALIDATION COVER SHEET

5119-1

Data Validation Cover Sheet

Records Use only



Section I.

REQUEST NUMBER: 11-3646 VALIDATION DATE: 11/01/11 LAB CODE: ARSCONTRACT LABORATORY NAME: American Radiation ServicesVALIDATOR: Kris Chupka 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 PESTICIDES/POLYCHLORINATED BIPHENYLS |
| <input type="checkbox"/> GENERAL CHEMISTRY | <input checked="" type="checkbox"/> RADIOCHEMISTRY | <input type="checkbox"/> LCMSMS HIGH EXPLOSIVES | |
- 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):

- An MS was not analyzed. However, an LCS was analyzed and met acceptance criteria; thus, no sample data were qualified.
- An LCSD was analyzed instead of a sample duplicate. Acceptance criteria were met and, thus, no sample data were qualified.
- 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 as a result.

Reviewed by: Susan Ball **Level:** I **Date:** 11/02/11

VALIDATOR'S SIGNATURE: _____

DATE: 11/01/11

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
(Check One)					
<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	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
			Gamma Spectroscopy.		
<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	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
			SMO or external laboratory for information.		
<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: ARS1-11-02040
Client Sample ID: MD21-11-26394
Sample Collection Date: 09/15/11
Sample Matrix: Silica

Request or PO Number: 11-3646
ARS Sample ID: ARS1-11-02040-001
Date Received: 09/21/11
Report Date: 10/18/11

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	285.230	65.023	201.657	99.009		pCi/L	ARS-054/EPA 906.0	10/06/11 06:49	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

Tuesday, September 20, 2011

REQUEST NUMBER: 11-3646

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: 11-3646
Per Agreement Number: 63641-001-10
Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 9/20/2011
TURNAROUND/REPORT DUE: 10/20/2011
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	MD21-11-26394	GAS	9/15/2011	

Tuesday, September 20, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-3646C

LOS ALAMOS

REQUEST NUMBER: 11-3646

NATIONAL LABORATORY

ATTN: Danny Coleman
American Radiation Services - Primary
1726 Wooddale Court
Baton Rouge, LA 70806
LAB REQUEST COMMENTS:

TURNAROUND/REPORT DUE: 10/20/2011
TURNAROUND REQ'D: 30

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-26394	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By: Date Time Received By: Date Time

<p>Signature</p> <p><i>Jay Williams</i> 9/20/11 1440</p> <p>Signature</p>	<p>Signature</p> <p><i>Coleman</i> 9-24/10:00</p> <p>Signature</p>
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: 11-3646



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: 11-3646**

Original COC

Tuesday, September 20, 2011

REQUEST NUMBER: 11-3646

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: 11-3646
Per Agreement Number: 63641-001-10
Project Cost Code: MR8R032NFM00

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 9/20/2011
TURNAROUND/REPORT DUE: 10/20/2011
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	MD21-11-26394	GAS	9/15/2011	

Tuesday, September 20, 2011

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 11-3646C

LOS ALAMOS

REQUEST NUMBER: 11-3646

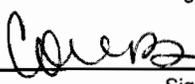
NATIONAL LABORATORY

ATTN: Danny Coleman
American Radiation Services - Primary
1726 Wooddale Court
Baton Rouge, LA 70806
LAB REQUEST COMMENTS:

TURNAROUND/REPORT DUE: 10/20/2011
TURNAROUND REQ'D: 30

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-11-26394	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:	Date	Time	Received By:	Date	Time
------------------	------	------	--------------	------	------

	9/20/11	1440		9-24/10:00	
Signature			Signature		
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: 11-3646**

Case Narrative



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

October 18, 2011

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

Request Number: **11-3646**
LANL Sample ID: MD21-11-26394.

Dear Mr. Greene;

On September 21, 2011, ARS International received one (1) Silica Gel sample to be analyzed for Tritium.

The sample was received in good condition. It was 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,

A handwritten signature in black ink that reads 'Eugene Mulligan'. The signature is written in a cursive, flowing style.

Laboratory Management
ARS International



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)
11-3646	MD21-11-26394	ARS1-11-02040-001

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

10-18-11
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: ARS1-11-02040
Client Sample ID: MD21-11-26394
Sample Collection Date: 09/15/11
Sample Matrix: Silica

Request or PO Number: 11-3646
ARS Sample ID: ARS1-11-02040-001
Date Received: 09/21/11
Report Date: 10/18/11

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	285.230	65.023	201.657	99.009		pCi/L	ARS-054/EPA 906.0	10/06/11 06:49	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



QC Results per Analytical Batch

Analytical Batch	ARS1-B11-03714
SDG	ARS1-11-02040
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	10/05/11 21:21	Analysis Technician	BSTEFFENS	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	Expected Value	LCS Rec (%)	MDC
ARS1-B11-03714-01	LCS	H-3	2400	150	2568	93	200

Duplicate RER/DER/RPD			Analysis Date	10/06/11 00:30	Analysis Technician	BSTEFFENS	
Analyte	Result LCS	CSU LCS (1s)	Results LCSD	CSU LCSD (1s)	RER	DER	RPD
H-3	2400	149	2430	151	0.05	0.14	1.2

Method Blank			Analysis Date	10/06/11 03:39	Analysis Technician	BSTEFFENS	
Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (1s)	MDC	Qual	
ARS1-B11-03714-03	MBL	H-3	52	59	200	U	

Susan Leese

Susan Leese

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

LELAP Certificate# 01949

NELAP Certificate # E87558



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

Samples

		LSC Instrument Data Transfer Report										LSC 2	
		ARS1-B11-03714					22					22	
44	BIKG	1	BACKGROUND	10/05/11 18:11	5.58	427.23	37.6000	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-01	2	B11-03714-01	10/05/11 21:20	15.82	439.96	38.1900	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-02	3	B11-03714-02	10/06/11 00:30	15.83	431.68	37.8100	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-03	4	B11-03714-03	10/06/11 03:39	5.80	432.66	37.8500	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-04	5	B11-03714-04	10/06/11 06:48	6.76	417.01	37.1300	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-05	6	B11-03714-05	10/06/11 09:58	8.63	417.82	37.1600	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-06	7	B11-03714-06	10/06/11 13:07	8.96	425.05	37.5000	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-07	8	B11-03714-07	10/06/11 16:16	118.78	422.42	37.3800	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-08	9	B11-03714-08	10/06/11 19:26	19.25	424.53	37.4800	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-09	10	B11-03714-09	10/06/11 22:35	6.61	414.72	37.0200	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-10	11	B11-03714-10	10/07/11 01:45	18.26	416.63	37.1100	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-11	12	B11-03714-11	10/07/11 04:54	9.69	418.11	37.1800	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-12	13	B11-03714-12	10/07/11 08:03	559.35	417.63	37.1600	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-13	14	B11-03714-13	10/07/11 11:13	6.49	416.56	37.1100	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-14	15	B11-03714-14	10/07/11 14:22	43.59	416.46	37.1000	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-15	16	B11-03714-15	10/07/11 17:32	6.34	414.05	36.9900	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-16	17	B11-03714-16	10/07/11 20:41	447.09	416.63	37.1100	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-17	18	B11-03714-17	10/07/11 23:51	382.70	416.13	37.0900	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-18	19	B11-03714-18	10/08/11 03:00	36.07	421.35	37.3300	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-19	20	B11-03714-19	10/08/11 06:09	7.02	408.88	36.7500	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-20	21	B11-03714-20	10/08/11 09:19	6.00	412.56	36.9200	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-21	22	B11-03714-21	10/08/11 12:28	6.35	413.05	36.9400	180.00	ARS1-B11-03714	1			
44	ARS1-B11-03714-22	23	B11-03714-22	10/08/11 15:38	6.45	409.98	36.8000	180.00	ARS1-B11-03714	1			

\\PACKARD370_NEW\Results\ARS1\H-3 Normal Lvl\

Procedure		ARS-054		Isotope		H-3	
Variable	Value	Calculated Values		VBA	V/V		
Gross Count Rate	15.820000	ACT	2399.202241	2399.202241	OK		
Sample Count Mins	180.000000	CU	80.786266	80.786266	OK		
BKG Count Rate	5.580000	TPU	149.194536	149.194536	OK		
BKG Count Mins	180.000000	MDA	195.464447	195.464447	OK		
Instrument Efficiency	0.381900	DL	95.968487	95.968487	OK		
Sample Aliquot	5.034200	Net Count Rate	10.240000	10.240000	OK		
Dilution Factor	1.000000	D t 1 (t2 - t1)	0.000000	0.000000	OK		
Aliquot Conversion Factor	0.001000	DF	1.000000	1.000000	OK		
		Sys Err	0.052280	0.052280	OK		
Sample Collection Date (t1)	10/5/11 9:21 PM	K	0.004268	0.004268	OK		
Count Date (t2)	10/5/11 9:21 PM	K MDA	0.768255	0.768255	OK		
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	Batch Identifiers and Other Related Information					
Aliquot Units	L	Batch	ARS1-B11-03714				
		Batch ID	ARS1-B11-03714-01				
		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	73				
		Instr Detector	P-44-S-2				
		Instr keV					
Variables Intact Test	OK	Version/Date	1.0 -- 11/18/2005				

Reviewed By: SDH

Date: 10-17-11

Procedure		Isotope		
ARS-054		H-3		
Variable	Value	Calculated Values	VBA	V/V
Gross Count Rate	15.830000	ACT	2432.833611	2432.833611 OK
Sample Count Mins	180.000000	CU	160.441493	160.441493 OK
BKG Count Rate	5.580000	TPU	296.455860	296.455860 OK
BKG Count Mins	180.000000	MDA	198.011045	198.011045 OK
Instrument Efficiency	0.378100	DL	97.218807	97.218807 OK
Sample Aliquot	5.019400	Net Count Rate	10.250000	10.250000 OK
Dilution Factor	1.000000	D t 1 (t2 - t1)	0.000000	0.000000 OK
Aliquot Conversion Factor	0.001000	DF	1.000000	1.000000 OK
		Sys Err	0.052280	0.052280 OK
Sample Collection Date (t1)	10/6/11 12:30 AM	K	0.004213	0.004213 OK
Count Date (t2)	10/6/11 12:30 AM	K MDA	0.758375	0.758375 OK
Activity Units = pCi --- UCF =	2.2200			
CF	1.9600			
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	Batch Identifiers and Other Related Information		
Aliquot Units	L	Batch	ARS1-B11-03714	
		Batch ID	ARS1-B11-03714-02	
		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	73	
		Instr Detector	P-44-S-3	
		Instr keV		
		Version/Date	1.0 -- 11/18/2005	
Variables Intact Test	OK			

Procedure		ARS-054		Isotope		H-3	
Variable	Value	Calculated Values	VBA	V/V			
Gross Count Rate	5.800000	ACT	51.970187	51.970187	OK		
Sample Count Mins	180.000000	CU	116.418647	116.418647	OK		
BKG Count Rate	5.580000	TPU	116.540380	116.540380	OK		
BKG Count Mins	180.000000	MDA	197.075426	197.075426	OK		
Instrument Efficiency	0.378500	DL	96.759440	96.759440	OK		
Sample Aliquot	5.037900	Net Count Rate	0.220000	0.220000	OK		
Dilution Factor	1.000000	D t 1 (t2 - t1)	0.000000	0.000000	OK		
Aliquot Conversion Factor	0.001000	DF	1.000000	1.000000	OK		
		Sys Err	0.052280	0.052280	OK		
Sample Collection Date (t1)	10/6/11 3:39 AM	K	0.004233	0.004233	OK		
Count Date (t2)	10/6/11 3:39 AM	K MDA	0.761975	0.761975	OK		
Activity Units = pCi -- UCF =	2.2200						
CF	1.9600						
Nuclide Abundance	1.000000						
Halflife 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	Batch Identifiers and Other Related Information					
Aliquot Units	L	Batch	ARS1-B11-03714				
		Batch ID	ARS1-B11-03714-03				
		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	73				
		Instr Detector	P-44-S-4				
		Instr keV					
		Version/Date	1.0 -- 11/18/2005				
Variables Intact Test	OK						

15 of 63
Reviewed By: SDH

Date: 10-17-11

Procedure		ARS-054		Isotope		H-3	
Variable	Value	Calculated Values	VBA	V/V			
Gross Count Rate	6.760000	ACT	285.229887	285.229887	OK		
Sample Count Mins	180.000000	CU	63.289891	63.289891	OK		
BKG Count Rate	5.580000	TPU	65.022844	65.022844	OK		
BKG Count Mins	180.000000	MDA	201.657276	201.657276	OK		
Instrument Efficiency	0.371300	DL	99.009022	99.009022	OK		
Sample Aliquot	5.035000	Net Count Rate	1.180000	1.180000	OK		
Dilution Factor	1.000000	D t 1 (t2 - t1)	20.784028	20.784028	OK		
Aliquot Conversion Factor	0.001000	DF	0.996804	0.996804	OK		
		Sys Err	0.052280	0.052280	OK		
Sample Collection Date (t1)	9/15/11 12:00 PM	K	0.004137	0.004137	OK		
Count Date (t2)	10/6/11 6:49 AM	K MDA	0.744662	0.744662	OK		
Activity Units = pCi --- UCF =	2.2200						
CF	1.0000						
Nuclide Abundance	1.000000						
Halflife 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	Batch Identifiers and Other Related Information					
Aliquot Units	L	Batch	ARS1-B11-03714				
		Batch ID	ARS1-B11-03714-04				
		Analysis Code	LSC-A-001				
		SDG	ARS1-11-02040				
		Fraction	001				
		Run Number	1				
		Client	Los Alamos National Laboratory				
		Client Profile	Keith Greene				
		Client ID	MD21-11-26394				
		Instr File Name	73				
		Instr Detector	P-44-S-5				
		Instr keV					
		Version/Date	1.0 -- 11/18/2005				
Variables Intact Test	OK						



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**

Laboratory

Records

Analysis Batch Report

18 of 63



Analysis Batch ID ARS1-B11-03714

Method		Analysis		Matrix		SI	
ARS-054		LSC-A-001		WRAD		XRAD	

Description		Run		Isotope Group		Lab Deadline	
Tritium (Aqueous)		FR		STD		10/18/11	
ARS1-B11-03714-01	TRG	001	1	STD	10/18/11		
ARS1-B11-03714-02	TRG	001	1	STD	10/18/11		
ARS1-B11-03714-03	TRG	002	1	STD	10/18/11		
ARS1-B11-03714-04	TRG	003	1	STD	10/18/11		
ARS1-B11-03714-05	TRG	004	1	STD	10/18/11		
ARS1-B11-03714-06	TRG	005	1	STD	10/18/11		
ARS1-B11-03714-07	TRG	006	1	STD	10/18/11		
ARS1-B11-03714-08	TRG	001	1	STD	10/18/11		
ARS1-B11-03714-09	TRG	002	1	STD	10/18/11		
ARS1-B11-03714-10	TRG	003	1	STD	10/18/11		
ARS1-B11-03714-11	TRG	004	1	STD	10/18/11		
ARS1-B11-03714-12	TRG	005	1	STD	10/18/11		
ARS1-B11-03714-13	TRG	006	1	STD	10/18/11		
ARS1-B11-03714-14	TRG	001	1	STD	10/18/11		
ARS1-B11-03714-15	TRG	002	1	STD	10/18/11		
ARS1-B11-03714-16	TRG	003	1	STD	10/18/11		
ARS1-B11-03714-17	TRG	004	1	STD	10/18/11		
ARS1-B11-03714-18	TRG	005	1	STD	10/18/11		
ARS1-B11-03714-19	TRG	006	1	STD	10/18/11		
ARS1-B11-03714-20	TRG	007	1	STD	10/18/11		
ARS1-B11-03714-21	TRG	001	1	STD	10/18/11		
ARS1-B11-03714-22	TRG	002	1	STD	10/18/11		

96929 11-02040-001-1 WRAD	96930 11-02041-001-1 WRAD	96931 11-02041-002-1 WRAD	96932 11-02041-003-1 WRAD	96933 11-02041-004-1 WRAD	96934 11-02041-005-1 WRAD	96935 11-02041-006-1 WRAD	96936 11-02042-001-1 WRAD	96937 11-02042-002-1 WRAD
96938 11-02042-003-1 WRAD	96939 11-02042-004-1 WRAD	96940 11-02042-005-1 WRAD	96941 11-02042-006-1 WRAD	96942 11-02042-007-1 WRAD	96943 11-02054-001-1 XRAD	96944 11-02054-002-1 XRAD	96945 11-02054-003-1 XRAD	96946 11-02054-004-1 XRAD
96947 11-02054-005-1 XRAD								

LCS Report
Analytical Batch: ARS1-B11-03714

19 of 6

IRMSD	ABatch	ABatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-12515	ARS1-B11-03714	ARS1-B11-03714-01	B-H3	S-0262	H-3	5	2.573293477	0	1	1	1 BSTEFFENS	9/22/2011	2.568145577	10/5/2011	2.568145577
B-12516	ARS1-B11-03714	ARS1-B11-03714-02	B-H3	S-0262	H-3	5	2.573293477	0	1	1	1 BSTEFFENS	9/22/2011	2.567750012	10/6/2011	2.567750012

ID_31001_054	ABatch	ABatchSampleID	ClientID	Aliquot1	AliquotUnits1	IC_ID1	Aliquot2	AliquotUnits2	IC_ID2	UserID	ModDate
10114	ARS1-B11-03714	ARS1-B11-03714-01					5.0342 g			BSTEFFENS	10/05/2011 12:27:12
10115	ARS1-B11-03714	ARS1-B11-03714-02					5.0194 g			BSTEFFENS	10/05/2011 12:27:12
10116	ARS1-B11-03714	ARS1-B11-03714-03					5.0379 g			BSTEFFENS	10/05/2011 12:27:13
10117	ARS1-B11-03714	ARS1-B11-03714-04	MD21-11-26394				5.035 g		96929	BSTEFFENS	10/05/2011 12:27:13
10118	ARS1-B11-03714	ARS1-B11-03714-05	MD21-11-26401				5.0843 g		96930	BSTEFFENS	10/05/2011 12:27:13
10119	ARS1-B11-03714	ARS1-B11-03714-06	MD21-11-26398				5.0076 g		96931	BSTEFFENS	10/05/2011 12:27:13
10120	ARS1-B11-03714	ARS1-B11-03714-07	MD21-11-26399				5.0468 g		96932	BSTEFFENS	10/05/2011 12:27:13
10121	ARS1-B11-03714	ARS1-B11-03714-08	MD21-11-26395				5.025 g		96933	BSTEFFENS	10/05/2011 12:27:13
10122	ARS1-B11-03714	ARS1-B11-03714-09	MD21-11-26397				5.0285 g		96934	BSTEFFENS	10/05/2011 12:27:13
10123	ARS1-B11-03714	ARS1-B11-03714-10	MD21-11-26400				5.0336 g		96935	BSTEFFENS	10/05/2011 12:27:13
10124	ARS1-B11-03714	ARS1-B11-03714-11	MD21-11-26417				5.0391 g		96936	BSTEFFENS	10/05/2011 12:27:13
10125	ARS1-B11-03714	ARS1-B11-03714-12	MD21-11-26415				5.0334 g		96937	BSTEFFENS	10/05/2011 12:27:13
10126	ARS1-B11-03714	ARS1-B11-03714-13	MD21-11-26402				5.0575 g		96938	BSTEFFENS	10/05/2011 12:27:13
10127	ARS1-B11-03714	ARS1-B11-03714-14	MD21-11-26414				5.0409 g		96939	BSTEFFENS	10/05/2011 12:27:13
10128	ARS1-B11-03714	ARS1-B11-03714-15	MD21-11-26420				5.0515 g		96940	BSTEFFENS	10/05/2011 12:27:14
10129	ARS1-B11-03714	ARS1-B11-03714-16	MD21-11-26419				5.0361 g		96941	BSTEFFENS	10/05/2011 12:27:14
10130	ARS1-B11-03714	ARS1-B11-03714-17	MD21-11-26416				5.0389 g		96942	BSTEFFENS	10/05/2011 12:27:14
10131	ARS1-B11-03714	ARS1-B11-03714-18	MD21-11-26436				5.0188 g		96943	BSTEFFENS	10/05/2011 12:27:14
10132	ARS1-B11-03714	ARS1-B11-03714-19	MD21-11-26437				5.0442 g		96944	BSTEFFENS	10/05/2011 12:27:14
10133	ARS1-B11-03714	ARS1-B11-03714-20	MD21-11-26438				5.0567 g		96945	BSTEFFENS	10/05/2011 12:27:14
10134	ARS1-B11-03714	ARS1-B11-03714-21	MD21-11-26435				5.0341 g		96946	BSTEFFENS	10/05/2011 12:27:14
10135	ARS1-B11-03714	ARS1-B11-03714-22	MD21-11-26434				5.0295 g		96947	BSTEFFENS	10/05/2011 12:27:14

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-03714-01				1	H-3	2399.202241	149.1945356	149.1945356	292.4212897	195.4644473	95.96848721	80.78626615	80.7862661	158.341082	pCi
ARS1-B11-03714-02				1	H-3	2432.833611	296.4558601	151.2529899	296.4558601	198.0110451	97.21880733	160.4414929	81.8579045	160.441493	pCi
ARS1-B11-03714-03				1	H-3	51.97018704	116.5403801	59.45937761	116.5403801	197.0754256	96.75943997	116.4186473	59.397269	116.418647	pCi
ARS1-B11-03714-04	ARS1-11-02040	001	MD21-11-26394	1	H-3	285.2298868	65.02284419	65.02284419	127.4447746	201.6572759	99.00902169	63.28989126	63.2898913	124.048187	pCi
ARS1-B11-03714-05	ARS1-11-02041	001	MD21-11-26401	1	H-3	729.4109757	77.26090169	77.26090169	151.4313673	199.5139784	97.95671255	67.19442487	67.1944249	131.701073	pCi
ARS1-B11-03714-06	ARS1-11-02041	002	MD21-11-26398	1	H-3	813.287237	80.52695818	80.52695818	157.832838	200.7373242	98.55734681	68.38694564	68.3869456	134.038413	pCi
ARS1-B11-03714-07	ARS1-11-02041	003	MD21-11-26399	1	H-3	27113.64909	1431.406707	1431.406707	2805.557146	199.8215936	98.10774445	199.0882588	199.088259	390.212987	pCi
ARS1-B11-03714-08	ARS1-11-02041	004	MD21-11-26395	1	H-3	3279.733699	193.2360883	193.2360883	378.7427331	200.1570731	98.27245707	89.10912412	89.1091241	174.653883	pCi
ARS1-B11-03714-09	ARS1-11-02041	005	MD21-11-26397	1	H-3	250.0212365	64.50734859	64.50734859	126.4344032	202.5072369	99.42633272	63.16918508	63.1691851	123.811603	pCi
ARS1-B11-03714-10	ARS1-11-02041	006	MD21-11-26400	1	H-3	3067.417716	182.9405082	182.9405082	358.5633961	201.8155111	99.08671146	88.03807563	88.0380756	172.554628	pCi
ARS1-B11-03714-11	ARS1-11-02042	001	MD21-11-26417	1	H-3	990.8567395	87.25865188	87.25865188	171.0269577	201.1267889	98.74856491	70.21862351	70.2186235	137.628502	pCi
ARS1-B11-03714-12	ARS1-11-02042	002	MD21-11-26415	1	H-3	133731.1285	7004.503224	7004.503224	13728.82632	201.4670183	98.91560964	427.8230223	427.823022	838.533124	pCi
ARS1-B11-03714-13	ARS1-11-02042	003	MD21-11-26402	1	H-3	219.1110387	63.39407564	63.39407564	124.2523882	200.8740053	98.62445409	62.35054411	62.3505441	122.207066	pCi
ARS1-B11-03714-14	ARS1-11-02042	004	MD21-11-26414	1	H-3	9180.656119	496.2858367	496.2858367	972.7202399	201.5007768	98.93218426	126.2378828	126.237883	247.42625	pCi
ARS1-B11-03714-15	ARS1-11-02042	005	MD21-11-26420	1	H-3	183.7280757	62.94767087	62.94767087	123.3774349	201.6799886	99.0201731	62.21051682	62.2105168	121.932613	pCi
ARS1-B11-03714-16	ARS1-11-02042	006	MD21-11-26416	1	H-3	106716.2727	592.248393	592.248393	10960.80685	201.6466344	99.00379695	383.3051972	383.305197	751.278186	pCi
ARS1-B11-03714-17	ARS1-11-02042	007	MD21-11-26416	1	H-3	91153.05368	4778.660373	4778.660373	9366.17433	201.6473557	99.00415108	354.999642	354.999642	695.799642	pCi
ARS1-B11-03714-18	ARS1-11-02054	001	MD21-11-26436	1	H-3	7831.610718	426.2940778	426.2940778	835.5363926	201.0954548	98.73318062	118.7017857	118.701786	232.6555	pCi
ARS1-B11-03714-19	ARS1-11-02054	002	MD21-11-26437	1	H-3	350.8172107	67.01516467	67.01516467	131.3497228	203.2447205	99.78841998	64.45660384	64.4566038	126.334944	pCi
ARS1-B11-03714-20	ARS1-11-02054	003	MD21-11-26438	1	H-3	101.600824	61.58674594	61.58674594	120.710022	201.8128491	99.08540449	61.35726133	61.3572613	120.260232	pCi
ARS1-B11-03714-21	ARS1-11-02054	004	MD21-11-26435	1	H-3	187.0069053	63.28434424	63.28434424	124.0373147	202.6132264	99.47837109	62.52459504	62.524595	122.548206	pCi
ARS1-B11-03714-22	ARS1-11-02054	005	MD21-11-26434	1	H-3	212.2956276	64.05277182	64.05277182	125.5434328	203.5741692	99.95017159	63.08387436	63.0838744	123.644394	pCi

ABatchSampleID	SDG	Fraction	AllquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCoilDate	MidPointCountDate	RP_DL
ARS1-B11-03714-01			L			0.087868889	180	0.031	180	0.3819	5.0342	10/10/2011	10/5/2011	
ARS1-B11-03714-02			L			0.087944444	180	0.031	180	0.3781	5.0194	10/10/2011	10/6/2011	
ARS1-B11-03714-03			L			0.032222222	180	0.031	180	0.3785	5.0379	10/10/2011	10/6/2011	
ARS1-B11-03714-04	ARS1-11-02040 001		L			0.037555556	180	0.031	180	0.3713	5.035	9/15/2011	10/6/2011	
ARS1-B11-03714-05	ARS1-11-02041 001		L			0.047944444	180	0.031	180	0.3716	5.0843	9/16/2011	10/6/2011	
ARS1-B11-03714-06	ARS1-11-02041 002		L			0.049777778	180	0.031	180	0.375	5.0076	9/16/2011	10/6/2011	
ARS1-B11-03714-07	ARS1-11-02041 003		L			0.659888889	180	0.031	180	0.3738	5.0468	9/16/2011	10/6/2011	
ARS1-B11-03714-08	ARS1-11-02041 004		L			0.106944444	180	0.031	180	0.3748	5.025	9/16/2011	10/6/2011	
ARS1-B11-03714-09	ARS1-11-02041 005		L			0.036722222	180	0.031	180	0.3702	5.0285	9/16/2011	10/6/2011	
ARS1-B11-03714-10	ARS1-11-02041 006		L			0.101444444	180	0.031	180	0.3711	5.0336	9/16/2011	10/7/2011	
ARS1-B11-03714-11	ARS1-11-02042 001		L			0.053833333	180	0.031	180	0.3718	5.0391	9/19/2011	10/7/2011	
ARS1-B11-03714-12	ARS1-11-02042 002		L			3.1075	180	0.031	180	0.3716	5.0334	9/19/2011	10/7/2011	
ARS1-B11-03714-13	ARS1-11-02042 003		L			0.036055556	180	0.031	180	0.3711	5.0575	9/16/2011	10/7/2011	
ARS1-B11-03714-14	ARS1-11-02042 004		L			0.242166667	180	0.031	180	0.371	5.0409	9/19/2011	10/7/2011	
ARS1-B11-03714-15	ARS1-11-02042 005		L			0.035222222	180	0.031	180	0.3699	5.0515	9/19/2011	10/7/2011	
ARS1-B11-03714-16	ARS1-11-02042 006		L			2.483833333	180	0.031	180	0.3711	5.0361	9/19/2011	10/7/2011	
ARS1-B11-03714-17	ARS1-11-02042 007		L			2.126111111	180	0.031	180	0.3709	5.0389	9/19/2011	10/7/2011	
ARS1-B11-03714-18	ARS1-11-02054 001		L			0.2115	180	0.031	180	0.3733	5.0188	9/21/2011	10/8/2011	
ARS1-B11-03714-19	ARS1-11-02054 002		L			0.039	180	0.031	180	0.3675	5.0442	9/21/2011	10/8/2011	
ARS1-B11-03714-20	ARS1-11-02054 003		L			0.033333333	180	0.031	180	0.3692	5.0567	9/21/2011	10/8/2011	
ARS1-B11-03714-21	ARS1-11-02054 004		L			0.035277778	180	0.031	180	0.3694	5.0341	9/21/2011	10/8/2011	
ARS1-B11-03714-22	ARS1-11-02054 005		L			0.035833333	180	0.031	180	0.368	5.0295	9/21/2011	10/8/2011	

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileNm	DetectorID	InstrumentKey	NuclideAbd	TracerMeasACT	TracerKnownACT
ARS1-B11-03714-01					2.22	1	15.82	5.58	10.24		73	P-44-S-2				
ARS1-B01-03714-02					2.22	1.96	15.83	5.58	10.25		73	P-44-S-3				
ARS1-B01-03714-03					2.22	1.96	5.8	5.58	0.22		73	P-44-S-4				
ARS1-B11-03714-04	ARS1-11-02040	001			2.22	1	6.76	5.58	1.18		73	P-44-S-5				
ARS1-B11-03714-05	ARS1-11-02041	001			2.22	1	8.63	5.58	3.05		73	P-44-S-6				
ARS1-B11-03714-06	ARS1-11-02041	002			2.22	1	8.96	5.58	3.38		73	P-44-S-7				
ARS1-B11-03714-07	ARS1-11-02041	003			2.22	1	118.78	5.58	113.2		73	P-44-S-8				
ARS1-B11-03714-08	ARS1-11-02041	004			2.22	1	19.25	5.58	13.67		73	P-44-S-9				
ARS1-B11-03714-09	ARS1-11-02041	005			2.22	1	6.61	5.58	1.03		73	P-44-S-10				
ARS1-B11-03714-10	ARS1-11-02041	006			2.22	1	18.26	5.58	12.68		73	P-44-S-11				
ARS1-B11-03714-11	ARS1-11-02042	001			2.22	1	9.69	5.58	4.11		73	P-44-S-12				
ARS1-B11-03714-12	ARS1-11-02042	002			2.22	1	559.35	5.58	553.77		73	P-44-S-13				
ARS1-B11-03714-13	ARS1-11-02042	003			2.22	1	6.49	5.58	0.91		73	P-44-S-14				
ARS1-B11-03714-14	ARS1-11-02042	004			2.22	1	43.59	5.58	38.01		73	P-44-S-15				
ARS1-B11-03714-15	ARS1-11-02042	005			2.22	1	6.34	5.58	0.76		73	P-44-S-16				
ARS1-B11-03714-16	ARS1-11-02042	006			2.22	1	447.09	5.58	441.51		73	P-44-S-17				
ARS1-B11-03714-17	ARS1-11-02042	007			2.22	1	382.7	5.58	377.12		73	P-44-S-18				
ARS1-B11-03714-18	ARS1-11-02054	001			2.22	1	38.07	5.58	32.49		73	P-44-S-19				
ARS1-B11-03714-19	ARS1-11-02054	002			2.22	1	7.02	5.58	1.44		73	P-44-S-20				
ARS1-B11-03714-20	ARS1-11-02054	003			2.22	1	6	5.58	0.42		73	P-44-S-21				
ARS1-B11-03714-21	ARS1-11-02054	004			2.22	1	6.35	5.58	0.77		73	P-44-S-22				
ARS1-B11-03714-22	ARS1-11-02054	005			2.22	1	6.45	5.58	0.87		73	P-44-S-23				

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	HalfLife1	HalfLife2	HalfLife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	DeltaT2	DeltaT3	DeltaT4
ARS1-B11-03714-01							4499.8			0.04133	0.02	0	0.025	0	0	0			
ARS1-B11-03714-02							4499.8			0.04133	0.02	0	0.025	0	0	0			
ARS1-B11-03714-03							4499.8			0.04133	0.02	0	0.025	0	0	0			
ARS1-B11-03714-04	ARS1-11-02040	001					4499.8			0.04133	0.02	0	0.025	0	0	20.78402778			
ARS1-B11-03714-05	ARS1-11-02041	001					4499.8			0.04133	0.02	0	0.025	0	0	19.91527778			
ARS1-B11-03714-06	ARS1-11-02041	002					4499.8			0.04133	0.02	0	0.025	0	0	20.04722222			
ARS1-B11-03714-07	ARS1-11-02041	003					4499.8			0.04133	0.02	0	0.025	0	0	20.17847222			
ARS1-B11-03714-08	ARS1-11-02041	004					4499.8			0.04133	0.02	0	0.025	0	0	20.30972222			
ARS1-B11-03714-09	ARS1-11-02041	005					4499.8			0.04133	0.02	0	0.025	0	0	20.44166667			
ARS1-B11-03714-10	ARS1-11-02041	006					4499.8			0.04133	0.02	0	0.025	0	0	20.57291667			
ARS1-B11-03714-11	ARS1-11-02042	001					4499.8			0.04133	0.02	0	0.025	0	0	17.70416667			
ARS1-B11-03714-12	ARS1-11-02042	002					4499.8			0.04133	0.02	0	0.025	0	0	17.83611111			
ARS1-B11-03714-13	ARS1-11-02042	003					4499.8			0.04133	0.02	0	0.025	0	0	20.96736111			
ARS1-B11-03714-14	ARS1-11-02042	004					4499.8			0.04133	0.02	0	0.025	0	0	18.09930556			
ARS1-B11-03714-15	ARS1-11-02042	005					4499.8			0.04133	0.02	0	0.025	0	0	18.23055556			
ARS1-B11-03714-16	ARS1-11-02042	006					4499.8			0.04133	0.02	0	0.025	0	0	18.36180556			
ARS1-B11-03714-17	ARS1-11-02042	007					4499.8			0.04133	0.02	0	0.025	0	0	18.49375			
ARS1-B11-03714-18	ARS1-11-02054	001					4499.8			0.04133	0.02	0	0.025	0	0	16.62569444			
ARS1-B11-03714-19	ARS1-11-02054	002					4499.8			0.04133	0.02	0	0.025	0	0	16.75694444			
ARS1-B11-03714-20	ARS1-11-02054	003					4499.8			0.04133	0.02	0	0.025	0	0	16.88819444			
ARS1-B11-03714-21	ARS1-11-02054	004					4499.8			0.04133	0.02	0	0.025	0	0	17.02013889			
ARS1-B11-03714-22	ARS1-11-02054	005					4499.8			0.04133	0.02	0	0.025	0	0	17.15138889			

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARSI-B11-03714-01					1					0.052279718	0.004268085	0.768825368		BSTEFFENS	10/10/2011
ARSI-B11-03714-02					1					0.052279718	0.004213194	0.758374922		BSTEFFENS	10/10/2011
ARSI-B11-03714-03					1					0.052279718	0.004233196	0.761975322		BSTEFFENS	10/10/2011
ARSI-B11-03714-04	ARSI-11-02040	001			0.996803557					0.052279718	0.004137014	0.744662498	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-05	ARSI-11-02041	001			0.99693696					0.052279718	0.004181456	0.752662104	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-06	ARSI-11-02041	002			0.996916698					0.052279718	0.004155973	0.748075185	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-07	ARSI-11-02041	003			0.996896543					0.052279718	0.004175019	0.751503419	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-08	ARSI-11-02041	004			0.996876388					0.052279718	0.004168021	0.750343839	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-09	ARSI-11-02041	005			0.996856127					0.052279718	0.004119665	0.741537009	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-10	ARSI-11-02041	006			0.996835973					0.052279718	0.004133377	0.744078639	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-11	ARSI-11-02042	001			0.997276574					0.052279718	0.004147926	0.746626602	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-12	ARSI-11-02042	002			0.997256304					0.052279718	0.004140921	0.745365728	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-13	ARSI-11-02042	003			0.996775407					0.052279718	0.004153145	0.74756617	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-14	ARSI-11-02042	004			0.997215874					0.052279718	0.004140227	0.745240853	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-15	ARSI-11-02042	005			0.997195713					0.052279718	0.004136548	0.744578636	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-16	ARSI-11-02042	006			0.997175552					0.052279718	0.004137232	0.744701796	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-17	ARSI-11-02042	007			0.997155285					0.052279718	0.004137217	0.744699132	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-18	ARSI-11-02054	001			0.997442262					0.052279718	0.004148572	0.746742938	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-19	ARSI-11-02054	002			0.997422096					0.052279718	0.004104702	0.738846305	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-20	ARSI-11-02054	003			0.997401931					0.052279718	0.004133825	0.744088454	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-21	ARSI-11-02054	004			0.997381659					0.052279718	0.004117495	0.741149102	LSC-A-001	BSTEFFENS	10/10/2011
ARSI-B11-03714-22	ARSI-11-02054	005			0.997361495					0.052279718	0.004098059	0.737650614	LSC-A-001	BSTEFFENS	10/10/2011

86
96

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 Lvl\20111005_1806
Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20111005_1806\20111005_1806.results
RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20111005_1806\H3 Results.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20111005_1806\H3 Results.csv
Assay File Name: C:\Packard\Tricarb\Assays\H-3 Normal Lvl.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 Repeat Sample Count: 1
#Vials/Sample: 1 Calculate % Reference: Off

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

Regions	-Lb	-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-

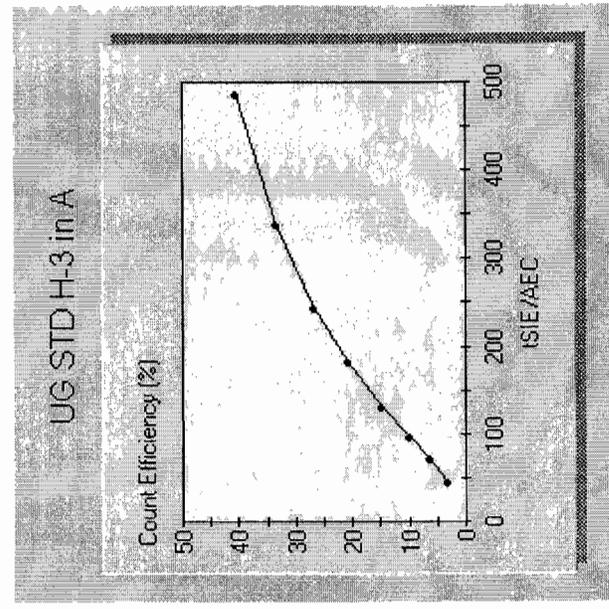
Static Controller: On Luminescence Correction: Off
Colored Samples: Off Heterogeneity Monitor: Off
Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off
Regions Half Life Units Reference Date Reference Time

27 of 63
A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 06/15/2011
Date Modified:
UG STD H-3 in A

tSIE/AEC	Count Efficiency (%)
40.41	487.53
33.51	339.12
26.83	243.83
20.93	182.60
14.63	130.85
9.97	96.86
6.34	71.30
3.09	46.31

Protocol# 44 - H-3 Normal Lvl.lsa

User: ARS

NO	OP#	S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl	In A	Count	Time	DATE	TIME	MESSAGES
44	44	1	BACKGROUND	5.58	14.85	427.23	37.60	180.00	180.00	6:11:55 PM	10/5/2011		
44	44	2	B11-03714-01	15.82	41.43	439.96	38.19	180.00	180.00	9:20:44 PM	10/5/2011		
44	44	3	B11-03714-02	15.83	41.87	431.68	37.81	180.00	180.00	12:30:05 AM	10/6/2011		
44	44	4	B11-03714-03	5.80	15.32	432.66	37.85	180.00	180.00	3:39:26 AM	10/6/2011		
44	44	5	B11-03714-04	6.76	18.22	417.01	37.13	180.00	180.00	6:48:47 AM	10/6/2011		
44	44	6	B11-03714-05	8.63	23.23	417.82	37.16	180.00	180.00	9:58:10 AM	10/6/2011		
44	44	7	B11-03714-06	8.96	23.89	425.05	37.50	180.00	180.00	1:07:33 PM	10/6/2011		
44	44	8	B11-03714-07	118.78	317.78	422.42	37.38	180.00	180.00	4:16:53 PM	10/6/2011		
44	44	9	B11-03714-08	19.25	51.37	424.53	37.48	180.00	180.00	7:26:18 PM	10/6/2011		
44	44	10	B11-03714-09	6.61	17.86	414.72	37.02	180.00	180.00	10:35:41 PM	10/6/2011		
44	44	11	B11-03714-10	18.26	49.20	416.63	37.11	180.00	180.00	1:45:04 AM	10/7/2011		
44	44	12	B11-03714-11	9.69	26.07	418.11	37.18	180.00	180.00	4:54:24 AM	10/7/2011		
44	44	13	B11-03714-12	559.35	1505.43	417.63	37.16	180.00	180.00	8:03:52 AM	10/7/2011		
44	44	14	B11-03714-13	6.49	17.48	416.56	37.11	180.00	180.00	11:13:17 AM	10/7/2011		
44	44	15	B11-03714-14	43.59	117.50	416.46	37.10	180.00	180.00	2:22:35 PM	10/7/2011		
44	44	16	B11-03714-15	6.34	17.14	414.05	36.99	180.00	180.00	5:32:01 PM	10/7/2011		
44	44	17	B11-03714-16	447.09	1204.81	416.63	37.11	180.00	180.00	8:41:29 PM	10/7/2011		
44	44	18	B11-03714-17	382.70	1031.94	416.13	37.09	180.00	180.00	11:51:02 PM	10/7/2011		
44	44	19	B11-03714-18	38.07	102.00	421.35	37.33	180.00	180.00	3:00:30 AM	10/8/2011		
44	44	20	B11-03714-19	7.02	19.10	408.88	36.75	180.00	180.00	6:09:58 AM	10/8/2011		
44	44	21	B11-03714-20	6.00	16.25	412.56	36.92	180.00	180.00	9:19:26 AM	10/8/2011		
44	44	22	B11-03714-21	6.35	17.19	413.05	36.94	180.00	180.00	12:28:54 PM	10/8/2011		
44	44	23	B11-03714-22	6.45	17.53	409.98	36.80	180.00	180.00	3:38:22 PM	10/8/2011		

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
4-29-11	1019	B11-03628-14	B11-03628	1320	[Signature]
10-3-11	0738	SNC 117	QA	QA	
L	L	Background	B11-03628	0917	[Signature]
L	L	B11-03628-18	L	L	[Signature]
10-3-11	0756	B11-03628-18	B11-03628	0757	[Signature]
L	0844	SNC 117	QA	QA	[Signature]
L	L	B11-03628-18	B11-03628	1023	[Signature]
10-5-11	1613	SNC 117	QA	QA	[Signature]
L	L	Background	B11-03714	1806	[Signature]
L	L	B11-03714-01	L	L	[Signature]
L	L	B11-03714-02	L	L	[Signature]
L	L	B11-03714-03	L	L	[Signature]
L	L	B11-03714-04	L	L	[Signature]
L	L	B11-03714-05	L	L	[Signature]
L	L	B11-03714-06	L	L	[Signature]
L	L	B11-03714-07	L	L	[Signature]
L	L	B11-03714-08	L	L	[Signature]
L	L	B11-03714-09	L	L	[Signature]
L	L	B11-03714-10	L	L	[Signature]
L	L	B11-03714-11	L	L	[Signature]

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
10-5-11	1613	B11-03714-12	B11-03714	1806	<i>[Signature]</i>
↓	↓	B11-03714-13	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-14	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-15	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-16	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-17	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-18	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-19	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-20	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-21	↓	↓	<i>[Signature]</i>
↓	↓	B11-03714-22	↓	↓	<i>[Signature]</i>
10-7-11	1241	SNC 117	QA	QA	<i>[Signature]</i>
10-7-11	1243	Background	B11-03814	2021	<i>[Signature]</i>
↓	↓	B11-03814-01	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-02	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-03	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-04	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-05	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-06	↓	↓	<i>[Signature]</i>
↓	↓	B11-03814-07	↓	↓	<i>[Signature]</i>



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

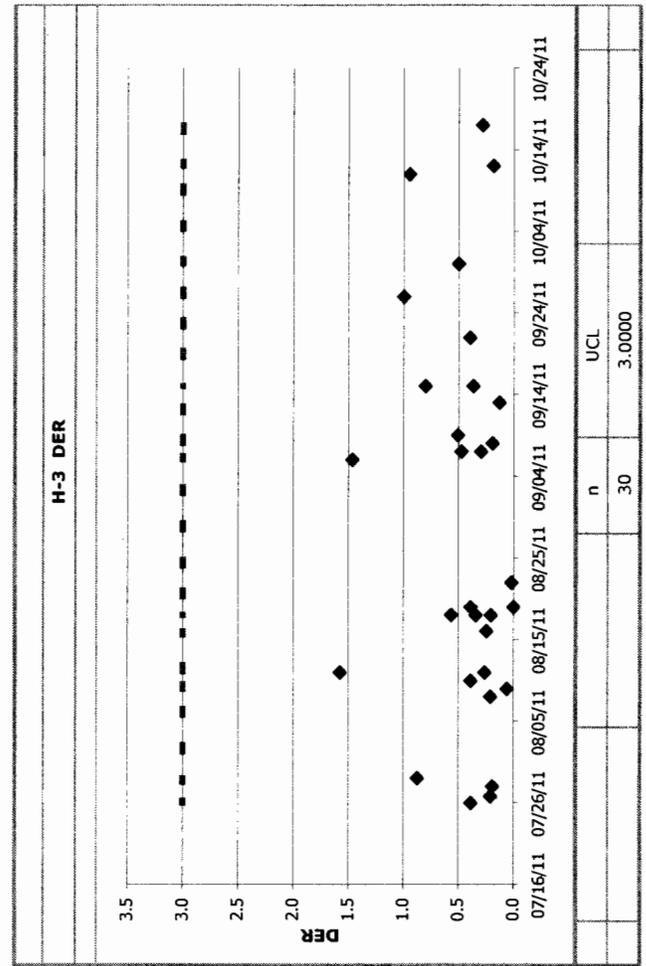
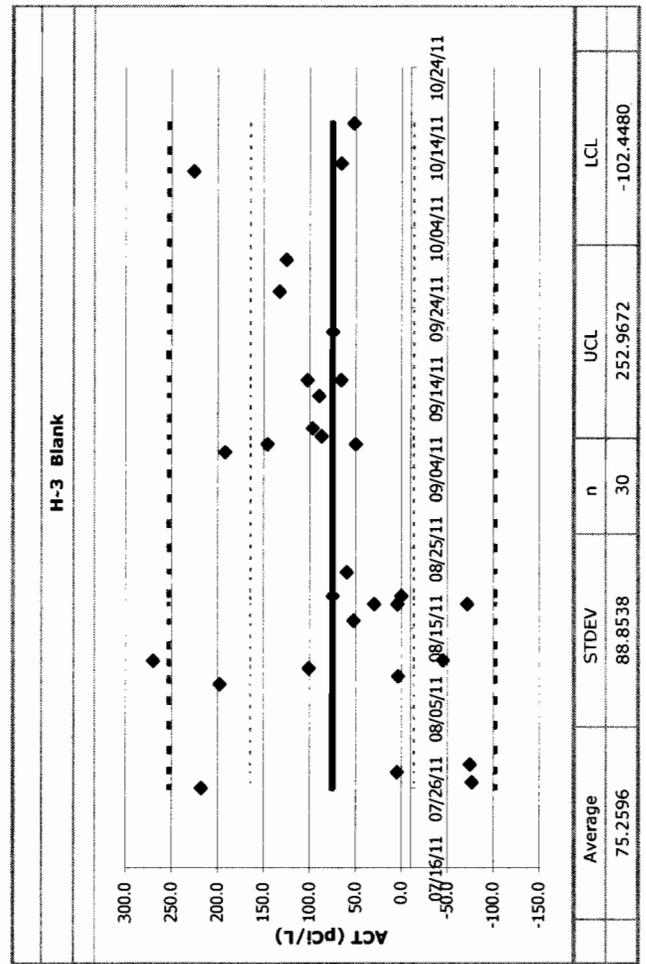
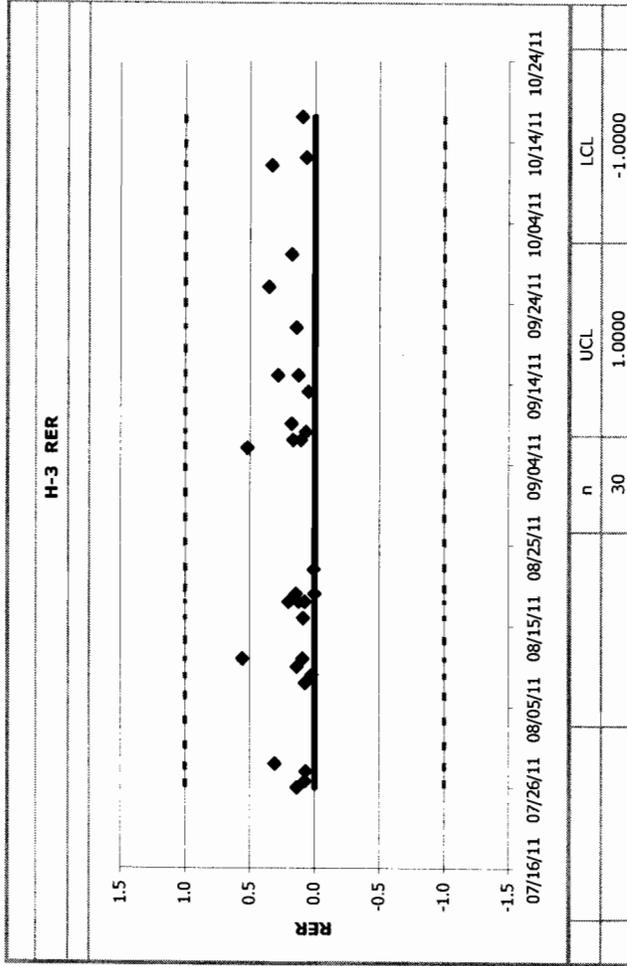
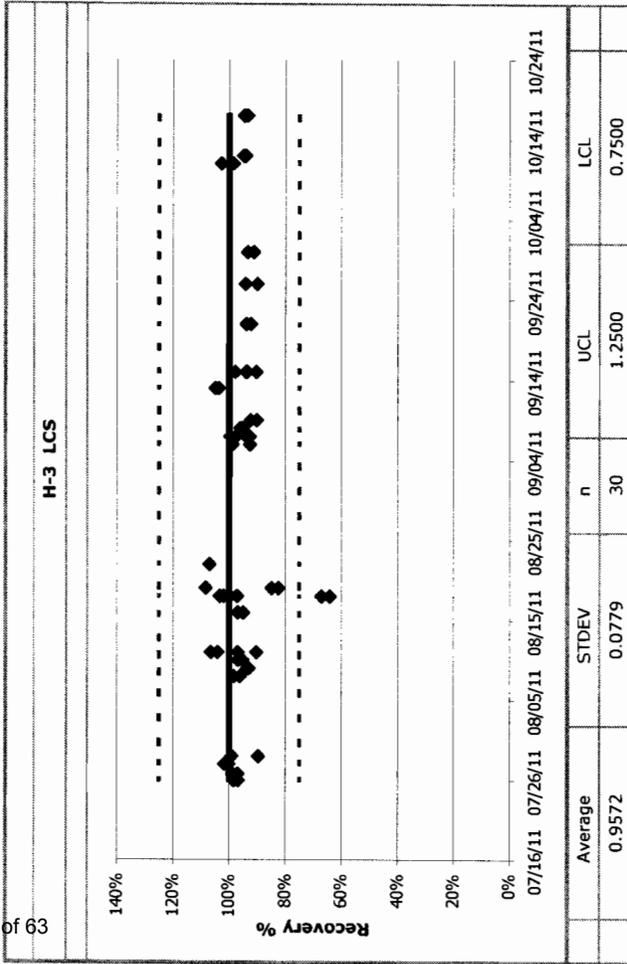
by

Low Level Liquid Scintillation Counting

Control Charts

QC Chart

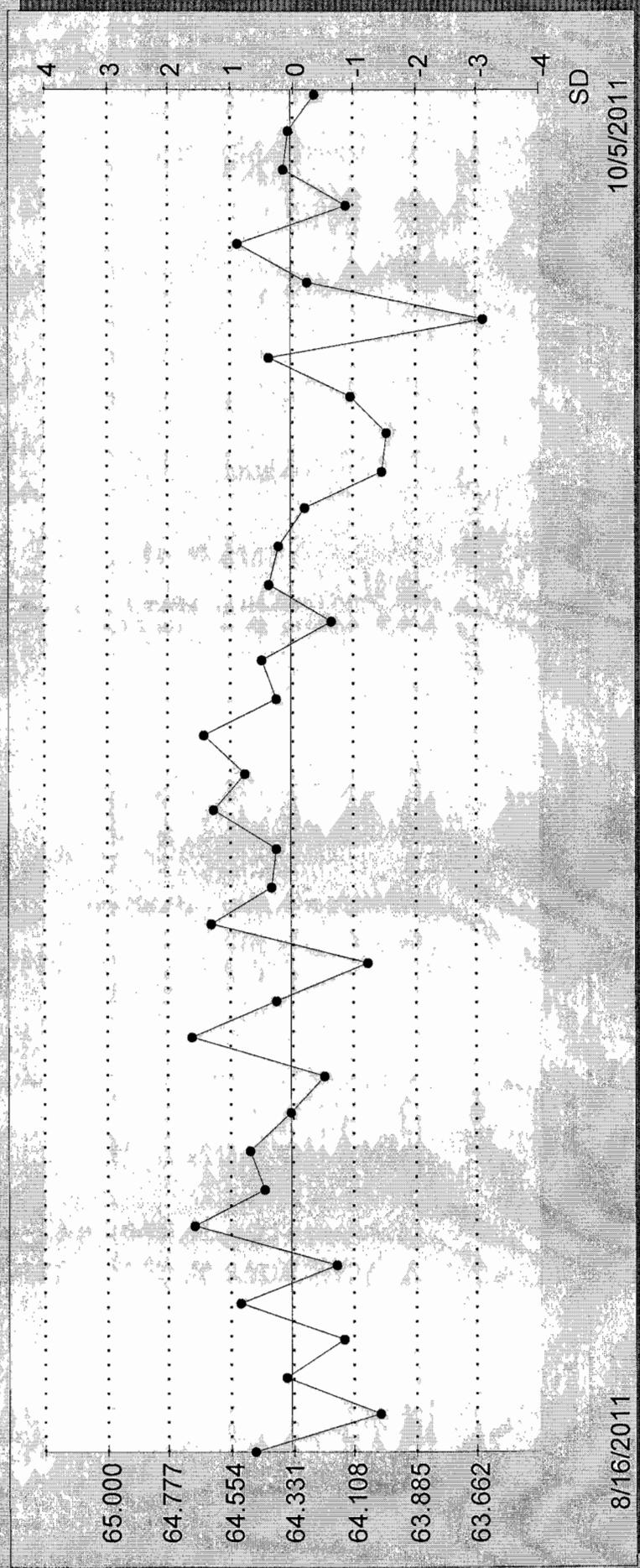
32 of 63



3H Efficiency
 Total # pts : 1690
 Valid # pts : 37
 Mean \bar{x} : 64.33
 SD σ : 0.22

Date	Value	Valid Pt
Aug 16, 2011	64.46	X
Aug 19, 2011	64.01	X
Aug 22, 2011	64.35	X
Aug 24, 2011	64.14	X
Aug 26, 2011	64.52	X
Aug 29, 2011	64.17	X
Aug 29, 2011	64.69	X
Aug 29, 2011	64.43	X
Sep 01, 2011	64.48	X
Sep 03, 2011	64.33	X
Sep 06, 2011	64.21	X
Sep 10, 2011	64.69	X
Sep 14, 2011	64.39	X
Sep 17, 2011	64.06	X
Sep 19, 2011	64.62	X
Sep 21, 2011	64.41	X
Sep 24, 2011	64.38	X
Sep 25, 2011	64.61	X
Sep 25, 2011	64.50	X
Sep 25, 2011	64.65	X
Sep 25, 2011	64.39	X
Sep 25, 2011	64.44	X
Sep 25, 2011	64.18	X
Sep 25, 2011	64.41	X
Sep 25, 2011	64.38	X
Sep 25, 2011	64.28	X
Sep 26, 2011	64.00	X
Sep 26, 2011	63.99	X
Sep 26, 2011	64.12	X
Sep 26, 2011	64.41	X
Sep 26, 2011	63.64	X
Sep 26, 2011	64.28	X
Sep 27, 2011	64.53	X
Sep 29, 2011	64.14	X
Oct 03, 2011	64.36	X
Oct 04, 2011	64.35	X
Oct 05, 2011	64.24	X

3H Efficiency : 1690
 Total # pts : 37
 Valid # pts : 64.33
 Mean σ : 0.22
 SD : 63



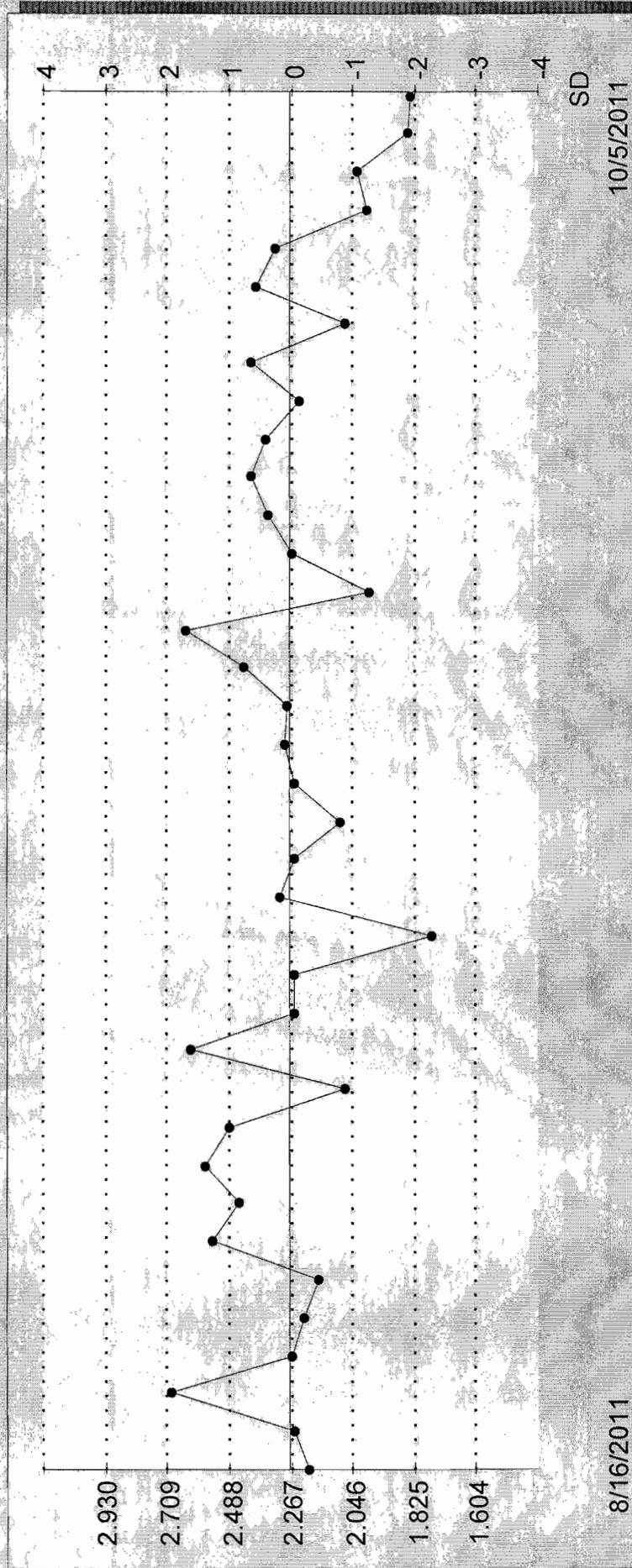
8/16/2011

10/5/2011

3H Background
 Total # pts : 1646
 Valid # pts : 37
 Mean \bar{Q} : 2.27
 SD σ : 0.22

Date	Value	Valid Pt
Aug 16, 2011	2.20	X
Aug 19, 2011	2.26	X
Aug 22, 2011	2.69	X
Aug 24, 2011	2.26	X
Aug 26, 2011	2.22	X
Aug 29, 2011	2.17	X
Aug 29, 2011	2.55	X
Aug 29, 2011	2.45	X
Sep 01, 2011	2.57	X
Sep 03, 2011	2.48	X
Sep 06, 2011	2.07	X
Sep 10, 2011	2.63	X
Sep 14, 2011	2.25	X
Sep 17, 2011	2.25	X
Sep 19, 2011	1.76	X
Sep 21, 2011	2.30	X
Sep 24, 2011	2.25	X
Sep 25, 2011	2.09	X
Sep 25, 2011	2.25	X
Sep 25, 2011	2.29	X
Sep 25, 2011	2.28	X
Sep 25, 2011	2.43	X
Sep 25, 2011	2.64	X
Sep 25, 2011	1.99	X
Sep 25, 2011	2.26	X
Sep 25, 2011	2.35	X
Sep 26, 2011	2.41	X
Sep 26, 2011	2.35	X
Sep 26, 2011	2.24	X
Sep 26, 2011	2.41	X
Sep 26, 2011	2.07	X
Sep 26, 2011	2.39	X
Sep 27, 2011	2.32	X
Sep 29, 2011	1.99	X
Oct 03, 2011	2.03	X
Oct 04, 2011	1.85	X
Oct 05, 2011	1.84	X

3H Background
 Total # pts : 1646
 Valid## pts : 37
 Mean σ : 2.27
 SD σ : 0.22



8/16/2011

SD

10/5/2011



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

Low Level Liquid Scintillation Counting

Calibration Information

STD ID: S-0262

		Add/Edit Secondary Stds	Parent Standard Data			
Planning		Parent Solution Reference #	NIST SRM 4927F			
Planning Comments	Create an H3 LCS stock solution.		Parent Solution #	S-0237		
Target dpm/g (on dil. date)	5.5	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 Sofn	3.408758506	Parent Certified Act	3503.682716	Certi Act/Vol Units	dpm	g
Appx vol ml of Parent Sofn	3.414905335	Parent Cert Act Uncert 1 Sigma	0.0636			
Expected Addition for Analysis g	5	Parent Sp. Gravity G/Ml	0.9982			
Standards Preparation / Dilution		Parent Supplier	NIST SRM 4927F			
Secondary Solution #	S-0262	Parent Date Recvd	01/02/00			
Dilution Date (New Ref Date)	09/07/2011 11:47	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)	13.352	Certified dpm/g on 09/07/2011 11:47	3226.981313			
Container Plus Solution (g)	16.889	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)	3.537					
DPH Xferred on 09/07/2011 11:47	11413.83291					
Diluent/matrix	Dead 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)	473.97	is_Calib	FALSE			
Dilution Full Cont g (if measured)	2467.33					
Dilution Final Volume ml (if measured)	2000					
Final Dilution Density (g/mL)	0.99848					
Final Dilution Measured Mass g	1993.36					
Comments	H3 LCS stock solution dilution performed as stated above by B Steffens. -BJS 9/7/11					
Final Dilution dpm/g	5.725925529					
Final Dil New Ref Date/Time	09/07/2011 11:47					

S-0262	
H-3	Verified 9/7/11
SL	Expires 9/7/12
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 9/13/2011 7:43 date counted
 STANDARD REFERENCE # S-0262

Principal Radionuclide H-3 ENTER -> Half Life, Years 1.232E+01 OR -> Half Life, Days 4.4998E+03
4.4998E+03

Radionuclide H-3 Dilution Reference Date 9/7/2011 11:47

Dilution Activity 2.58 pCi per gram ==> dpm/g 5.73
 Verif. Date Decay Corrected 2.58 pCi per gram ==> dpm/g 5.72

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-0262-V1	16.07	1	LSC	0.3754	5.40	5.050	5.63	2.54
S-0262-V2	16.39	1	LSC	0.3770	5.40	5.037	5.79	2.61
S-0262-V3	15.70	1	LSC	0.3763	5.40	5.035	5.44	2.45
S-0262-V4	15.00	1	LSC	0.3768	5.40	5.022	5.07	2.29
S-0262-V5	15.85	1	LSC	0.3774	5.40	5.019	5.52	2.49

Average	<u>5.49</u>	<u>2.47</u>
Two Sigma Uncertainty	<u>0.52</u>	<u>0.24</u>
Standard Deviation percent of known concentration	<u>4.66%</u>	<u>4.66%</u>
Target Activity	<u>5.72</u>	<u>2.58</u>
% Diff	<u>-4.13%</u>	<u>-4.13%</u>

10% Max **PASS** 5% Max **PASS**

Verification Expiration Date: #####

Prepared & Counted By [Signature] Date: 9/13/2011 7:43
 Verified & Approved By [Signature] Date: 9-13-11
 QC Approval [Signature] Date: 9-13-11

S-0262	
H-3	Verified <u>9/7/11</u>
SL	Expires <u>9/7/12</u>
Manufacturer	NIST SRM 4927F
Sol Matrix	H2O
Ref No	NIST SRM 4927F
Tech	Unknown
Parent ID	S-0237

ARS INTERNATIONAL

RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

Assay Definition-
Assay Description:
H-3 Normal Level Assay
Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20110912_2059
Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20110912_2059\20110912_2059.results
RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20110912_2059\H-3 Results.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20110912_2059\H-3 Results.csv
Assay File Name: C:\Packard\TriCarb\Assays\H-3 Normal Lvl 3.lsa

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): 120.00
Count Mode: Normal
Assay Count Cycles: 1 Repeat Sample Count: 1
#Vials/Sample: 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

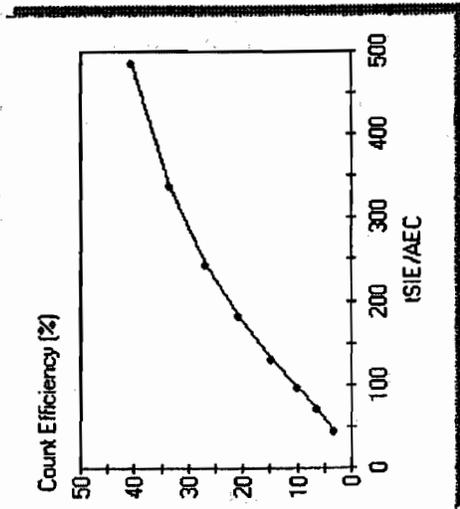
Half Life-
Half Life Correction: Off
Regions Half Life Units Reference Date Reference Time

42 of 63

A
B
C

Cycle 1 Results
Quench Curve Block Data

UG STD H-3 in A



Date Acquired: 06/15/2011
Date Modified:
UG STD H-3 in A

tSIE/AEC	Count Efficiency (%)
487.53	40.41
339.12	33.51
243.83	26.83
182.60	20.93
130.85	14.63
96.86	9.97
71.30	6.34
46.31	3.09

P#	S#	SMPL ID	CPMA	DPM1	tsIE	Eff Nucl	In A	Count Time	DATE	TIME	MESSAGES
50	1	BACKGROUND	5.40	14.31	429.68	37.72	37.72	120.00	9/12/2011	9:04:58 PM	
50	2	S-0262-V1	16.07	42.82	425.91	37.54	37.54	120.00	9/12/2011	11:12:00 PM	
50	3	S-0262-V2	16.39	43.48	429.27	37.70	37.70	120.00	9/13/2011	1:19:59 AM	
50	4	S-0262-V3	15.70	41.73	427.79	37.63	37.63	120.00	9/13/2011	3:27:57 AM	
50	5	S-0262-V4	15.00	39.81	428.81	37.68	37.68	120.00	9/13/2011	5:35:55 AM	
50	6	S-0262-V5	15.85	42.00	430.24	37.74	37.74	120.00	9/13/2011	7:43:52 AM	



National Institute of Standards & Technology

Certificate

Standard Reference Material 4927F

Hydrogen-3 Radioactivity Standard

This Standard Reference Material (SRM) consists of tritiated water, having a standardized and certified quantity of radioactive hydrogen-3. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. The solution, whose composition is specified in Table 1, is contained in a flame-sealed, 5 mL, NIST, borosilicate-glass ampoule (see Note 1)*.

The certified **hydrogen-3** massic activity value, at a **Reference Time of 1200 EST, 3 September 1998**, is:

$$(634.7 \pm 4.6) \text{ kBq}\cdot\text{g}^{-1}$$

Additional physical, chemical, and radiological properties for the SRM, as well as details on the standardization method, are given in Table 1. Uncertainty intervals for certified quantities are expanded ($k = 2$) uncertainties calculated according to the ISO and NIST Guidelines (see Note 2). Table 2 contains a specification of the components that comprise the uncertainty analyses.

The certification of this SRM, within the measurement uncertainties specified, is valid for at least five (5) years after receipt. The solution matrix, in an unopened ampoule, is believed to be indefinitely homogeneous and stable, within its half-life-dependent, useful lifetime. NIST will monitor this material and will report any substantive changes in certification to the purchaser. Should any of the certified values change, purchasers of this SRM will be notified of the change by NIST.

This SRM may represent a radiological hazard. Hydrogen-3 decays by beta particle emission. None of the beta particles escape from the SRM vial. During the decay process no photons are emitted. The SRM should be stored and used at a temperature between 5 and 35 °C. See Note 1

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

Lisa R. Karam, Deputy Chief
Ionizing Radiation Division

Gaithersburg, Maryland 20899
May 2008
See Certificate Revision History on Last Page

Robert L. Watters, Jr., Chief
Measurement Services Division

Table 1. Properties of SRM 4927F

Certified values

Radionuclide	Hydrogen-3
Reference time	1200 EST, 3 September 1998
Massic activity of the solution	634.7 kBq•g⁻¹
Relative expanded uncertainty (<i>k</i> = 2)	0.72 % (see Note 2)*

Uncertified information

Source description	Liquid in flame-sealed, 5 mL NIST borosilicate ampoule (see Note 1)
Solution composition	Distilled water
Solution density	(0.998 ± 0.002) g•mL ⁻¹ at 20 °C (see Note 3)
Solution mass	Approximately 5.0 g
Radionuclidic impurities	None detected (see Note 4)
Half-lives used	³ H: (4500 ± 8) d (see Note 5)
Calibration method (and instruments)	The certified massic activity for ³ H was obtained by 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 (LS) counting systems (see Note 6)

Table 2. Uncertainty evaluation for the massic activity for SRM 4927F

	Uncertainty component	Assessment Type [†]	Relative standard uncertainty contribution on massic activity of ³ H (%)
1	Massic count rate of SRM 4927E, corrected for background and decay; standard deviation of the mean for 23 sets of gas counting measurements (see Note 6)	A	0.18
2	LS intercomparison of SRM 4927F and SRM 4927E; standard deviation of the mean for 7 sets of LS measurements	A	0.06
3	Decay corrections for ³ H; (for half-life uncertainty of 0.18%)	A	0.002
4	Gram-mole determinations based on pressure, volume and temperature measurements	B	0.20
5	Livetime determinations	B	0.10
6	Extrapolation of count-rate-versus-energy to zero energy	B	0.20
7	Limit for radionuclidic impurities	B	0.05
Relative combined standard uncertainty			0.36
Relative expanded uncertainty (<i>k</i> = 2)			0.72

[†] = (A) denotes evaluation by statistical methods; (B) denotes evaluation by other methods.

NOTES

Note 1. Refer to <http://physics.nist.gov/Divisions/Div846/srm.html> for the standardized ampoule dimensions and for assistance and instructions on how to properly open an ampoule. Information on additional storage and handling requirements is also included in the website.

Note 2. The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO and NIST Guides (see references [1] and [2]). The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain an approximate 95 % level of confidence.

Note 3. The stated uncertainty is two times the standard uncertainty. See reference [2]

Note 4. The estimated lower limit of detection for radionuclidic impurities is $300 \text{ Bq}\cdot\text{g}^{-1}$

Note 5. The stated uncertainty is the standard uncertainty. See reference [2] and [3].

Note 6. 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 using LS counting.

REFERENCES

- [1] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993 (corrected and reprinted, 1995). Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.
- [2] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.
- [3] L.L Lucas and M.P. Unterweger, *Comprehensive Review and Critical Evaluation of the Half-Life of Tritium*, J. Res. Natl. Inst. Stand. Technol. **105**, 541-549 (2000)

Certificate Revision History: May 2008 (Text revised); February 2007 (Text revised and expiration date extended); October 2000 (Half-life and text revised); June 1999 (Original certificate 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

Percent Moisture



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-11-02040
Client Sample ID: MD21-11-26394
Sample Collection Date: 09/15/11
Sample Matrix: Silica

Request or PO Number: 11-3646
ARS Sample ID: ARS1-11-02040-001
Date Received: 09/21/11
Report Date: 10/18/11

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	8.577	NA	NA	NA		%	Percent Moisture	10/06/11 06:49	BS	NA

NOTES: Project Cost Code MR8R032NFM00

SOL

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

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Percent Moisture Laboratory Records

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

SDG Number ARS1-11-02040, 02041, 02042, 02054
 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
MD21-11-26394	ARS1-11-02040-001	588	432	155	13.2936	5.035	8.576516129
MD21-11-26401	ARS1-11-02041-001	601	443	158	19.6278	5.0843	12.42265823
MD21-11-26398	ARS1-11-02041-002	620	438	182	37.5767	5.0076	20.64653846
MD21-11-26399	ARS1-11-02041-003	624	443	181	37.8642	5.0468	20.91944751
MD21-11-26395	ARS1-11-02041-004	627	439	187	42.7506	5.025	22.86128342
MD21-11-26397	ARS1-11-02041-005	630	441	188	41.0583	5.0285	21.83952128
MD21-11-26400	ARS1-11-02041-006	628	457	170	27.2601	5.0336	16.03535294
MD21-11-26417	ARS1-11-02042-001	618	439	179	34.7754	5.0391	19.42759777
MD21-11-26415	ARS1-11-02042-002	625	433	191	44.7769	5.0334	23.44340314
MD21-11-26402	ARS1-11-02042-003	605	440	164	20.6431	5.0575	12.5872561
MD21-11-26414	ARS1-11-02042-004	653	448	203	48.6434	5.0409	23.96226601
MD21-11-26420	ARS1-11-02042-005	615	452	162	17.4901	5.0515	10.79635802
MD21-11-26419	ARS1-11-02042-006	642	450	191	41.838	5.0361	21.90471204
MD21-11-26416	ARS1-11-02042-007	623	443	180	42.1155	5.0389	23.3975
MD21-11-26436	ARS1-11-02054-001	620	450	169	21.3451	5.0188	12.63023669
MD21-11-26437	ARS1-11-02054-002	605	438	167	23.3721	5.0442	13.99526946

MD21-11-26438	ARS1-11-02054-003	620	455	164	19.2483	5.0567	11.73676829
MD23-11-26435	ARS1-11-02054-004	621	451	170	24.9414	5.0341	14.67141176
MD21-11-26434	ARS1-11-02054-005	617	447	171	25.1074	5.0295	14.68269006

Balance ID: 0102/H1331122173560P

Pipettor ID: FJ40469



Signature

Date

10-10-11

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

SDG Number ARS1-11-02040, 02041, 02042, 02054
 Client LANL

LCS- 5.034Z
 LCSB-5.0194
 BIK-5.0379

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
MD21-11-26394	ARS1-11-02040-001	588	432	155	13.2936	5.0350	#DIV/0!
MD21-11-26401	ARS1-11-02041-001	601	443	158	19.6278	5.0843	#DIV/0!
MD21-11-26398	ARS1-11-02041-002	620	438	182	37.5767	5.0076	#DIV/0!
MD21-11-26399	ARS1-11-02041-003	624	443	181	37.8042	5.0468	#DIV/0!
MD21-11-26395	ARS1-11-02041-004	627	439	187	42.7506	5.0250	#DIV/0!
MD21-11-26397	ARS1-11-02041-005	630	441	188	41.0583	5.0285	#DIV/0!
MD21-11-26400	ARS1-11-02041-006	628	457	170	37.2601	5.0336	#DIV/0!
MD21-11-26417	ARS1-11-02042-001	618	439	179	34.7754	5.0391	#DIV/0!
MD21-11-26415	ARS1-11-02042-002	625	433	191	44.7769	5.0334	#DIV/0!
MD21-11-26402	ARS1-11-02042-003	605	440	164	20.6431	5.0575	#DIV/0!
MD21-11-26414	ARS1-11-02042-004	653	448	203	48.6134	5.0409	#DIV/0!
MD21-11-26420	ARS1-11-02042-005	615	452	162	17.4901	5.0515	#DIV/0!
MD21-11-26419	ARS1-11-02042-006	642	450	191	41.8380	5.0361	#DIV/0!
MD21-11-26416	ARS1-11-02042-007	623	443	180	42.1155	5.0389	#DIV/0!
MD21-11-26436	ARS1-11-02054-001	620	450	169	21.3451	5.0188	#DIV/0!
MD21-11-26437	ARS1-11-02054-002	605	438	167	23.3721	5.0442	#DIV/0!

MD21-11-26438	ARS1-11-02054-003	620	455	164	19,2483	5,0567	#DIV/0!
MD21-11-26435	ARS1-11-02054-004	621	451	170	24,9414	5,0341	#DIV/0!
MD21-11-26434	ARS1-11-02054-005	617	447	171	25,1071	5,0295	#DIV/0!

Balance ID: 0102/H1331122173560P
Pipettor ID: FJ40469



Signature

Date

10-4-11



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

Folder Duplicate



Report Compilation Checklist

ARS SDG:	<u>11-02040</u>	Client Name:	<u>LANL</u>	Sample Matrix:	<u>SI</u>
----------	-----------------	--------------	-------------	----------------	-----------

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

LEVEL 2 COMPONENTS	1st Reviewer		
6) Batch Quality Control Report is Present and Accurate?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
7) DQO Report is Present and Accurate?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
8) Client Specific Batch QC Components are Present and Complete?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

LEVEL 3 COMPONENTS	1st Reviewer		
9) Efficiencies are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
10) Calibrations are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
11) Backgrounds are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
12) Spectrum Analysis is Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
13) Spectral Plots are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
14) Plateaus are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
15) Control Charts are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> 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	<input type="checkbox"/> No	<input type="checkbox"/> N/A
18) Instrument Raw Data Present and Complete?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
19) Calibration Certificates Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
20) Copies of Log Book Pages Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
21) Sample Receiving Documentation Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
22) LIMS Reports Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
23) Applicable Correspondence Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
24) Other:	Yes	No	<input checked="" type="checkbox"/> N/A

Suzanne Heese 10-18-11
 Report Generator Signature Date

JMM 10-18-11
 Management Review Signature Date



LSC Technical Review Checklist

ARS SDG 11-02040

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

Required QC Samples (Mark all that apply): Blank LGS LGS D Sample Dup MS MSD

ARS A. Batch ID(s): Batch A: B11-03714 Batch B: N/A Batch C: N/A

Test 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="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
2) 100% of Manual Calculations Verified?	Yes No <input checked="" type="checkbox"/> N/A	Yes No <input checked="" type="checkbox"/> N/A
3) Blank Composition/Configuration Matches Calibration?	<input checked="" type="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
4) Deviations from procedure are documented and verified?	Yes No <input checked="" type="checkbox"/> N/A	Yes No <input checked="" type="checkbox"/> N/A
5) Appropriate Cocktail Selected?	<input checked="" type="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
6) Sample Prep Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____		
 Chemist Signature	<u>10-5-11</u> Date	 Verifier Review Signature
<u>10-5-11</u> Date		

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations Valid and Current?	<input checked="" type="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
2) Backgrounds Valid and Current?	<input checked="" type="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
3) Source Checks Completed and Acceptable?	<input checked="" type="checkbox"/> Yes No N/A	<input checked="" type="checkbox"/> Yes No N/A
 QA Officer Signature		<u>10-18-11</u> Date
	Analyst Review	Technical Review
4) Background Checks Complete and Acceptable?	<input checked="" type="checkbox"/> Yes No N/A	Yes No N/A
5) 100% of Manually Entered Parameters Verified Accurate?	<input checked="" type="checkbox"/> Yes No N/A	Yes No N/A
6) Appropriate QC samples initiated at required frequency?	<input checked="" type="checkbox"/> Yes No N/A	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="checkbox"/> Yes No N/A	Yes No N/A
b) Spectra show no Evidence of Interferences?	<input checked="" type="checkbox"/> Yes No N/A	Yes No N/A
c) Sample Quench for All Samples within Range of Quench Curve?	<input checked="" type="checkbox"/> 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): _____		
 Analyst Signature	<u>10-10-11</u> Date	<u>N/A</u> Technical Reviewer Signature
<u>10-10-11</u> Date		

SDG Report - Samples and Containers

SDG		SDG Specific Data	
Sample Count	1	TAT Days	30
Client	Los Alamos National Laboratory	Date Received	9/21/2011
Client Code	114	Client Deadline	10/20/2011
Profile Number	PN-00094	Internal Deadline	10/20/2011
Comments		Lab Deadline	10/18/2011
		Project Type	Environmental
		COC Number	11-3646
		PO Number	63641-001-10
		Job Number	MR8A032NFM00
		Job Location	

Samples and Containers (→) Checked In Thru Far															
FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
001	MD21-11-26394	SI	09/15/11 12:00 PM	09/15/11 12:00 PM	H	90	5	Q6							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	96094	1		1.00			40	20		N	N/A				

SDG Report - Analysis Assignments

Temp SDG	ARS1-11-02040	Sample Count	1
Client	Los Alamos National Laboratory	Analysis Count	1-1

Samples Count Totals per Analysis		
Analysis Code	Analysis Description	Samples Count
LSC-A-001	Tritium in (Water [Aqueous, AQ, SI])	1

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

DQO Report for SDG
ARSI-11-02040

Analysis Code	Group	Isotope	Activity Units	Aliquot Units	ProcedureNo	RDI	LCS_LL	LCS_UL	MS_LL	MS_UL	RadY_LL	RadY_UL	Grav_LL	Grav_UL	RPD	DilutionReq	RoughPrepReq	BlankCorrectionMDA	BlankCorrectionAll	CountTimeReq	AliquotRequired	
LSC-A-001	STI	H-3	pCi	L	ARS-054	2.50E+02	80	120	75	125	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		

ARS FILE TRACKING SHEET

SDG: ARS1-11-02040

Task	Date / Time	Initials
Date & Time Samples Received	09-21-11/10:00	CMB
ICOC Initiated / Storage Location: <u>Q6</u>	09-21-11/15:43	CMB
Technical Checks Performed	See Batch	_____
Report Written / EDD Generated: <u>10-18-11 10:15</u> <u>SOL</u> <small style="display: inline-block; width: 100px; text-align: center;">Date/Time Initials</small>	10-18-11/10:11	SOL
Quality Assurance Checks Performed on Report	10-18-11 1357	VM
Management Check Performed on Report		
<i>Preliminary Report Sent</i>		
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 ^{see notes} Mgmt. Approval: _____		✓

NOTES:

