

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4031 EVENT NAME: Mortandad/Sandia (MDA C and GS Monitoring) Q1 Watershed Sampling_MORTANDAD

SAMPLE ID: CAMO-13-24279 WORK ORDER: NA

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED (MM/DD/YYYY):		ow 11/01/12 11/01/12 2012	FIELD MATRIX:	WG	OK
TIME COLLECTED (HH:MM):		1134	MEDIA:	UA	OK
PRS ID:		OK	SAMPLE TECH CODE:	UA	GS1
LOCATION ID: R-60			FIELD PREP:	UF	OK
LOCATION TYPE: MON			FIELD QC TYPE:	REG	
PORT: SINGLE COMPLETION			SAMPLE USAGE:	INV	

PRIORITY	ORDER	CONTAINER	#	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
NA	WSP-8260B-VOA	40 ML SEPTUM AMBER GLASS	2	HCL	Y	NA
	WSP-8270C-SVOA	1 LITER AMBER GLASS	3	ICE		
	WSP-GrossA/B	1 LITER POLY	1	NONE		
	WSP-LL-H-3	1 LITER POLY	1	NONE		
	WSP-RAD	1 GAL POLY	1	HNO3		
	WSP-TKN+TOC	500 ML AMBER GLASS	1	H2SO4		

SAMPLE COMMENTS: Samples taken within 50 feet of a running diesel generator

LOCATION COMMENTS: None

FIELD PARAMETERS:

Dissolved Oxygen 5.85 mg/L Oxidation-Reduction Potential 132.2 MV pH 8.30 SU
 Specific Conductance 116 uS/cm Temperature 23.72 deg C Turbidity 1.49 NTU

COLLECTED BY (PRINT) D Felkenz

RELINQUISHED BY (Printed Name) D Woody (Signature) David Woody	Date/Time 11/01/12 1230	RECEIVED BY (Printed Name) M. May (Signature) [Signature]	Date/Time 11/01/12 1230
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

Report Date 10/24/2012

Data Validation Report

Chain Of Custody No. 2013-26SARS

1. Distribution Of Samples In EDD.

	Analytical	Regular	Field	Trip	Field	Equipment
SDG	Method	Samples	Duplicates	Blanks	Blanks	Blanks
ARS1-12-02261	Generic:Low_Level_Tritium	1				

	Analytical	Analysis	Prep	Regular	Field	Trip	Field	Equipment	Method	Matrix	Matrix
SDG	Method	Lot ID	Lot ID	Samples	Duplicates	Blanks	Blanks	Blanks	Blanks	Spikes	Spike Dups
ARS1-12-02261	Generic:Low_Level_Tritium	ARS1-B12-02721	ARS1-B12-02721	1						1	

2. Distribution Of Analytes In EDD.

Analytical Method	Method Category	Field Sample ID	Lab Sample ID	Sample Purpose	Target Analytes	Surrogates	Spikes	TICS
Generic:Low_Level_Tritium	RAD							
LCS	ARS1-B12-02721-01	LCS	0	0	1	0		
Generic:Low_Level_Tritium	RAD	CAMO-13-24279	ARS1-B12-02721-04	REG	1	0	0	0
Generic:Low_Level_Tritium	RAD	LCSD	ARS1-B12-02721-02	LCSD	0	0	1	0
Generic:Low_Level_Tritium	RAD	MB	ARS1-B12-02721-03	MB	1	0	0	0

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

Any samples affected by the presence of contaminants in blanks?

No.

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

Analytical	Post-Digestion	Lab Control	Lab Control	Blank	Blank	Lab	Storage	Preparation	Reagent
Spikes	Spikes	Samples	Sample Dups	Spikes	Spike Dups	Duplicates	Blanks	Blanks	Blanks
		1	1						

Data Validation Report for:

Chain Of Custody No. 2013-265ARS

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

None.

13. Display Flagged Data.

Location ID	Chain Of Custody No	Field Sample ID	Sample Purpose	Analysis Type Code	Analytical Suite	Analytical Method	Parameter Name	Lab Qualifier	Validation Qualifier	Validation Reason Codes	Detected
R-60	2013-265ARS	CAMO-13-24279	REG	INIT	RAD	Generic:Low_Level_Tritium	Tritium	U	U	RS	N

Reason Code

Description

RS

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

14. Useable Result Count.

Field	Location	Sample	Analytical	No. Unuseable	Total No. Of
Sample ID	ID	Purpose	Method	Records	Records
CAMO-13-24279	R-60	REG	Generic:Low_Level_Tritium	0	1

Lab Result	Lab Units	Report Result	Report Units	Report MDA	Report Uncertainty	Lab Matrix	Sample Date	Percent Moisture	Analysis Lot ID	Validation Status Code	Use Flag
-0.213	pCi/L	-0.213	pCi/L	2.247	0.655	W	11/1/2012		ARS1-B12- 02721	VAL	Y



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: 2013-265 ARS



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: 2013-265 ARS**

Original COC



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: 2013-265 ARS**

Case Narrative



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

December 7, 2012

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

Request Number: **2013-265ARS**
LANL Sample ID: **CAMO-13-24279**

Dear Mr. Greene;

On November 9, 2012, ARS International received one (1) water sample to be analyzed for Low Level Tritium.

The sample underwent enrichment and was 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, appearing to read 'James D. Flannery', is written over a horizontal line.

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)
2013-265ARS	CAMO-13-24279	ARS1-12-02261-001

ANALYTICAL METHODS

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


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

12-10-12
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

Low Level Tritium by Low Level Liquid Scintillation Counting

ARS Sample Delivery Group: ARS1-12-02261
 Client Sample ID: CAMO-13-24279
 Sample Collection Date: 11/01/12
 Sample Matrix: Aqueous

Request or PO Number: 2013-265ARS
 ARS Sample ID: ARS1-12-02261-001
 Date Received: 11/09/12
 Report Date: 12/10/12

Analysis Description	Analysis Results	Analysis Error +/- 1 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Enriched H-3	-0.213	0.655	2.247	1.085	U	pCi/L	ARS-040	12/05/12 09:30	RJU	NA

NOTES: Lab Agreement 63641-001-10


 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



2609 North River Road, Port Allen, Louisiana 70767

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

QC Results Report

Sample Delivery Group: ARS1-12-02261

Date Received: 11/9/2012

Laboratory Control Sample Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Percent Recovery (%)	LCS Acceptance Range
ARS1-B12-02721	LCS	H3	25.875	4.032	2.269	25.703		pCi/L	ARS-040	12/4/12 18:56	RJU	101	80%-120%

Blank Evaluation

Analysis Batch	QC Type	Analyte	Analysis Results	CSU 1 (1s)	MDC	Expected Value	Qual	Report Units	Analysis Test Method	Analysis Date/Time	Analysis Technician
ARS1-B12-02721	MBL	H3	-0.085	0.625	2.135	NA	U	pCi/L	ARS-040	12/4/12 18:56	RJU

Sample RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-B12-02721	LCSD	H3	25.875	4.032	24.604	3.836		pCi/L	ARS-040	12/4/12 18:56	RJU	0.16	< 1

Sample DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 2 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-B12-02721	LCSD	H3	25.875	4.032	24.604	3.836		pCi/L	ARS-040	12/4/12 18:56	RJU	0.46	< 3

Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558

QC Evaluation

EPA Method: ARS-040

Batch ID: ARS1-B12-02721

SDG's: ARS1-12-02261;2262;2263;2264;2305;2306;2307;2309

LCS	<u>25.8750</u>	CSU (2s)	<u>7.9020</u>
LCSD	<u>24.6040</u>	CSU-D (2s)	<u>7.5190</u>

$$DER = \frac{\text{abs}(LSC-LSCD)}{\text{sqr}((2s \text{ CSU}/2)^2 + ((2s \text{ CSU-D}/2)^2) \text{ at } 1 \text{ sigma}} = < 3$$

$$DER = \frac{1.271}{5.453828} = 0.233047 < 3$$

$$\% \text{ RPD} = \frac{\text{ABS}(LCS - LSCD)}{(LCS+LCSD)/2} * 100 = < 25\%$$

$$\% \text{ RPD} = \frac{1.271}{25.2395} * 100 = 5.035757 < 25\%$$

The RPD shall be less than 25% or other client-applied criteria

$$RER = \frac{\text{abs}((LCS-LSCD))}{(CSU)+(CSD) \text{ at } 2 \text{ sigma}} = < 1 \quad \leftarrow \text{LANL Requirement}$$

$$RER = \frac{1.271}{15.4210} = 0.082420077 < 1$$

Blank Information

	Act	CSU(2s)	MDA	Act>MDA	
AM-241					
U-234					*MDA should be below RDL
U-235					*Blank activity must be below MDA
U-238					*Blank activity must be < 1.65*CSU (DOE only)
Pu-238					
Pu-239/240					ACT = -0.085
Th-228					CSU = 1.225
Th-230					Is ACT<1.65*CSU? YES
Th-232					
H3	-0.085	1.225	2.135		
Ra-226					
Ra-228					
Total U					
Pb-210					
Po-209					
Sr-90					
TC-99					
NI-63					



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 Tritium

by

Low Level Liquid Scintillation Counting

Laboratory Records

12 of 85

LCS Report
Analytical Batch: ARS1-B12-02721

13 of

StdID	Batch	BatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmplyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-14793	ARS1-B12-02721	ARS1-B12-02721-01	B-H3	S-0279	H-3	5	2.552560129	13.098	18.151	5.053	AMRAD\BSTEFFENS	11/13/2012			
B-14794	ARS1-B12-02721	ARS1-B12-02721-02	B-H3	S-0279	H-3	5	2.552560129	13.14	18.192	5.052	AMRAD\BSTEFFENS	11/13/2012			

14 of 5

ID	31001_040	ABatch	AnalysisCode	ABatchSampleID	ClientID	IC_ID	S01_1_EnrichCellNo	S01_2_TareCell	S01_3_TareResv	S02_GrossWtResv	S03_1_WtNa202	C_GrossSampleAdded
444	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-01			4		327.7	200.9	701.14	2.07	500.24
445	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-02			33		336.25	215.3	718.8	2.08	503.5
446	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-03			74		328.56	197.95	701.97	2.06	504.02
447	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-04	CAMO-13-24279		61		335.51	213.55	714.87	2	501.32
448	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-05	CAMO-13-24241		64		331.04	209.03	714.77	2.01	505.74
449	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-06	CAMO-13-24242		68		334.63	204.08	706.25	2.02	502.17
450	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-07	CAMO-13-24225		29		335.72	206.2	707.31	2.06	501.11
451	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-08	CAMO-13-24247		55		331.14	208.66	711.99	2.02	503.33
452	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-09	CAMO-13-24248		84		336.66	197.55	700.94	2.05	503.39
453	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-10	CAMO-13-24276		89		340.12	203.22	707.98	2.08	504.76
454	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-11	CASA-13-24209		97		332.94	202.132	708.3	2	506.168
455	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-12	CASA-13-24213		3		332.17	214.84	717.62	2.03	502.78
456	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-13	CASA-13-24214		16		329.44	217.7	718.25	2.09	500.55
457	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-14	CASA-13-24210		26		337.76	213.12	716.43	2	503.31
458	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-15	CAMO-13-24245		44		331.35	214.173	718.93	2.08	504.757
459	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-16	CAMO-13-24246		50		329.91	216.33	717.493	2.07	501.163
460	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-17	CAMO-13-24249		31		334.66	204.09	709.85	2.08	505.76
461	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-18	CAMO-13-24250		8		332.1	204.54	705.56	2	501.02
462	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-19	CAMO-13-24253		87		334.14	207.46	710.88	2.01	503.42
463	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-20	CAMO-13-24228		94		337.21	197.78	700.71	2.05	502.93
464	ARS1-B12-02721	LSC-A-022	ARS1-B12-02721-21	CASA-13-24211		99		336.65	206.9	709.24	2.06	502.34

Ben [Signature] 12-4-12

S04_1_ElectroID	S04_2_StartAmp	S04_3_StartBathC	S05_1_ElectroIED	S05_2_EndBathC	S05_3_EndCellWt	C_GrossSmpIRec	C_EnrichmentF	S06_TareWt	S07_GrossWt	C_RecoveredWa
11/16/2012 15:00:00	5	1.8 11/30/2012 14:58:00	2		545.34	16.74	29.88291517	117.45	130.16	12.71
11/16/2012 15:00:00	5	1.8 11/30/2012 15:00:00	2		567.84	16.29	30.90853284	117.71	129.56	11.85
11/16/2012 15:00:00	5	1.8 11/29/2012 07:51:00	1.8		543.45	16.94	29.75324675	101.5	114.12	12.62
11/16/2012 15:00:00	5	1.8 11/29/2012 07:53:00	1.8		565.75	16.69	30.03714799	108.55	121.28	12.73
11/16/2012 15:00:00	5	1.8 11/30/2012 15:01:00	2		555.66	15.59	32.44002566	104.53	115.28	10.75
11/16/2012 15:00:00	5	1.8 12/03/2012 12:24:00	1.9		553.86	15.15	33.14653465	102.66	112.87	10.21
11/16/2012 15:00:00	5	1.8 11/29/2012 13:10:00	2		558.94	17.02	29.44242068	116.99	128.81	11.82
11/16/2012 15:00:00	5	1.8 11/30/2012 15:03:00	2		555.09	15.29	32.91890124	110.03	121.82	11.79
11/16/2012 15:00:00	5	1.8 11/30/2012 15:05:00	2		549.5	15.29	32.92282538	109.95	120.14	10.19
11/16/2012 15:00:00	5	1.8 11/30/2012 15:06:00	2		560.19	16.85	29.95608309	96.23	110.02	13.79
11/16/2012 15:00:00	5	1.8 11/30/2012 15:07:00	2		552.49	17.418	29.06005282	107.55	120.29	12.74
11/16/2012 15:00:00	5	1.8 11/29/2012 13:08:00	2		563.52	16.51	30.45305875	117.92	129.06	11.14
11/16/2012 15:00:00	5	1.8 12/04/2012 07:37:00	2.1		564.03	16.89	29.63587922	105.46	120.29	14.83
11/16/2012 15:00:00	5	1.8 12/04/2012 07:39:00	2.1		565.2	14.32	35.14734637	101.94	114.75	12.81
11/16/2012 15:00:00	5	1.8 12/04/2012 07:42:00	2.1		563.27	17.747	28.44182115	116.81	128.38	11.57
11/16/2012 15:00:00	5	1.8 12/04/2012 07:45:00	2.1		563.14	16.9	29.65461538	109.51	121.45	11.94
11/16/2012 15:00:00	5	1.8 12/04/2012 11:41:00	2.1		555.31	16.56	30.5410628	111.9	124.2	12.3
11/16/2012 15:00:00	5	1.8 11/29/2012 07:56:00	1.8		553.44	16.8	29.82261905	105.48	117.84	12.36
11/16/2012 15:00:00	5	1.8 11/29/2012 07:58:00	1.8		558.66	17.06	29.5087925	112	125.02	13.02
11/16/2012 15:00:00	5	1.8 11/29/2012 13:05:00	1.9		551.09	16.1	31.2378882	115.1	127.71	12.61
11/16/2012 15:00:00	5	1.8 11/29/2012 13:03:00	1.9		560.98	17.43	28.82042456	104.78	117.5	12.72

Ben Day 12-4-12

16 of 55

S08_TearWtLSCVial	S09_VialPlusSmpl	C_NetSample	S10_1_WtVisIsmpIDrWatFill	C_NetDeadWaterAdded	C_TareWtBFCocktail	S10_2_GrossWtWSC	C_NetWtCocktailAdded	UserID	ModDate
6.44	16.44	10	0	0	16.44	27.34	10.9	AMRAD\RUSEY	12/03/2012 12:16:52
6.44	16.45	10.01	0	0	16.45	27.43	10.98	AMRAD\RUSEY	12/03/2012 12:18:50
6.51	16.53	10.02	0	0	16.53	27.02	10.49	AMRAD\RUSEY	11/29/2012 14:42:42
6.53	16.54	10.01	0	0	16.54	26.83	10.29	AMRAD\RUSEY	11/29/2012 14:44:17
6.45	16.5	10.05	0	0	16.5	26.92	10.42	AMRAD\RUSEY	12/03/2012 12:20:31
6.53	16.54	10.01	0	0	16.54	26.86	10.32	AMRAD\RUSEY	12/03/2012 14:37:15
6.38	16.42	10.04	0	0	16.42	27.17	10.75	AMRAD\RUSEY	11/29/2012 15:39:24
6.59	16.64	10.05	0	0	16.64	26.96	10.32	AMRAD\RUSEY	12/03/2012 12:23:43
6.47	16.53	10.06	0	0	16.53	26.85	10.32	AMRAD\RUSEY	12/03/2012 14:39:07
6.54	16.54	10	0	0	16.54	26.89	10.35	AMRAD\RUSEY	12/03/2012 14:41:26
6.68	16.69	10.01	0	0	16.69	26.99	10.3	AMRAD\RUSEY	12/03/2012 14:43:02
6.52	16.56	10.04	0	0	16.56	26.84	10.28	AMRAD\RUSEY	11/29/2012 15:42:09
6.64	16.69	10.05	0	0	16.69	26.89	10.2	AMRAD\RUSEY	12/04/2012 10:57:08
6.38	16.39	10.01	0	0	16.39	26.6	10.21	AMRAD\RUSEY	12/04/2012 10:59:05
6.61	16.64	10.03	0	0	16.64	26.99	10.35	AMRAD\RUSEY	12/04/2012 11:01:07
6.49	16.54	10.05	0	0	16.54	26.84	10.3	AMRAD\RUSEY	12/04/2012 11:02:49
6.46	16.53	10.07	0	0	16.53	26.79	10.26	AMRAD\RUSEY	12/04/2012 13:55:27
6.5	16.58	10.08	0	0	16.58	26.89	10.31	AMRAD\RUSEY	11/29/2012 14:45:59
6.56	16.58	10.02	0	0	16.58	26.94	10.36	AMRAD\RUSEY	11/29/2012 14:47:45
6.46	16.49	10.03	0	0	16.49	26.79	10.3	AMRAD\RUSEY	11/29/2012 15:43:57
6.57	16.59	10.02	0	0	16.59	26.89	10.3	AMRAD\RUSEY	11/29/2012 15:45:48


12-4-12



LSC Instrument Data Transfer Report

\\Packard3170\Results\HS Low Level\Low Level HS_3\

AMERICAN RADIATION SERVICES, LLC

Batch Sample ID						Non-BKG Samples Transferred				Samples Eligible To Save			
ARS1-B12-02721						21				21			
LIMS Batch Sample ID	LSC P#	LSC PID	LSC S#	LSC SMPL_ID	LSC Count Date	LSC CPMA	LSC ISTE	LSC EFF	LSC Count Dur	Analysis Batch	LIMS SDG	LIMS Run	
BKG	10		1	BACKGROUND	12/04/12 14:45	1.11	395.29	25.3300	240.00	ARS1-B12-02721			
ARS1-B12-02721-01	10		2	B12-02721-01	12/04/12 18:56	4.84	378.07	24.5900	240.00	ARS1-B12-02721			
ARS1-B12-02721-02	10		3	B12-02721-02	12/04/12 23:07	4.79	377.91	24.5800	240.00	ARS1-B12-02721			
ARS1-B12-02721-03	10		4	B12-02721-03	12/05/12 03:18	1.09	407.72	25.9200	240.00	ARS1-B12-02721			
ARS1-B12-02721-04	10		5	B12-02721-04	12/05/12 07:29	1.08	378.13	24.5900	240.00	ARS1-B12-02721	ARS1-12-02261	1	
ARS1-B12-02721-05	10		6	B12-02721-05	12/05/12 11:40	1.28	395.32	25.3300	240.00	ARS1-B12-02721	ARS1-12-02262	1	
ARS1-B12-02721-06	2		1	B12-02721-06	12/06/12 16:58	3.80	401.27	25.6100	240.00	ARS1-B12-02721	ARS1-12-02262	1	
ARS1-B12-02721-07	2		2	B12-02721-07	12/06/12 21:09	1.32	410.59	26.0600	240.00	ARS1-B12-02721	ARS1-12-02262	1	
ARS1-B12-02721-08	2		3	B12-02721-08	12/07/12 01:20	1.47	395.87	25.3500	240.00	ARS1-B12-02721	ARS1-12-02262	1	
ARS1-B12-02721-09	2		4	B12-02721-09	12/07/12 05:31	1.35	351.17	23.5500	240.00	ARS1-B12-02721	ARS1-12-02262	1	
ARS1-B12-02721-10	2		5	B12-02721-10	12/07/12 09:42	1.06	286.28	20.1600	240.00	ARS1-B12-02721	ARS1-12-02263	1	
ARS1-B12-02721-11	2		6	B12-02721-11	12/07/12 13:53	1.82	354.31	23.6700	240.00	ARS1-B12-02721	ARS1-12-02264	1	
ARS1-B12-02721-12	10		13	B12-02721-12	12/05/12 15:52	1.03	220.99	15.6400	240.00	ARS1-B12-02721	ARS1-12-02264	1	
ARS1-B12-02721-13	10		14	B12-02721-13	12/05/12 20:03	1.28	402.67	25.6800	240.00	ARS1-B12-02721	ARS1-12-02264	1	
ARS1-B12-02721-14	10		15	B12-02721-14	12/06/12 00:14	1.00	286.72	20.1900	240.00	ARS1-B12-02721	ARS1-12-02305	1	
ARS1-B12-02721-15	10		16	B12-02721-15	12/06/12 04:24	1.16	290.87	20.4700	240.00	ARS1-B12-02721	ARS1-12-02306	1	
ARS1-B12-02721-16	10		17	B12-02721-16	12/06/12 08:35	1.17	258.02	18.2400	240.00	ARS1-B12-02721	ARS1-12-02306	1	
ARS1-B12-02721-17	10		18	B12-02721-17	12/06/12 12:46	3.55	251.93	17.8300	240.00	ARS1-B12-02721	ARS1-12-02306	1	
ARS1-B12-02721-18	10		1	B12-02721-18	12/07/12 18:04	1.08	258.29	18.2500	240.00	ARS1-B12-02721	ARS1-12-02306	1	
ARS1-B12-02721-19	10		2	B12-02721-19	12/07/12 22:15	1.85	308.77	21.6900	240.00	ARS1-B12-02721	ARS1-12-02307	1	
ARS1-B12-02721-20	10		3	B12-02721-20	12/08/12 02:26	1.39	304.39	21.3900	240.00	ARS1-B12-02721	ARS1-12-02307	1	
ARS1-B12-02721-21	10		4	B12-02721-21	12/08/12 06:37	1.07	280.53	19.7700	240.00	ARS1-B12-02721	ARS1-12-02309	1	

ARS-040 Calculation Results

ARS1-B12-02721

ACF 1

UCF 2.22

Sys Error 0.15

AnalysisCode	BatchSampleID	Total_Bkg_Count	Duration_min	DF	Sample_Activity_Conc	Standard_Counting_Uncertainty	CU_1	CSU_1	CU_1_96	CSU_1_96	MDC	DLC	ActivityReportUnits
LSC-A-022	ARS1-B12-02721-01	240.000	0.98654	0.98638	25.875	1.091	1.091	4.032	2.139	7.902	2.269	1.095	pCi
LSC-A-022	ARS1-B12-02721-02	240.000	0.98638	0.98638	24.604	1.047	1.047	3.836	2.052	7.519	2.186	1.055	pCi
LSC-A-022	ARS1-B12-02721-03	240.000	0.99908	0.99908	-0.085	0.625	0.625	0.625	1.225	1.225	2.135	1.031	pCi
LSC-A-022	ARS1-B12-02721-04	240.000	0.99478	0.99478	-0.213	0.655	0.655	0.655	1.283	1.285	2.247	1.085	pCi
LSC-A-022	ARS1-B12-02721-05	240.000	0.99462	0.99462	1.037	0.608	0.608	0.628	1.192	1.230	1.997	0.964	pCi
LSC-A-022	ARS1-B12-02721-06	240.000	0.99447	0.99447	15.912	0.845	0.845	2.532	1.656	4.963	1.933	0.933	pCi
LSC-A-022	ARS1-B12-02721-07	240.000	0.99432	0.99432	1.394	0.661	0.661	0.694	1.296	1.359	2.153	1.039	pCi
LSC-A-022	ARS1-B12-02721-08	240.000	0.99524	0.99524	2.149	0.620	0.620	0.699	1.215	1.369	1.959	0.946	pCi
LSC-A-022	ARS1-B12-02721-09	240.000	0.99524	0.99524	1.567	0.650	0.650	0.691	1.274	1.355	2.102	1.015	pCi
LSC-A-022	ARS1-B12-02721-10	240.000	0.99508	0.99508	-0.376	0.795	0.795	0.797	1.559	1.563	2.738	1.322	pCi
LSC-A-022	ARS1-B12-02721-11	240.000	0.99508	0.99508	5.262	0.817	0.817	1.136	1.601	2.227	2.422	1.169	pCi
LSC-A-022	ARS1-B12-02721-12	240.000	0.99570	0.99570	-0.793	0.998	0.998	1.005	1.956	1.970	3.460	1.670	pCi
LSC-A-022	ARS1-B12-02721-13	240.000	0.99554	0.99554	1.108	0.657	0.657	0.678	1.288	1.329	2.159	1.042	pCi
LSC-A-022	ARS1-B12-02721-14	240.000	0.99646	0.99646	-0.723	0.658	0.658	0.667	1.290	1.307	2.296	1.109	pCi
LSC-A-022	ARS1-B12-02721-15	240.000	0.99631	0.99631	0.469	0.844	0.844	0.847	1.655	1.661	2.843	1.372	pCi
LSC-A-022	ARS1-B12-02721-16	240.000	0.99631	0.99631	0.613	0.905	0.905	0.910	1.775	1.784	3.040	1.468	pCi
LSC-A-022	ARS1-B12-02721-17	240.000	0.99585	0.99585	22.455	1.280	1.280	3.603	2.510	7.063	3.008	1.452	pCi
LSC-A-022	ARS1-B12-02721-18	240.000	0.99570	0.99570	-0.287	0.882	0.882	0.883	1.731	1.731	3.027	1.461	pCi
LSC-A-022	ARS1-B12-02721-19	240.000	0.99539	0.99539	5.878	0.879	0.879	1.245	1.723	2.440	2.593	1.252	pCi
LSC-A-022	ARS1-B12-02721-20	240.000	0.99539	0.99539	2.120	0.766	0.766	0.830	1.502	1.626	2.460	1.188	pCi
LSC-A-022	ARS1-B12-02721-21	240.000	0.99631	0.99631	-0.311	0.846	0.846	0.847	1.658	1.661	2.906	1.403	pCi

ARS-040 Calculation Results

ARS1-B12-02721

ACF 1

UCF 2.22

Sys Error 0.15

85

AnalysisCode	ABatchSampleID	Initial_Mass_sample_g	Mass_Na2O2_added_g	Final_mass_electrolyzed_sample_NaOH_g	Mass_equivalent_NaOH_g	Final_Mass_Electrolyzed_sample_g	VolumeFactor_X	Enrichment_Factor_Y
LSC-A-022	ARS1-B12-02721-01	500.240	2.070	16.740	2.124	14.616	0.029	26.782
LSC-A-022	ARS1-B12-02721-02	503.500	2.080	16.290	2.134	14.156	0.028	27.791
LSC-A-022	ARS1-B12-02721-03	504.020	2.060	16.940	2.114	14.826	0.029	26.608
LSC-A-022	ARS1-B12-02721-04	501.320	2.000	16.890	2.052	14.838	0.029	26.799
LSC-A-022	ARS1-B12-02721-05	505.740	2.010	15.590	2.062	13.528	0.027	29.154
LSC-A-022	ARS1-B12-02721-06	502.170	2.020	15.150	2.073	13.077	0.026	29.914
LSC-A-022	ARS1-B12-02721-07	501.110	2.060	17.020	2.114	14.906	0.030	26.324
LSC-A-022	ARS1-B12-02721-08	503.330	2.020	15.290	2.073	13.217	0.026	29.675
LSC-A-022	ARS1-B12-02721-09	503.390	2.050	15.290	2.103	13.187	0.026	29.745
LSC-A-022	ARS1-B12-02721-10	504.760	2.080	16.850	2.134	14.716	0.029	26.838
LSC-A-022	ARS1-B12-02721-11	506.168	2.000	17.418	2.052	15.366	0.030	25.815
LSC-A-022	ARS1-B12-02721-12	502.780	2.030	16.510	2.083	14.427	0.029	27.251
LSC-A-022	ARS1-B12-02721-13	500.550	2.090	16.890	2.144	14.746	0.029	26.571
LSC-A-022	ARS1-B12-02721-14	503.310	2.000	14.320	2.052	12.268	0.024	31.878
LSC-A-022	ARS1-B12-02721-15	504.757	2.080	17.747	2.134	15.613	0.031	25.354
LSC-A-022	ARS1-B12-02721-16	501.163	2.070	16.900	2.124	14.776	0.029	26.550
LSC-A-022	ARS1-B12-02721-17	505.760	2.080	16.560	2.134	14.426	0.029	27.409
LSC-A-022	ARS1-B12-02721-18	501.020	2.000	16.800	2.052	14.748	0.029	26.591
LSC-A-022	ARS1-B12-02721-19	503.420	2.010	17.060	2.062	14.998	0.030	26.286
LSC-A-022	ARS1-B12-02721-20	502.930	2.050	16.100	2.103	13.997	0.028	28.064
LSC-A-022	ARS1-B12-02721-21	502.340	2.060	17.430	2.114	15.316	0.030	25.707

ARS-040 Calculation Results

ARS1-B12-02721

ACF 1
UCF 2.22
Sys Error 0.15

AnalysisCode	ABatchSampleID	Average_Sample_CPM	Bkg_CPM	TSIE	Detector_Eff_decimal	Aliquot	AliqUnits	Activity_reference_date	Start_Date_of_Count	Sample_Count	Duration_min
LSC-A-022	ARS1-B12-02721-01	4.839	1.107	378.070	0.246	0.01000	L	9/7/2012	12/4/2012		240.000
LSC-A-022	ARS1-B12-02721-02	4.791	1.107	377.910	0.246	0.01001	L	9/7/2012	12/4/2012		240.000
LSC-A-022	ARS1-B12-02721-03	1.094	1.107	407.720	0.259	0.01002	L	11/29/2012	12/5/2012		240.000
LSC-A-022	ARS1-B12-02721-04	1.076	1.107	378.130	0.246	0.01001	L	11/1/2012	12/5/2012		240.000
LSC-A-022	ARS1-B12-02721-05	1.277	1.107	395.320	0.253	0.01005	L	10/31/2012	12/5/2012		240.000
LSC-A-022	ARS1-B12-02721-06	3.801	1.107	401.270	0.256	0.01001	L	10/31/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-07	1.319	1.107	410.590	0.261	0.01004	L	10/31/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-08	1.466	1.107	395.870	0.254	0.01005	L	11/6/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-09	1.351	1.107	351.170	0.236	0.01006	L	11/6/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-10	1.062	1.107	286.280	0.202	0.01000	L	11/5/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-11	1.818	1.107	354.310	0.237	0.01001	L	11/5/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-12	1.022	1.107	220.990	0.156	0.01004	L	11/7/2012	12/5/2012		240.000
LSC-A-022	ARS1-B12-02721-13	1.275	1.107	402.670	0.257	0.01005	L	11/7/2012	12/5/2012		240.000
LSC-A-022	ARS1-B12-02721-14	1.004	1.107	286.720	0.202	0.01001	L	11/13/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-15	1.161	1.107	290.870	0.205	0.01003	L	11/12/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-16	1.173	1.107	258.020	0.182	0.01005	L	11/12/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-17	3.550	1.107	251.930	0.178	0.01007	L	11/9/2012	12/6/2012		240.000
LSC-A-022	ARS1-B12-02721-18	1.076	1.107	258.290	0.183	0.01008	L	11/9/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-19	1.849	1.107	308.770	0.217	0.01002	L	11/8/2012	12/7/2012		240.000
LSC-A-022	ARS1-B12-02721-20	1.389	1.107	304.390	0.214	0.01003	L	11/8/2012	12/8/2012		240.000
LSC-A-022	ARS1-B12-02721-21	1.072	1.107	280.530	0.198	0.01002	L	11/14/2012	12/8/2012		240.000

ARS-040 Calculation Results

ARS1-B12-02721

ACF 1
UCF 2.22
Sys Error 0.15

AnalysisCode	ABatchSampleID	AliquotReportUnits	UserID	ModDate
LSC-A-022	ARS1-B12-02721-01	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-02	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-03	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-04	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-05	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-06	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-07	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-08	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-09	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-10	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-11	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-12	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-13	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-14	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-15	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-16	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-17	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-18	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-19	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-20	L	AMRAD\RUSEY	12/10/2012
LSC-A-022	ARS1-B12-02721-21	L	AMRAD\RUSEY	12/10/2012

22 of 85

Assay Definition-

Assay Description:
LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121204_1437

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121204_1437\20121204_1437.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121204_1437\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121204_1437\LLH3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\Low Level H3_3.1sa

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tsIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 240.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Luminescence Correction: Off

Heterogeneity Monitor: Off

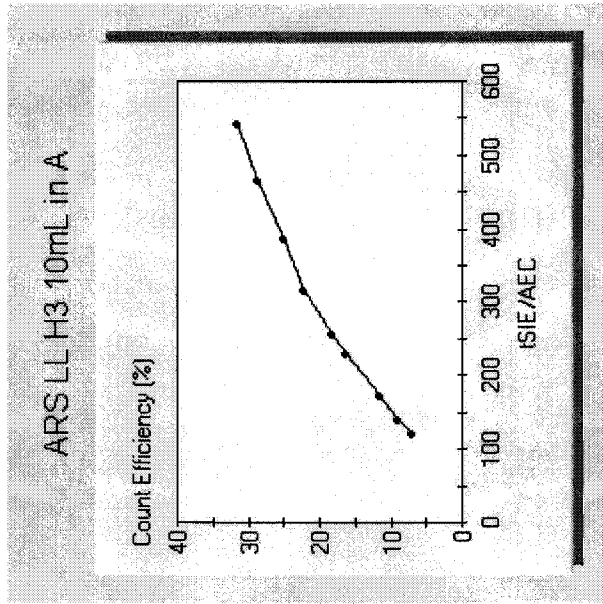
Delay Before Burst (nsec): 75

Half Life-

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

23 of 85
A B C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 11/20/2012	
Date Modified:	
ARS LL H3 10mL in A	
tSIE/AEC	Count Efficiency (%)
543.57	31.51
466.44	28.74
387.42	24.95
316.48	22.21
257.14	18.18
229.94	16.37
172.56	11.68
142.07	9.08
121.26	7.13

24 of 89

P#	S#	SMPL_ID	CPMA	DPM1	tsIE	Eff Nucl	In A	Count	Time	DATE	TIME	MESSAGES
10	1	BACKGROUND	1.107	4.37	395.29		25.33	240.00		12/4/2012	2:45:58 PM	
10	2	B12-02721-01	4.839	19.68	378.07		24.59	240.00		12/4/2012	6:56:59 PM	
10	3	B12-02721-02	4.791	19.49	377.91		24.58	240.00		12/4/2012	11:07:59 PM	
10	4	B12-02721-03	1.094	4.22	407.72		25.92	240.00		12/5/2012	3:18:59 AM	
10	5	B12-02721-04	1.076	4.37	378.13		24.59	240.00		12/5/2012	7:29:54 AM	
10	6	B12-02721-05	1.277	5.04	395.32		25.33	240.00		12/5/2012	11:40:51 AM	
		Missing vial 7.										
		Missing vial 8.										
		Missing vial 9.										
		Missing vial 10.										
		Missing vial 11.										
		Missing vial 12.										
10	13	B12-02721-12	1.032	6.60	220.99		15.64	240.00		12/5/2012	3:52:07 PM	
10	14	B12-02721-13	1.275	4.96	402.67		25.68	240.00		12/5/2012	8:03:04 PM	
10	15	B12-02721-14	1.004	4.97	286.72		20.19	240.00		12/6/2012	12:14:02 AM	
10	16	B12-02721-15	1.161	5.67	290.87		20.47	240.00		12/6/2012	4:24:59 AM	
10	17	B12-02721-16	1.173	6.43	258.02		18.24	240.00		12/6/2012	8:35:55 AM	
10	18	B12-02721-17	3.550	19.91	251.93		17.83	240.00		12/6/2012	12:46:52 PM	

25 of 85

Assay Definition-

Assay Description:

LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121206_1649

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121206_1649\20121206_1649.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121206_1649\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121206_1649\LLH3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\Low Level H3.lsa

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tsIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 240.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

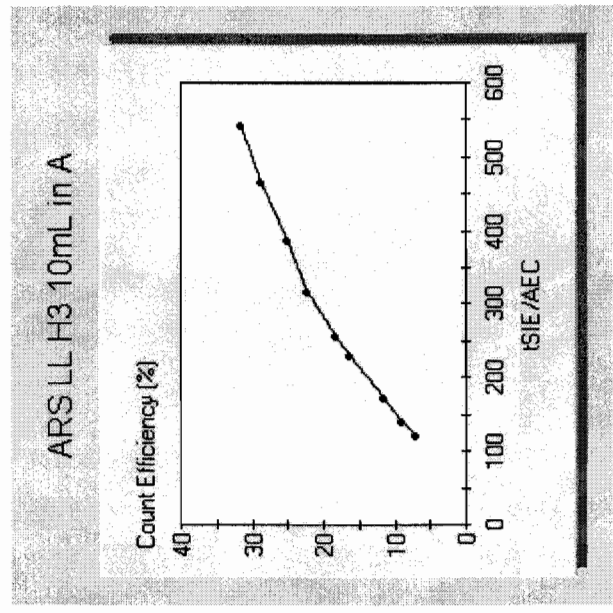
Regions Half Life

Units Reference Date

Reference Time

26 of 85
A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 11/20/2012
Date Modified:
ARS LL H3 10mL in A

tSIE/AEC	Count Efficiency (%)
543.57	31.51
466.44	28.74
387.42	24.95
316.48	22.21
257.14	18.18
229.94	16.37
172.56	11.68
142.07	9.08
121.26	7.13

27 of 86

P#

S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl In A	Count Time	DATE	TIME	MESSAGES
1	B12-02721-06	3.801	14.84	401.27	25.61	240.00	12/6/2012	4:58:25 PM	
2	B12-02721-07	1.319	5.06	410.59	26.06	240.00	12/6/2012	9:09:28 PM	
3	B12-02721-08	1.466	5.78	395.87	25.35	240.00	12/7/2012	1:20:23 AM	
4	B12-02721-09	1.351	5.73	351.17	23.55	240.00	12/7/2012	5:31:20 AM	
5	B12-02721-10	1.062	5.27	286.28	20.16	240.00	12/7/2012	9:42:17 AM	
6	B12-02721-11	1.818	7.68	354.31	23.67	240.00	12/7/2012	1:53:14 PM	

28
08

Assay Definition-

Assay Description:

LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121207_1755

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121207_1755\20121207_1755.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121207_1755\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20121207_1755\LLH3 Results.csv

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

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tsIE/AEC

External Std Terminator (sec): 0.5 2s

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 240.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Luminescence Correction: Off

Heterogeneity Monitor: Off

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions Half Life

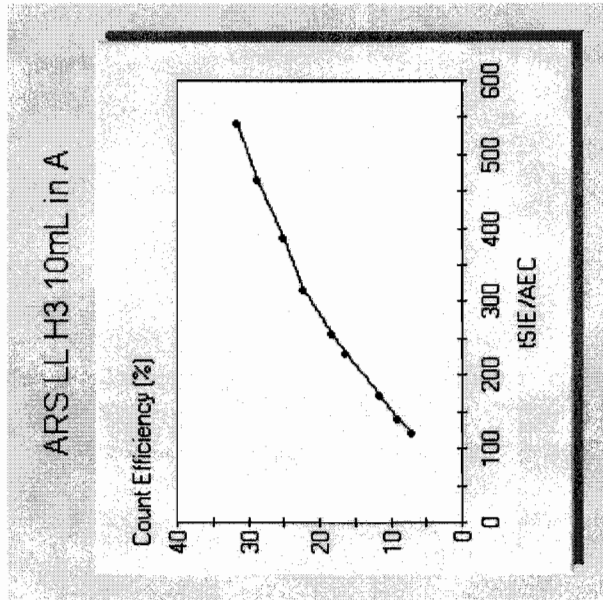
Units

Reference Date

Reference Time

29 of 85
A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 11/20/2012
Date Modified:
ARS LL H3 10mL in A

tSIE/AEC	Count Efficiency (%)
543.57	31.51
466.44	28.74
387.42	24.95
316.48	22.21
257.14	18.18
229.94	16.37
172.56	11.68
142.07	9.08
121.26	7.13

Protocol# 10 - Low Level H3_3.lsa

User: H3 Low Level

30 of 80

P#	S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl	In A	Count Time	DATE	TIME	MESSAGES
10	1	B12-02721-18	1.076	5.89	258.29		18.25	240.00	12/7/2012	6:04:50 PM	
10	2	B12-02721-19	1.849	8.53	308.77		21.69	240.00	12/7/2012	10:15:50 PM	
10	3	B12-02721-20	1.389	6.50	304.39		21.39	240.00	12/8/2012	2:26:47 AM	
10	4	B12-02721-21	1.072	5.42	280.53		19.77	240.00	12/8/2012	6:37:44 AM	



ARS Batch Number:

ARS1-B12 -

02721

Enter these Values for LCS

Current ACT	5.6490
NetWt	5.0530
Aliquot	0.5002

Report Name Field Name on the Report

Standards Report ACT at Date Above (dpm/g)
LCS Report NetWt
Tritium Enrichment Data Gross Sample Added/1000

Enter these Values for LCSD

Current ACT	5.6490
NetWt	5.0520
Aliquot	0.5035

Report Name Field Name on the Report

Standards Report ACT at Date Above (dpm/g)
LCS Report NetWt
Tritium Enrichment Data Gross Sample Added/1000

Expected Value Calculations

ARS Batch Number:

ARS1-B11 -

02721

LCS CALCULATED = EXPECTED VALUE

25.703

Range

20.563 - 30.844

LCSD CALCULATED = EXPECTED VALUE

25.532

Range

20.425 - 30.638



32 of 85



Standards Activity as of: 12/03/12 12:16

Active	Std ID	Isotope	PSCLT	Verification Date	Exp Date	Status	Ref Date	Ref ACT (dpm)	ACT at Date Above (dpm/g)	Half-life (days)	Parent ID	Expend Date	Comments
A	S-0279	H-3	SL	09/10/12	09/10/13	OK	09/07/12	5.7255E+00	5.6493	4.500E+03	S-0237		H3 LCS standard. Dilution performed as stated above by B Steffens - 9

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
11-21-12	0702	SNC-16	QA	QA	RJA
11-21-12	1136	Background	B12-02616	1417	RJA
↓	↓	B12-02616-01	↓	↓	RJA
↓	↓	B12-02616-02	↓	↓	RJA
↓	↓	B12-02616-03	↓	↓	RJA
↓	↓	B12-02616-04	↓	↓	RJA
↓	↓	B12-02616-05	↓	↓	RJA
↓	↓	B12-02616-06	↓	↓	RJA
↓	↓	B12-02616-07	↓	↓	RJA
↓	↓	B12-02616-08	↓	↓	RJA
↓	↓	B12-02616-09	↓	↓	RJA
↓	↓	B12-02616-10	↓	↓	RJA
11-21-12	1206	SNC-16	QA	QA	RJA
12-4-12	0732	SNC-16	QA	QA	RJA
12-4-12	1434	Background	B12-02721	1437	RJA
↓	↓	B12-02721-01	↓	↓	RJA
↓	↓	B12-02721-02	↓	↓	RJA
↓	↓	B12-02721-03	↓	↓	RJA
↓	↓	B12-02721-04	↓	↓	RJA
↓	↓	B12-02721-05	↓	↓	RJA

Beta Liquid Scintillation Counter Log Book

Technician Initials	Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
	12-4-12	1434	B12-02721-06	B12-02721	1437	DJK
	↓	↓	B12-02721-07	↓	↓	DJK
	↓	↓	B12-02721-08	↓	↓	DJK
	↓	↓	B12-02721-09	↓	↓	DJK
	↓	↓	B12-02721-10	↓	↓	DJK
	↓	↓	B12-02721-11	↓	↓	DJK
	↓	↓	B12-02721-12	↓	↓	DJK
	↓	↓	B12-02721-13	↓	↓	DJK
	↓	↓	B12-02721-14	↓	↓	DJK
	↓	↓	B12-02721-15	↓	↓	DJK
	↓	↓	B12-02721-16	↓	↓	DJK
	↓	↓	B12-02721-17	↓	↓	DJK
	↓	↓	B12-02721-18	↓	↓	DJK
	↓	↓	B12-02721-19	↓	↓	DJK
	↓	↓	B12-02721-20	↓	↓	DJK
	↓	↓	B12-02721-21	↓	↓	DJK
	12-4-12	1437	SNC-16	QA	QA	DJK
	12-5-12	1604	B12-02721-06	B12-02721	1649	DJK
	↓	↓	B12-02721-07	↓	↓	DJK
	↓	↓	B12-02721-08	↓	↓	DJK

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials	
12-5-12	1604	B12-02721-09	B12-02721	1649	J. H. Hester	
L	L	B12-02721-10	L	L		
L	L	B12-02721-11	L	L		
12-7-12	1026	B12-02721-18	B12-02721	1755		
L	L	B12-02721-19	L	L		
L	L	B12-02721-20	L	L		
L	L	B12-02721-21	L	L		
<div>12-10-12</div>						



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 Tritium

by

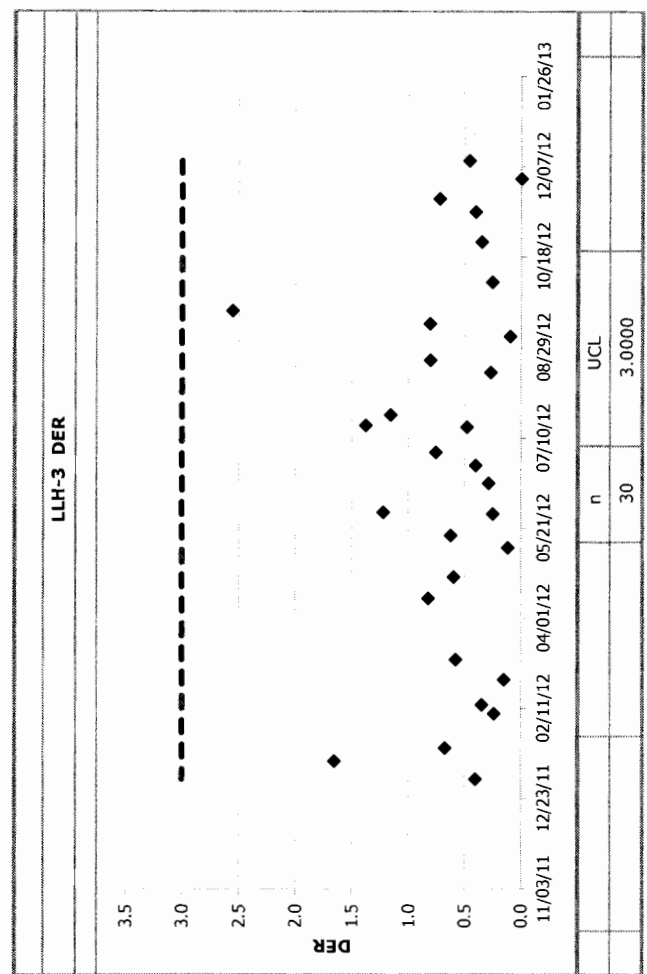
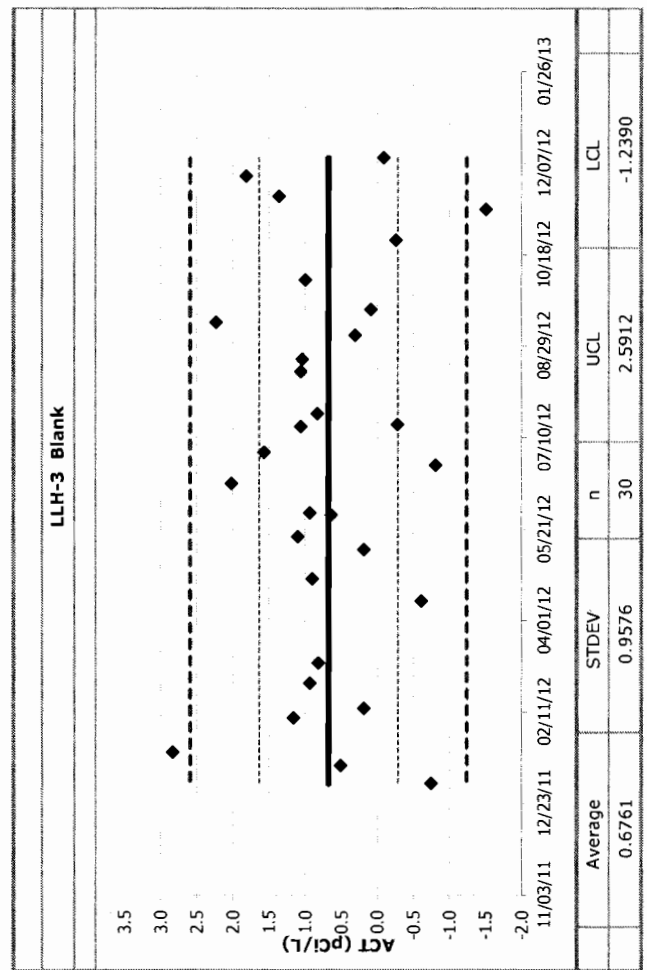
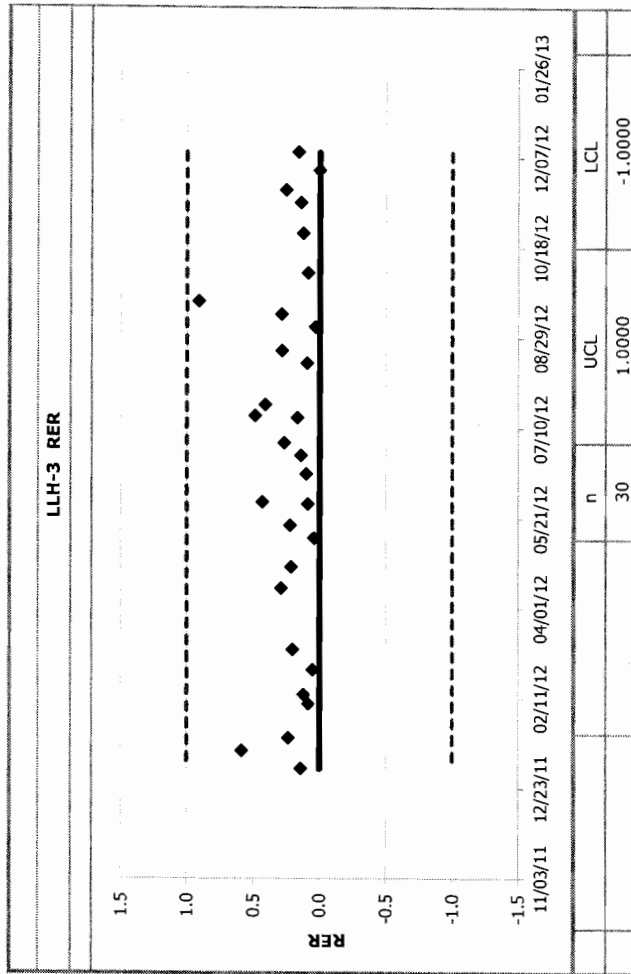
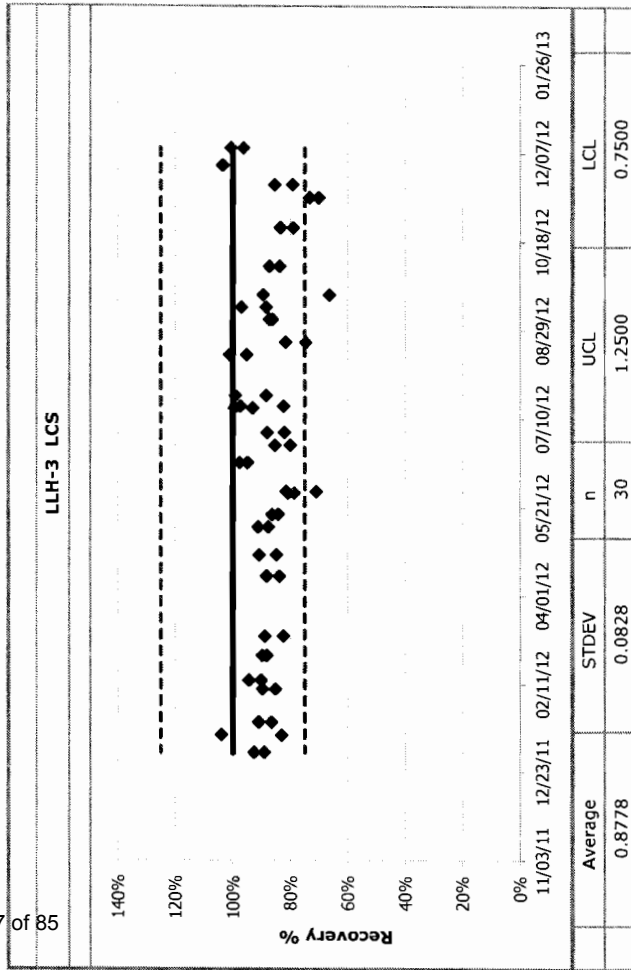
Low Level Liquid

Scintillation Counting

Control Charts

QC chart

37 of 85



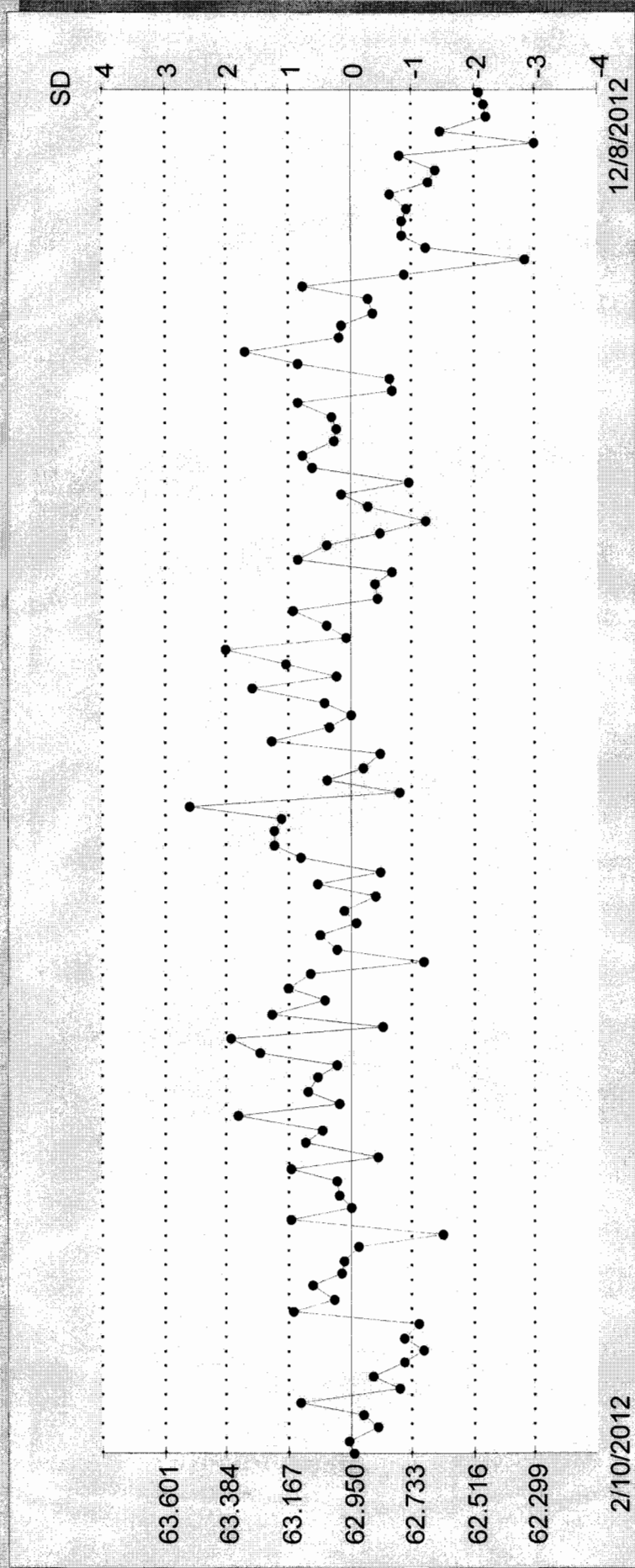
3H Efficiency
Total # pts : 5553
Valid # pts : 106
Mean : 62.95
SD : 0.22

Date	Value	Valid Pt
Feb 10, 2012	62.94	X
Feb 15, 2012	62.96	X
Feb 16, 2012	62.86	X
Feb 17, 2012	62.90	X
Feb 20, 2012	63.13	X
Feb 23, 2012	62.77	X
Feb 24, 2012	62.87	X
Mar 05, 2012	62.76	X
Mar 07, 2012	62.70	X
Mar 12, 2012	62.76	X
Mar 15, 2012	62.71	X
Mar 22, 2012	63.15	X
Mar 23, 2012	63.01	X
Mar 28, 2012	63.08	X
Apr 05, 2012	62.98	X
Apr 10, 2012	62.97	X
Apr 12, 2012	62.92	X
Apr 13, 2012	62.63	X
Apr 20, 2012	63.16	X
Apr 23, 2012	62.95	X
Apr 26, 2012	62.99	X
Apr 27, 2012	62.99	X
Apr 30, 2012	63.16	X
May 01, 2012	62.85	X
May 03, 2012	63.11	X
May 07, 2012	63.05	X
May 09, 2012	63.34	X
May 14, 2012	62.99	X
May 17, 2012	63.10	X
May 17, 2012	63.07	X
May 23, 2012	62.99	X
May 30, 2012	63.26	X
May 31, 2012	63.37	X
Jun 06, 2012	62.83	X
Jun 13, 2012	63.22	X
Jun 21, 2012	63.04	X
Jun 22, 2012	63.16	X
Jun 25, 2012	63.09	X
Jun 27, 2012	62.70	X
Jun 27, 2012	62.99	X
Jun 28, 2012	63.05	X
Jun 29, 2012	62.93	X

Jun 30, 2012	62.97	X
Jul 05, 2012	62.86	X
Jul 11, 2012	63.07	X
Jul 12, 2012	62.85	X
Jul 16, 2012	63.12	X
Jul 20, 2012	63.22	X
Jul 22, 2012	63.22	X
Jul 26, 2012	63.19	X
Jul 27, 2012	63.52	X
Aug 09, 2012	62.77	X
Aug 13, 2012	63.03	X
Aug 14, 2012	62.90	X
Aug 16, 2012	62.85	X
Aug 17, 2012	63.22	X
Aug 18, 2012	63.03	X
Aug 21, 2012	62.94	X
Aug 22, 2012	63.04	X
Aug 26, 2012	63.29	X
Aug 27, 2012	62.99	X
Aug 27, 2012	63.17	X
Sep 05, 2012	63.39	X
Sep 09, 2012	62.96	X
Sep 11, 2012	63.03	X
Sep 17, 2012	63.15	X
Sep 18, 2012	62.86	X
Sep 20, 2012	62.86	X
Sep 20, 2012	62.80	X
Sep 24, 2012	63.14	X
Sep 28, 2012	63.03	X
Oct 01, 2012	62.85	X
Oct 04, 2012	62.68	X
Oct 05, 2012	62.88	X
Oct 06, 2012	62.98	X
Oct 11, 2012	62.74	X
Oct 12, 2012	63.08	X
Oct 13, 2012	63.12	X
Oct 17, 2012	63.00	X
Oct 19, 2012	63.00	X
Oct 22, 2012	63.02	X
Oct 23, 2012	63.13	X
Oct 23, 2012	62.80	X
Oct 23, 2012	62.81	X
Oct 23, 2012	63.13	X
Oct 25, 2012	63.32	X
Oct 27, 2012	62.99	X
Oct 31, 2012	62.98	X
Nov 02, 2012	62.87	X
Nov 02, 2012	62.89	X
Nov 04, 2012	63.11	X
Nov 05, 2012	62.76	X
Nov 10, 2012	62.33	X
Nov 12, 2012	62.69	X

Nov 13, 2012	62.76	X
Nov 14, 2012	62.75	X
Nov 15, 2012	62.81	X
Nov 18, 2012	62.68	X
Nov 19, 2012	62.65	X
Nov 19, 2012	62.78	X
Nov 20, 2012	62.30	X
Nov 21, 2012	62.63	X
Nov 23, 2012	62.47	X
Dec 04, 2012	62.48	X
Dec 08, 2012	62.49	X

3H Efficiency
Total # pts : 5553
Valid # pts : 106
Mean : 62.95
SD : 0.22



3H Background

Total # pts : 5479
Valid # pts : 106
Mean : 2.14
SD : 0.17

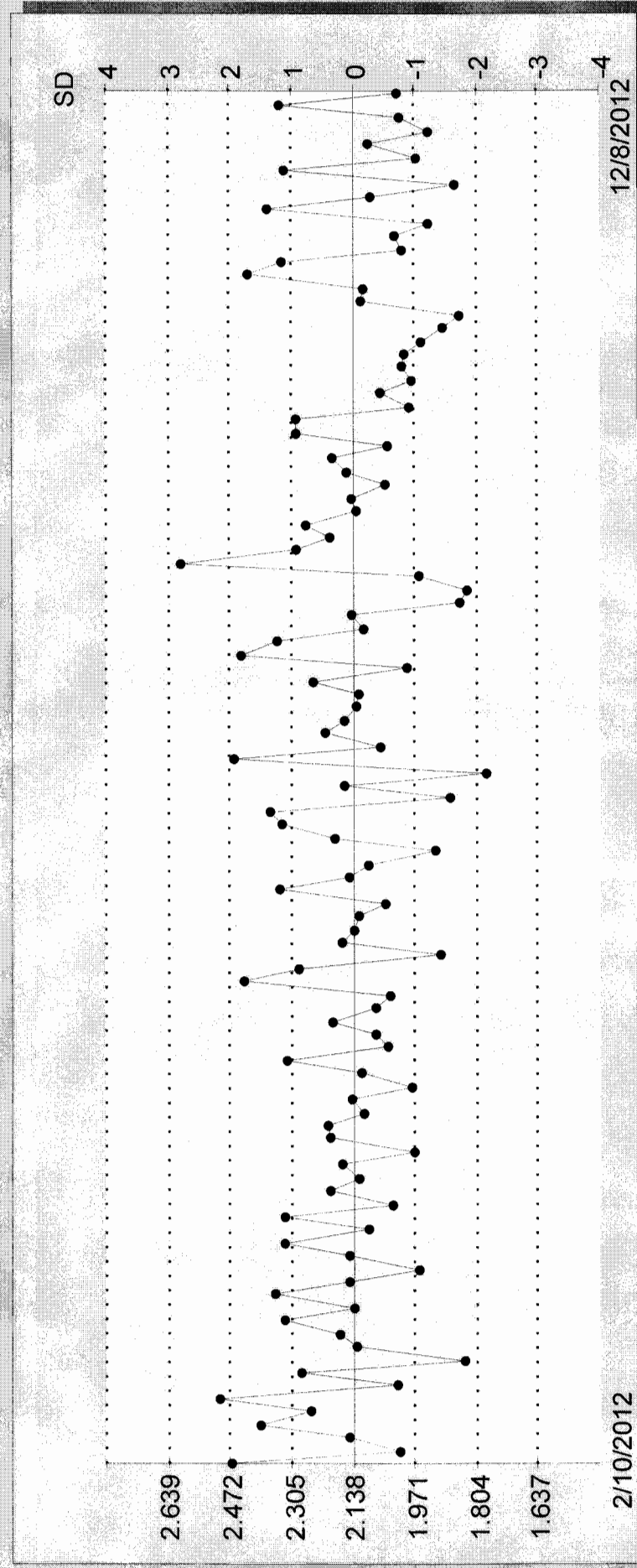
Date	Value	Valid Pt
Feb 10, 2012	2.47	X
Feb 15, 2012	2.01	X
Feb 16, 2012	2.15	X
Feb 17, 2012	2.39	X
Feb 20, 2012	2.25	X
Feb 23, 2012	2.50	X
Feb 24, 2012	2.01	X
Mar 05, 2012	2.28	X
Mar 07, 2012	1.84	X
Mar 12, 2012	2.13	X
Mar 15, 2012	2.17	X
Mar 22, 2012	2.32	X
Mar 23, 2012	2.13	X
Mar 28, 2012	2.35	X
Apr 05, 2012	2.15	X
Apr 10, 2012	1.96	X
Apr 12, 2012	2.15	X
Apr 13, 2012	2.32	X
Apr 20, 2012	2.09	X
Apr 23, 2012	2.32	X
Apr 26, 2012	2.03	X
Apr 27, 2012	2.20	X
Apr 30, 2012	2.12	X
May 01, 2012	2.17	X
May 03, 2012	1.97	X
May 07, 2012	2.20	X
May 09, 2012	2.20	X
May 14, 2012	2.11	X
May 17, 2012	2.14	X
May 17, 2012	1.98	X
May 23, 2012	2.11	X
May 30, 2012	2.31	X
May 31, 2012	2.04	X
Jun 06, 2012	2.07	X
Jun 13, 2012	2.19	X
Jun 21, 2012	2.08	X
Jun 22, 2012	2.04	X
Jun 25, 2012	2.43	X
Jun 27, 2012	2.28	X
Jun 27, 2012	1.90	X
Jun 28, 2012	2.16	X
Jun 29, 2012	2.13	X

Jun 30, 2012	2.12	X
Jul 05, 2012	2.05	X
Jul 11, 2012	2.33	X
Jul 12, 2012	2.15	X
Jul 16, 2012	2.09	X
Jul 20, 2012	1.91	X
Jul 22, 2012	2.19	X
Jul 26, 2012	2.33	X
Jul 27, 2012	2.36	X
Aug 09, 2012	1.88	X
Aug 13, 2012	2.16	X
Aug 14, 2012	1.78	X
Aug 16, 2012	2.46	X
Aug 17, 2012	2.06	X
Aug 18, 2012	2.21	X
Aug 21, 2012	2.16	X
Aug 22, 2012	2.13	X
Aug 26, 2012	2.12	X
Aug 27, 2012	2.25	X
Aug 27, 2012	1.99	X
Sep 05, 2012	2.44	X
Sep 09, 2012	2.34	X
Sep 11, 2012	2.11	X
Sep 17, 2012	2.14	X
Sep 18, 2012	1.85	X
Sep 20, 2012	1.83	X
Sep 20, 2012	1.96	X
Sep 24, 2012	2.60	X
Sep 28, 2012	2.29	X
Oct 01, 2012	2.20	X
Oct 04, 2012	2.26	X
Oct 05, 2012	2.13	X
Oct 06, 2012	2.14	X
Oct 11, 2012	2.05	X
Oct 12, 2012	2.15	X
Oct 13, 2012	2.19	X
Oct 17, 2012	2.04	X
Oct 19, 2012	2.29	X
Oct 22, 2012	2.29	X
Oct 23, 2012	1.99	X
Oct 23, 2012	2.06	X
Oct 23, 2012	1.98	X
Oct 23, 2012	2.01	X
Oct 25, 2012	2.00	X
Oct 27, 2012	1.95	X
Oct 31, 2012	1.89	X
Nov 02, 2012	1.85	X
Nov 02, 2012	2.11	X
Nov 04, 2012	2.11	X
Nov 05, 2012	2.42	X
Nov 10, 2012	2.33	X
Nov 12, 2012	2.00	X

Nov 13, 2012	1.93	X
Nov 14, 2012	2.37	X
Nov 15, 2012	2.09	X
Nov 18, 2012	1.86	X
Nov 19, 2012	2.32	X
Nov 19, 2012	1.96	X
Nov 20, 2012	2.09	X
Nov 21, 2012	1.93	X
Nov 23, 2012	2.01	X
Dec 04, 2012	2.34	X
Dec 08, 2012	2.02	X

3H Background

Total # pts : 5479
Valid # pts : 106
Mean : 2.14
SD : 0.17





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- Screening by Low Level Liquid Scintillation Counting



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-Screening by Low Level Liquid Scintillation Counting Samples

ARS File ID Numbers: ARS1-12-02261; 2262; 2263; 2264
 ARS Batch ID: ARS1-B12-02676

Sample ID:	COUNT TIME	CPMA	Background CPMA	Eff Nucl In A	Aliquot (grams)	ACTIVITY	units	MDA	Sample Must be analyzed as LSC-A-001
1 B12-02676-04	120	1.295	1.161	26.74	10.00	22.573	pCi/L	98.37195	NO
2 B12-02676-05	120	1.175	1.161	26.28	10.00	2.400	pCi/L	100.0938	NO
3 B12-02676-06	120	1.362	1.237	27.42	10.00	20.535	pCi/L	98.90302	NO
4 B12-02676-07	120	1.543	1.161	26.41	10.00	65.154	pCi/L	99.60114	NO
5 B12-02676-08	120	1.396	1.161	26.38	10.00	40.127	pCi/L	99.71441	NO
6 B12-02676-09	120	1.678	1.237	27.9	10.00	71.200	pCi/L	97.20146	NO
7 B12-02676-10	120	1.596	1.237	27.66	10.00	58.464	pCi/L	98.04486	NO
8 B12-02676-11	120	1.250	1.237	27.44	10.00	2.134	pCi/L	98.83093	NO
9 B12-02676-12	120	1.420	1.237	27.33	10.00	30.162	pCi/L	99.22872	NO
10 B12-02676-13	120	1.206	1.237	27.82	10.00	-5.019	pCi/L	97.48098	NO
11						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
12						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
13						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
14						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
15						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
16						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
17						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
18						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
19						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
20						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
21						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
22						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!
23						#DIV/0!	pCi/L	#DIV/0!	#DIV/0!



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-Screening by Low Level Liquid Scintillation Counting Laboratory Records

Analysis Batch Report

50 of 85



Analysis Batch ID ARS1-B12-02676									
Method		ARS-054		Analysis		LSC-A-021		Matrix	AQ
Description				Low Level Tritium Screening					
Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
LCS									
LCSD									
MBL									
TRG				ARS1-12-02261	001	1	CAMO-13-24279	STD	11/29/12
TRG				ARS1-12-02262	001	1	CAMO-13-24241	STD	12/06/12
TRG				ARS1-12-02262	002	1	CAMO-13-24242	STD	12/06/12
TRG				ARS1-12-02262	003	1	CAMO-13-24225	STD	12/06/12
TRG				ARS1-12-02262	004	1	CAMO-13-24247	STD	12/06/12
TRG				ARS1-12-02262	005	1	CAMO-13-24248	STD	12/06/12
TRG				ARS1-12-02263	001	1	CAMO-13-24276	STD	12/06/12
TRG				ARS1-12-02264	001	1	CASA-13-24209	STD	12/06/12
TRG				ARS1-12-02264	002	1	CASA-13-24213	STD	12/06/12
TRG				ARS1-12-02264	003	1	CASA-13-24214	STD	12/06/12

50 of 85



126511
12-02263-001-1
WRAD

126510
12-02262-005-1
WRAD

126509
12-02262-004-1
WRAD

126508
12-02262-003-1
WRAD

126507
12-02262-002-1
WRAD

126506
12-02262-001-1
WRAD

126503
12-02261-001-1
WRAD

126513
12-02264-002-1
WRAD

126512
12-02264-001-1
WRAD

126514
12-02264-003-1
WRAD

51 of 59

ID	1001_054	ABatch	ABatchSampleID	ClientID	Aliquot1	AliquotUnits1	IC_ID1	Aliquot2	AliquotUnits2	IC_ID2	UserID	ModDate
	11960	ARS1-B12-02676	ARS1-B12-02676-01		1 g						AMRAD\RUSEY	11/12/2012 14:02:14
	11961	ARS1-B12-02676	ARS1-B12-02676-02		1 g						AMRAD\RUSEY	11/12/2012 14:02:14
	11962	ARS1-B12-02676	ARS1-B12-02676-03		1 g						AMRAD\RUSEY	11/12/2012 14:02:14
	11963	ARS1-B12-02676	ARS1-B12-02676-04	CAMO-13-24279	10 g		126503				AMRAD\RUSEY	11/12/2012 14:02:14
	11964	ARS1-B12-02676	ARS1-B12-02676-05	CAMO-13-24241	10 g		126506				AMRAD\RUSEY	11/12/2012 14:02:14
	11965	ARS1-B12-02676	ARS1-B12-02676-06	CAMO-13-24242	10 g		126507				AMRAD\RUSEY	11/12/2012 14:02:14
	11966	ARS1-B12-02676	ARS1-B12-02676-07	CAMO-13-24225	10 g		126508				AMRAD\RUSEY	11/12/2012 14:02:14
	11967	ARS1-B12-02676	ARS1-B12-02676-08	CAMO-13-24247	10 g		126509				AMRAD\RUSEY	11/12/2012 14:02:15
	11968	ARS1-B12-02676	ARS1-B12-02676-09	CAMO-13-24248	10 g		126510				AMRAD\RUSEY	11/12/2012 14:02:15
	11969	ARS1-B12-02676	ARS1-B12-02676-10	CAMO-13-24276	10 g		126511				AMRAD\RUSEY	11/12/2012 14:02:15
	11970	ARS1-B12-02676	ARS1-B12-02676-11	CASA-13-24209	10 g		126512				AMRAD\RUSEY	11/12/2012 14:02:15
	11971	ARS1-B12-02676	ARS1-B12-02676-12	CASA-13-24213	10 g		126513				AMRAD\RUSEY	11/12/2012 14:02:15
	11972	ARS1-B12-02676	ARS1-B12-02676-13	CASA-13-24214	10 g		126514				AMRAD\RUSEY	11/12/2012 14:02:16

52 of 88

Assay Definition-

Assay Description:

LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121113_1339

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121113_1339\20121113_1339.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121113_1339\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121113_1339\LLH3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\Low Level H3.lsa

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tSIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 120.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

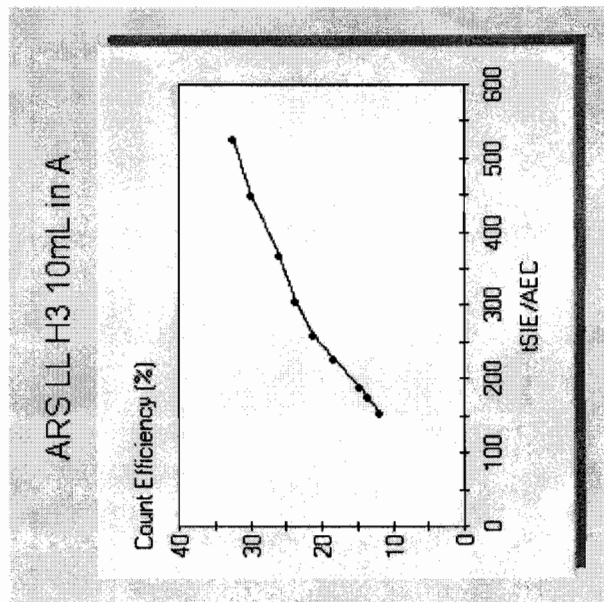
Regions Half Life

Units Reference Date

Reference Time

53 of 85
A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 11/18/2011
Date Modified:
ARS LL H3 10mL in A

tSIE/AEC	Count Efficiency (%)
526.29	32.47
450.16	29.90
370.15	25.92
306.68	23.60
260.68	20.99
228.69	18.21
189.46	14.53
177.14	13.64
155.73	11.73

54 of 84

PH	S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl In A	Count Time	DATE	TIME	MESSAGES
2	1	BACKGROUND	1.161	4.63	346.75	25.07	120.00	11/13/2012	1:48:10 PM	
2	2	B12-02676-04	1.295	4.84	386.58	26.74	120.00	11/13/2012	3:58:07 PM	
2	3	B12-02676-05	1.175	4.47	377.35	26.28	120.00	11/13/2012	6:08:00 PM	
2	4	B12-02676-06	2.297	8.70	379.47	26.39	120.00	11/13/2012	8:17:56 PM	
2	5	B12-02676-07	1.543	5.84	379.91	26.41	120.00	11/13/2012	10:27:52 PM	
2	6	B12-02676-08	1.396	5.29	379.25	26.38	120.00	11/14/2012	12:37:45 AM	

Protocol# 2 - Low Level H3.lsa User: H3 Low Level

55
56
57
58

Assay Definition-

Assay Description:

LLH3 Assay in DPM Mode

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121114_0812

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121114_0812\20121114_0812.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121114_0812\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3\20121114_0812\LLH3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\Low Level H3.lsa

Count Conditions-

Nuclide: Low Level H3

Quench Indicator: tsIE/AEC

External Std Terminator (sec): 0.5 2s%

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: ARS LL H3 10mL

Count Time (min): 120.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Delay Before Burst (nsec): 75

Half Life-

Half Life Correction: Off

Regions Half Life

Units Reference Date

Reference Time

56 of 85

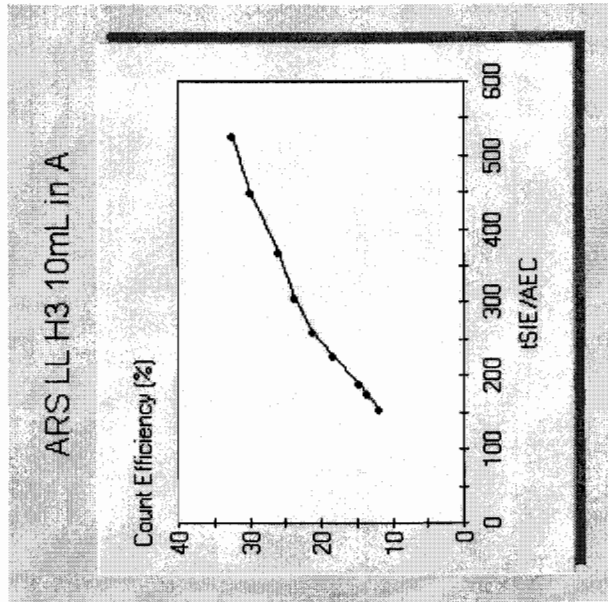
A

B

C

Cycle 1 Results

Quench Curve Block Data



Date Acquired: 11/18/2011

Date Modified:

ARS LL H3 10mL in A

tSIE/AEC	Count Efficiency (%)
526.29	32.47
450.16	29.90
370.15	25.92
306.68	23.60
260.68	20.99
228.69	18.21
189.46	14.53
177.14	13.64
155.73	11.73

57 of 84

P#	S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl	In A	Count Time	DATE	TIME	MESSAGES
2	1	BACKGROUN	1.237	4.79	366.64	25.80		120.00	11/14/2012	8:21:32 AM	
2	2	B12-02676-06	1.362	4.97	400.26	27.42		120.00	11/14/2012	10:31:28 AM	
2	3	B12-02676-09	1.678	6.01	409.90	27.90		120.00	11/14/2012	12:41:23 PM	
2	4	B12-02676-10	1.596	5.77	405.21	27.66		120.00	11/14/2012	2:51:17 PM	
2	5	B12-02676-11	1.250	4.56	400.64	27.44		120.00	11/14/2012	5:01:10 PM	
2	6	B12-02676-12	1.420	5.19	398.45	27.33		120.00	11/14/2012	7:11:07 PM	
2	7	B12-02676-13	1.206	4.34	408.26	27.82		120.00	11/14/2012	9:21:01 PM	



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-Screening by Low Level Liquid Scintillation Counting Control Charts

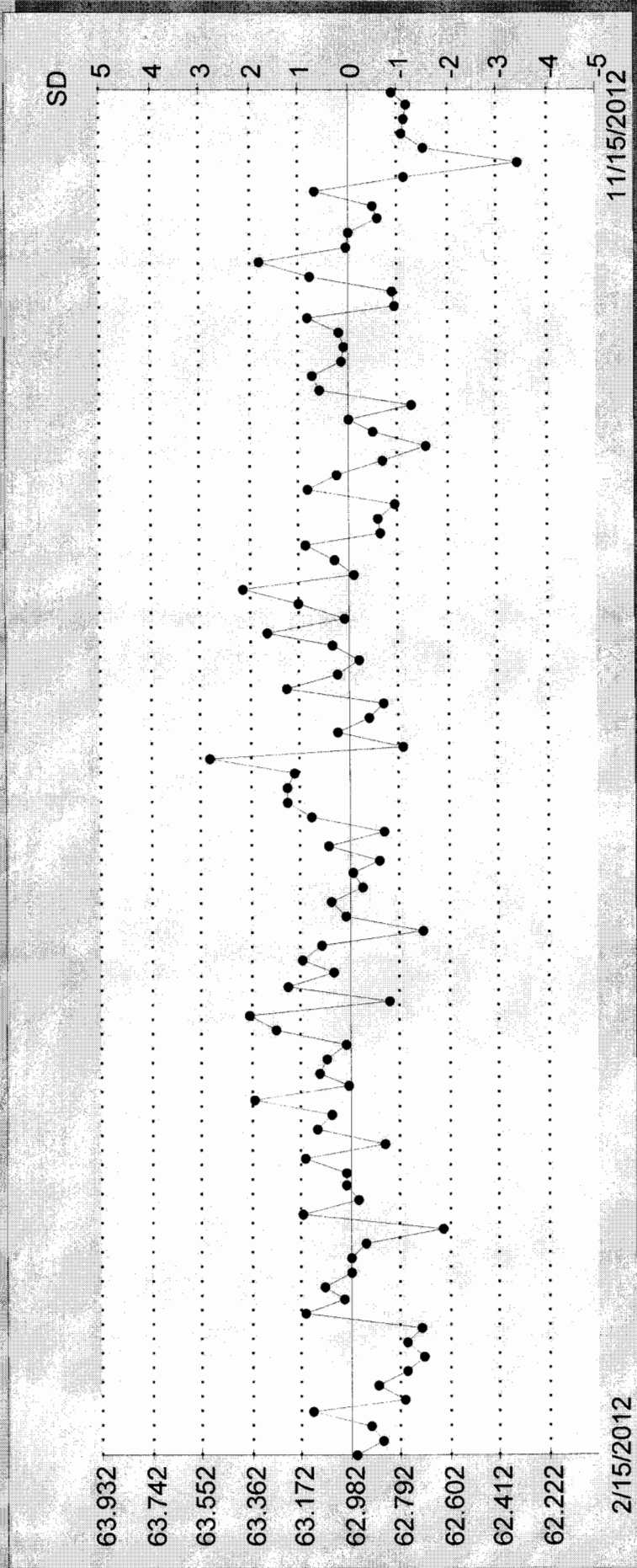
3H Efficiency
Total # pts : 5545
Valid # pts : 97
Mean : 62.98
SD : 0.19

Date	Value	Valid Pt
Feb 15, 2012	62.96	X
Feb 16, 2012	62.86	X
Feb 17, 2012	62.90	X
Feb 20, 2012	63.13	X
Feb 23, 2012	62.77	X
Feb 24, 2012	62.87	X
Mar 05, 2012	62.76	X
Mar 07, 2012	62.70	X
Mar 12, 2012	62.76	X
Mar 15, 2012	62.71	X
Mar 22, 2012	63.15	X
Mar 23, 2012	63.01	X
Mar 28, 2012	63.08	X
Apr 05, 2012	62.98	X
Apr 10, 2012	62.97	X
Apr 12, 2012	62.92	X
Apr 13, 2012	62.63	X
Apr 20, 2012	63.16	X
Apr 23, 2012	62.95	X
Apr 26, 2012	62.99	X
Apr 27, 2012	62.99	X
Apr 30, 2012	63.16	X
May 01, 2012	62.85	X
May 03, 2012	63.11	X
May 07, 2012	63.05	X
May 09, 2012	63.34	X
May 14, 2012	62.99	X
May 17, 2012	63.10	X
May 17, 2012	63.07	X
May 23, 2012	62.99	X
May 30, 2012	63.26	X
May 31, 2012	63.37	X
Jun 06, 2012	62.83	X
Jun 13, 2012	63.22	X
Jun 21, 2012	63.04	X
Jun 22, 2012	63.16	X
Jun 25, 2012	63.09	X
Jun 27, 2012	62.70	X
Jun 27, 2012	62.99	X
Jun 28, 2012	63.05	X
Jun 29, 2012	62.93	X
Jun 30, 2012	62.97	X

Jul 05, 2012	62.86	X
Jul 11, 2012	63.07	X
Jul 12, 2012	62.85	X
Jul 16, 2012	63.12	X
Jul 20, 2012	63.22	X
Jul 22, 2012	63.22	X
Jul 25, 2012	63.19	X
Jul 27, 2012	63.52	X
Aug 09, 2012	62.77	X
Aug 13, 2012	63.03	X
Aug 14, 2012	62.90	X
Aug 16, 2012	62.85	X
Aug 17, 2012	63.22	X
Aug 18, 2012	63.03	X
Aug 21, 2012	62.94	X
Aug 22, 2012	63.04	X
Aug 26, 2012	63.29	X
Aug 27, 2012	62.99	X
Aug 27, 2012	63.17	X
Sep 05, 2012	63.39	X
Sep 09, 2012	62.96	X
Sep 11, 2012	63.03	X
Sep 17, 2012	63.15	X
Sep 18, 2012	62.86	X
Sep 20, 2012	62.86	X
Sep 20, 2012	62.80	X
Sep 24, 2012	63.14	X
Sep 28, 2012	63.03	X
Oct 01, 2012	62.85	X
Oct 04, 2012	62.68	X
Oct 05, 2012	62.88	X
Oct 06, 2012	62.98	X
Oct 11, 2012	62.74	X
Oct 12, 2012	63.08	X
Oct 13, 2012	63.12	X
Oct 17, 2012	63.00	X
Oct 19, 2012	63.00	X
Oct 22, 2012	63.02	X
Oct 23, 2012	63.13	X
Oct 23, 2012	62.80	X
Oct 23, 2012	62.81	X
Oct 23, 2012	63.13	X
Oct 25, 2012	63.32	X
Oct 27, 2012	62.99	X
Oct 31, 2012	62.98	X
Nov 02, 2012	62.87	X
Nov 02, 2012	62.89	X
Nov 04, 2012	63.11	X
Nov 05, 2012	62.76	X
Nov 10, 2012	62.33	X
Nov 12, 2012	62.69	X
Nov 12, 2012	62.77	X

Nov 14, 2012	62.75	X
Nov 15, 2012	62.81	X

3H Efficiency
Total # pts : 5545
Valid # pts : 97
Mean : 62.98
SD : 0.19



3H Background

Total # pts : 5471
Valid # pts : 97
Mean : 2.14
SD : 0.16

Date	Value	Valid Pt
Feb 15, 2012	2.01	X
Feb 16, 2012	2.15	X
Feb 17, 2012	2.39	X
Feb 20, 2012	2.25	X
Feb 23, 2012	2.50	X
Feb 24, 2012	2.01	X
Mar 05, 2012	2.28	X
Mar 07, 2012	1.84	X
Mar 12, 2012	2.13	X
Mar 15, 2012	2.17	X
Mar 22, 2012	2.32	X
Mar 23, 2012	2.13	X
Mar 28, 2012	2.35	X
Apr 05, 2012	2.15	X
Apr 10, 2012	1.96	X
Apr 12, 2012	2.15	X
Apr 13, 2012	2.32	X
Apr 20, 2012	2.09	X
Apr 23, 2012	2.32	X
Apr 26, 2012	2.03	X
Apr 27, 2012	2.20	X
Apr 30, 2012	2.12	X
May 01, 2012	2.17	X
May 03, 2012	1.97	X
May 07, 2012	2.20	X
May 09, 2012	2.20	X
May 14, 2012	2.11	X
May 17, 2012	2.14	X
May 17, 2012	1.98	X
May 23, 2012	2.11	X
May 30, 2012	2.31	X
May 31, 2012	2.04	X
Jun 06, 2012	2.07	X
Jun 13, 2012	2.19	X
Jun 21, 2012	2.08	X
Jun 22, 2012	2.04	X
Jun 25, 2012	2.43	X
Jun 27, 2012	2.28	X
Jun 27, 2012	1.90	X
Jun 28, 2012	2.16	X
Jun 29, 2012	2.13	X
Jun 30, 2012	2.12	X

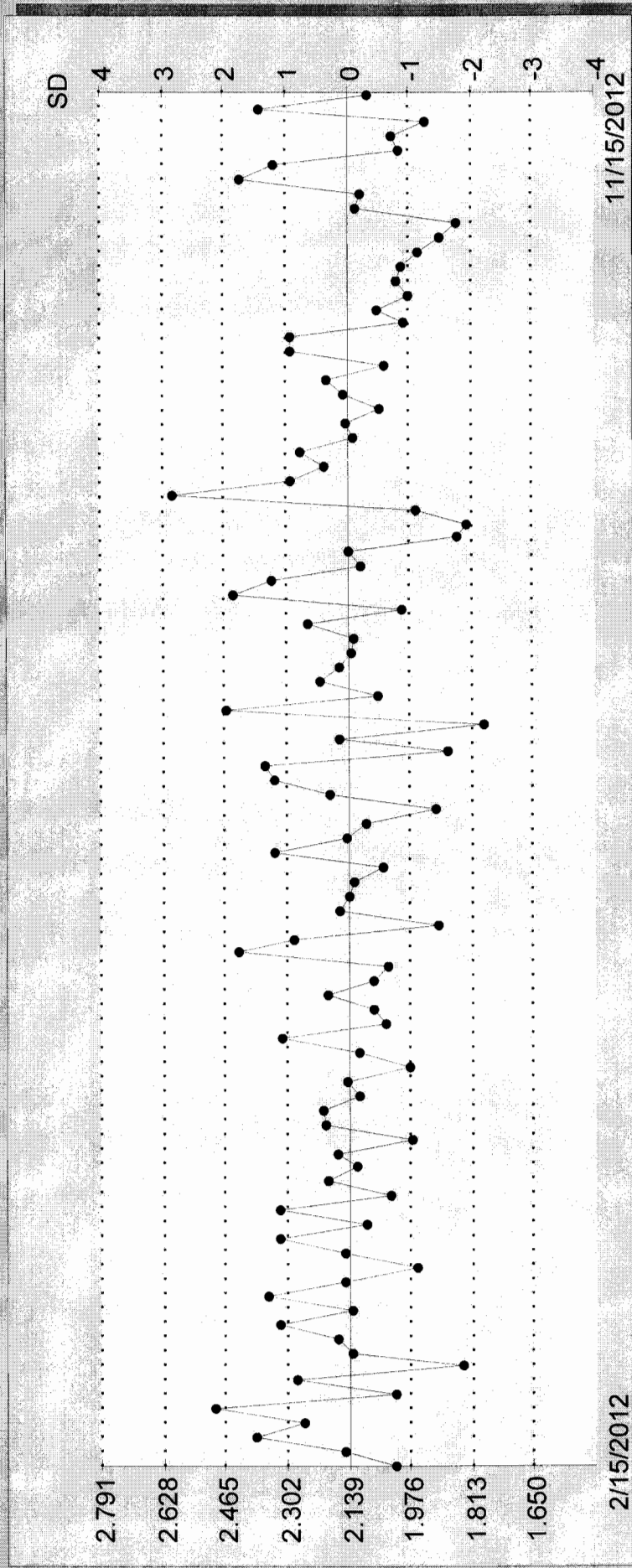
Jul 05, 2012	2.05	X
Jul 11, 2012	2.33	X
Jul 12, 2012	2.15	X
Jul 16, 2012	2.09	X
Jul 20, 2012	1.91	X
Jul 22, 2012	2.19	X
Jul 26, 2012	2.33	X
Jul 27, 2012	2.36	X
Aug 09, 2012	1.88	X
Aug 13, 2012	2.16	X
Aug 14, 2012	1.78	X
Aug 16, 2012	2.46	X
Aug 17, 2012	2.06	X
Aug 18, 2012	2.21	X
Aug 21, 2012	2.16	X
Aug 22, 2012	2.13	X
Aug 26, 2012	2.12	X
Aug 27, 2012	2.25	X
Aug 27, 2012	1.99	X
Sep 05, 2012	2.44	X
Sep 09, 2012	2.34	X
Sep 11, 2012	2.11	X
Sep 17, 2012	2.14	X
Sep 18, 2012	1.85	X
Sep 20, 2012	1.83	X
Sep 20, 2012	1.96	X
Sep 24, 2012	2.60	X
Sep 28, 2012	2.29	X
Oct 01, 2012	2.20	X
Oct 04, 2012	2.26	X
Oct 05, 2012	2.13	X
Oct 06, 2012	2.14	X
Oct 11, 2012	2.05	X
Oct 12, 2012	2.15	X
Oct 13, 2012	2.19	X
Oct 17, 2012	2.04	X
Oct 19, 2012	2.29	X
Oct 22, 2012	2.29	X
Oct 23, 2012	1.99	X
Oct 23, 2012	2.06	X
Oct 23, 2012	1.98	X
Oct 23, 2012	2.01	X
Oct 25, 2012	2.00	X
Oct 27, 2012	1.95	X
Oct 31, 2012	1.89	X
Nov 02, 2012	1.85	X
Nov 02, 2012	2.11	X
Nov 04, 2012	2.11	X
Nov 05, 2012	2.42	X
Nov 10, 2012	2.33	X
Nov 12, 2012	2.00	X
Nov 12, 2012	2.02	X

Nov 14, 2012 2.37
Nov 15, 2012 2.09

X
X

3H Background

Total # pts : 5471
 Valid # pts : 97
 Mean : 2.14
 SD : 0.16





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



QUALITY CONTROL PROGRAM

 AMERICAN RADIATION SERVICES
 RADIOACTIVE REFERENCE SOLUTIONS
 ANNUAL ACTIVITY VERIFICATION

 VERIFICATION DATE 9/10/2012 20:16 date counted
 STANDARD REFERENCE # S-0279

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

9/7/2012 10:40

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-0279-V1	15.91	1	LSC	0.3302	6.49	5.019	5.68	2.56
S-0279-V2	16.21	1	LSC	0.3291	6.49	5.018	5.89	2.65
S-0279-V3	15.76	1	LSC	0.3290	6.49	5.018	5.62	2.53
S-0279-V4	15.62	1	LSC	0.3293	6.49	5.008	5.54	2.49
S-0279-V5	15.76	1	LSC	0.3280	6.49	5.018	5.63	2.54

10% Max

PASS

Standard Deviation percent of known concentration

5% Max

PASS

Target Activity

% Diff

Average

Two Sigma Uncertainty

5.67	2.55
0.26	0.12
2.30%	2.30%
5.72	2.58
-0.91%	-0.91%

Verification Expiration Date: #####

Prepared & Counted By

Date: 9/10/2012 20:16

Verified & Approved By

Date: 9-11-12 0817

QC Approval

Date: 9-11-12 0817**S-0279****H-3**

Verified

9/10/12

SL**Expires****9/10/13**

Manufacturer

NIST SRM 4927F

Sol Matrix

H2O

Ref No

NIST SRM 4927F

Tech

Unknown

Parent ID

S-0237



RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

H-3 Standard Verification

Verifier's Name: Brian Steffens

Date: 9/7/2012

Pipettor ID: FJ40469

Pipettor ID: Auto-pipettor

Pipettor ID: na

Standard ID: S-0279

Standard ID: N/A

Standards brought up to ~5g with distilled dead water.
Standards made in glass vials.

Weight of Standard		
15mL of Ultima Gold added to standard	S-0279-V1	5.019 g
	S-0279-V2	5.018 g
	S-0279-V3	5.018 g
	S-0279-V4	5.008 g
	S-0279-V5	5.018 g

Balance ID: H1331122173560P

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\20120910_0931
Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20120910_0931\20120910_0931.results
RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20120910_0931\H3 Results.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal 3\20120910_0931\H3 Results.csv
Assay File Name: C:\Packard\Tricarb\Assays\H-3 Normal 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
#Vials/Sample: 1
Repeat Sample Count: 1
Calculate & Reference: Off

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

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

Count Corrections-

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

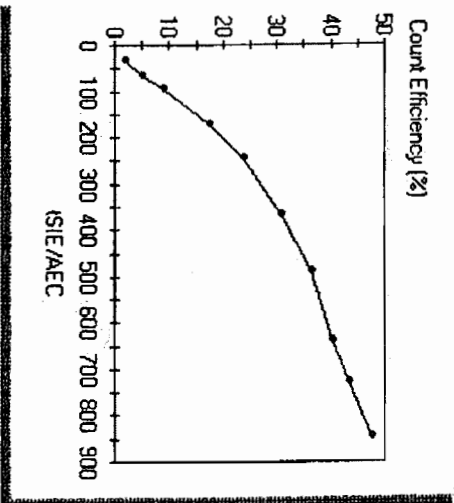
Half Life

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

A
 B
 C

Cycle 1 Results
 Quench Curve Block Data

UG STD H-3 in A



Date Acquired: 06/27/2012
 Date Modified:
 UG STD H-3 in A

tSIE/AEC	Count Efficiency (%)
846.90	47.58
730.85	43.21
639.47	40.08
487.78	36.36
365.41	30.73
244.81	23.69
169.28	17.31
95.01	8.79
64.60	4.97
34.32	0.64

9/10/2012 10:19:47 PM
Protocol# 54 - H-3 Normal 3.1sa

QuantasSmart (TM) - 2.03 - Serial# 061533

Page # 3
User: ARS

P#	S#	SMPL ID	CPMA	DPM1	tsIE	Eff Nucl In A	Count Time	DATE	TIME	MESSAGES
54	1	BACKGROUND	6.49	19.81	409.74	32.77	120.00	9/10/2012	9:36:46 AM	
54	2	S-0279-V1	15.91	48.18	415.20	33.02	120.00	9/10/2012	11:44:40 AM	
54	3	S-0279-V2	16.21	49.25	412.72	32.91	120.00	9/10/2012	1:52:36 PM	
54	4	S-0279-V3	15.76	47.89	412.56	32.90	120.00	9/10/2012	4:00:32 PM	
54	5	S-0279-V4	15.62	47.44	413.22	32.93	120.00	9/10/2012	6:08:27 PM	
54	6	S-0279-V5	15.76	48.04	410.40	32.80	120.00	9/10/2012	8:16:20 PM	

STD ID: S-0279

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data			
Planning		Parent Solution Reference # NIST SRM 4927F				
Planning Comments	Create a H3 LCS standard.	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 Sol'n	3.606433954	Parent Certified Act	3503.682716	Certi Act/Vol Units	dpm g	
Appx vol ml of Parent Sol'n	3.612937241	Parent Cert Act Uncert 1 Sigma	0.0036			
Expected Addition for Analysis g	5	Parent Sp. Gravity G/Ml	0.9982			
Standards Preparation / Dilution		Parent Supplier	NIST SRM 4927F			
Secondary Solution #	S-0279	Parent Date Recvd	01/02/00			
Dilution Date (New Ref Date)	09/07/2012 10:40	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)	13.144	Certified dpm/g on 09/07/2012 10:40	3050.10438			
Container Plus Solution (g)	16.89	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)	3.746	Parent Comments				
DPM Xferred on 09/07/2012 10:40	11425.69101	Parent Tech	Unknown			
Diluent/matrix	DI H2O	Is_Primary	FALSE			
Diluent Density Cont, empty (g)		Is_LCS	TRUE			
Test Mass of 5 ml of Diluent (g)		Is_Tracer	FALSE			
Diluent Density Test - (g/mL)		Is_Calib	FALSE			
Dilution Empty Container Mass (g)	473.93					
Dilution Full Cont g (if measured)	2469.52					
Dilution Final Volume ml (if measured)	2000					
Final Dilution Density (g/mL)	0.997795					
Final Dilution Measured Mass g	1995.59					
Comments	H3 LCS standard. Dilution performed as stated above by B Steffens. -BJS 9/7/12					
Final Dilution dpm/g	5.725470166					
Final Dil New Ref Date/Time	09/07/2012 10:40					



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: 12-02261 Client Name: LANL Sample Matrix: AQ

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?	Yes	No	<input checked="" type="checkbox"/> 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?	Yes	No	<input checked="" type="checkbox"/> 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	

Shh

Report Generator Signature

12-10-12

Date

James D. Ru

Management Review Signature

12-10-12

Date



LSC Technical Review Checklist

ARS SDG ARS1-12-02261

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

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

ARS A. Batch ID(s): Batch A: ARS1-B12-02676 Batch B: N/A Batch C: N/A

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

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Verifier Review
1) 100% of Manual Transcriptions Verified?	Yes No N/A	Yes No N/A
2) 100% of Manual Calculations Verified?	Yes No N/A	Yes No N/A
3) Blank Composition/Configuration Matches Calibration?	Yes No N/A	Yes No N/A
4) Deviations from procedure are documented and verified?	Yes No N/A	Yes No N/A
5) Appropriate Cocktail Selected?	Yes No N/A	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>[Signature]</u> Date <u>11-13-12</u>		Verifier Review Signature <u>[Signature]</u> Date <u>11-13-12</u>

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations Valid and Current?	Yes No N/A	Yes No N/A
2) Backgrounds Valid and Current?	Yes No N/A	Yes No N/A
3) Source Checks Completed and Acceptable?	Yes No N/A	Yes No N/A
QA Officer Signature <u>James D. Lee</u> Date <u>12-10-12</u>		
	Analyst Review	Technical Review
4) Background Checks Complete and Acceptable?	Yes No N/A	Yes No N/A
5) 100% of Manually Entered Parameters Verified Accurate?	Yes No N/A	Yes No N/A
6) Appropriate QC samples initiated at required frequency?	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?	Yes No N/A	Yes No N/A
b) Spectra show no Evidence of Interferences?	Yes No N/A	Yes No N/A
c) Sample Quench for All Samples within Range of Quench Curve?	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>[Signature]</u> Date <u>11-15-12</u>		Technical Reviewer Signature <u>N/A</u> Date _____



LSC Technical Review Checklist

ARS SDG ARS1-12-02261

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

Required QC Samples (Mark all that apply): Blank ☒ LOS ☒ LOSD ☒ Sample Dup MS MSD

ARS A. Batch ID(s): Batch A: ARS1-B12-02721 Batch B: N/A Batch C: N/A

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

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Verifier Review
1) 100% of Manual Transcriptions Verified?	Yes No N/A	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?	Yes No N/A	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?	Yes No N/A	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>[Signature]</u> Date <u>12-4-12</u>		Verifier Review Signature <u>[Signature]</u> Date <u>12-4-12</u>

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations Valid and Current?	Yes No N/A	Yes No N/A
2) Backgrounds Valid and Current?	Yes No N/A	Yes No N/A
3) Source Checks Completed and Acceptable?	Yes No N/A	Yes No N/A
QA Officer Signature <u>[Signature]</u> Date <u>12-10-12</u>		
	Analyst Review	Technical Review
4) Background Checks Complete and Acceptable?	Yes No N/A	Yes No N/A
5) 100% of Manually Entered Parameters Verified Accurate?	Yes No N/A	Yes No N/A
6) Appropriate QC samples initiated at required frequency?	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?	Yes No N/A	Yes No N/A
b) Spectra show no Evidence of Interferences?	Yes No N/A	Yes No N/A
c) Sample Quench for All Samples within Range of Quench Curve?	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>[Signature]</u> Date <u>12-10-12</u>		Technical Reviewer Signature <u>[Signature]</u> Date <u>12-10-12</u>



C. BATCH QC VALIDATION

	Proj. Mgr. Review			QA Officer Review		
1) Activity + 3xCSU a Negative Number?	Yes	No	N/A	Yes	No	N/A
2) RDL Criteria are Met?	Yes	No	N/A	Yes	No	N/A
3) Method Blank Criterion Met?	Yes	No	N/A	Yes	No	N/A
4) LCS/LCD Criteria Met?	Yes	No	N/A	Yes	No	N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes	No	N/A	Yes	No	N/A
6) MS/MSD Criteria Met?	Yes	No	N/A	Yes	No	N/A
7) Batch QC Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____						
<u>[Signature]</u>		<u>12-10-12</u>		<u>[Signature]</u>		<u>12-10-12</u>
Project Manager Signature		Date		QA Officer Signature		Date

GENERAL COMMENTS

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

80 of

Analysis Code	Group	Isotope	Activity Units	Aliquot Units	Procedure No	RDL	LCS_LL	LCS_UL	MS_LL	MS_UL	Rdy_LL	Rdy_UL	Grav_LL	Grav_UL	RER	RPD	DilutionReq	RoughPrepReq	BlankCorrectionMDA	BlankCorrectionAll	CountTimeReq	AliquotRequired
LSC-A-021	STD	H-3	pCi	L	ARS-054	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
LSC-A-022	STD	Enriched H-3	pCi	L	ARS-040	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		

SDG Report - Samples and Containers

81

SDG Specific Data

SDG	ARS1-12-02261	TAT Days	28	Project Type	Environmental
Sample Count	Rpt Level	Date Received	11/9/2012	COC Number	2013-265
Client	Los Alamos National Laboratory	Client Deadline	12/2/2012	PO Number	63641-001-10
Client Code	114	Internal Deadline	12/1/2012	Job Number	
Profile Number	PN-00094	Lab Deadline	11/29/2012	Job Location	
Comments					

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
001	CANA-13-24279	AQ	11/01/12 11:34 AM	11/01/12 11:34 AM	H	90	5	01							
→	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
	126359	1	1000.00		N		80	24		N	N/A				

SDG Report - Analysis Assignments

Temp SDG	ARS1-12-02261	Sample Count	1
Client	Los Alamos National Laboratory	Analysis Count	2-2

Samples Count Totals per Analysis		
Analysis Code	Analysis Description	Samples Count
LSC-A-021	Low Level Tritium Screen in (Aqueous)	1
LSC-A-022	Low Level Tritium by Enrichment Process in (Aqueous [AQ])	1

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

Susan Leese

From: Greene, Keith R <kgreene@lanl.gov>
Sent: Thursday, November 29, 2012 11:22 AM
To: Susan Leese
Subject: 2013-265

Susan, we had a make a change for 2013-265 that I had to hand write some stuff on. Could you call the file name and in edd the field for coc as 2013-265ARS, txs

ARSL-12-02261

SKL
11-29-12

ARS FILE TRACKING SHEET

SDG: ARS1-12-02261

Task	Date / Time	Initials
Date & Time Samples Received	11/9/12 10:30	cad
ICOC Initiated / Storage Location: <u>O1</u>	11/9/12 12:21	cad
Technical Checks Performed	<i>See Batch</i>	
Report Written / EDD Generated: <u>12-10-12/ 14 02</u> <u>SDR</u>	12-10-12/1357	SDR
Quality Assurance Checks Performed on Report	12-10-12/1505	JDE
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		✓
3 Day TAT		✓
5 Day TAT		✓

NOTES:

COMPANY NAME: LANCSDG: ARS-12-02261

External and Internal Surveys

SHIPPING CONTAINER

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

COC PRESENT WITH SAMPLES

COC ☒ Yes ☐ No

SAMPLE CONTAINER(S)

Good Condition ☐ Yes ☐ No
Sec. Seals ☒ Yes ☐ No
Seal Intact ☒ Yes ☐ No ☐ N/A
Marked Radioactive ☐ Yes ☐ No

Samples Rcv 10

Matrix [AF , AQ , BI , FE , LT , SI , SO , UR , VG]

Exposure Rate Meter: <u>M3 242861</u>	Serial No.: <u>PR 244204</u>	Calibration Due Date: <u>4-13-13</u>
Count Rate Meter: <u>M2 154859</u>	Serial No.: <u>PR 184559</u>	Calibration Due Date: <u>4-13-13</u>
Background Exposure Rate ($\mu\text{R/hr}$) <u>24</u>	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) <u>28</u>	$\mu\text{R/hr}$
Background Count Rate (cpm) <u>80</u>	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) <u>80</u>	cpm
	Max. Removable Count Rate on Shipping Containers Internals <u>80</u>	cpm

Sample Label/Comments/Notes	pH Orig	pH Final	Mark if Preserve	Acid Lot #	Weight(g) / Volume(mL)	Acceptance Limits	
						$<500 \mu\text{R/hr}$	$<100 \text{cpm/cm}^2$
* CAMO-13-24279			<input type="checkbox"/>		1000mL	24	80
			<input type="checkbox"/>				
			<input type="checkbox"/>		1000mL	24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>			24	80
CAMO-13-24276			<input type="checkbox"/>		1000mL	24	80
			<input type="checkbox"/>				
			<input type="checkbox"/>		1000mL	24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>			24	80
CASA-13-24209			<input type="checkbox"/>		1000mL	24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>			24	80
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				
			<input type="checkbox"/>				

Surveyors' Name: ASDate/Time Surveyed: 11/9/12 1045

* This sample only in this SDC.