

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

Chain of Custody/Analysis Request

ADEP

COC/Lab Request #:

2014-2980

Page 1 of 1

Client Contact:

Lab Agreement # : 63641-001-10

Site Name: Los Alamos National Laboratory

Project Number :

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Day - ☐

14 Day - ☐

21 Day - ☐

28 Day - ☒

Rad Screening Info:

Yes, Below Background

Lab Reporting Limit Type:

Sample Quantitation Limit

Special Instructions:

Field Sample ID

Sample Date

Sample Time

Sample Matrix

WSP-LL-H-3

CAAN-14-54788

Mar 12 2014

10:15

W

1

Special Instructions:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4563 EVENT NAME: Ancho (MDA AB Monitoring)
 Q2 MY2014 Sampling Event
 SAMPLE ID: CAAN-14-54788 WORK ORDER: NA

| | <u>AS PLANNED</u> | <u>AS COLLECTED</u> | | <u>AS PLANNED</u> | <u>AS COLLECTED</u> |
|---------------------------------|-----------------------|---------------------|----------------------|-----------------------|---------------------|
| DATE COLLECTED (MM/DD/YYYY): | | 03/12/2014 | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | | 1015 | MEDIA: | UA | |
| PRS ID: | | OK | SAMPLE TECH CODE: | UA | GSP |
| LOCATION ID: R-29 | | | 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 |
|----------|------------------------|-----------------------------|---|----------------------------|------------------|-------------------------|
| MS | MSGP-Hg | 1 LITER POLY | 1 | HNO3 | Y | MS |
| | WSP-8011-EDB_DBCP | 40 ML SEPTUM AMBER GLASS | 2 | HCL MS 3/2/14 K2S2O3 | | |
| | WSP-8260B-VOA | 40 ML SEPTUM AMBER GLASS | 2 | HCL | | |
| | WSP-8270C-SVOA | 1 LITER AMBER GLASS | 2 | ICE MS 3/12/14 | | |
| | WSP-8310-PAH | 1 LITER AMBER GLASS | 2 | ICE | | |
| | WSP-8321A-NMED HEXP | 1 LITER AMBER GLASS | 2 | ICE MS 3/12/14 | | |
| | WSP-CN(T) | 250 ML POLY | 1 | NAOH | | |
| | WSP-GrossA/B | 1 LITER POLY | 1 | HNO3 | | |
| | WSP-LL-8081A-HCB | 1 LITER AMBER GLASS | 2 | ICE | | |
| | WSP-LL-8151A-PCP | 1 LITER AMBER GLASS | 2 | ICE | | |

Analyses continued on next page

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 4563

EVENT NAME:

Ancho (MDA AB Monitoring)

Q2 MY2014 Sampling Event

SAMPLE ID: CAAN-14-54788

WORK ORDER:

NA

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|--------------|--------------------------|---|--------------|---------------|----------------------|
| NA | WSP-LL-8260B | 40 ML SEPTUM AMBER GLASS | 2 | HCL | Y | NA |
| | WSP-LL-8270C | 1 LITER AMBER GLASS | 1 | ICE | | |
| | 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:

NA

LOCATION COMMENTS:

diesel generator running 40' down wind

FIELD PARAMETERS:

Dissolved Oxygen 8.17 mg/L Flow (in gpm) 7.3 GPM Oxidation-Reduction Potential 133.5 mV
 pH 8.10 SU Specific Conductance 129 uS/cm Temperature 18.21 deg C
 Turbidity 7.2 NTU

COLLECTED BY (PRINT)

M. Sherbo, P. Fellerz

| | | | |
|--|-----------------------------|--|-----------------------------|
| RELINQUISHED BY (Printed Name) (Signature) | Date/Time 3/2/14 1325 | RECEIVED BY (Printed Name) (Signature) | Date/Time 3/2/14 1325 |
| RELINQUISHED BY (Printed Name) (Signature) | Date/Time | RECEIVED BY (Printed Name) (Signature) | Date/Time |

Report Date 02/27/2014

DATA VALIDATION REPORT

Chain Of Custody No. 2014-2980

1. Distribution Of Samples In EDD.

| SDG | Analytical Method | Regular Samples | Field Duplicates | Trip Blanks | Field Blanks | Equipment Blanks |
|---------------|---------------------------|-----------------|------------------|-------------|--------------|------------------|
| ARS1-14-00617 | Generic:Low_Level_Tritium | 1 | | | | |

| SDG | Analytical Method | Analysis Lot ID | Prep Lot ID | Regular Samples | Field Duplicates | Trip Blanks | Field Blanks | Equipment Blanks | Method Blanks | Matrix Spikes | Matrix Spike Dups | Analytical Spikes | Post-Digestion Spikes | Lab Control Samples | Lab Control Sample Dups | Blank Spike | Blank Spike Dups | Lab Duplicates | Storage Blanks | Preparation Blanks | Reagent Blanks |
|---------------|---------------------------|-----------------|-------------|-----------------|------------------|-------------|--------------|------------------|---------------|---------------|-------------------|-------------------|-----------------------|---------------------|-------------------------|-------------|------------------|----------------|----------------|--------------------|----------------|
| ARS1-14-00617 | Generic:Low_Level_Tritium | ARS1-B14- | ARS1-B14- | 1 | | | | | 1 | | | | | 1 | 1 | | | | | | |

2. Distribution Of Analytes In EDD.

| Analytical Method | Analytical Method Category | Field Sample ID | Lab Sample ID | Sample Purpose | Target Analytes | Surrogates | Spiked Compounds | TICS |
|---------------------------|----------------------------|-----------------|-------------------|----------------|-----------------|------------|------------------|------|
| Generic:Low_Level_Tritium | RAD | CAAN-14-54788 | ARS1-B14-00610-06 | REG | 1 | 0 | 0 | 0 |
| Generic:Low_Level_Tritium | RAD | LCS | ARS1-B14-00610-01 | LCS | 0 | 0 | 1 | 0 |
| Generic:Low_Level_Tritium | RAD | LCSD | ARS1-B14-00610-02 | LCSD | 0 | 0 | 1 | 0 |
| Generic:Low_Level_Tritium | RAD | MB | ARS1-B14-00610-03 | MB | 1 | 0 | 0 | 0 |

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

No.

5. Any contaminants in blanks?

No.

DATA VALIDATION REPORT

6. Any surrogate recoveries outside the control limits?

No.

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

No.

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

| LCS Lab Sample | LCSD Lab | Analytical Method | Parameter Name | Lab Lot ID | Analysis | Sample Matrix | LCS Spike Recovery | LCSD Spike Recovery | Upper Limit | Lower Limit | Upper Rejection Limit | Lower Rejection Limit | RPD | RPD Limit |
|-------------------|-------------------|---------------------------|----------------|----------------|------------|---------------|--------------------|---------------------|-------------|-------------|-----------------------|-----------------------|--------|-----------|
| ARS1-B14-00610-01 | ARS1-B14-00610-02 | Generic:Low_Level_Tritium | Tritium | ARS1-B14-00610 | 04-08-2014 | W | 42.000 | 66.000 | 120.000 | 80.000 | | 10 | 43.775 | |

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

DATA VALIDATION REPORT

| Location ID | COC Number | Field Sample ID | Sample Purpose | Analysis Type Code | Analytical Suite | Analytical Method | Parameter Name | Lab Qualifier | Validation Qualifier | Validation Reason Codes | Detect Flag | Lab Result | Lab Units | Report Result | Report Units | Report MDA | Report Uncertainty | Lab Matrix | Sample Date | Percent | Analysis Lot ID | Validation Status Code | Use Flag |
|-------------|------------|-----------------|----------------|--------------------|------------------|---------------------------|----------------|---------------|----------------------|-------------------------|-------------|------------|-----------|---------------|--------------|------------|--------------------|------------|-------------|---------|-----------------|------------------------|----------|
| R-29 | 2014-2980 | CAAN-14-54788 | REG | INIT | RAD | Generic:Low_Level Tritium | Tritium | U | U | R5 | N | 0.6560 | pCi/L | 0.6560 | pCi/L | 1.6030 | 0.4950 | W | 03/12/2014 | | ARS1-B14-00610 | VAL | Y |

Reason Code

Description

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

14. Usable Result Count.

| Field Sample ID | Location ID | Sample Purpose | Analytical Method | No. Unuseable Records | Total Records |
|-----------------|-------------|----------------|---------------------------|-----------------------|---------------|
| CAAN-14-54788 | R-29 | REG | Generic:Low_Level_Tritium | 0 | 1 |



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Request Number: 2014-2980



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American Radiation Services Analytical Reports

for

**Los Alamos National Laboratory
Request: 2014-2980**

Original COC

Chain of Custody/Analysis Request *ADep*

[illegible]

Special Instructions:

| | | | | | | |
|------------------|-------------|------------|--------------|------------|-------------|------------|
| Relinquished by: | Print Name: | Date/Time: | Received by: | Date/Time: | Pipe Name: | Date/Time: |
| Relinquished by: | Print Name: | Date/Time: | Received by: | Date/Time: | Print Name: | Date/Time: |
| Relinquished by: | Print Name: | Date/Time: | Received by: | Date/Time: | Print Name: | Date/Time: |



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for

**Los Alamos National Laboratory
Request: 2014-2980**

Case Narrative



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

April 15, 2014

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

Request Number: **2014-2980**
LANL Sample ID: **CAAN-14-54788**

Dear Mr. Greene;

On March 13, 2014, ARS International received one (1) water sample to be analyzed for Low Level Tritium.

Sample 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. Fu', is written over a horizontal line.

Laboratory Management
ARS International



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COVER PAGE

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

| Request Number | LANL PROJECT SAMPLE ID NUMBER | American Radiation Services SAMPLE ID NUMBER(S) |
|----------------|-------------------------------|---|
| 2014-2980 | CAAN-14-54788 | ARS1-14-00617-001 |

SAMPLE RECEIPT

The samples were received in good condition. The samples were screened for radioactive contamination as per procedure ARS-062 "Sample Receiving". A 28-day turnaround was requested on the chain of custody.

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.
LCS/LCSD recovery for this batch was biased low and duplicate criteria was not met.

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

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

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

Signature

Laboratory Management, ARS International

Title

04-15-14

Date

2609 North River Road, Port Allen, Louisiana 70767

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



ARS International, LLC

Laboratory Analysis Report

ARS1-14-00617

Prepared for:

Los Alamos National Laboratory

Keith Greene

P.O. Box 1663

MS M992

Los Alamos, NM 87545

kgreene@lanl.gov

Phone: 505-665-9966

Fax: 505-665-9972

Project Manager Review

Management Review

Notes: ARS International, LLC 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.

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

Project Manager

ProjectManagers@amrad.com

Phone: 225.381.2991

Fax: 225.381.2996



LELAP Cert# 01949



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Low Level 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: ARS1-14-00617
Client Sample ID: CAAN-14-54788
Sample Collection Date: 03/12/14
Sample Matrix: Aqueous

Request or PO Number: 2014-2980
ARS Sample ID: ARS1-14-00617-001
Date Received: 03/13/14
Report Date: 04/15/14

| 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 | 0.656 | 0.495 | 1.603 | 0.776 | U | pCi/L | ARS-040 | 04/09/14 20:31 | JPB | NA |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

NOTES: Contract#250953


Project Manager Review

Notes: ARS International, LLC 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, LLC. The results in this report pertain only to the samples tested and are intended solely for the use of the client.

LELAP Certificate# 01949



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QC Results Report

Sample Delivery Group: ARS1-14-00616;617;667

Date Received: 3/13/2014

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-B14-00610 | LCS | H3 | 16.308 | 2.559 | 1.676 | 24.890 | | pCi/L | ARS-040 | 4/8/14 21:14 | JPS | 66 | 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-B14-00610 | MBL | H3 | 0.536 | 0.541 | 1.783 | NA | U | pCi/L | ARS-040 | 4/8/14 21:14 | JPS |

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-B14-00610 | LCSD | H3 | 16.308 | 2.559 | 10.451 | 1.910 | | pCi/L | ARS-040 | 4/8/14 21:14 | JPS | 1.31 | < 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-B14-00610 | LCSD | H3 | 16.308 | 2.559 | 10.451 | 1.910 | | pCi/L | ARS-040 | 4/8/14 21:14 | JPS | 3.67 | < 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-B14-00610
SDG's: ARS1-14-00616; 617; 667

| | | | |
|------|----------------|------------|---------------|
| LCS | <u>10.4510</u> | CSU (2s) | <u>3.7440</u> |
| LCSD | <u>16.3080</u> | CSU-D (2s) | <u>5.0150</u> |

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

$$DER = \frac{5.857}{3.129208} = 1.87172 < 3$$

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

$$\% \text{RPD} = \frac{5.857}{13.3795} * 100 = 43.77593 < 25\%$$

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

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

$$RER = \frac{5.857}{8.7590} = 0.66868364 < 1$$

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 = 0.536 |
| Th-228 | | | | | CSU = 1.061 |
| Th-230 | | | | | Is ACT<1.65*CSU? YES |
| Th-232 | | | | | |
| H3 | 0.536 | 1.061 | 1.783 | | |
| Ra-226 | | | | | |
| Ra-228 | | | | | |
| Total U | | | | | |
| Pb-210 | | | | | |
| Po-209 | | | | | |
| Sr-90 | | | | | |
| TC-99 | | | | | |
| NI-63 | | | | | |



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**American Radiation Services
Analytical Reports**

for

Los Alamos National Laboratory

**Low Level Tritium
by
Low Level Liquid
Scintillation Counting
Laboratory
Records**

Analysis Batch Report



| Analysis Batch ID ARS1-B14-00610 | | | | | | | | | | | | |
|---|------------|------------|--|---------------|----------|-----|---------------|---------------|--------------|--------|----|--|
| Method | | | ARS-040 | | Analysis | | | LSC-A-022 | | Matrix | AQ | |
| Description | | | Low Level Tritium by Electrolytic Enrichment | | | | | | | | | |
| Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Isotope Group | Lab Deadline | | | |
| ARS1-B14-00610-01 | LCS | B-16536 | | | | | | | | | | |
| ARS1-B14-00610-02 | LCS | B-16537 | | | | | | | | | | |
| ARS1-B14-00610-03 | MBL | | | | | | | | | | | |
| ARS1-B14-00610-04 | TRG | | | ARS1-14-00616 | 001 | 1 | CAWA-14-54782 | STD | 04/08/14 | | | |
| ARS1-B14-00610-05 | TRG | | | ARS1-14-00616 | 002 | 1 | CAWA-14-54783 | STD | 04/08/14 | | | |
| ARS1-B14-00610-06 | TRG | | | ARS1-14-00617 | 001 | 1 | CAAN-14-54788 | STD | 04/08/14 | | | |
| ARS1-B14-00610-07 | TRG | | | ARS1-14-00667 | 001 | 1 | CAWA-14-54739 | STD | 04/14/14 | | | |
| ARS1-B14-00610-08 | TRG | | | ARS1-14-00667 | 002 | 1 | CAWA-14-54703 | STD | 04/14/14 | | | |
| ARS1-B14-00610-09 | TRG | | | ARS1-14-00667 | 003 | 1 | CAWA-14-54742 | STD | 04/14/14 | | | |
| ARS1-B14-00610-10 | TRG | | | ARS1-14-00667 | 004 | 1 | CAWA-14-54705 | STD | 04/14/14 | | | |

LCS Report
Analytical Batch: ARS1-B14-00610

| BlindID | ABatch | ABatchSampleID | BlindGroup | SuID | Isotope | ExpectedAddition | ExpectedValue | EmptyWt | GrossWt | NetWt | UserID | ModDate | ExpectedValue_CT | MidPointCountDate | KnownValue |
|---------|----------------|-------------------|------------|--------|---------|------------------|---------------|---------|---------|-------|-----------------|-----------|------------------|-------------------|------------|
| B-16536 | ARS1-B14-00610 | ARS1-B14-00610-01 | B-H3 | S-0289 | H-3 | 5 | 2.486493693 | 13.301 | 18.352 | 5.051 | AMRAD\BSTEFFENS | 3/20/2014 | | | |
| B-16537 | ARS1-B14-00610 | ARS1-B14-00610-02 | B-H3 | S-0289 | H-3 | 5 | 2.486493693 | 13.349 | 18.386 | 5.037 | AMRAD\BSTEFFENS | 3/20/2014 | | | |

| ID_31001_040 | ABatch | AnalysisCode | ABatchSampleID | ClientID | IC_ID | S01_1_EnrichCellNo |
|--------------|----------------|--------------|-------------------|---------------|-------|--------------------|
| 975 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-01 | | | 94 |
| 976 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-02 | | | 48 |
| 977 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-03 | | | 0 |
| 978 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-04 | CAWA-14-54782 | | 1 |
| 979 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-05 | CAWA-14-54783 | | 2 |
| 980 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-06 | CAAN-14-54788 | | 2 |
| 981 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-07 | CAWA-14-54739 | | 33 |
| 982 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-08 | CAWA-14-54703 | | 3 |
| 983 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-09 | CAWA-14-54742 | | 80 |
| 984 | ARS1-B14-00610 | LSC-A-022 | ARS1-B14-00610-10 | CAWA-14-54705 | | 4 |

| S01_2_TareCell | S01_3_TareResv | S02_GrossWtResv | S03_1_WtNa2O2 | C_GrossSampleAdded | S04_1_ElectroISD |
|----------------|----------------|-----------------|---------------|--------------------|---------------------|
| 338.52 | 219.9 | 725.81 | 2 | 505.91 | 03/21/2014 13:40:00 |
| 330.63 | 230.13 | 731.69 | 2 | 501.56 | 03/21/2014 13:40:00 |
| 325.01 | 196.6 | 697.11 | 2 | 500.51 | 03/21/2014 13:40:00 |
| 329.63 | 200.7 | 701.65 | 2 | 500.95 | 03/21/2014 13:40:00 |
| 326.14 | 209.59 | 709.59 | 2 | 500 | 03/21/2014 13:40:00 |
| 325.41 | 197.61 | 697.92 | 2 | 500.31 | 03/21/2014 13:40:00 |
| 330.64 | 230.27 | 730.27 | 2 | 500 | 03/21/2014 13:40:00 |
| 322.81 | 221.8 | 721.8 | 2 | 500 | 03/21/2014 13:40:00 |
| 332.04 | 222.15 | 722.15 | 2 | 500 | 03/21/2014 13:40:00 |
| 327.85 | 212.72 | 712.92 | 2 | 500.2 | 03/21/2014 13:40:00 |

| S04_2_StartAmp | S04_3_StartBathC | S05_1_ElectroLED | S05_2_EndBathC | S05_3_EndCellWt | C_GrossSmpIRec |
|----------------|------------------|---------------------|----------------|-----------------|----------------|
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 567.6 | 9.18 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 574.2 | 13.44 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 538.37 | 16.76 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 543.46 | 13.13 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 550 | 14.27 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 537.6 | 14.58 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 578.33 | 17.42 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 559.7 | 15.09 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 570.64 | 16.45 |
| 5 | 2 | 04/04/2014 16:00:00 | 2 | 554.64 | 14.07 |

| C_EnrichmentF | S06_TareWt | S07_GrossWt | C_RecoveredWa | S08_TearWtLSCVial | S09_VialPlusSmpl | C_NetSample |
|---------------|------------|-------------|---------------|-------------------|------------------|-------------|
| 55.11002179 | 109.22 | 112.56 | 3.34 | 6.36 | 9.53 | 3.17 |
| 37.31845238 | 107.37 | 116.57 | 9.2 | 6.58 | 15.38 | 8.8 |
| 29.86336516 | 117.1 | 128.43 | 11.33 | 6.43 | 16.43 | 10 |
| 38.15308454 | 106.64 | 113.7 | 7.06 | 6.57 | 13.19 | 6.62 |
| 35.0385424 | 103.24 | 116.44 | 13.2 | 6.56 | 16.56 | 10 |
| 34.31481481 | 97.04 | 107.45 | 10.41 | 6.39 | 16.09 | 9.7 |
| 28.70264064 | 117.02 | 125.07 | 8.05 | 6.38 | 14.28 | 7.9 |
| 33.13452618 | 106.9 | 119.1 | 12.2 | 6.54 | 16.54 | 10 |
| 30.39513678 | 109.39 | 120.6 | 11.21 | 6.66 | 16.66 | 10 |
| 35.55081734 | 97.46 | 107.62 | 10.16 | 6.65 | 16.65 | 10 |

| S10_1_WtVisISmplDrWatFill | C_NetDeadWaterAdded | C_TareWtBFCocktail | S10_2_GrossWtVSC | C_NetWtCocktailAdded |
|---------------------------|---------------------|--------------------|------------------|----------------------|
| 16.36 | 6.83 | 16.36 | 26.67 | 10.31 |
| 16.59 | 1.21 | 16.59 | 26.94 | 10.35 |
| 16.43 | 0 | 16.43 | 26.73 | 10.3 |
| 16.57 | 3.38 | 16.57 | 26.86 | 10.29 |
| 16.56 | 0 | 16.56 | 26.89 | 10.33 |
| 16.39 | 0.3 | 16.39 | 26.68 | 10.29 |
| 16.38 | 2.1 | 16.38 | 26.69 | 10.31 |
| 16.54 | 0 | 16.54 | 26.84 | 10.3 |
| 16.66 | 0 | 16.66 | 26.96 | 10.3 |
| 16.65 | 0 | 16.65 | 26.99 | 10.34 |

| UserID | ModDate |
|-------------|---------------------|
| AMRAD\JBYRD | 04/08/2014 12:05:58 |
| AMRAD\JBYRD | 04/08/2014 12:25:19 |
| AMRAD\JBYRD | 04/08/2014 21:44:03 |
| AMRAD\JBYRD | 04/08/2014 12:09:24 |
| AMRAD\JBYRD | 04/08/2014 12:30:32 |
| AMRAD\JBYRD | 04/08/2014 18:11:46 |
| AMRAD\JBYRD | 04/08/2014 18:17:13 |
| AMRAD\JBYRD | 04/08/2014 18:24:18 |
| AMRAD\JBYRD | 04/08/2014 18:31:28 |
| AMRAD\JBYRD | 04/08/2014 21:38:21 |

LSC Instrument Data Transfer Report

\\Packard3270\Results\33 Low Level\Low Level H3_3\

| <div><div></div><div>INTERNATIONAL</div></div> | | Batch Sample ID | | | Non-BKG Samples Transferred | | | Samples Eligible To Save | | | LSC 1 | | |
|--|-------------------|-----------------|--------|--------------|-----------------------------|----------------|----------|--------------------------|---------------|----------------|----------------|----------|--|
| | | ARS1-B14-00610 | | | 10 | | | 10 | | | | | |
| LIMS Batch Sample ID | LSC P# | LSC PID | LSC S# | LSC SMPL_ID | LSC Count Date | LSC CPMA | LSC LSIE | LSC EFF | LSC Count Dur | Analysis Batch | LIMS SDG | LIMS Run | |
| BKG | 10 | | 1 | BACKGROUND | 04/08/14 16:03 | 1.06 | 382.85 | 26.0400 | 300.00 | ARS1-B14-00610 | | | |
| | ARS1-B14-00610-01 | 10 | | 2 | B14-00610-01 | 04/08/14 21:14 | 2.04 | 388.21 | 26.3100 | 300.00 | ARS1-B14-00610 | | |
| ARS1-B14-00610-02 | 10 | | 3 | B14-00610-02 | 04/09/14 02:26 | 3.84 | 410.98 | 27.4600 | 300.00 | ARS1-B14-00610 | | | |
| ARS1-B14-00610-03 | 10 | | 11 | B14-00610-03 | 04/10/14 19:57 | 1.15 | 404.60 | 27.1300 | 300.00 | ARS1-B14-00610 | | | |
| ARS1-B14-00610-04 | 10 | | 4 | B14-00610-04 | 04/09/14 07:38 | 1.21 | 403.99 | 27.1000 | 300.00 | ARS1-B14-00610 | ARS1-14-00616 | 1 | |
| ARS1-B14-00610-05 | 10 | | 5 | B14-00610-05 | 04/09/14 12:49 | 0.99 | 244.08 | 17.9900 | 300.00 | ARS1-B14-00610 | ARS1-14-00616 | 1 | |
| ARS1-B14-00610-06 | 10 | | 6 | B14-00610-06 | 04/09/14 18:00 | 1.18 | 397.43 | 26.7700 | 300.00 | ARS1-B14-00610 | ARS1-14-00617 | 1 | |
| ARS1-B14-00610-07 | 10 | | 7 | B14-00610-07 | 04/09/14 23:12 | 2.06 | 395.16 | 26.6600 | 300.00 | ARS1-B14-00610 | ARS1-14-00667 | 1 | |
| ARS1-B14-00610-08 | 10 | | 8 | B14-00610-08 | 04/10/14 04:23 | 2.27 | 362.57 | 25.0600 | 300.00 | ARS1-B14-00610 | ARS1-14-00667 | 1 | |
| ARS1-B14-00610-09 | 10 | | 9 | B14-00610-09 | 04/10/14 09:35 | 1.24 | 401.53 | 26.9800 | 300.00 | ARS1-B14-00610 | ARS1-14-00667 | 1 | |
| ARS1-B14-00610-10 | 10 | | 10 | B14-00610-10 | 04/10/14 14:46 | 1.28 | 403.60 | 27.0800 | 300.00 | ARS1-B14-00610 | ARS1-14-00667 | 1 | |

ARS-040 Calculation Results

ARS1-B14-00610

| | |
|-----------|------|
| ACF | 1 |
| UCF | 2.22 |
| Sys Error | 0.15 |

| AnalysisCode | ABatchSampleID | Total_Bkg_Count | Duration_min | DF | Sample_Activity_Conc | Standard_Counting_Uncertainty | CU_1 | CSU_1 | CU_1_96 | CSU_1_96 | MDC | DLC | ActivityReportUnits |
|--------------|-------------------|-----------------|--------------|--------|----------------------|-------------------------------|-------|-------|---------|----------|-------|-----|---------------------|
| LSC-A-022 | ARS1-B14-00610-01 | 300.000 | 0.93145 | 10.451 | 1.091 | 0.750 | 1.910 | 2.139 | 3.744 | 3.070 | 1.487 | pCi | |
| LSC-A-022 | ARS1-B14-00610-02 | 300.000 | 0.93145 | 16.308 | 0.750 | 0.535 | 2.559 | 1.470 | 5.015 | 1.676 | 0.812 | pCi | |
| LSC-A-022 | ARS1-B14-00610-03 | 300.000 | 0.99954 | 0.536 | 0.535 | 0.541 | 1.049 | 1.061 | 1.783 | 0.863 | pCi | | |
| LSC-A-022 | ARS1-B14-00610-04 | 300.000 | 0.99493 | 1.038 | 0.627 | 0.627 | 0.646 | 1.229 | 1.266 | 2.061 | 0.998 | pCi | |
| LSC-A-022 | ARS1-B14-00610-05 | 300.000 | 0.99493 | -0.594 | 0.654 | 0.654 | 0.660 | 1.282 | 1.294 | 2.262 | 1.095 | pCi | |
| LSC-A-022 | ARS1-B14-00610-06 | 300.000 | 0.99570 | 0.556 | 0.485 | 0.485 | 0.495 | 0.950 | 0.969 | 1.603 | 0.776 | pCi | |
| LSC-A-022 | ARS1-B14-00610-07 | 300.000 | 0.99631 | 8.407 | 0.859 | 0.859 | 1.526 | 1.683 | 2.990 | 2.406 | 1.165 | pCi | |
| LSC-A-022 | ARS1-B14-00610-08 | 300.000 | 0.99631 | 7.265 | 0.636 | 0.636 | 1.262 | 1.246 | 2.473 | 1.726 | 0.836 | pCi | |
| LSC-A-022 | ARS1-B14-00610-09 | 300.000 | 0.99646 | 1.117 | 0.541 | 0.541 | 0.566 | 1.060 | 1.110 | 1.764 | 0.854 | pCi | |
| LSC-A-022 | ARS1-B14-00610-10 | 300.000 | 0.99646 | 1.126 | 0.456 | 0.456 | 0.487 | 0.894 | 0.954 | 1.476 | 0.715 | pCi | |

ARS-040 Calculation Results

ARS1-B14-00610

| | |
|-----------|------|
| ACF | 1 |
| UCF | 2.22 |
| Sys Error | 0.15 |

| AnalysisCode | ABatchSampleID | AliquotReportUnits | UserID | ModDate |
|--------------|-------------------|--------------------|--------------|-----------|
| LSC-A-022 | ARS1-B14-00610-01 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-02 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-03 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-04 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-05 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-06 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-07 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-08 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-09 | L | AMRAD\SLEESE | 4/11/2014 |
| LSC-A-022 | ARS1-B14-00610-10 | L | AMRAD\SLEESE | 4/11/2014 |

| ARS-040 Calculation Results | | |
|-----------------------------|------|--|
| ARS1-B14-00610 | | |
| ACF | 1 | |
| UCF | 2.22 | |
| Sys Error | 0.15 | |

| AnalysisCode | ABatchSampleID | Initial_Mass_sample_g | Mass_Na2O2_added_g | Final_mass_electrolyzed_sample_NaOH_g | Mass_equivalent_NaOH_g | Final_Mass_Electrolyzed_sample_g | VolumeFactor_X | Enrichment_Factor_Y |
|--------------|-------------------|-----------------------|--------------------|---------------------------------------|------------------------|----------------------------------|----------------|---------------------|
| LSC-A-022 | ARS1-B14-00610-01 | 505.910 | 2.000 | 9.180 | 2.052 | 7.128 | 0.014 | 53.986 |
| LSC-A-022 | ARS1-B14-00610-02 | 501.560 | 2.000 | 13.440 | 2.052 | 11.388 | 0.023 | 34.128 |
| LSC-A-022 | ARS1-B14-00610-03 | 500.510 | 2.000 | 16.760 | 2.052 | 14.708 | 0.029 | 26.635 |
| LSC-A-022 | ARS1-B14-00610-04 | 500.950 | 2.000 | 13.130 | 2.052 | 11.078 | 0.022 | 35.004 |
| LSC-A-022 | ARS1-B14-00610-05 | 500.000 | 2.000 | 14.270 | 2.052 | 12.218 | 0.024 | 31.801 |
| LSC-A-022 | ARS1-B14-00610-06 | 500.310 | 2.000 | 14.580 | 2.052 | 12.528 | 0.025 | 31.063 |
| LSC-A-022 | ARS1-B14-00610-07 | 500.000 | 2.000 | 17.420 | 2.052 | 15.368 | 0.031 | 25.509 |
| LSC-A-022 | ARS1-B14-00610-08 | 500.000 | 2.000 | 15.090 | 2.052 | 13.038 | 0.026 | 29.877 |
| LSC-A-022 | ARS1-B14-00610-09 | 500.000 | 2.000 | 16.450 | 2.052 | 14.398 | 0.029 | 27.159 |
| LSC-A-022 | ARS1-B14-00610-10 | 500.200 | 2.000 | 14.070 | 2.052 | 12.018 | 0.024 | 32.322 |

ARS-040 Calculation Results

ARS1-B14-00610

ACF 1

UCF 2.22

Sys Error 0.15

| AnalysisCode | ABatchSampleID | Average_Sample_CPM | Bkg_CPM | LSIE | Detector_Eff_decimal | Aliquot | AliqUnits | Activity reference date | Start Date of Count | Sample Count | Duration_min |
|--------------|-------------------|--------------------|---------|---------|----------------------|---------|-----------|-------------------------|---------------------|--------------|--------------|
| LSC-A-022 | ARS1-B14-00610-01 | 2.035 | 1.062 | 388.210 | 0.263 | 0.00317 | L | 1/3/2013 | 4/8/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-02 | 3.843 | 1.062 | 410.980 | 0.275 | 0.00880 | L | 1/3/2013 | 4/9/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-03 | 1.148 | 1.062 | 404.600 | 0.271 | 0.01000 | L | 4/8/2014 | 4/10/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-04 | 1.206 | 1.062 | 403.990 | 0.271 | 0.00662 | L | 3/7/2014 | 4/9/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-05 | 0.987 | 1.062 | 244.080 | 0.180 | 0.01000 | L | 3/7/2014 | 4/9/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-06 | 1.179 | 1.062 | 397.430 | 0.268 | 0.00970 | L | 3/12/2014 | 4/9/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-07 | 2.061 | 1.062 | 395.160 | 0.267 | 0.00790 | L | 3/17/2014 | 4/9/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-08 | 2.265 | 1.062 | 362.570 | 0.251 | 0.01000 | L | 3/17/2014 | 4/10/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-09 | 1.243 | 1.062 | 401.530 | 0.270 | 0.01000 | L | 3/18/2014 | 4/10/2014 | | 300.000 |
| LSC-A-022 | ARS1-B14-00610-10 | 1.280 | 1.062 | 403.600 | 0.271 | 0.01000 | L | 3/18/2014 | 4/10/2014 | | 300.000 |

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\20140408_1554

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140408_1554\20140408_1554.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140408_1554\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140408_1554\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): 300.00

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

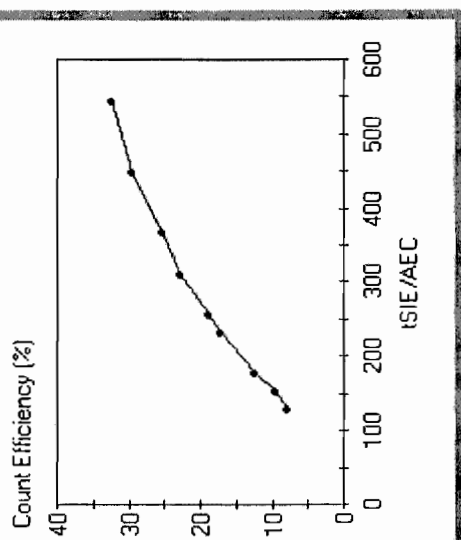
Regions Half Life

Units Reference Date Reference Time

A
 B
 C

Cycle 1 Results
 Quench Curve Block Data

ARS LL H3 10mL in A



Date Acquired: 08/22/2013
 Date Modified:
 ARS LL H3 10mL in A

| tSIE/AEC | Count Efficiency (%) |
|----------|----------------------|
| 544.56 | 32.36 |
| 451.00 | 29.46 |
| 369.98 | 25.40 |
| 311.75 | 22.73 |
| 257.34 | 18.93 |
| 232.82 | 17.19 |
| 180.53 | 12.39 |
| 154.79 | 9.65 |
| 131.07 | 7.78 |

| P# | S# | SMPL_ID | CPMA | DPM1 | tSIE | Eff | Nucl | In A | Count | Time | DATE | TIME | MESSAGES |
|----|----|--------------|-------|-------|--------|-----|------|-------|--------|------|-----------|-------------|----------|
| 10 | 1 | BACKGROUND | 1.062 | 4.08 | 382.85 | | | 26.04 | 300.00 | | 4/8/2014 | 4:03:28 PM | |
| 10 | 2 | B14-00610-01 | 2.035 | 7.74 | 388.21 | | | 26.31 | 300.00 | | 4/8/2014 | 9:14:55 PM | |
| 10 | 3 | B14-00610-02 | 3.843 | 14.00 | 410.98 | | | 27.46 | 300.00 | | 4/9/2014 | 2:26:35 AM | |
| 10 | 4 | B14-00610-04 | 1.206 | 4.45 | 403.99 | | | 27.10 | 300.00 | | 4/9/2014 | 7:38:00 AM | |
| 10 | 5 | B14-00610-05 | 0.987 | 5.49 | 244.08 | | | 17.99 | 300.00 | | 4/9/2014 | 12:49:24 PM | |
| 10 | 6 | B14-00610-06 | 1.179 | 4.40 | 397.43 | | | 26.77 | 300.00 | | 4/9/2014 | 6:00:47 PM | |
| 10 | 7 | B14-00610-07 | 2.061 | 7.73 | 395.16 | | | 26.66 | 300.00 | | 4/9/2014 | 11:12:09 PM | |
| 10 | 8 | B14-00610-08 | 2.265 | 9.04 | 362.57 | | | 25.06 | 300.00 | | 4/10/2014 | 4:23:43 AM | |
| 10 | 9 | B14-00610-09 | 1.243 | 4.61 | 401.53 | | | 26.98 | 300.00 | | 4/10/2014 | 9:35:06 AM | |
| 10 | 10 | B14-00610-10 | 1.280 | 4.73 | 403.60 | | | 27.08 | 300.00 | | 4/10/2014 | 2:46:29 PM | |
| 10 | 11 | B14-00610-03 | 1.148 | 4.23 | 404.60 | | | 27.13 | 300.00 | | 4/10/2014 | 7:57:52 PM | |

SNC Protocol

Calibration Information

Software Version IC: 2.12

Software Version EC: 2.03

Instrument Model: Tri-Carb 3170TR/SL

Instrument Serial Number: 423814

3H Chi Square: 45.98 Date Processed: 4/11/2014 2:41:01 AM

14C Chi Square: 14.14 Date Processed: 4/11/2014 2:41:01 AM

3H E²/B (1-18.6 keV): 1846.82 Date Processed: 4/11/2014 2:41:01 AM14C E²/B (4-156 keV): 6632.44 Date Processed: 4/11/2014 2:41:01 AM

3H Efficiency (0-18.6 keV): 62.59 Date Processed: 4/11/2014 2:41:01 AM

14C Efficiency (0-156 keV): 95.23 Date Processed: 4/11/2014 2:41:01 AM

IPA Background Date Processed: 4/11/2014 2:41:01 AM

3H Background CPM (0-18.6 keV): 2.23 Date Processed: 4/11/2014 2:41:01 AM

14C Background CPM (0-156 keV): 2.46 Date Processed: 4/11/2014 2:41:01 AM

3H Calibration DPM: 268700

3H Reference Date: 9/2/2011

14C Calibration DPM: 127700

==== IPA Errors and Warnings for Last Acquired Data Per Parameter ====

2/15/2009 2:09:35 AM: IPA Error - Insufficient 14C data to calculate Chi Square.

== End of IPA Errors and Warnings for Last Acquired Data Per Parameter ==



Standards Activity as of: 04/08/14 10:16

| 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 |
|--------|--------|---------|-------|-------------------|----------|--------|----------|---------------|---------------------------|------------------|-----------|
| A | S-0289 | H-3 | SL | 01/07/14 | 01/07/15 | OK | 01/03/13 | 5.9080E+00 | 5.5039 | 4.500E+03 | S-0237 |

ARS Batch Number:

ARS1-B14 - 00610

Enter
these
Values
for
LCS

Current ACT
NetWt
Aliquot

5.5039
5.0510
0.5059

Standards Report
LCS Report
Procedural Data Report

Enter
these
Values
for
LCSD

Current ACT
NetWt
Aliquot

5.5039
5.0370
0.5016

Standards Report
LCS Report
Procedural Data Report

Expected Value Calculations

ARS Batch Number:

| | | | | |
|------|------------------------------|---|---------|-------------------|
| LCS | CALCULATED EXPECTED VALUE | = | 24.7526 | |
| | | | Range | 18.5645 - 30.9408 |
| LCSD | CALCULATED EXPECTED VALUE | = | 24.8981 | |
| | | | Range | 18.6736 - 31.1227 |

Beta Liquid Scintillation Counter Log Book

| Date | Time | ARS Sample I.D. Number | Batch Number | Liquid Scintillation File Number | Technician Initials |
|--------|-------|---------------------------|-----------------|--|------------------------|
| 4-8-14 | 1423 | SNC 16 | QA | QA | <i>[Signature]</i> |
| 4-9-14 | 11:00 | Background | B14-00610 | | <i>JB</i> |
| ↓ | ↓ | B14-00610-01 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -02 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -03 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -04 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -05 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -06 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -07 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -08 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -09 | ↓ | ↓ | <i>JB</i> |
| ↓ | ↓ | ↓ -10 | ↓ | ↓ | <i>JB</i> |
| 4-9-14 | 11:00 | SNC 16 | QA | QA | <i>JB</i> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Low Level Tritium

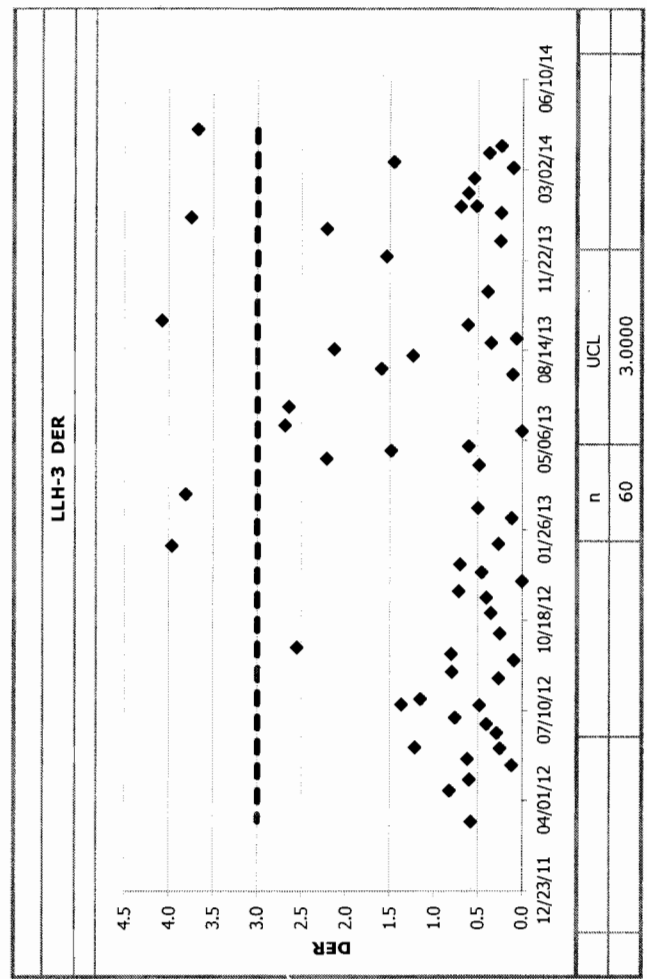
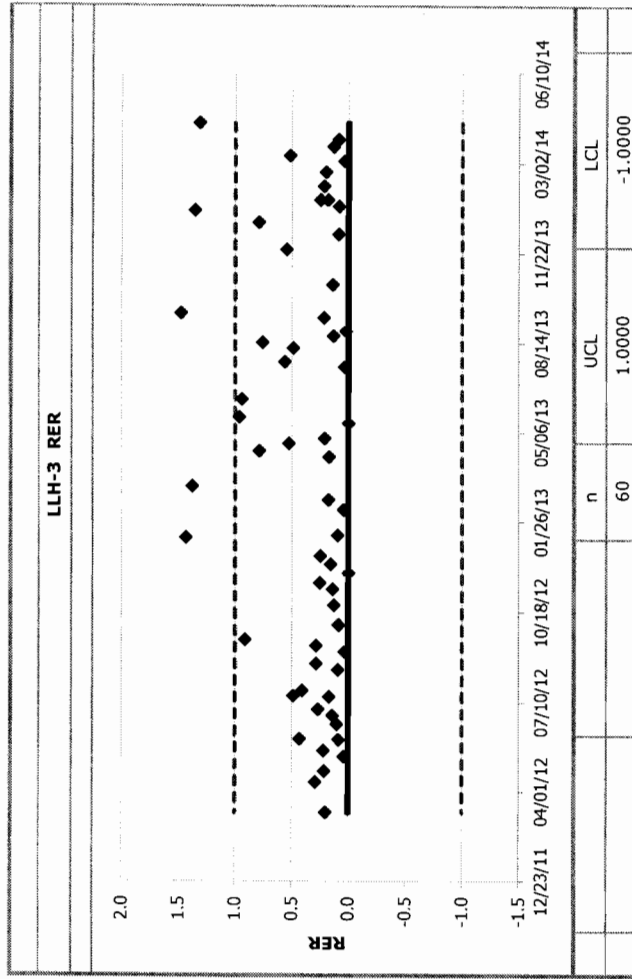
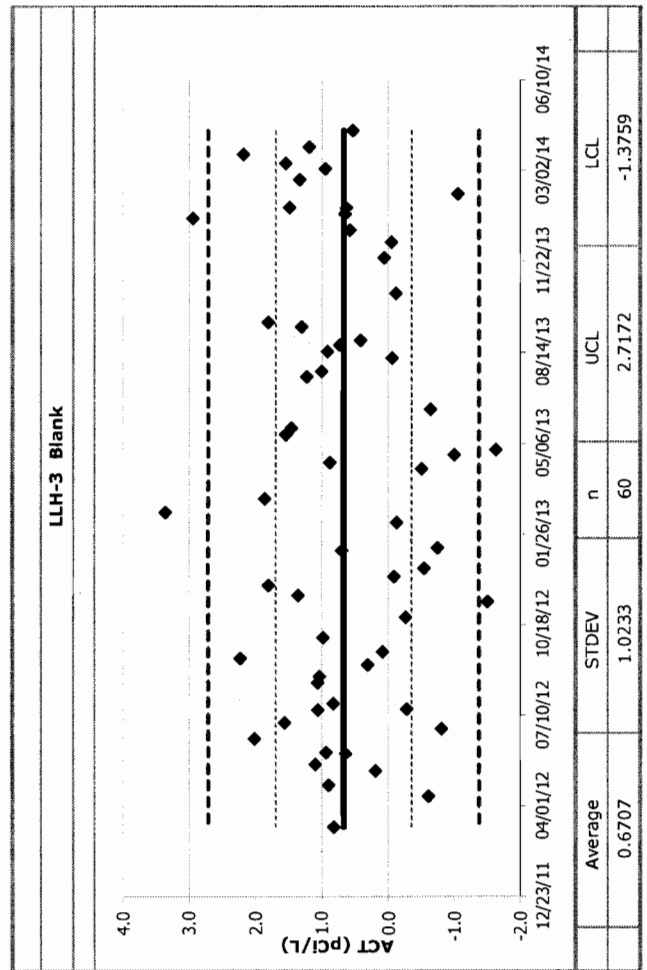
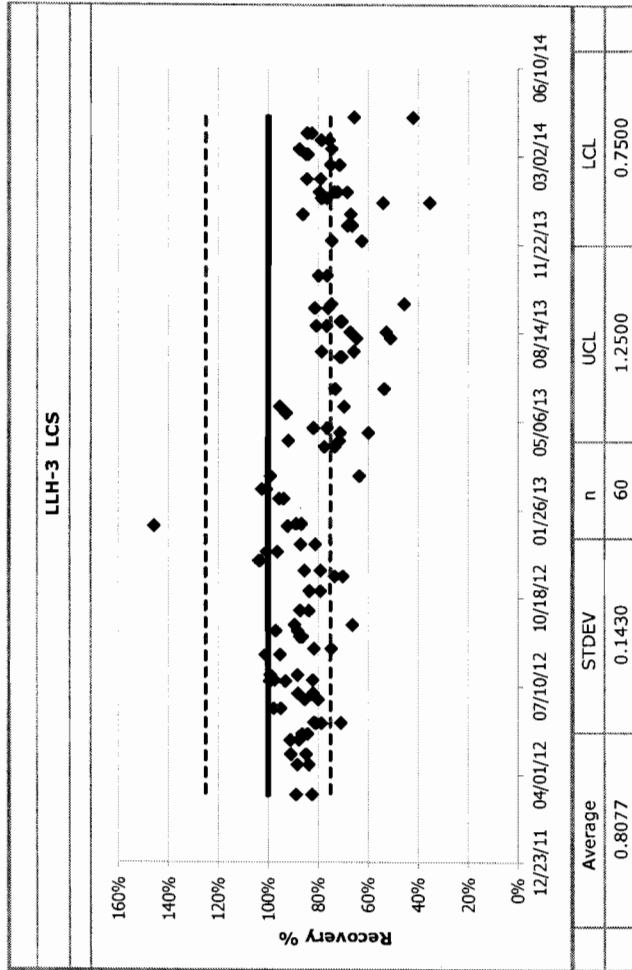
by

Low Level Liquid

Scintillation Counting

Control Charts

QC Chart

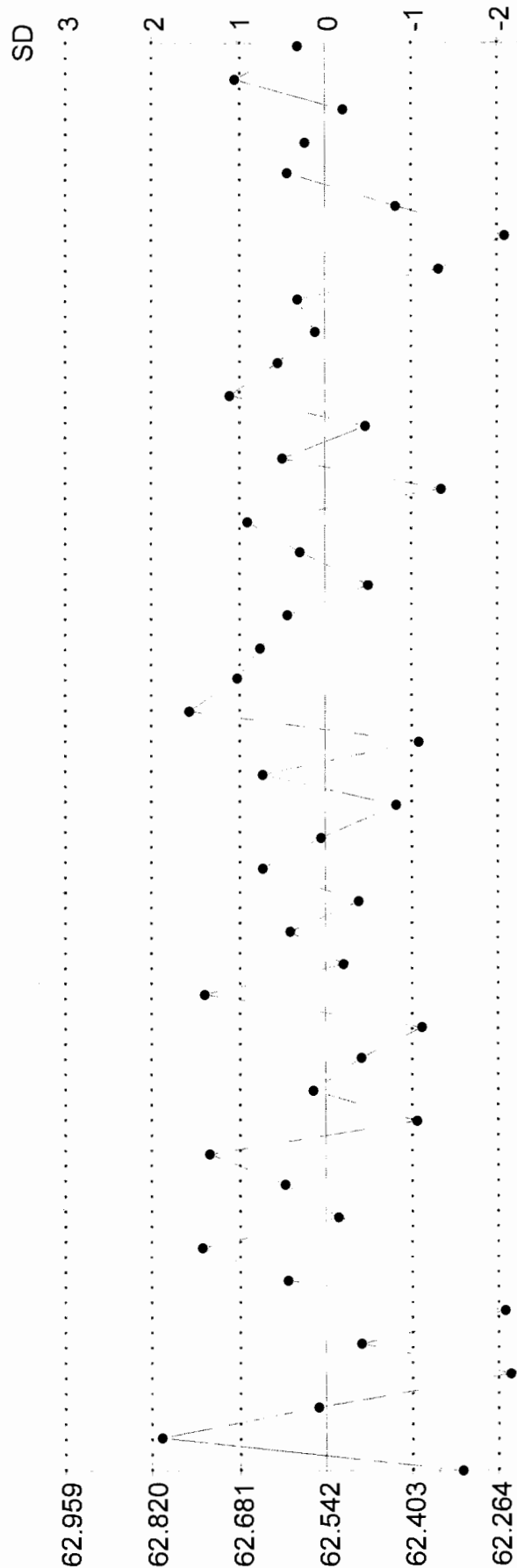


3H Efficiency
Total # pts : 5855
Valid # pts : 46
Mean : 62.54
SD : 0.14

| Date | Value | Valid Pt |
|--------------|-------|----------|
| Mar 11, 2014 | 62.32 | X |
| Mar 17, 2014 | 62.81 | X |
| Mar 17, 2014 | 62.56 | X |
| Mar 20, 2014 | 62.24 | X |
| Mar 20, 2014 | 62.49 | X |
| Mar 21, 2014 | 62.25 | X |
| Mar 28, 2014 | 62.60 | X |
| Apr 01, 2014 | 62.74 | X |
| Apr 02, 2014 | 62.52 | X |
| Apr 02, 2014 | 62.61 | X |
| Apr 02, 2014 | 62.73 | X |
| Apr 02, 2014 | 62.40 | X |
| Apr 02, 2014 | 62.56 | X |
| Apr 02, 2014 | 62.48 | X |
| Apr 02, 2014 | 62.39 | X |
| Apr 02, 2014 | 62.74 | X |
| Apr 02, 2014 | 62.51 | X |
| Apr 02, 2014 | 62.60 | X |
| Apr 02, 2014 | 62.49 | X |
| Apr 02, 2014 | 62.65 | X |
| Apr 02, 2014 | 62.55 | X |
| Apr 02, 2014 | 62.43 | X |
| Apr 03, 2014 | 62.64 | X |
| Apr 03, 2014 | 62.39 | X |
| Apr 03, 2014 | 62.76 | X |
| Apr 03, 2014 | 62.69 | X |
| Apr 03, 2014 | 62.65 | X |
| Apr 03, 2014 | 62.60 | X |
| Apr 03, 2014 | 62.47 | X |
| Apr 03, 2014 | 62.58 | X |
| Apr 03, 2014 | 62.67 | X |
| Apr 03, 2014 | 62.35 | X |
| Apr 03, 2014 | 62.61 | X |
| Apr 03, 2014 | 62.48 | X |
| Apr 03, 2014 | 62.70 | X |
| Apr 03, 2014 | 62.62 | X |
| Apr 04, 2014 | 62.56 | X |
| Apr 04, 2014 | 62.59 | X |
| Apr 04, 2014 | 62.36 | X |
| Apr 04, 2014 | 62.25 | X |
| Apr 04, 2014 | 62.43 | X |
| Apr 04, 2014 | 62.60 | X |

| | | |
|--------------|-------|---|
| Apr 04, 2014 | 62.58 | X |
| Apr 04, 2014 | 62.51 | X |
| Apr 08, 2014 | 62.69 | X |
| Apr 11, 2014 | 62.59 | X |

3H Efficiency
Total # pts : 5855
Valid # pts : 46
Mean : 62.54
SD : 0.14



3/11/2014

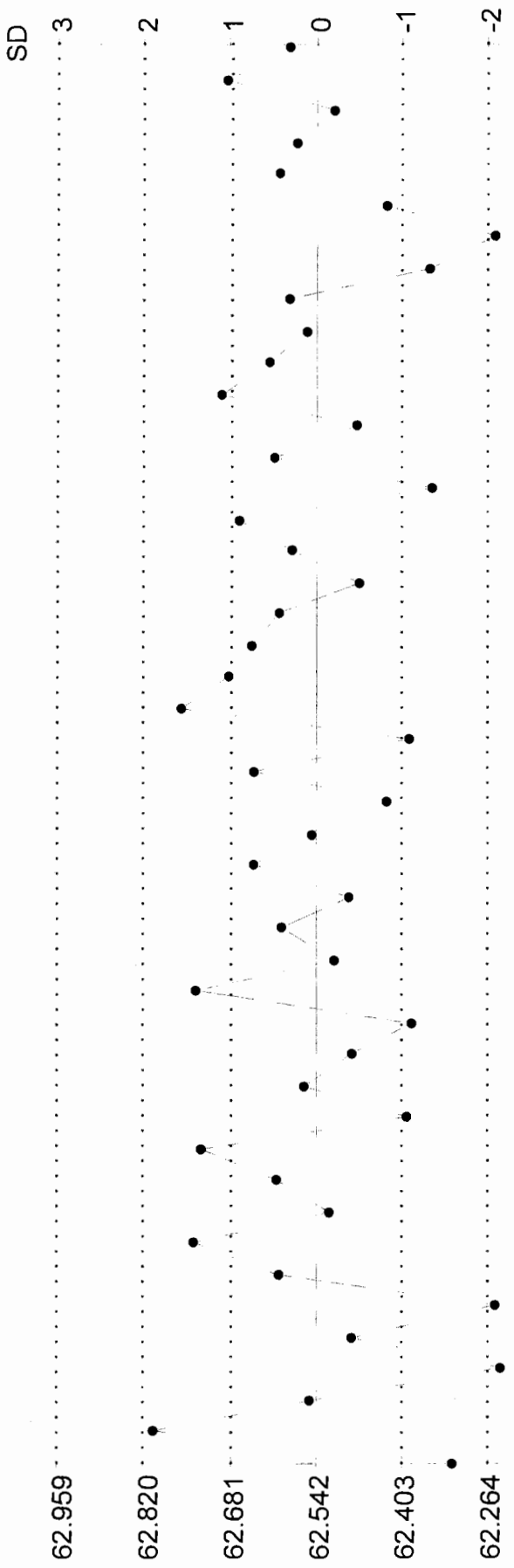
4/11/2014

3H Efficiency
Total # pts : 5855
Valid # pts : 46
Mean : 62.54
SD : 0.14

| Date | Value | Valid Pt |
|--------------|-------|----------|
| Mar 11, 2014 | 62.32 | X |
| Mar 17, 2014 | 62.81 | X |
| Mar 17, 2014 | 62.56 | X |
| Mar 20, 2014 | 62.24 | X |
| Mar 20, 2014 | 62.49 | X |
| Mar 21, 2014 | 62.25 | X |
| Mar 28, 2014 | 62.60 | X |
| Apr 01, 2014 | 62.74 | X |
| Apr 02, 2014 | 62.52 | X |
| Apr 02, 2014 | 62.61 | X |
| Apr 02, 2014 | 62.73 | X |
| Apr 02, 2014 | 62.40 | X |
| Apr 02, 2014 | 62.56 | X |
| Apr 02, 2014 | 62.48 | X |
| Apr 02, 2014 | 62.39 | X |
| Apr 02, 2014 | 62.74 | X |
| Apr 02, 2014 | 62.51 | X |
| Apr 02, 2014 | 62.60 | X |
| Apr 02, 2014 | 62.49 | X |
| Apr 02, 2014 | 62.65 | X |
| Apr 02, 2014 | 62.55 | X |
| Apr 02, 2014 | 62.43 | X |
| Apr 03, 2014 | 62.64 | X |
| Apr 03, 2014 | 62.39 | X |
| Apr 03, 2014 | 62.76 | X |
| Apr 03, 2014 | 62.69 | X |
| Apr 03, 2014 | 62.65 | X |
| Apr 03, 2014 | 62.60 | X |
| Apr 03, 2014 | 62.47 | X |
| Apr 03, 2014 | 62.58 | X |
| Apr 03, 2014 | 62.67 | X |
| Apr 03, 2014 | 62.35 | X |
| Apr 03, 2014 | 62.61 | X |
| Apr 03, 2014 | 62.48 | X |
| Apr 03, 2014 | 62.70 | X |
| Apr 03, 2014 | 62.62 | X |
| Apr 04, 2014 | 62.56 | X |
| Apr 04, 2014 | 62.59 | X |
| Apr 04, 2014 | 62.36 | X |
| Apr 04, 2014 | 62.25 | X |
| Apr 04, 2014 | 62.43 | X |
| Apr 04, 2014 | 62.60 | X |

| | | |
|--------------|-------|---|
| Apr 04, 2014 | 62.58 | X |
| Apr 04, 2014 | 62.51 | X |
| Apr 08, 2014 | 62.69 | X |
| Apr 11, 2014 | 62.59 | X |

3H Efficiency : 5855
Total # pts : 46
Valid # pts : 62.54
Mean : 0.14
SD



3/11/2014

4/11/2014



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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Tritium- Screening by Low Level Liquid Scintillation Counting



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American Radiation Services Analytical Reports

for

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Tritium-Screening by Low Level Liquid Scintillation Counting Samples

ARS File ID Numbers: ARS1-14-00616; 617
 ARS Batch ID: ARS1-B14-00549

| 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 B14-00549-04 | 120 | 1.293 | 1.105 | 28.15 | 10.01 | 30.053 | pCi/L | 91.16022 | NO |
| 2 B14-00549-05 | 120 | 1.383 | 1.105 | 28.23 | 10.02 | 44.270 | pCi/L | 90.81116 | NO |
| 3 B14-00549-06 | 120 | 1.199 | 1.105 | 27.1 | 10.07 | 15.516 | pCi/L | 94.12805 | NO |
| 4 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 5 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 6 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 7 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 8 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 9 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 10 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 11 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 12 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 13 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 14 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 15 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 16 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 17 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 18 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 19 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 20 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 21 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 22 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |
| 23 | | | | | | #DIV/0! | pCi/L | #DIV/0! | #DIV/0! |



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for

Los Alamos National Laboratory

Tritium-Screening by Low Level Liquid Scintillation Counting Laboratory Records

Analysis Batch Report

| Analysis Batch ID ARS1-B14-00549 | | | | | | | | | | | | | | |
|---|-------------|------------|------------|------------|-----------------------------|-----|-----|---------------|---------------|--------------|-----------|----------|--------|----|
|  | Method | | ARS-054 | | Low Level Tritium Screening | | | | Analysis | | LSC-A-021 | | Matrix | AQ |
| | Description | | | | | | | | | | | | | |
| | Type | Blind Iso1 | Blind Iso2 | Blind Iso3 | SDG | FR | Run | Client ID | Isotope Group | Lab Deadline | | | | |
| ARS1-B14-00549-01 | LCS | | | | | | | | | | | | | |
| ARS1-B14-00549-02 | LCSD | | | | | | | | | | | | | |
| ARS1-B14-00549-03 | MBL | | | | | | | | | | | | | |
| ARS1-B14-00549-04 | TRG | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| ARS1-B14-00549-04 | TRG | | | | ARS1-14-00616 | 001 | 1 | CAWA-14-54782 | STD | | | 04/08/14 | | |
| ARS1-B14-00549-05 | TRG | | | | ARS1-14-00616 | 002 | 1 | CAWA-14-54783 | STD | | | 04/08/14 | | |
| ARS1-B14-00549-06 | TRG | | | | ARS1-14-00617 | 001 | 1 | CAAN-14-54788 | STD | | | 04/08/14 | | |

| ID_31001_054 | ABatch | ABatchSampleID | ClientID | Aliquot1 | AliquotUnits1 | IC_ID1 | Aliquot2 | AliquotUnits2 | IC_ID2 | UserID | ModDate |
|--------------|----------------|-------------------|---------------|----------|---------------|--------|----------|---------------|--------|---------------|---------------------|
| 13404 | ARS1-B14-00549 | ARS1-B14-00549-01 | | 1 g | | | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:04 |
| 13405 | ARS1-B14-00549 | ARS1-B14-00549-02 | | 1 g | | | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:04 |
| 13406 | ARS1-B14-00549 | ARS1-B14-00549-03 | | 1 g | | | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:04 |
| 13407 | ARS1-B14-00549 | ARS1-B14-00549-04 | CAWA-14-54782 | 10.01 g | | 158602 | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:04 |
| 13408 | ARS1-B14-00549 | ARS1-B14-00549-05 | CAWA-14-54783 | 10.02 g | | 158603 | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:05 |
| 13409 | ARS1-B14-00549 | ARS1-B14-00549-06 | CAAN-14-54788 | 10.07 g | | 158604 | | | | AMRAD\PSAVAGE | 03/17/2014 10:08:05 |

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\20140317_1642

Raw Results Path: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140317_1642\20140317_1642.results

RTF File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140317_1642\LLH3.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\H3 Low Level\Low Level H3_3\20140317_1642\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): 120.00

Count Mode: Low Level

Assay Count Cycles: 1

#Vials/Sample: 1

Repeat Sample Count: 1

Calculate % Reference: Off

Background Subtract: Off

Low CPM Threshold: Off

2 Sigma % Terminator: On - Any Region

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

Count Corrections-

Static Controller: On

Colored Samples: Off

Coincidence Time (nsec): 18

Half Life-

47 0f 86

Luminescence Correction: Off

Heterogeneity Monitor: Off

Delay Before Burst (nsec): 75

Half Life Correction: Off

Regions Half Life

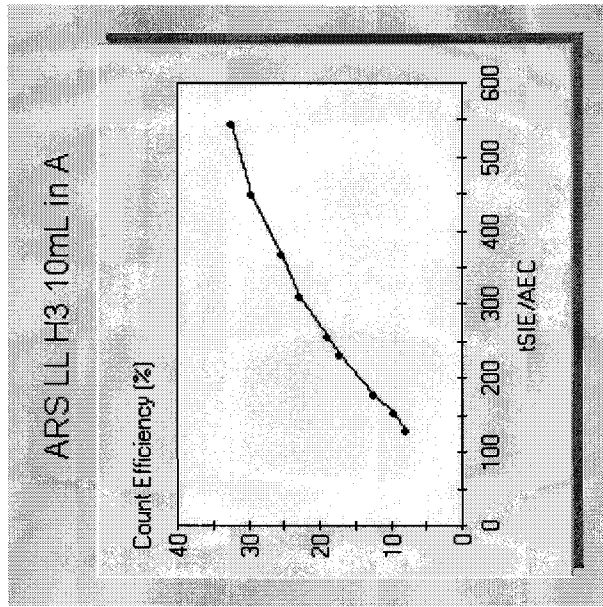
Units

Reference Date

Reference Time

A
B
C

Cycle 1 Results
Quench Curve Block Data



| Date Acquired: 08/22/2013 | | |
|---------------------------|-------|----------------|
| Date Modified: | | |
| ARS LL H3 10mL in A | | |
| tSIE/AEC | Count | Efficiency (%) |
| 544.56 | 32.36 | |
| 451.00 | 29.46 | |
| 369.98 | 25.40 | |
| 311.75 | 22.73 | |
| 257.34 | 18.93 | |
| 232.82 | 17.19 | |
| 180.53 | 12.39 | |
| 154.79 | 9.65 | |
| 131.07 | 7.78 | |

| P# | S# | SMPL_ID | CPMA | DPM1 | tsIE | Eff Nucl | In A | Count | Time | DATE | TIME | MESSAGES |
|----|----|--------------|-------|------|--------|----------|-------|--------|------|-----------|-------------|----------|
| 10 | 1 | BACKGROUND | 1.105 | 3.97 | 418.33 | | 27.82 | 120.00 | | 3/17/2014 | 4:50:58 PM | |
| 10 | 2 | B14-00549-04 | 1.293 | 4.59 | 424.84 | | 28.15 | 120.00 | | 3/17/2014 | 7:00:50 PM | |
| 10 | 3 | B14-00549-05 | 1.383 | 4.90 | 426.43 | | 28.23 | 120.00 | | 3/17/2014 | 9:10:39 PM | |
| 10 | 4 | B14-00549-06 | 1.199 | 4.42 | 403.95 | | 27.10 | 120.00 | | 3/17/2014 | 11:20:29 PM | |

Low Level Tritium pH Checks

[illegible]

Beta Liquid Scintillation Counter Log Book

| Date | Time | ARS Sample I.D. Number | Batch Number | Liquid Scintillation File Number | Technician Initials |
|---------|-------|-----------------------------------|--------------|----------------------------------|---------------------|
| 7-14 | 14:30 | D14-00269-02 | D14-00269 | 16021 | ms |
| ↓ | ↓ | ↓ 03 | ↓ | ↓ | Phs |
| ↓ | ↓ | ↓ 04 | ↓ | ↓ | Phs |
| ↓ | ↓ | ↓ 05 | ↓ | ↓ | Phs |
| ↓ | ↓ | ↓ 06 | ↓ | ↓ | ms |
| ↓ | ↓ | ↓ -07 | ↓ | ↓ | Phs |
| ↓ | ↓ | ↓ -08 | ↓ | ↓ | Phs |
| ↓ | ↓ | ↓ -09 | ↓ | ↓ | Phs |
| 3-11-14 | 14:15 | D14-00269-02 SNC 16 | QA | QA | JB |
| 3-11-14 | 14:15 | Background | B14-00319 | | JB |
| 3-11-14 | 14:15 | B14-00319-01 | B14-00319 | | JB |
| ↓ | ↓ | ↓ -02 | ↓ | ↓ | JB |
| ↓ | ↓ | ↓ -03 | ↓ | ↓ | JB |
| ↓ | ↓ | ↓ -04 | ↓ | ↓ | JB |
| ↓ | ↓ | ↓ -05 | ↓ | ↓ | JB |
| ↓ | ↓ | ↓ -06 | ↓ | ↓ | JB |
| 3-17-14 | 10:50 | SNC 16 | QA | QA | Phs |
| ↓ | ↓ | Background | D14-00549 | 16012 | ms |
| ↓ | ↓ | D14-00549-04 | ↓ | ↓ | ms |
| ↓ | ↓ | ↓ 05 | ↓ | ↓ | ms |

Beta Liquid Scintillation Counter Log Book

| Date | Time | ARS Sample I.D. Number | Batch Number | Liquid Scintillation File Number | Technician Initials |
|--------------------|------------------|------------------------|--------------|----------------------------------|---------------------|
| 3-17-14 | 10:00 | | | | |
| 3-17-14 | 10:52 | D14W424-01 | D14W424 | 1242 | VR |
| | 14:50 | Background | D14W424 | | VR |
| | | D14W424-01 | | | VR |
| | | -02 | | | VR |
| | | -03 | | | VR |
| | | -04 | | | VR |
| | | -05 | | | VR |
| | | -06 | | | VR |
| | | -07 | | | VR |
| | | -08 | | | VR |
| | | -09 | | | VR |
| | | -10 | | | VR |
| SDH 3-18-14 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
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**Tritium-Screening
by**

**Low Level Liquid
Scintillation Counting**

Control Charts

3H Efficiency

Total # pts : 5812
Valid # pts : 228
Mean : 62.56
SD : 0.18

| Date | Value | Valid Pt |
|--------------|-------|----------|
| Mar 18, 2013 | 62.45 | X |
| Mar 22, 2013 | 62.47 | X |
| Mar 22, 2013 | 62.43 | X |
| Mar 23, 2013 | 62.64 | X |
| Mar 28, 2013 | 62.47 | X |
| Mar 29, 2013 | 62.47 | X |
| Apr 04, 2013 | 62.44 | X |
| Apr 05, 2013 | 62.70 | X |
| Apr 07, 2013 | 62.62 | X |
| Apr 11, 2013 | 62.77 | X |
| Apr 12, 2013 | 62.38 | X |
| Apr 15, 2013 | 62.83 | X |
| Apr 16, 2013 | 62.42 | X |
| Apr 16, 2013 | 62.53 | X |
| Apr 16, 2013 | 62.55 | X |
| Apr 16, 2013 | 62.41 | X |
| Apr 16, 2013 | 62.78 | X |
| Apr 16, 2013 | 62.37 | X |
| Apr 18, 2013 | 62.59 | X |
| Apr 19, 2013 | 62.54 | X |
| Apr 22, 2013 | 62.44 | X |
| Apr 24, 2013 | 62.54 | X |
| Apr 24, 2013 | 62.62 | X |
| Apr 25, 2013 | 62.71 | X |
| Apr 25, 2013 | 62.40 | X |
| Apr 27, 2013 | 63.02 | X |
| Apr 29, 2013 | 62.92 | X |
| May 01, 2013 | 62.68 | X |
| May 03, 2013 | 62.51 | X |
| May 06, 2013 | 62.24 | X |
| May 07, 2013 | 62.57 | X |
| May 09, 2013 | 62.56 | X |
| May 09, 2013 | 62.84 | X |
| May 09, 2013 | 62.92 | X |
| May 09, 2013 | 62.83 | X |
| May 09, 2013 | 62.46 | X |
| May 10, 2013 | 62.57 | X |
| May 14, 2013 | 62.57 | X |
| May 15, 2013 | 62.40 | X |
| May 16, 2013 | 62.37 | X |
| May 17, 2013 | 62.57 | X |
| May 17, 2013 | 62.52 | X |

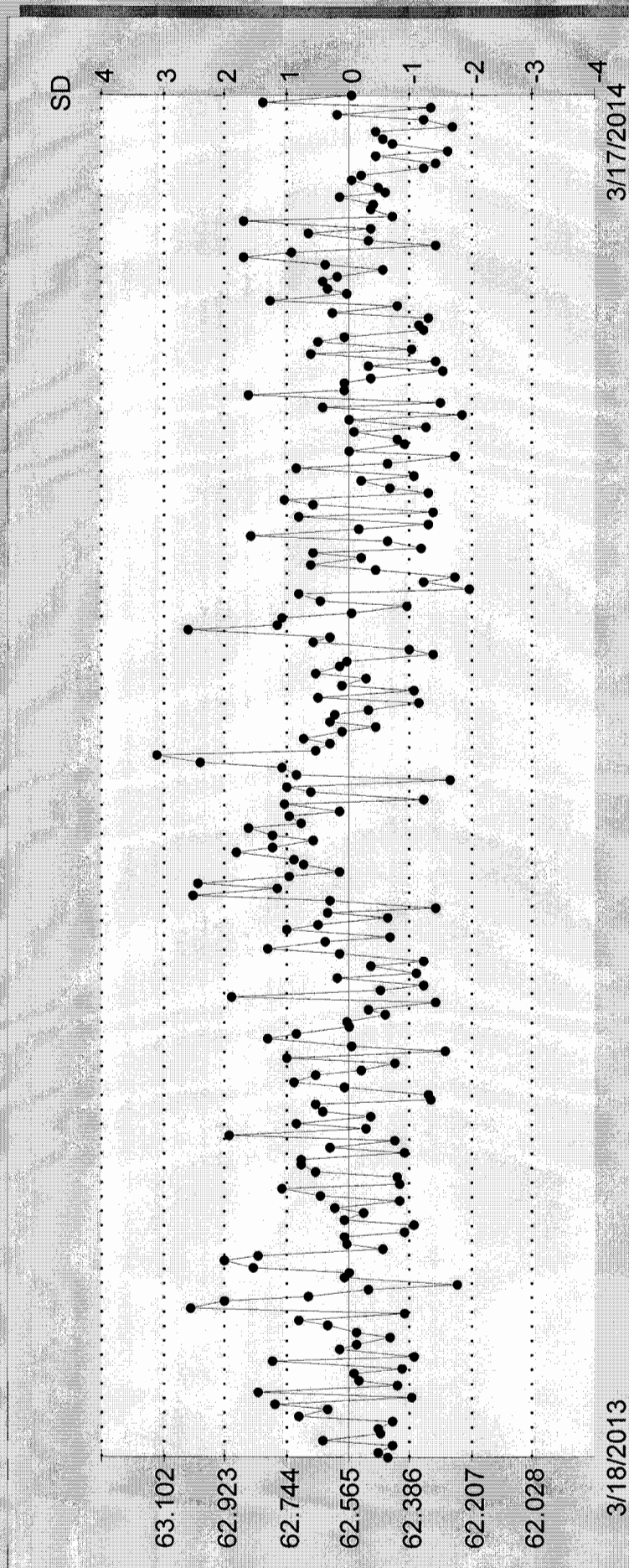
| | | |
|--------------|-------|---|
| May 17, 2013 | 62.60 | X |
| May 17, 2013 | 62.41 | X |
| May 21, 2013 | 62.65 | X |
| May 22, 2013 | 62.75 | X |
| May 24, 2013 | 62.41 | X |
| May 24, 2013 | 62.42 | X |
| May 29, 2013 | 62.66 | X |
| Jun 07, 2013 | 62.70 | X |
| Jun 07, 2013 | 62.70 | X |
| Jun 09, 2013 | 62.40 | X |
| Jun 10, 2013 | 62.61 | X |
| Jun 13, 2013 | 62.43 | X |
| Jun 15, 2013 | 62.91 | X |
| Jun 17, 2013 | 62.51 | X |
| Jun 18, 2013 | 62.71 | X |
| Jun 19, 2013 | 62.50 | X |
| Jun 21, 2013 | 62.64 | X |
| Jun 24, 2013 | 62.66 | X |
| Jun 27, 2013 | 62.32 | X |
| Jun 28, 2013 | 62.33 | X |
| Jul 01, 2013 | 62.58 | X |
| Jul 03, 2013 | 62.72 | X |
| Jul 11, 2013 | 62.66 | X |
| Jul 15, 2013 | 62.53 | X |
| Jul 17, 2013 | 62.43 | X |
| Jul 17, 2013 | 62.74 | X |
| Jul 18, 2013 | 62.28 | X |
| Jul 20, 2013 | 62.55 | X |
| Jul 22, 2013 | 62.79 | X |
| Jul 23, 2013 | 62.71 | X |
| Jul 29, 2013 | 62.56 | X |
| Aug 01, 2013 | 62.57 | X |
| Aug 02, 2013 | 62.46 | X |
| Aug 05, 2013 | 62.50 | X |
| Aug 06, 2013 | 62.31 | X |
| Aug 08, 2013 | 62.90 | X |
| Aug 08, 2013 | 62.47 | X |
| Aug 09, 2013 | 62.34 | X |
| Aug 13, 2013 | 62.59 | X |
| Aug 13, 2013 | 62.36 | X |
| Aug 13, 2013 | 62.50 | X |
| Aug 13, 2013 | 62.34 | X |
| Aug 13, 2013 | 62.59 | X |
| Aug 13, 2013 | 62.80 | X |
| Aug 13, 2013 | 62.63 | X |
| Aug 13, 2013 | 62.44 | X |
| Aug 14, 2013 | 62.74 | X |
| Aug 14, 2013 | 62.65 | X |
| Aug 14, 2013 | 62.45 | X |
| Aug 14, 2013 | 62.62 | X |
| Aug 14, 2013 | 62.31 | X |
| Aug 14, 2013 | 62.62 | X |

| | | |
|--------------|-------|---|
| Aug 23, 2013 | 62.77 | X |
| Aug 28, 2013 | 63.00 | X |
| Sep 04, 2013 | 62.73 | X |
| Sep 09, 2013 | 62.59 | X |
| Sep 09, 2013 | 62.69 | X |
| Sep 09, 2013 | 62.72 | X |
| Sep 13, 2013 | 62.88 | X |
| Sep 15, 2013 | 62.78 | X |
| Sep 20, 2013 | 62.66 | X |
| Sep 24, 2013 | 62.78 | X |
| Sep 26, 2013 | 62.85 | X |
| Oct 10, 2013 | 62.70 | X |
| Oct 11, 2013 | 62.74 | X |
| Oct 11, 2013 | 62.59 | X |
| Oct 12, 2013 | 62.75 | X |
| Oct 12, 2013 | 62.34 | X |
| Oct 12, 2013 | 62.67 | X |
| Oct 12, 2013 | 62.74 | X |
| Oct 12, 2013 | 62.27 | X |
| Oct 12, 2013 | 62.72 | X |
| Oct 12, 2013 | 62.75 | X |
| Oct 12, 2013 | 62.99 | X |
| Oct 12, 2013 | 63.12 | X |
| Oct 12, 2013 | 62.66 | X |
| Oct 12, 2013 | 62.62 | X |
| Oct 12, 2013 | 62.69 | X |
| Oct 12, 2013 | 62.58 | X |
| Oct 12, 2013 | 62.48 | X |
| Oct 13, 2013 | 62.62 | X |
| Oct 13, 2013 | 62.60 | X |
| Oct 13, 2013 | 62.50 | X |
| Oct 13, 2013 | 62.36 | X |
| Oct 13, 2013 | 62.65 | X |
| Oct 13, 2013 | 62.37 | X |
| Oct 13, 2013 | 62.58 | X |
| Oct 13, 2013 | 62.51 | X |
| Oct 13, 2013 | 62.66 | X |
| Oct 13, 2013 | 62.59 | X |
| Oct 13, 2013 | 62.57 | X |
| Oct 13, 2013 | 62.32 | X |
| Oct 13, 2013 | 62.38 | X |
| Oct 13, 2013 | 62.66 | X |
| Oct 13, 2013 | 62.62 | X |
| Oct 14, 2013 | 63.03 | X |
| Oct 14, 2013 | 62.77 | X |
| Oct 14, 2013 | 62.75 | X |
| Oct 14, 2013 | 62.55 | X |
| Oct 14, 2013 | 62.39 | X |
| Oct 16, 2013 | 62.64 | X |
| Oct 17, 2013 | 62.71 | X |
| Oct 24, 2013 | 62.21 | X |
| Oct 25, 2013 | 62.34 | X |

| | | |
|--------------|-------|---|
| Nov 06, 2013 | 62.48 | X |
| Nov 07, 2013 | 62.67 | X |
| Nov 08, 2013 | 62.52 | X |
| Nov 15, 2013 | 62.66 | X |
| Nov 16, 2013 | 62.35 | X |
| Nov 22, 2013 | 62.45 | X |
| Nov 26, 2013 | 62.84 | X |
| Dec 03, 2013 | 62.54 | X |
| Dec 06, 2013 | 62.33 | X |
| Dec 09, 2013 | 62.70 | X |
| Dec 09, 2013 | 62.31 | X |
| Dec 12, 2013 | 62.67 | X |
| Dec 13, 2013 | 62.75 | X |
| Dec 15, 2013 | 62.33 | X |
| Dec 20, 2013 | 62.44 | X |
| Dec 27, 2013 | 62.53 | X |
| Dec 31, 2013 | 62.37 | X |
| Dec 31, 2013 | 62.71 | X |
| Dec 31, 2013 | 62.45 | X |
| Dec 31, 2013 | 62.25 | X |
| Dec 31, 2013 | 62.56 | X |
| Dec 31, 2013 | 62.40 | X |
| Dec 31, 2013 | 62.42 | X |
| Dec 31, 2013 | 62.55 | X |
| Dec 31, 2013 | 62.33 | X |
| Dec 31, 2013 | 62.56 | X |
| Jan 01, 2014 | 62.23 | X |
| Jan 01, 2014 | 62.64 | X |
| Jan 01, 2014 | 62.29 | X |
| Jan 01, 2014 | 62.85 | X |
| Jan 01, 2014 | 62.57 | X |
| Jan 01, 2014 | 62.58 | X |
| Jan 01, 2014 | 62.50 | X |
| Jan 01, 2014 | 62.29 | X |
| Jan 01, 2014 | 62.51 | X |
| Jan 01, 2014 | 62.31 | X |
| Jan 01, 2014 | 62.67 | X |
| Jan 01, 2014 | 62.38 | X |
| Jan 01, 2014 | 62.65 | X |
| Jan 01, 2014 | 62.57 | X |
| Jan 02, 2014 | 62.34 | X |
| Jan 02, 2014 | 62.36 | X |
| Jan 02, 2014 | 62.33 | X |
| Jan 02, 2014 | 62.61 | X |
| Jan 02, 2014 | 62.42 | X |
| Jan 02, 2014 | 62.79 | X |
| Jan 02, 2014 | 62.57 | X |
| Jan 02, 2014 | 62.62 | X |
| Jan 02, 2014 | 62.64 | X |
| Jan 02, 2014 | 62.60 | X |
| Jan 02, 2014 | 62.46 | X |
| Jan 02, 2014 | 62.63 | X |

| | | |
|--------------|-------|---|
| Jan 02, 2014 | 62.73 | X |
| Jan 03, 2014 | 62.31 | X |
| Jan 03, 2014 | 62.50 | X |
| Jan 03, 2014 | 62.68 | X |
| Jan 03, 2014 | 62.50 | X |
| Jan 03, 2014 | 62.87 | X |
| Jan 03, 2014 | 62.44 | X |
| Jan 03, 2014 | 62.49 | X |
| Jan 08, 2014 | 62.49 | X |
| Jan 15, 2014 | 62.58 | X |
| Jan 17, 2014 | 62.46 | X |
| Jan 20, 2014 | 62.48 | X |
| Jan 20, 2014 | 62.55 | X |
| Jan 27, 2014 | 62.52 | X |
| Jan 31, 2014 | 62.34 | X |
| Feb 03, 2014 | 62.31 | X |
| Feb 05, 2014 | 62.48 | X |
| Feb 11, 2014 | 62.27 | X |
| Feb 14, 2014 | 62.43 | X |
| Feb 25, 2014 | 62.46 | X |
| Feb 26, 2014 | 62.48 | X |
| Feb 27, 2014 | 62.26 | X |
| Mar 06, 2014 | 62.35 | X |
| Mar 07, 2014 | 62.59 | X |
| Mar 11, 2014 | 62.32 | X |
| Mar 17, 2014 | 62.81 | X |
| Mar 17, 2014 | 62.56 | X |

3H Efficiency : 5812
 Total # pts : 228
 Valid # pts : 62.56
 Mean : 0.18
 SD



3H Background

Total # pts : 5738
Valid # pts : 228
Mean : 2.10
SD : 0.18

| Date | Value | Valid Pt |
|--------------|-------|----------|
| Mar 18, 2013 | 2.22 | X |
| Mar 22, 2013 | 2.16 | X |
| Mar 22, 2013 | 2.25 | X |
| Mar 23, 2013 | 2.19 | X |
| Mar 28, 2013 | 1.99 | X |
| Mar 29, 2013 | 1.93 | X |
| Apr 04, 2013 | 2.40 | X |
| Apr 05, 2013 | 2.36 | X |
| Apr 07, 2013 | 2.25 | X |
| Apr 11, 2013 | 2.09 | X |
| Apr 12, 2013 | 2.13 | X |
| Apr 15, 2013 | 2.22 | X |
| Apr 16, 2013 | 2.16 | X |
| Apr 16, 2013 | 1.93 | X |
| Apr 16, 2013 | 1.87 | X |
| Apr 16, 2013 | 2.24 | X |
| Apr 16, 2013 | 1.75 | X |
| Apr 16, 2013 | 2.05 | X |
| Apr 18, 2013 | 2.02 | X |
| Apr 19, 2013 | 2.34 | X |
| Apr 22, 2013 | 2.04 | X |
| Apr 24, 2013 | 2.26 | X |
| Apr 24, 2013 | 2.22 | X |
| Apr 25, 2013 | 2.14 | X |
| Apr 25, 2013 | 2.13 | X |
| Apr 27, 2013 | 1.97 | X |
| Apr 29, 2013 | 1.89 | X |
| May 01, 2013 | 2.26 | X |
| May 03, 2013 | 2.04 | X |
| May 06, 2013 | 1.99 | X |
| May 07, 2013 | 1.84 | X |
| May 09, 2013 | 2.03 | X |
| May 09, 2013 | 2.24 | X |
| May 09, 2013 | 1.88 | X |
| May 09, 2013 | 1.88 | X |
| May 09, 2013 | 1.99 | X |
| May 10, 2013 | 2.15 | X |
| May 14, 2013 | 2.12 | X |
| May 15, 2013 | 2.06 | X |
| May 16, 2013 | 2.25 | X |
| May 17, 2013 | 2.23 | X |
| May 17, 2013 | 2.01 | X |

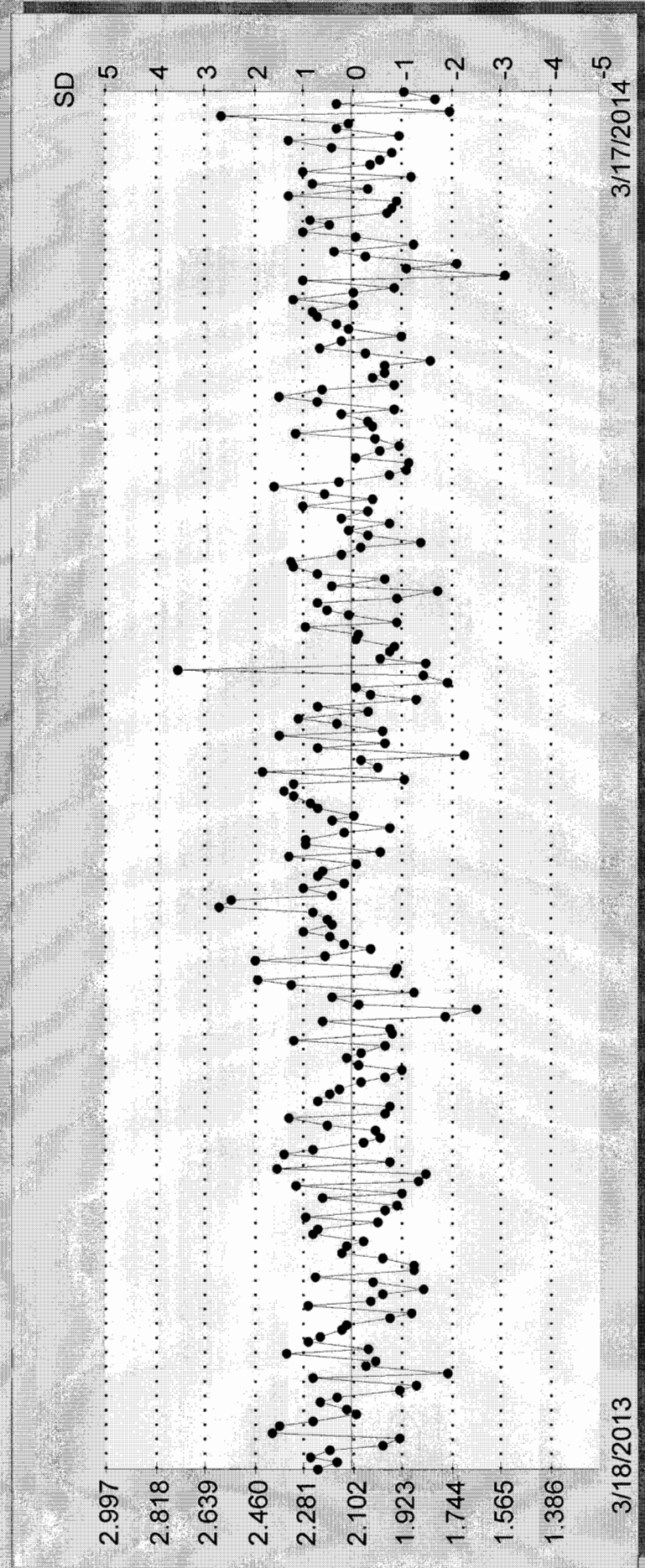
| | | |
|--------------|------|---|
| May 17, 2013 | 2.27 | X |
| May 17, 2013 | 1.99 | X |
| May 21, 2013 | 1.94 | X |
| May 22, 2013 | 2.21 | X |
| May 24, 2013 | 1.92 | X |
| May 24, 2013 | 2.31 | X |
| May 29, 2013 | 1.86 | X |
| Jun 07, 2013 | 1.83 | X |
| Jun 07, 2013 | 2.38 | X |
| Jun 09, 2013 | 1.97 | X |
| Jun 10, 2013 | 2.35 | X |
| Jun 13, 2013 | 2.24 | X |
| Jun 15, 2013 | 2.06 | X |
| Jun 17, 2013 | 2.00 | X |
| Jun 18, 2013 | 2.02 | X |
| Jun 19, 2013 | 2.20 | X |
| Jun 21, 2013 | 2.34 | X |
| Jun 24, 2013 | 1.98 | X |
| Jun 27, 2013 | 1.96 | X |
| Jun 28, 2013 | 2.23 | X |
| Jul 01, 2013 | 2.19 | X |
| Jul 03, 2013 | 2.15 | X |
| Jul 11, 2013 | 2.07 | X |
| Jul 15, 2013 | 1.98 | X |
| Jul 17, 2013 | 1.93 | X |
| Jul 17, 2013 | 2.08 | X |
| Jul 18, 2013 | 2.13 | X |
| Jul 20, 2013 | 2.07 | X |
| Jul 22, 2013 | 1.99 | X |
| Jul 23, 2013 | 2.32 | X |
| Jul 29, 2013 | 1.96 | X |
| Aug 01, 2013 | 1.97 | X |
| Aug 02, 2013 | 2.21 | X |
| Aug 05, 2013 | 1.77 | X |
| Aug 06, 2013 | 1.66 | X |
| Aug 08, 2013 | 2.08 | X |
| Aug 08, 2013 | 2.18 | X |
| Aug 09, 2013 | 1.88 | X |
| Aug 13, 2013 | 2.32 | X |
| Aug 13, 2013 | 2.45 | X |
| Aug 13, 2013 | 1.95 | X |
| Aug 13, 2013 | 1.94 | X |
| Aug 13, 2013 | 2.45 | X |
| Aug 13, 2013 | 2.21 | X |
| Aug 13, 2013 | 2.03 | X |
| Aug 13, 2013 | 2.13 | X |
| Aug 14, 2013 | 2.18 | X |
| Aug 14, 2013 | 2.29 | X |
| Aug 14, 2013 | 2.17 | X |
| Aug 14, 2013 | 2.19 | X |
| Aug 14, 2013 | 2.25 | X |
| Aug 14, 2013 | 2.59 | X |

| | | |
|--------------|------|---|
| Aug 23, 2013 | 2.18 | X |
| Aug 28, 2013 | 2.28 | X |
| Sep 04, 2013 | 2.13 | X |
| Sep 09, 2013 | 2.23 | X |
| Sep 09, 2013 | 2.21 | X |
| Sep 09, 2013 | 2.09 | X |
| Sep 13, 2013 | 2.34 | X |
| Sep 15, 2013 | 2.00 | X |
| Sep 20, 2013 | 2.28 | X |
| Sep 24, 2013 | 2.27 | X |
| Sep 26, 2013 | 2.13 | X |
| Oct 10, 2013 | 1.97 | X |
| Oct 11, 2013 | 2.17 | X |
| Oct 11, 2013 | 2.10 | X |
| Oct 12, 2013 | 2.23 | X |
| Oct 12, 2013 | 2.25 | X |
| Oct 12, 2013 | 2.32 | X |
| Oct 12, 2013 | 2.35 | X |
| Oct 12, 2013 | 2.31 | X |
| Oct 12, 2013 | 1.92 | X |
| Oct 12, 2013 | 2.43 | X |
| Oct 12, 2013 | 2.01 | X |
| Oct 12, 2013 | 2.08 | X |
| Oct 12, 2013 | 1.70 | X |
| Oct 12, 2013 | 2.23 | X |
| Oct 12, 2013 | 1.98 | X |
| Oct 12, 2013 | 2.37 | X |
| Oct 12, 2013 | 1.99 | X |
| Oct 13, 2013 | 2.16 | X |
| Oct 13, 2013 | 2.30 | X |
| Oct 13, 2013 | 2.04 | X |
| Oct 13, 2013 | 2.23 | X |
| Oct 13, 2013 | 1.88 | X |
| Oct 13, 2013 | 2.03 | X |
| Oct 13, 2013 | 2.09 | X |
| Oct 13, 2013 | 1.76 | X |
| Oct 13, 2013 | 1.84 | X |
| Oct 13, 2013 | 2.74 | X |
| Oct 13, 2013 | 1.83 | X |
| Oct 13, 2013 | 2.01 | X |
| Oct 13, 2013 | 1.97 | X |
| Oct 13, 2013 | 1.95 | X |
| Oct 13, 2013 | 2.09 | X |
| Oct 14, 2013 | 2.08 | X |
| Oct 14, 2013 | 2.28 | X |
| Oct 14, 2013 | 1.94 | X |
| Oct 14, 2013 | 2.11 | X |
| Oct 14, 2013 | 2.19 | X |
| Oct 16, 2013 | 2.23 | X |
| Oct 17, 2013 | 1.94 | X |
| Oct 24, 2013 | 1.79 | X |
| Oct 25, 2013 | 2.17 | X |

| | | |
|--------------|------|---|
| Nov 06, 2013 | 2.23 | X |
| Nov 07, 2013 | 2.31 | X |
| Nov 08, 2013 | 2.33 | X |
| Nov 15, 2013 | 2.14 | X |
| Nov 16, 2013 | 2.08 | X |
| Nov 22, 2013 | 1.85 | X |
| Nov 26, 2013 | 2.04 | X |
| Dec 03, 2013 | 2.12 | X |
| Dec 06, 2013 | 1.97 | X |
| Dec 09, 2013 | 2.14 | X |
| Dec 09, 2013 | 2.04 | X |
| Dec 12, 2013 | 2.28 | X |
| Dec 13, 2013 | 2.03 | X |
| Dec 15, 2013 | 2.21 | X |
| Dec 20, 2013 | 2.39 | X |
| Dec 27, 2013 | 2.15 | X |
| Dec 31, 2013 | 1.97 | X |
| Dec 31, 2013 | 1.90 | X |
| Dec 31, 2013 | 1.90 | X |
| Dec 31, 2013 | 2.09 | X |
| Dec 31, 2013 | 2.00 | X |
| Dec 31, 2013 | 1.93 | X |
| Dec 31, 2013 | 2.02 | X |
| Dec 31, 2013 | 2.31 | X |
| Dec 31, 2013 | 2.03 | X |
| Dec 31, 2013 | 2.04 | X |
| Jan 01, 2014 | 2.14 | X |
| Jan 01, 2014 | 1.95 | X |
| Jan 01, 2014 | 2.22 | X |
| Jan 01, 2014 | 2.37 | X |
| Jan 01, 2014 | 2.21 | X |
| Jan 01, 2014 | 1.95 | X |
| Jan 01, 2014 | 2.03 | X |
| Jan 01, 2014 | 1.99 | X |
| Jan 01, 2014 | 1.99 | X |
| Jan 01, 2014 | 1.82 | X |
| Jan 01, 2014 | 2.05 | X |
| Jan 01, 2014 | 2.22 | X |
| Jan 01, 2014 | 2.14 | X |
| Jan 01, 2014 | 1.92 | X |
| Jan 02, 2014 | 2.11 | X |
| Jan 02, 2014 | 2.16 | X |
| Jan 02, 2014 | 2.23 | X |
| Jan 02, 2014 | 2.24 | X |
| Jan 02, 2014 | 2.10 | X |
| Jan 02, 2014 | 2.31 | X |
| Jan 02, 2014 | 2.10 | X |
| Jan 02, 2014 | 1.95 | X |
| Jan 02, 2014 | 2.28 | X |
| Jan 02, 2014 | 1.55 | X |
| Jan 02, 2014 | 1.90 | X |
| Jan 02, 2014 | 1.72 | X |

| | | |
|--------------|------|---|
| Jan 02, 2014 | 2.17 | X |
| Jan 03, 2014 | 1.88 | X |
| Jan 03, 2014 | 2.09 | X |
| Jan 03, 2014 | 2.28 | X |
| Jan 03, 2014 | 2.19 | X |
| Jan 03, 2014 | 2.26 | X |
| Jan 03, 2014 | 1.98 | X |
| Jan 03, 2014 | 1.96 | X |
| Jan 08, 2014 | 1.94 | X |
| Jan 15, 2014 | 2.33 | X |
| Jan 17, 2014 | 2.05 | X |
| Jan 20, 2014 | 2.24 | X |
| Jan 20, 2014 | 1.89 | X |
| Jan 27, 2014 | 2.28 | X |
| Jan 31, 2014 | 2.04 | X |
| Feb 03, 2014 | 2.00 | X |
| Feb 05, 2014 | 1.96 | X |
| Feb 11, 2014 | 2.18 | X |
| Feb 14, 2014 | 2.33 | X |
| Feb 25, 2014 | 1.94 | X |
| Feb 26, 2014 | 2.16 | X |
| Feb 27, 2014 | 2.12 | X |
| Mar 06, 2014 | 2.58 | X |
| Mar 07, 2014 | 1.75 | X |
| Mar 11, 2014 | 2.16 | X |
| Mar 17, 2014 | 1.80 | X |
| Mar 17, 2014 | 1.91 | X |

3H Background
Total # pts : 5738
Valid # pts : 228
Mean : 2.10
SD : 0.18





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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 1/7/2014 3:43 date counted
 STANDARD REFERENCE # S-0289

Principal Radionuclide

H-3

ENTER -->

Half Life, Years

1.232E+01

OR -->

Half Life, Days

4.4998E+034.4998E+03Radionuclide H-3Dilution Reference Date 1/3/2014 13:25Dilution Activity 2.66 pCi per gram ==> dpm/g5.91Verif. Date Decay Corrected 2.66 pCi per gram ==> dpm/g5.90**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-0289-V1 | 21.75 | 1 | LSC | 0.3549 | 10.54 | 5.019 | 6.29 | 2.83 |
| S-0289-V2 | 20.53 | 1 | LSC | 0.3546 | 10.54 | 4.993 | 5.64 | 2.54 |
| S-0289-V3 | 20.60 | 1 | LSC | 0.3548 | 10.54 | 4.996 | 5.68 | 2.56 |
| S-0289-V4 | 21.00 | 1 | LSC | 0.3547 | 10.54 | 5.005 | 5.89 | 2.65 |
| S-0289-V5 | 21.18 | 1 | LSC | 0.3542 | 10.54 | 4.993 | 6.02 | 2.71 |

10% Max

PASS

Standard Deviation percent of known concentration

5% Max

PASS

Average

Two Sigma Uncertainty

Target Activity

% Diff

5.900.524.51%5.900.00%Verification Expiration Date: January 7, 2015Prepared & Counted By [Signature]Date: 1/7/2014 3:43Verified & Approved By [Signature]Date: 1-8-14QC Approval [Signature]Date: 1-8-14**S-0289****H-3****SL**

Manufacturer

Sol Matrix

Ref No

Tech

Parent ID

Verified

1/7/14

Expires

1/7/15

NIST SRM 4927F

H2O

NIST SRM 4927F

Unknown

S-0237


RADIOACTIVE STANDARDS - BACHMANN LABORATORY

Assay Definition-

Assay Description:
H3 Normal Lvl

Assay Type: DPM (Single)

Report Name: Report1

Output Data Path: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl2\20140106_1733

Raw Results Path: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl2\20140106_1733\H3 Results.results

RTF File Name: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl2\20140106_1733\H3 Results.rtf

Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H3 Normal Lvl2\20140106_1733\H3 Results.csv

Assay File Name: C:\Packard\Tricarb\Assays\H3 Normal Lvl2.lsa

Count Conditions-

Nuclide: Standard H3

Quench Indicator: tsIE/AEC

External Std Terminator (sec): 0.5 2s

Pre-Count Delay (min): 0.00

Quench Set:

Low Energy: PE UG STD H3

Count Time (min): 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

Half Life-

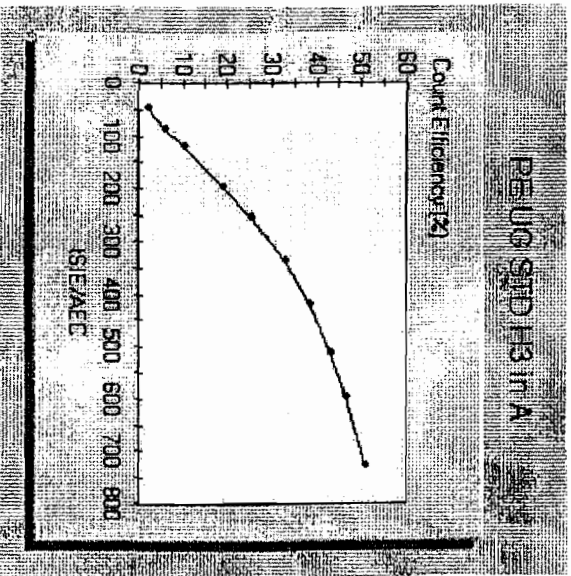
Luminescence Correction: n/a
Heterogeneity Monitor: n/a
Delay Before Burst (nsec): 75

Half Life Correction: Off
Regions Half Life

Units Reference Date Reference Time

A
B
C

Cycle 1 Results
Quench Curve Block Data



Date Acquired: 05/30/2013
Date Modified:
PE UC STD H3 in A

| tSIE/AEC | Count Efficiency (%) |
|----------|----------------------|
| 726.67 | 50.69 |
| 595.82 | 46.27 |
| 512.39 | 42.97 |
| 421.70 | 38.56 |
| 337.18 | 32.90 |
| 253.25 | 25.44 |
| 195.24 | 19.09 |
| 120.68 | 10.06 |
| 85.94 | 5.83 |
| 47.95 | 1.96 |

1/7/2014 5:46:59 AM
Protocol# 20 - H3 Normal Lvl2.1sa

QuantaSmart (TM) - 2.03 - Serial# 421926

Page # 3
User: ARS

| P# | S# | SMP_L_ID | CPMA | DPM1 | TSIE | Eff Nucl In A | Count Time | DATE | TIME | MESSAGES |
|----|----|------------|-------|-------|--------|---------------|------------|----------|-------------|----------|
| 20 | 1 | BACKGROUND | 10.54 | 29.70 | 375.63 | 35.48 | 120.00 | 1/6/2014 | 5:34:01 PM | |
| 20 | 2 | S-0289-V1 | 21.75 | 61.30 | 375.79 | 35.49 | 120.00 | 1/6/2014 | 7:35:52 PM | |
| 20 | 3 | S-0289-V2 | 20.53 | 57.89 | 375.34 | 35.46 | 120.00 | 1/6/2014 | 9:37:44 PM | |
| 20 | 4 | S-0289-V3 | 20.60 | 58.09 | 375.37 | 35.46 | 120.00 | 1/6/2014 | 11:39:36 PM | |
| 20 | 5 | S-0289-V4 | 21.00 | 59.21 | 375.58 | 35.47 | 120.00 | 1/7/2014 | 1:41:31 AM | |
| 20 | 6 | S-0289-V5 | 21.18 | 59.80 | 374.77 | 35.42 | 120.00 | 1/7/2014 | 3:43:23 AM | |

STD ID: S-0289

| ARS INTERNATIONAL | | Add/Edit Secondary Stds | Parent Standard Data | |
|--|--|-------------------------------------|--|-------------------------------|
| Planning | | Parent Solution Reference # | NIST SRM 4927F | |
| Planning Comments | Create an H-3 LCS standard | Parent Solution # | S-0237 | |
| Target dpm/g (on 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 | 3.67265112 | Parent Certified Act | 3503.682716 | Certi Act/Vol Units dpm |
| Appx vol mL of Parent Sol'n | 3.69923813 | 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-0289 | Parent Date Recvd | 01/02/00 | |
| Dilution Date (New Ref Date) | 01/03/2013 13:25 | Parent Received By | Unknown | |
| Ampoule, Empty (g) | | Parent Cert Exp Date | | |
| Ampoule /Solution Gross (g) | | Parent Matrix | H2O | |
| Net Wt Removed (g) | | Certified dpm/g At Ref Date | 3503.682716 | |
| Transfer Container, empty (g) | 1.8639 | Certified dpm/g on 01/03/2013 13:25 | 2995.111607 | |
| Container Plus Solution (g) | 5.8014 | Parent Comments | Intermediate level H-3 standard for creating LCS solutions and matrix spikes. Dilution performed as stated above by B Steffens - BIS 3/22/10 | |
| Net Wt Transferred (g) | 3.9375 | | | |
| DPM Xferred on 01/03/2013 13:25 | 11793.25195 | | | |
| Diluent/matrix | DI H2O | Parent Tech | Unknown | |
| Diluent Density Cont, empty (g) | | Is_Primary | FALSE | |
| Test Mass of 5 ml of Diluent (g) | | Is_LCS | TRUE | |
| Diluent Density Test - (g/mL) | | Is_Tracer | FALSE | |
| Dilution Empty Container Mass (g) | 416.9 | Is_Calib | FALSE | |
| Dilution Full Cont g (if measured) | 2413.04 | | | |
| Dilution Final Volume mL (if measured) | 2000 | | | |
| Final Dilution Density (g/mL) | 0.99807 | | | |
| Final Dilution Measured Mass g | 1996.14 | | | |
| Comments | H3 LCS standard. Dilution performed as stated above by BSteffens on 1/3/13. BIS 1/3/13 | | | |
| Final Dilution dpm/g | 5.908028472 | | | |
| Final Dil New Ref Date/Time | 01/03/2013 13:25 | | | |

H-3 Standard Verification

Verifier's Name: Brian Steffens

Date: 1/6/2014

Pipettor ID: FJ40469

Pipettor ID: Auto-pipettor

Pipettor ID: na

Standard ID: S-0289

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-0289-V1 | 5.019 g |
| S-0289-V2 | 4.993 g |
| S-0289-V3 | 4.996 g |
| S-0289-V4 | 5.005 g |
| S-0289-V5 | 4.993 g |

Balance ID: H1331122173560P

H-3 Standard Verification

Verifier's Name: Brian Steffens

Date: 7-6-14

Pipettor ID: FJ40469

Pipettor ID: Auto-pipettor

Pipettor ID: na

Standard ID: S-0289

Standard ID: N/A

Standards brought up to ~5g with distilled dead water.

Standards made in glass vials.

| Weight of Standard | | | Balance ID: <u>H1331122173560P</u> |
|---|-----------|----------------|------------------------------------|
| | | | |
| 15mL of Ultima Gold added to standard | S-0289-V1 | <u>5.019</u> g | } |
| | S-0289-V2 | <u>4.993</u> g | |
| | S-0289-V3 | <u>4.996</u> g | |
| | S-0289-V4 | <u>5.005</u> g | |
| | S-0289-V5 | <u>4.993</u> g | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| ARS INTERNATIONAL | | Add/Edit Secondary Stds | Parent Standard Data | | | |
|--|------------------|-------------------------------------|--|--------------------|--------------|---|
| Planning | | Parent Solution Reference # | NIST SRM 4927F | | | |
| Planning Comments | | 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 | 3.884989595 | Parent Certified Act | 3503.682716 | Cert Act/Vol Units | dpm | g |
| Appx vol ml of Parent Sol'n | 3.892005204 | Parent Cert Act Uncert 1 Sigma | 0.0036 | | | |
| Expected Addition for Analysis g | | Parent Sp. Gravity G/ML | 0.9982 | | | |
| Standards Preparation / Dilution | | Parent Supplier | NIST SRM 4927F | | | |
| Secondary Solution # | S-0289 | Parent Date Recvd | 01/02/00 | | | |
| Dilution Date (New Ref Date) | 1-3-13 1325 | Parent Received By | Unknown | | | |
| Ampoule, Empty (g) | | Parent Cert Exp Date | | | | |
| Ampoule /Solution Gross (g) | | Parent Matrix | H2O | | | |
| Net Wt Removed (g) | | Certified dpm/g At Ref Date | 3503.682716 | | | |
| Transfer Container, empty (g) | 1.8639 | Certified dpm/g on 01/03/2014 11:01 | 2831.403127 | | | |
| Container Plus Solution (g) | 5.8014 | Parent Comments | Intermediate level H-3 standard for creating LCS solutions and matrix spikes. Dilution performed as stated above by B. Steffens. BIS 3/22/10 | | | |
| Net Wt Transferred (g) | | | | | | |
| DPH Xferred on 01/03/2014 11:01 | | | | | | |
| Diluent/matrix | | 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) | 416.90 | Is_Calib | FALSE | | | |
| Dilution Full Cont g (if measured) | 2413.04 | | | | | |
| Dilution Final Volume ml (if measured) | | | | | | |
| Final Dilution Density (g/mL) | | | | | | |
| Final Dilution Measured Mass g | | | | | | |
| Comments | | | | | | |
| Final Dilution dpm/g | | | | | | |
| Final Dil New Ref Date/Time | 01/03/2014 11:01 | | | | | |



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>14-00617</u> | Client Name: <u>LANL</u> | Sample Matrix: <u>AQ</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 type="checkbox"/> Yes | <input type="checkbox"/> 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 | <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 type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" 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: | <input type="checkbox"/> Yes | <input type="checkbox"/> 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: | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A | |


4-15-14
 Report Generator Signature Date


4-15-14
 Management Review Signature Date



LSC
Technical Review Checklist

ARS SDG ARS1-14-00617

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: B14-00610 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? | <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): _____ | | | | | | |
| <div style="display: flex; justify-content: space-between;"><div>Chemist Signature <u>[Signature]</u> Date <u>4-11-2014</u></div><div>Verifier Review Signature <u>[Signature]</u> Date <u>4-11-14</u></div></div> | | | | | | |

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 |
| <div style="display: flex; justify-content: space-between;"><div>QA Officer Signature <u>James D. Lee</u></div><div>Date <u>4-15-14</u></div></div> | | | | | | |
| | Analyst Review | | | Technical Review | | |
| 4) Background Checks Complete and Acceptable? | <input checked="" type="checkbox"/> Yes | No | N/A | <input checked="" type="checkbox"/> Yes | No | N/A |
| 5) 100% of Manually Entered Parameters Verified Accurate? | <input checked="" type="checkbox"/> Yes | No | N/A | <input checked="" type="checkbox"/> Yes | No | N/A |
| 6) Appropriate QC samples initiated at required frequency? | <input checked="" type="checkbox"/> Yes | No | N/A | <input checked="" type="checkbox"/> 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 | <input checked="" type="checkbox"/> Yes | No | N/A |
| b) Spectra show no Evidence of Interferences? | <input checked="" type="checkbox"/> Yes | No | N/A | <input checked="" type="checkbox"/> Yes | No | N/A |
| c) Sample Quench for All Samples within Range of Quench Curve? | <input checked="" type="checkbox"/> Yes | No | N/A | <input checked="" type="checkbox"/> Yes | No | N/A |
| 7) Analysis Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Comments) NCR # (If initiated): _____ | | | | | | |
| <div style="display: flex; justify-content: space-between;"><div>Analyst Signature <u>[Signature]</u> Date <u>4-11-2014</u></div><div>Technical Reviewer Signature <u>[Signature]</u> Date <u>4-11-14</u></div></div> | | | | | | |

Batch A: B14-00610

LSC Technical Review Checklist

C. BATCH QC VALIDATION

| | Proj. Mgr. Review | QA Officer Review |
|--|--|--|
| 1) Activity + 3xCSU a Negative Number? | Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> N/A |
| 2) RDL Criteria are Met? | <input checked="" type="checkbox"/> Yes No N/A | <input checked="" type="checkbox"/> Yes No N/A |
| 3) Method Blank Criterion Met? | <input checked="" type="checkbox"/> Yes No N/A | <input checked="" type="checkbox"/> Yes No N/A |
| 4) LCS/LCD Criteria Met? | Yes <input checked="" type="checkbox"/> No N/A | Yes <input checked="" type="checkbox"/> No N/A |
| 5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met? | Yes <input checked="" type="checkbox"/> No N/A | Yes <input checked="" type="checkbox"/> No N/A |
| 6) MS/MSD Criteria Met? | Yes No <input checked="" type="checkbox"/> N/A | Yes No <input checked="" type="checkbox"/> N/A |
| 7) Batch QC Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____ | | |
| <div style="display: flex; justify-content: space-between;"><div style="width: 45%; text-align: center;"><u>SDA</u> Project Manager Signature</div><div style="width: 10%; text-align: center;"><u>4-15-14</u> Date</div><div style="width: 45%; text-align: center;"><u>James D. Lee</u> QA Officer Signature</div><div style="width: 10%; text-align: center;"><u>4-15-14</u> Date</div></div> | | |

GENERAL COMMENTS



LSC Technical Review Checklist

ARS SDG ARS1-14-00617Sample 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: B14-00549 Batch B: NA Batch C: NATest Method(s): LSC-A-021 NA NA

A. RADIOCHEMICAL PREPARATION REVIEW

| | Chemist Review | Verifier Review |
|---|---|---|
| 1) 100% of Manual Transcriptions Verified? | <input checked="" type="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| 2) 100% of Manual Calculations Verified? | Yes No <input checked="" type="radio"/> N/A | Yes No <input checked="" type="radio"/> N/A |
| 3) Blank Composition/Configuration Matches Calibration? | Yes No <input checked="" type="radio"/> N/A | Yes No <input checked="" type="radio"/> N/A |
| 4) Deviations from procedure are documented and verified? | Yes No <input checked="" type="radio"/> N/A | Yes No <input checked="" type="radio"/> N/A |
| 5) Appropriate Cocktail Selected? | <input checked="" type="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| 6) Sample Prep Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Tech Notes) NCR # (If initiated): _____ | | |
| <div>Chemist Signature: <u>[Signature]</u> Date: <u>3-18-14</u></div> <div>Verifier Review Signature: <u>[Signature]</u> Date: <u>3-18-14</u></div> | | |

B. ANALYSIS REVIEW

| | Analyst Review | QA Officer Review |
|--|---|---|
| 1) Calibrations Valid and Current? | <input checked="" type="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| 2) Backgrounds Valid and Current? | <input checked="" type="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| 3) Source Checks Completed and Acceptable? | <input checked="" type="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| <div>QA Officer Signature: <u>[Signature]</u> Date: <u>4-15-14</u></div> | | |
| | Analyst Review | Technical Review |
| 4) Background Checks Complete and Acceptable? | <input checked="" type="radio"/> Yes No N/A | Yes No N/A |
| 5) 100% of Manually Entered Parameters Verified Accurate? | <input checked="" type="radio"/> Yes No N/A | Yes No N/A |
| 6) Appropriate QC samples initiated at required frequency? | <input checked="" type="radio"/> 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="radio"/> Yes No N/A | <input checked="" type="radio"/> Yes No N/A |
| b) Spectra show no Evidence of Interferences? | <input checked="" type="radio"/> Yes No N/A | Yes No N/A |
| c) Sample Quench for All Samples within Range of Quench Curve? | <input checked="" type="radio"/> Yes No N/A | Yes No N/A |
| 7) Analysis Anomaly? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (See Comments) NCR # (If initiated): _____ | | |
| <div>Analyst Signature: <u>[Signature]</u> Date: <u>3-18-14</u></div> <div>Technical Reviewer Signature: <u>NA</u> Date: _____</div> | | |

| Analysis Code | Group | Isotope | Activity Units | Aliquot Units | ProcedureNo | RDL | LCS_LL | LCS_UL | MS_LL | MS_UL | RadY_LL | RadY_UL | GravY_LL | GravY_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

| SDG | | SDG Specific Data | | | | Project Type | |
|----------------|--------------------------------|-------------------|-----------|-------------------|-----------|--------------|---------------|
| Sample Count | ARS1-14-00617 | TAT Days | 30 | Date Received | 3/13/2014 | COC Number | Environmental |
| Client | Rpt Level 4 | Client Deadline | 4/11/2014 | Internal Deadline | 4/10/2014 | PO Number | 2014-2980 |
| Client Code | Los Alamos National Laboratory | Lab Deadline | 4/8/2014 | | | Job Number | 63641-001-10 |
| Profile Number | 114 | | | | | Job Location | |
| Comments | PN-00094 | | | | | | |

| Samples and Containers (→) Checked In Thus Far | | | | | | | | | | | | | |
|--|---------------|--------|-------------------|-------------------|----------|----------|------|------|---------|---------|---------|----------|--------------|
| FR | ClientID | Matrix | SampleStartDate | SampleEndDate | SampleID | Disp | Hold | Arch | Storage | X | Units | Y | Units |
| 001 | CAAN-14-54788 | AQ | 03/12/14 10:15 AM | 03/12/14 10:15 AM | | H | 90 | 5 | O4 | | | | |
| → | IC_ID | Cnt | Volume_mL | Wt_g | pH_Orig | pH_Final | CPM | VOA | ur_hr | Storage | Head Sp | AF Units | AF Rate |
| | 158485 | 1 | 1000.00 | | | | 80 | N | 24 | | N/A | | |
| | | | | | | | | | | | | | AF Total Vol |

SDG Report - Analysis Assignments

| | | | |
|----------|--------------------------------|----------------|-----|
| Temp SDG | ARS1-14-00617 | Sample Count | |
| 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 |

ARS FILE TRACKING SHEET

SDG: ARS1-14-00617

| Task | Date / Time | Initials |
|--|-----------------------|------------|
| Date & Time Samples Received | 03-13-14 10:40 | MD |
| ICOC Initiated/Storage Location: <u>O4</u> | 03-13-14 13:39 | MD |
| Technical Checks Performed | <i>See Batch</i> | |
| Report Written / EDD Generated <u>4-11-14 / 1331</u> / <i>DL</i> | <u>4-15-14 / 1547</u> | <i>SDH</i> |
| Quality Assurance Checks Performed on Report | <i>4-15-14 / 1600</i> | <i>JBT</i> |
| Management Checks Performed on Report | | |
| <i>Preliminary Report Scan</i> | | |
| Report E-mailed/Faxed | | |
| Invoice Completed Invoice #: _____ | | |
| Requires Report Mailed Yes / No | | |
| Requires Original COC mailed Yes / No | | |
| Report Reviewed and Imaged | | |

SPECIAL REQUIREMENTS

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

NOTES

Sealed

American Radiation Services - Primary
1728 Wooddale Court
Baton Rouge LA 70806

Chain of Custody/Analysis Request

ADGP

COC/Lab Request #:

2014-2980

Page 1 of 1

Client Contact: Lab Agreement #: 63641-001-10

Project Number:

Analysis Turnaround Time:

24 Hour - ☐ Other - ☐

7 Day - ☐

14 Day - ☐

21 Day - ☐

28 Day - ☒

Field Sample ID

CAAN-14-54788

Sample Date

Mar 12 2014

Sample Time

10:15

Sample Matrix

W

WSP-LL-H-3

Rad Screening Info:

Yes, Below Background

Lab Reporting Limit Type:

Sample Quantitation Limit

Special Instructions:

Special Instructions:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

Relinquished by:

Print Name:

Date/Time:

Received by:

Print Name:

Date/Time:

CANL

SDG: AKS1-19-00617

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 _____
 Matrix AF AQ BI

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

External and Internal Surveys

| | | | | | |
|---|------------------|--|------------------|-----------------------|----------------|
| Exposure Rate Meter: | <u>M3 242861</u> | Serial No.: | <u>PR 264266</u> | Calibration Due Date: | <u>4/16/14</u> |
| Count Rate Meter: | <u>M2 154859</u> | Serial No.: | <u>PR 184559</u> | Calibration Due Date: | <u>4/16/14</u> |
| Background Exposure Rate (μ R/hr) | <u>29</u> | Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) | <u>29</u> | μ 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 (Plus Bkgd) | <u>80</u> | cpm | |

Acceptance Limits

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

Surveyors'
Name:

Richard Dancy

Date/Time Surveyed:

3-13-14 1040