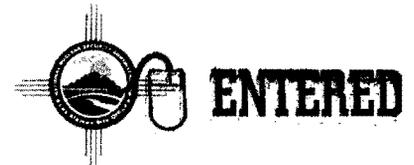


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Date: **MAR 29 2010**  
Refer To: EP2010-0122

James Bearzi, Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505-6303

**Subject: Submittal of the Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009**

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009.

If you have any questions, please contact Bruce Wedgeworth at (505) 231-0108 (brucew@lanl.gov) or Woody Woodworth at (505) 665-5820 (lwoodworth@doeal.gov).

Sincerely,

Michael J. Graham, Associate Director  
Environmental Programs  
Los Alamos National Laboratory

Sincerely,

David R. Gregory, Project Director  
Environmental Operations  
Los Alamos Site Office



MG/DG/BC/BW:sm

Enclosures: Two hard copies with electronic files – Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009 (LA-UR-10-1758)

Cy: (w/enc.)  
Neil Weber, San Ildefonso Pueblo  
Woody Woodworth, DOE-LASO, MS A316  
Bruce Wedgeworth, EP-TA-21, MS C349  
RPF, MS M707 (w/ two CDs)  
Public Reading Room, MS M992

Cy: (Letter and CD and/or DVD only)  
Laurie King, EPA Region 6, Dallas, TX  
Steve Yanicak, NMED-DOE-OB, MS M894  
Emily Day, Weston Solutions, Los Alamos, NM (w/ MS Word files on CD)  
Kristine Smeltz, EP-WES, MS M992

Cy: (w/o enc.)  
Tom Skibitski, NMED-OB, Santa Fe, NM  
Annette Russell, DOE-LASO (date-stamped letter emailed)  
Bill Criswell, EP-TA-21, MS C349  
Michael J. Graham, ADEP, MS M991  
IRM-RMMSO, MS A150 (date-stamped letter emailed)

LA-UR-10-1758  
April 2010  
EP2010-0122

**Periodic Monitoring Report for  
Vapor-Sampling Activities at  
Material Disposal Area V,  
Consolidated Unit 21-018(a)-99,  
at Technical Area 21,  
November 2009**

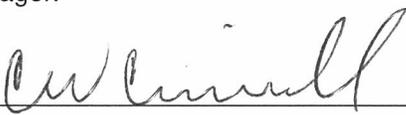
Prepared by the Environmental Programs Directorate

Los Alamos National Laboratory, operated by Los Alamos National Security, LLC, for the U.S. Department of Energy under Contract No. DE-AC52-06NA25396, has prepared this document pursuant to the Compliance Order on Consent, signed March 1, 2005. The Compliance Order on Consent contains requirements for the investigation and cleanup, including corrective action, of contamination at Los Alamos National Laboratory. The U.S. government has rights to use, reproduce, and distribute this document. The public may copy and use this document without charge, provided that this notice and any statement of authorship are reproduced on all copies.

# Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009

April 2010

Responsible project manager:

<i>for</i> Bruce Wedgeworth		Project Manager	Environmental Programs	3/29/2010
Printed Name	Signature	Title	Organization	Date

Responsible LANS representative:

Michael J. Graham		Associate Director	Environmental Programs	29 March 10
Printed Name	Signature	Title	Organization	Date

Responsible DOE representative:

David R. Gregory		Project Director	DOE-LASO	3/26/2010
Printed Name	Signature	Title	Organization	Date

## EXECUTIVE SUMMARY

This periodic monitoring report summarizes the latest results of the vapor-monitoring activities conducted during November 2009 at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, within Technical Area 21 at Los Alamos National Laboratory. The objectives of vapor monitoring at MDA V were (1) to collect additional samples from vapor-monitoring wells previously sampled at MDA V and (2) to compare the results with previously detected tritium activities in pore gas beneath MDA V.

To define the vertical extent of tritium and to measure tritium activity over time, two new vapor-monitoring wells were installed in 2009 within 10 ft of the location of borehole 21-24524, which was plugged and abandoned in June 2006. These new wells retained the location identification number of 21-24524, with an additional designation of west (21-24524W) and south (21-24524S) to indicate their locations relative to former location 21-24524.

To date, vapor monitoring wells 21-24524W and 21-24524S have been sampled for two quarters. The first quarterly sampling was completed in August and October 2009 and consisted of one sampling event. The second quarterly sampling was completed in November 2009 and consisted of one sampling event. This report presents sample data collected during the second quarter.

Vapor data collected from second quarter samples are presented and compared in this report. Pore-gas data from the previous quarter of vapor sampling at MDA V (August and October 2009) and initial site sampling results from years 2005–2006 are also presented and compared with the second quarter data, as appropriate, for assessing trends over time.

Tritium activities measured from the second quarter samples collected from vapor-monitoring wells 21-24524W and 21-24524S are similar to those reported during the first quarter with two peak occurrences of tritium activity followed by decreases in activity with increased depth. Both quarterly sampling activities are lower than sampling activities reported during the 2005–2006 investigation.

Quarterly sampling of vapor-monitoring wells 21-24524W and 21-24524S will continue, and the results will be presented in the July and October 2010 periodic monitoring reports

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### Appendixes

Appendix A	Acronyms and Abbreviations, Metric Conversion Table, and Data Qualifier Definitions
Appendix B	Field Methods
Appendix C	Quality Assurance/Quality Control Program
Appendix D	Analytical Suites and Results and Analytical Reports (on CD included with this document)

## 1.0 INTRODUCTION

This report presents the results of vapor-monitoring activities conducted during November 2009 at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, in Technical Area 21 (TA-21) at Los Alamos National Laboratory (LANL or the Laboratory) (Figure 1.0-1). These activities were conducted per the requirements outlined in the approved MDA V well installation work plan (LANL 2009, 106760; NMED 2009, 107304). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to New Mexico Environment Department (NMED) in accordance with U.S. Department of Energy policy.

The objectives of the MDA V vapor-monitoring activities were (1) to collect additional vapor samples from vapor-monitoring wells previously sampled at MDA V and (2) to compare the results with previously detected tritium activities beneath MDA V.

To define the vertical extent of tritium and to measure tritium activity over time, new vapor-monitoring wells were installed in 2009 within 10 ft of the location of borehole 21-24524, which was plugged and abandoned in June 2006. These wells retained the location identification number of 21-24524, but with an additional designation of west (21-24524W) and south (21-24524S) to indicate their locations relative to former location 21-24524 (Figure 1.0-2). Vapor-monitoring well 21-24524W has seven ports with depths from 45 ft below ground surface (bgs) to 380 ft bgs, and vapor-monitoring well 21-24524S has two ports located at depths of 680 ft bgs and 715 ft bgs. Figure 1.0-3 shows a schematic design of the vapor-monitoring wells. Data collected from these two well locations are presented as a single well system in this report.

To date, vapor-monitoring wells 21-24524W and 21-24524S have been sampled for two quarters. The first quarterly sampling was completed in August and October 2009 (LANL 2009, 108134) and consisted of one sampling event. The second quarterly sampling was completed in 2009 and consisted of one sampling event. This report presents sample data collected during the second quarter.

Table 1.0-1 summarizes and clarifies MDA V vapor-monitoring well 21-24524 sampling quarters, events, and dates. All pore-gas samples were submitted for off-site analysis of tritium.

This report primarily presents and discusses all results obtained during the second quarter monitoring activities; however, first quarter vapor data and vapor data collected in the 2005 and 2006 investigations (LANL 2006, 094361) are also included in the data evaluation section of this report, as appropriate, for comparison and for assessing trends over time.

### 1.1 Site Location and Description

MDA V is located within TA-21 on DP Mesa (Figure 1.0-1). This MDA included three cobble- and gravel-filled absorption beds measuring 25 ft × 220 ft × 5–6 ft that were removed in 2005 and replaced by soil covered with aggregate-based graveled pavement and native grasses. The entire MDA V site measures approximately 0.88 acres in size. A recently constructed haul road for MDA B runs along the northwest perimeter.

The edge of BV Canyon, which is a tributary to Los Alamos Canyon, is approximately 75 ft south of the location of the former absorption beds. The entire site was regraded following sampling and removal activities in 2005 and has best management practices installed, including straw waddles and revegetation with native grass seed. The top of the regional aquifer is approximately 1300 ft bgs at MDA V, based on nearby water-level information from regional wells R-7, Otowi-4, and R-8 (LANL 2004, 087358; Kleinfelder 2005, 091693).

The MDA V investigation report (LANL 2007, 098942) presents further details regarding historical operations and past investigation activities.

## 2.0 SCOPE OF ACTIVITIES

As directed by the approved MDA V well installation work plan (LANL 2009, 106760; NMED 2009, 107304), two quarterly pore-gas field-screening and sampling activities have been completed at vapor-monitoring wells 21-24524W and 21-24524S (Figure 1.0-2 and Table 2.0-1).

During November 2009, 10 pore-gas samples (9 characterization and 1 quality assurance/quality control (QA/QC) were collected for tritium analysis from seven of seven ports in well 21-24524W, and two of two ports in well 21-24524S. Field duplicate (FD) samples were collected at a minimum frequency of 1 for every 10 samples. Table 2.0-1 summarizes the November 2009 pore-gas sampling depths and sample collection dates by well location. Table 2.0-2 summarizes the November 2009 samples collected at MDA V vapor-monitoring wells 21-24524W and 21-24524S and their respective analyses.

All samples were collected in accordance with the current version of standard operating procedure (SOP) EP-ERSS-SOP-5074, Sampling for Sub-Atmospheric Air, and submitted to an off-site analytical laboratory for tritium analysis using U.S. Environmental Protection Agency (EPA) Method 906.0. Further discussion of the field methods used for pore-gas field-screening and sample collection are presented in Appendix B. Field chain-of-custody (COC) forms and sample collection logs (SCLs) are provided on a CD (Appendix D). No investigation-derived waste was generated during execution of vapor-monitoring activities at MDA V.

The November 2009 pore-gas field-screening results are presented in section 4, and the November 2009 pore-gas analytical results are presented in section 5. Any deviations from the scope of activities presented in the approved MDA V well installation work plan (LANL 2009, 106760; NMED 2009, 107304) are presented in the following section.

### 2.1 Deviations

There were no deviations from the approved MDA V well installation work plan (LANL 2009, 106760; NMED 2009, 107304).

## 3.0 REGULATORY CRITERIA

There are no applicable standards for tritium extracted from pore vapor.

## 4.0 FIELD-SCREENING RESULTS

Before each sampling event, field screening was performed in each vapor-monitoring well and targeted sampling interval to ensure percent carbon dioxide (%CO<sub>2</sub>) and oxygen (%O<sub>2</sub>) levels at each sampling port had stabilized at values representative of subsurface pore-gas conditions. Further details are provided in Appendix B. Table 4.0-1 presents a summary of all field-screening results obtained during the November 2009 sampling events at vapor-monitoring wells 21-24524W and 21-24524S.

Atmospheric information was obtained from <http://www.wunderground.com/history/airport/KLAM> for the day of sampling using the closest Laboratory weather station to MDA V (KLAM Weather Station, Los Alamos Airport, latitude 35.83°, longitude 106.22°). Table 4.0-2 summarizes the barometric pressure, temperature, and relative humidity for the sampling date.

## 5.0 ANALYTICAL DATA RESULTS

Analytical results for tritium were produced from laboratory analysis of vapor collected in silica gel columns and analyzed using EPA Method 906.0. All analytical data were subject to extensive QA/QC and data validation reviews in accordance with Laboratory guidance and procedures. The QA/QC and data validation review for the November 2009 MDA V pore-gas data are presented in Appendix C. All validated analytical results from pore-gas sampling during this sampling period are presented on a CD in Appendix D.

Vapor analytical sampling data are also available at the Risk Analysis, Communication, Evaluation, and Reduction website at <http://www.racernm.com>.

### 5.1 Pore-Vapor Tritium Results

The results of all tritium data collected at vapor-monitoring well location 21-24524 are summarized in Table 5.1-1. For clarity, data in Figure 5.1-1 are presented as undifferentiated for vapor-monitoring well 21-24524 rather than for 21-24524W and 21-24524S individually. Certain activity trends observed during the November 2009 sampling period in vapor-monitoring wells 21-24524W and 21-24524S (Figure 5.1-1) are similar to those reported in August and October 2009 (LANL 2009, 108134).

Consistent with the first quarter (August and October 2009) results discussed below, second quarter results (November 2009) include the following.

- Vapor-port samples collected between depths of 45 and 302.5 ft bgs (ports 1–5) indicated two peaks in tritium activity. The first peak of 44,020 pCi/L was detected at a depth of 42.5 to 47.5 ft bgs (port 1), and the second peak of 67,924 pCi/L was detected at a depth of 300 to 305 ft bgs (port 5).
- Tritium activity decreased to 7649 pCi/L at 327.5 to 332.5 ft bgs (port 6), increased slightly to 10,458 pCi/L at a depth of 377.5 to 382.5 ft bgs (port 7), and decreased to 349 pCi/L and 464 pCi/L, respectively, at depths of 677.5 to 682.5 ft bgs (port 10) and 712.5 to 717.5 ft bgs (port 11).

Comparisons between the first quarter (August and October 2009) and second quarter (November 2009) vapor-port monitoring samples as well as samples from the 2005 and 2006 investigations are presented below.

- Second quarter tritium results indicate a similar trend to those seen in the first quarter results.
- There was a peak of tritium activity (18,980 pCi/L in August and October 2009 and 44,020 pCi/L in November 2009) at a depth of 42.5 to 47.5 ft bgs (port 1).
- There was a higher peak of tritium activity (46,830 pCi/L in August and October 2009 and 67,924 pCi/L in November 2009) occurring at a depth of 300 to 305 ft bgs (port 5).
- Below port 5, tritium activities decreased toward total depth (TD).
- The highest tritium activity from the second quarter sampling of 67,924 pCi/L showed an increase from the first quarter sampling of 46,830 pCi/L, occurring at 300 to 305 ft bgs (port 5).
- Two samples collected during second quarter sampling (one from each of the deepest vapor ports [10 and 11] at depths of 677.5 to 682.5 ft bgs and 712.5 to 717.5 ft bgs, respectively), had activities of 349 pCi/L and 464 pCi/L during November 2009 sampling. The August and October 2009 samples from ports 10 and 11 had activities of 495 pCi/L and 1713 pCi/L, respectively.

- The second quarter tritium activities were higher than those of the first quarter results, from a depth of 45 to 302.5 ft bgs; however, they were lower in the bottom two depths sampled. The largest change observed occurred at depths between 42.5 to 47.5 ft bgs (port 1), which had an activity of 18,980 pCi/L in August and October 2009 and 44,020 pCi/L in November 2009.
- Second and first quarter tritium activities continue to be lower than activities from samples collected during the 2005 and 2006 investigations. The maximum tritium activity during the 2005 and 2006 investigations was 271,192 pCi/L at depths between 379 to 380 ft bgs. In comparison, tritium activities from the first and second quarter data at depths between 377.5 to 382.5 ft bgs were 9808 pCi/L and 10,458 pCi/L, respectively.

## 6.0 SUMMARY

Vapor-monitoring wells 21-24524W and 21-24524S were sampled in November 2009 and the results of the second quarter monitoring activities indicate trends similar to those reported during first quarter monitoring activities (LANL 2009, 108134).

Consistent with previous results, the highest tritium activities occurred at depths between 300 to 305 ft bgs (port 5), at activities of 46,830 pCi/L in August and October 2009 and 67,924 pCi/L in November 2009. Below port 6, tritium activities decreased toward TD.

Quarterly vapor-monitoring activities will continue at MDA V per the requirements outlined in the approved MDA V well installation work plan (LANL 2009, 106760; NMED 2009, 107304). Sampling of vapor-monitoring wells 21-24524W and 21-24524S will continue and the results will be presented in the July and October 2010 periodic monitoring reports.

## 7.0 REFERENCES AND MAP DATA SOURCES

### 7.1 References

*The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.*

*Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.*

Kleinfelder, April 2005. "Final Completion Report, Characterization Wells R-6/R-6i," report prepared for Los Alamos National Laboratory, Project No. 37151, Albuquerque, New Mexico. (Kleinfelder 2005, 091693)

LANL (Los Alamos National Laboratory), June 2004. "Investigation Work Plan for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21," Los Alamos National Laboratory document LA-UR-04-3699, Los Alamos, New Mexico. (LANL 2004, 087358)

LANL (Los Alamos National Laboratory), October 2006. "Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21," Los Alamos National Laboratory document LA-UR-06-6609, Los Alamos, New Mexico. (LANL 2006, 094361)

LANL (Los Alamos National Laboratory), July 2007. "Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21, Revision 1," Los Alamos National Laboratory document LA-UR-07-4390, Los Alamos, New Mexico. (LANL 2007, 098942)

LANL (Los Alamos National Laboratory), August 2009. "Vadose Zone Subsurface Characterization and Vapor-Monitoring Well Installation Work Plan for Material Disposal Area V, Consolidated Unit 21-018(a)-99, Revision 1," Los Alamos National Laboratory document LA-UR-09-5021, Los Alamos, New Mexico. (LANL 2009, 106760)

LANL (Los Alamos National Laboratory), December 2009. "Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, June to October 2009," Los Alamos National Laboratory document LA-UR-09-8123, Los Alamos, New Mexico. (LANL 2009, 108134)

NMED (New Mexico Environment Department), September 3, 2009. "Approval with Modifications, Vadose Zone Subsurface Characterization and Vapor-Monitoring Well Installation Work Plan for Material Disposal Area V, Consolidated Unit 21-018(a)-99," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 107304)

## **7.2 Map Data Sources**

Data sources used in original figures created for this report are described below and identified by legend title.

Data sources of existing figures used in this report are identified below:

Drainage; County of Los Alamos, Information Services; as published 16 May 2006.

Former Structures of the Los Alamos Site; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0441; 1:2,500 Scale Data; 08 August 2008.

Materials Disposal Areas; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; ER2004-0221; 1:2,500 Scale Data; 23 April 2004.

Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0592; 04 November 2008.

Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2008-0623; 1:2,500 Scale Data; 10 December 2008.

Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.

Waste Storage Features; Los Alamos National Laboratory, Environment and Remediation Support Services Division, GIS/Geotechnical Services Group, EP2007-0032; 1:2,500 Scale Data; 13 April 2007.

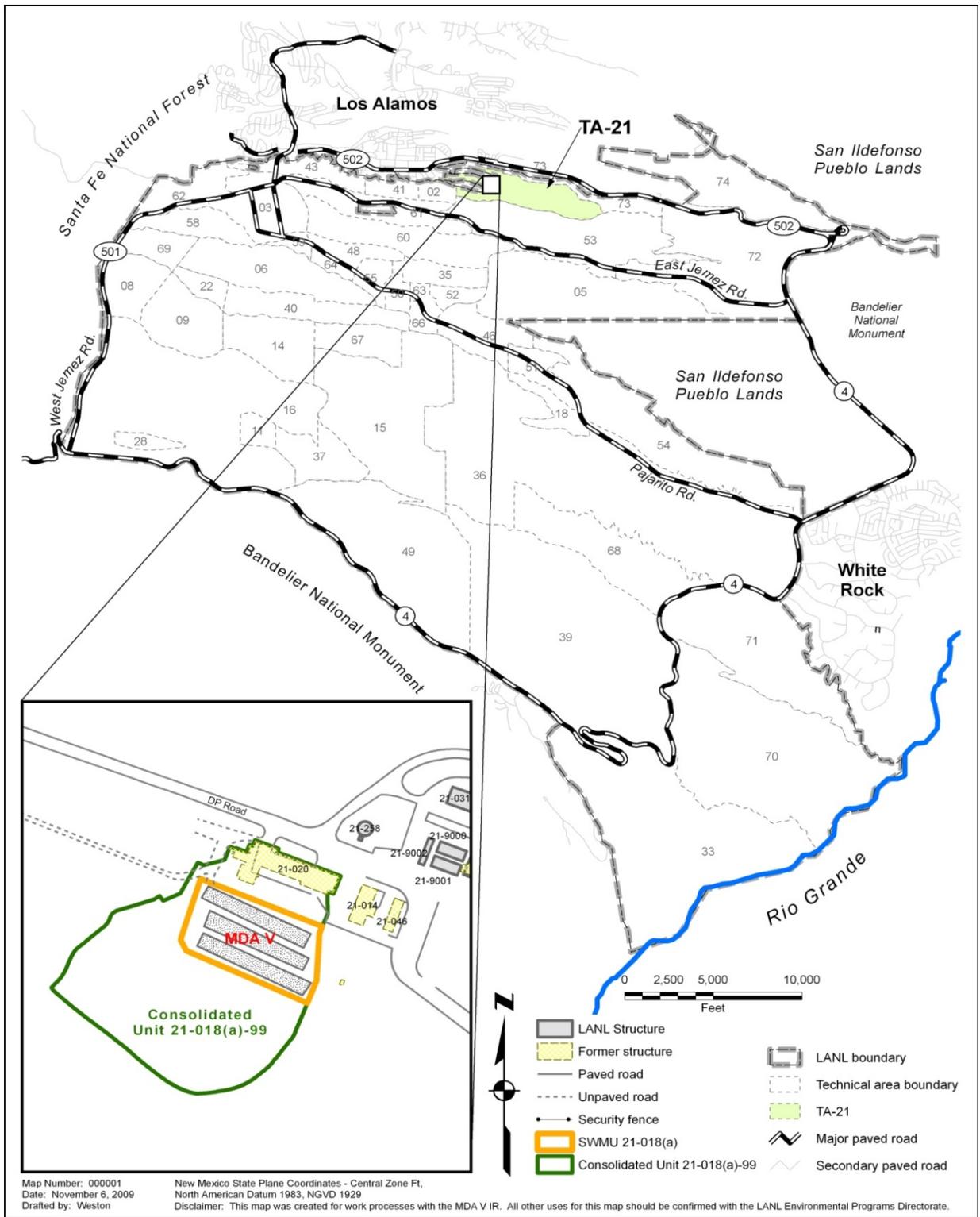


Figure 1.0-1 Location of MDA V at TA-21

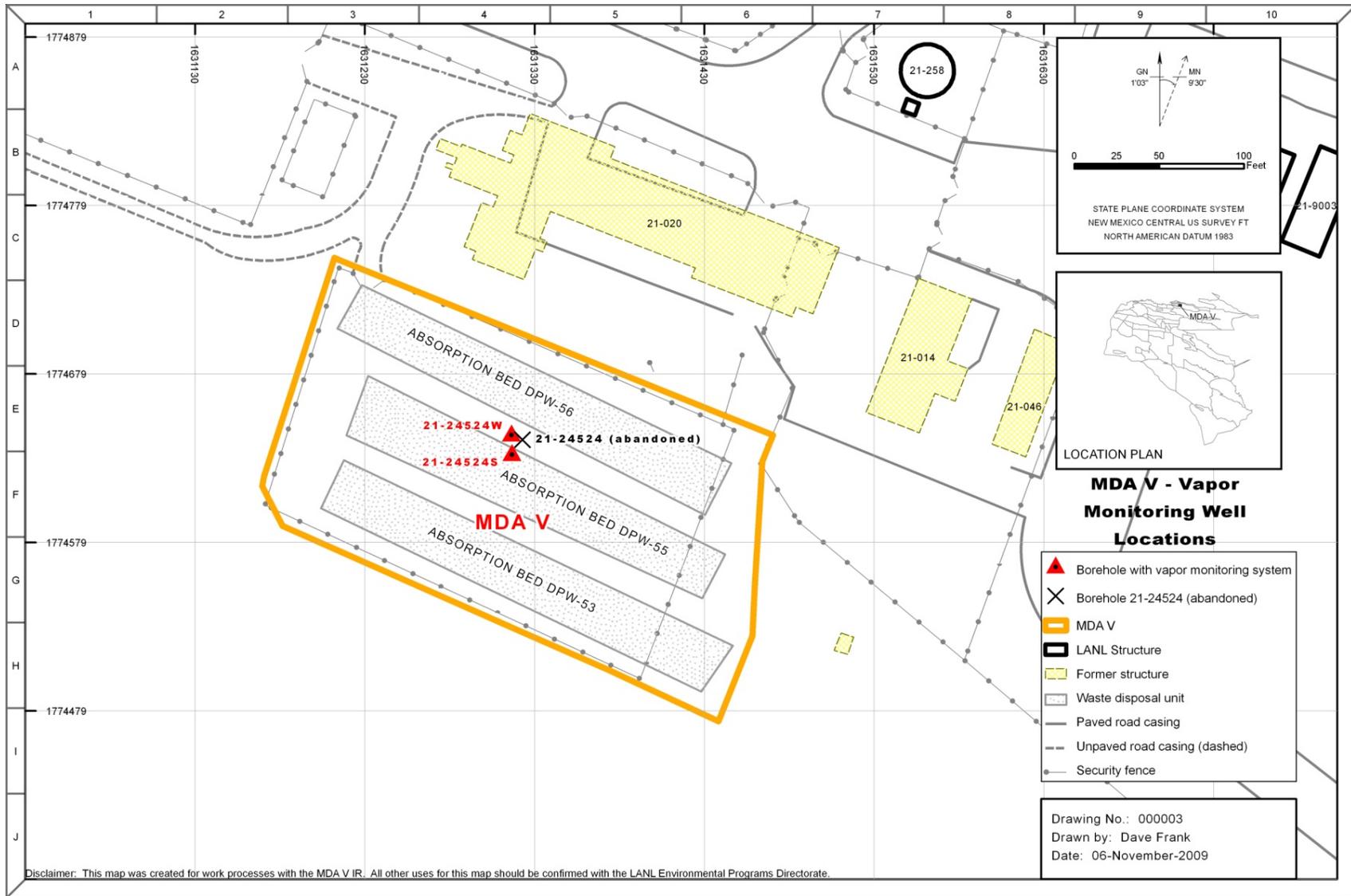


Figure 1.0-2 Locations of MDA V vapor-monitoring wells and associated structures and features

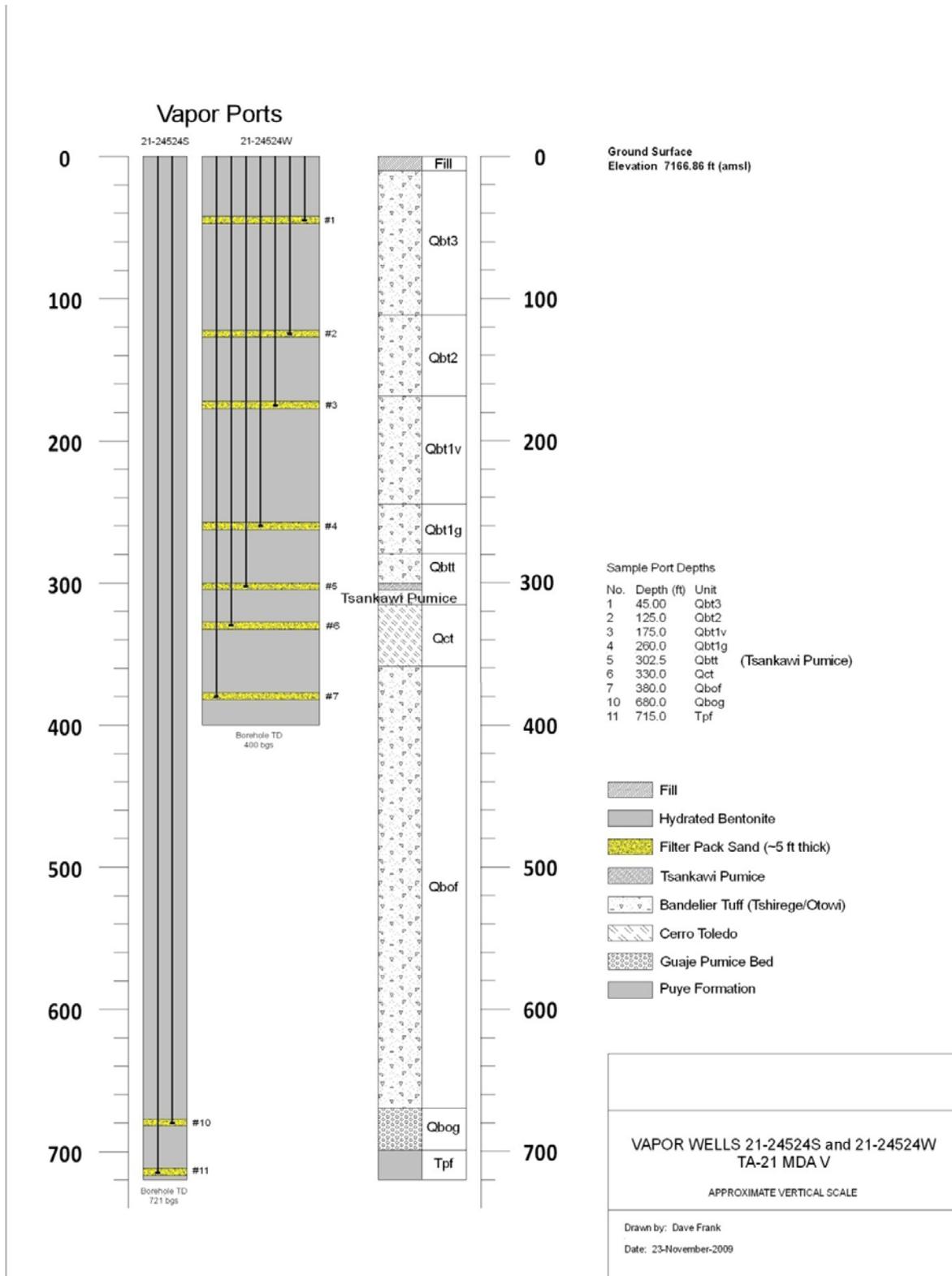


Figure 1.0-3 Schematic of vapor-monitoring wells 21-24524W/21-24524S installation at MDA V

April 2010

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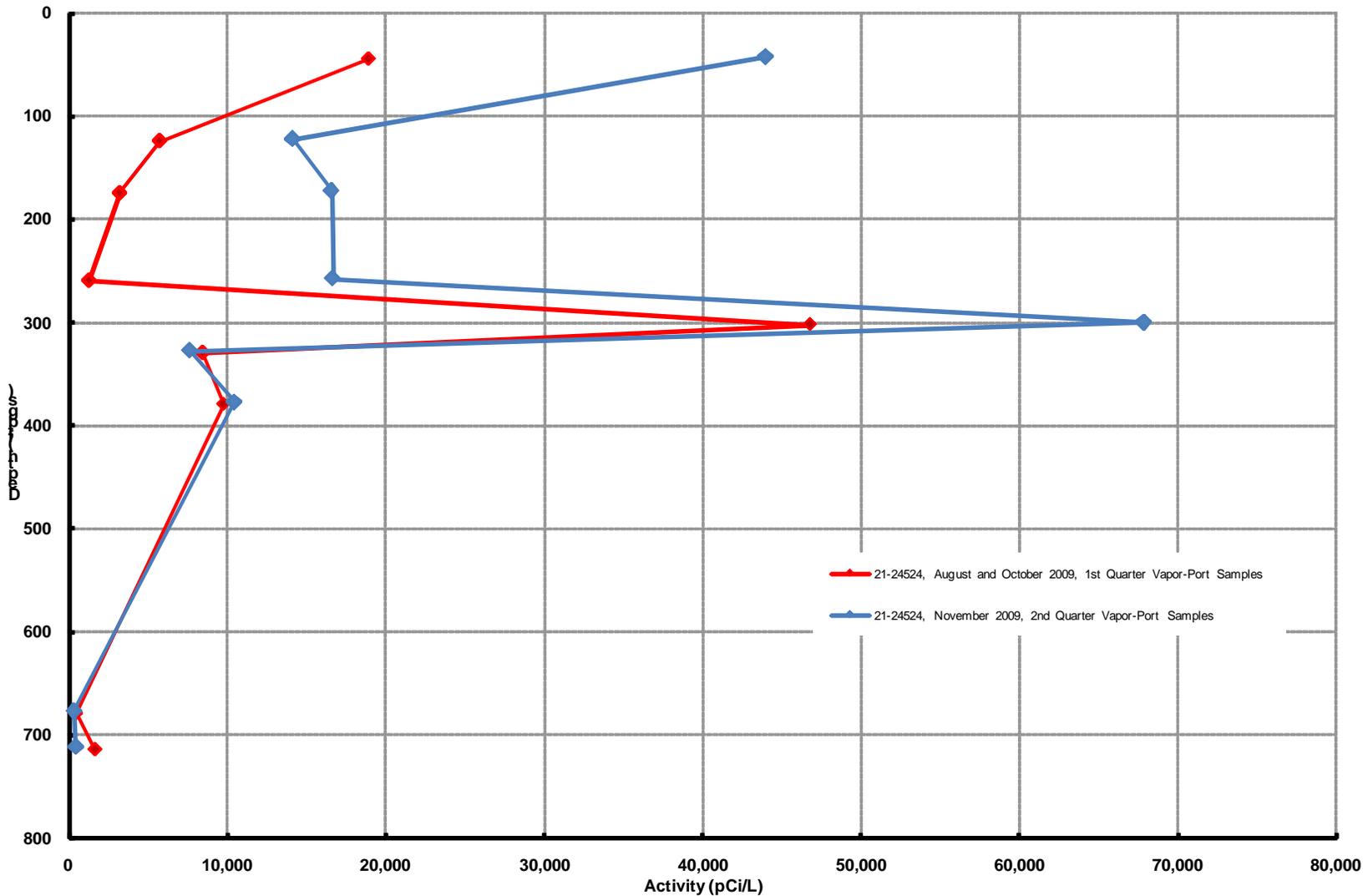


Figure 5.1-1 Vertical profile of tritium vapor-port samples from vapor-monitoring wells 21-24524W and 21-24524S, August, October, and November 2009 sampling

**Table 1.0-1  
History of Vapor-Monitoring Events at Vapor-Monitoring Well 21-24524**

Quarter/Monitoring Event	Months Sampled	Event ID	Vapor-Monitoring Wells Sampled	Associated Report Title
2 <sup>nd</sup> Quarter	November 2009	2442	21-24524S/ 21-24524W	Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009
1 <sup>st</sup> Quarter	August and October 2009	2215/756	21-24524S/ 21-24524W <sup>a</sup>	Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, June-October 2009 (LANL 2009, 108134)
2006 Investigation	May–June 2006	9902	21-24524 <sup>b</sup>	Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21 (LANL 2006, 094361)
2005 Investigation	July–August 2005	5782	21-24524	Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21 (LANL 2006, 094361)

<sup>a</sup> Wells 21-24524S and 21-24524W were completed in 2009 and within 10 ft of original borehole location 21-24524. Wells 21-24524S and 21-24524W were evaluated as a single well.

<sup>b</sup> Vapor monitoring well 21-24524 was abandoned in June 2006.

**Table 2.0-1  
MDA V Pore-Gas Sampling Depths and Collection Dates,  
November 2009**

Vapor-Monitoring Well ID	Sampling Port	Begin Depth (ft bgs)	End Depth (ft bgs)	First Quarter Date (Event ID 2215)	Second Quarter Collection Date (Event ID 2442)
21-24524W	1	42.5	47.5	8/20/2009	11/23/2009
21-24524W	2	122.5	127.5	8/20/2009	11/23/2009
21-24524W	3	172.5	177.5	8/20/2009	11/23/2009
21-24524W	4	257.5	262.5	8/20/2009	11/23/2009
21-24524W	5	300.0	305.0	8/20/2009	11/23/2009
21-24524W	6	327.5	332.5	8/20/2009	11/23/2009
21-24524W	7	377.5	382.5	8/20/2009	11/23/2009
21-24524S	10	677.5	682.5	10/14/2009	11/23/2009
21-24524S	11	712.5	717.5	10/14/2009	11/23/2009

Note: Event IDs refer to the SCL and COC packages provided in Appendix D.

**Table 2.0-2**  
**Summary of Tritium Vapor Samples Collected at MDA V, November 2009**

Sample ID	Vapor- Monitoring Well ID	Sampling Port	Depth (ft bgs)	Collection Date	Field QC Type	Request Number
MD21-10-5343	21-24524W	1	42.5–47.5	11/23/2009	n/a <sup>a</sup>	10-660
MD21-10-5344	21-24524W	2	122.5–127.5	11/23/2009	n/a	10-660
MD21-10-5345	21-24524W	3	172.5–177.5	11/23/2009	n/a	10-660
MD21-10-5346	21-24524W	4	257.5–262.5	11/23/2009	n/a	10-660
MD21-10-5347	21-24524W	5	300–305	11/23/2009	n/a	10-660
MD21-10-5348	21-24524W	6	327.5–332.5	11/23/2009	n/a	10-660
MD21-10-5349	21-24524W	7	377.5–382.5	11/23/2009	n/a	10-660
MD21-10-5350	21-24524S	10	677.5–682.5	11/23/2009	n/a	10-660
MD21-10-5351	21-24524S	11	712.5–717.5	11/23/2009	n/a	10-660
MD21-10-5352	21-24524W	5	300–305	11/23/2009	FD <sup>b</sup>	10-660

<sup>a</sup> n/a = Not applicable.

<sup>b</sup> FD = Field duplicate.

**Table 4.0-1**  
**Summary of Field-Screening Results, November 2009**

Event ID	Collection Date	Sampling Quarter	Location ID	Sampling Port Number	Top Depth (ft bgs)	Bottom Depth (ft bgs)	Percent %CO <sub>2</sub>	Percent %O <sub>2</sub>
2242	11/23/2009	Second	21-24524W	1	42.5	47.5	2.7	18.5
2242	11/23/2009	Second	21-24524W	2	122.5	127.5	0.4	21.2
2242	11/23/2009	Second	21-24524W	3	172.5	177.5	0.4	20.6
2242	11/23/2009	Second	21-24524W	4	257.5	262.5	0.5	20.2
2242	11/23/2009	Second	21-24524W	5	300.0	305.0	0.4	20.4
2242	11/23/2009	Second	21-24524W	6	327.5	332.5	0.0	20.8
2242	11/23/2009	Second	21-24524W	7	377.5	382.5	0.3	20.4
2242	11/23/2009	Second	21-24524S	10	677.5	682.5	0.1	20.9
2242	11/23/2009	Second	21-24524S	11	712.5	717.5	0.3	19.4

Note: Event IDs refer to the SCL and COC packages provided in Appendix D.

**Table 4.0-2**  
**Barometric Pressure, Relative Humidity, and Temperature at**  
**KLAM Weather Station during Sample Collection, November 2009**

Sampling Quarter	Date of Measurement	Average Barometric Pressure (in Hg)*	Average Relative Humidity (%)*	Average Temperature (°F)*
Second Quarter	11/23/2009	29.98	28	42

\* Data obtained from: <http://www.wunderground.com/history/airport/KLAM>

**Table 5.1-1**  
**Summary of Tritium Results for Vapor Samples**  
**Collected at Monitoring Well 21-24524, July 2005–November 2009**

Sample ID	Vapor-Monitoring Well ID	Depth (ft bgs)	Collection Date	Tritium Result (pCi/L)
<b>2005–2006 Investigation Samples</b>				
MD21-05-61752	21-24524	14–15	07/08/2005	45,334
MD21-06-71202	21-24524	14–15	05/06/2006	134,634
MD21-06-71201	21-24524	379–380	05/06/2006	271,192
<b>1<sup>st</sup> Quarter, August and October 2009 Samples</b>				
MD21-09-12336	21-24524W	42.5–47.5	8/20/2009	18,980
MD21-09-12337	21-24524W	122.5–127.5	8/20/2009	5791
MD21-09-12338	21-24524W	172.5–177.5	8/20/2009	3268
MD21-09-12339	21-24524W	257.5–262.5	8/20/2009	1324
MD21-09-12340	21-24524W	300–305	8/20/2009	46,830
MD21-09-12341	21-24524W	327.5–332.5	8/20/2009	8495
MD21-09-12342	21-24524W	377.5–382.5	8/20/2009	9808
MD21-09-12343	21-24524S	677.5–682.5	10/14/2009	495
MD21-09-12344	21-24524S	712.5–717.5	10/14/2009	1713
<b>2nd Quarter, November 2009 Samples</b>				
MD21-10-5343	21-24524W	42.5–47.5	11/23/2009	44,020
MD21-10-5344	21-24524W	122.5–127.5	11/23/2009	14,159
MD21-10-5345	21-24524W	172.5–177.5	11/23/2009	16,601
MD21-10-5346	21-24524W	257.5–262.5	11/23/2009	16,664
MD21-10-5347	21-24524W	300–305	11/23/2009	67,924
MD21-10-5348	21-24524W	327.5–332.5	11/23/2009	7649
MD21-10-5349	21-24524W	377.5–382.5	11/23/2009	10,458
MD21-10-5350	21-24524S	677.5–682.5	11/23/2009	349
MD21-10-5351	21-24524S	712.5–717.5	11/23/2009	464



# **Appendix A**

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*Acronyms and Abbreviations,  
Metric Conversion Table, and Data Qualifier Definitions*

**A-1.0 ACRONYMS AND ABBREVIATIONS**

%R	percent recoveries
bgs	below ground surface
CCV	continuing calibration verification
COC	chain of custody
DER	duplicate error ratio
EPA	Environmental Protection Agency (U.S.)
FD	field duplicate
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
MDA	material disposal area
MDC	minimum detectable concentration
NMED	New Mexico Environment Department
MS	matrix spike
PB	performance blank
QA	quality assurance
QC	quality control
RPF	Records Processing Facility
SCL	sample collection log
SMO	Sample Management Office
SOP	standard operating procedures
SOW	statement of work
TA	technical area
TD	total depth

**A-2.0 METRIC CONVERSION TABLE**

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns ( $\mu\text{m}$ )	0.0000394	inches (in.)
square kilometers ( $\text{km}^2$ )	0.3861	square miles ( $\text{mi}^2$ )
hectares (ha)	2.5	acres
square meters ( $\text{m}^2$ )	10.764	square feet ( $\text{ft}^2$ )
cubic meters ( $\text{m}^3$ )	35.31	cubic feet ( $\text{ft}^3$ )
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter ( $\text{g}/\text{cm}^3$ )	62.422	pounds per cubic foot ( $\text{lb}/\text{ft}^3$ )
milligrams per kilogram ( $\text{mg}/\text{kg}$ )	1	parts per million (ppm)
micrograms per gram ( $\mu\text{g}/\text{g}$ )	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter ( $\text{mg}/\text{L}$ )	1	parts per million (ppm)
degrees Celsius ( $^{\circ}\text{C}$ )	$9/5 + 32$	degrees Fahrenheit ( $^{\circ}\text{F}$ )

**A-3.0 DATA QUALIFIER DEFINITIONS**

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control parameters.

# **Appendix B**

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*Field Methods*

## **B-1.0 INTRODUCTION**

This appendix summarizes the field methods used during the November 2009 sampling activities at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, in Technical Area 21 at Los Alamos National Laboratory (LANL or the Laboratory). All activities were conducted in accordance with the applicable standard operating procedures (SOPs), quality procedures, Laboratory implementation requirements, and Laboratory procedural requirements. Table B-1.0-1 provides a summary of the field methods used, and Table B-1.0-2 lists the applicable procedures.

## **B-2.0 FIELD METHODS**

All work was conducted per a site-specific health and safety plan and an integrated work document. Field activities conducted according to SOPs are discussed below.

### **B-2.1 Tritium Pore-Gas Field Screening**

Field screening was done in accordance with the current version of EP-ERSS-SOP-5074. Before each sampling event, each sample port was purged and monitored with a Landtec GEM2000 instrument (or equivalent) until the percent carbon dioxide (%CO<sub>2</sub>) and percent oxygen (%O<sub>2</sub>) levels stabilized at values representative of subsurface pore-gas conditions. Each instrument rental comes factory-calibrated and is returned to a LANDTEC authorized service facility for service/calibration as needed. As described in Landtec documentation, accuracies for %O<sub>2</sub> and %CO<sub>2</sub> for Landtec instrumentation are +/- 0.5-1.0% and +/-0.3-3.0%, respectively.

All CO<sub>2</sub> and O<sub>2</sub> levels for November 2009 were acceptable. Once purging and field screening was complete, vapor samples for tritium analysis were collected. Field-screening results were recorded on the appropriate sample collection log (SCL) and/or in the field logbook. Field chains of custody (COCs) and SCLs are provided in Appendix D.

All samples were submitted to the Sample Management Office (SMO) for processing and transport to off-site contract analytical laboratories.

### **B-2.2 Tritium Pore-Gas Sample Collection**

All tritium samples were collected in accordance with the current version of EP-ERSS-SOP-5074. Water vapor intended for tritium analysis was collected from pore gas by pulling a pore-gas sample through a canister of silica gel and the sample information recorded on the appropriate SCL (Appendix D). Silica gel column field duplicate samples were also collected at a frequency greater than or equal to 10% per sampling event in accordance with the current version of EP-ERSS-SOP-5059.

Following delivery of the canister and silica gel sample to the analytical laboratory, the silica gel was heated and the moisture driven off was collected for liquid scintillation counting. Silica gel was prepared for sampling by drying it at a temperature above 100°C. Before sample collection, the amount of silica gel used in each sample was weighed (typically about 135 g) as well as the sample canister with silica gel. EP-ERSS-SOP-5074 required that at least 5 g of moisture be collected. After sampling, the sample canister with silica gel was weighed again.

The sample (canister plus silica gel) was shipped to the analytical laboratory where the canister with silica gel was weighed again. The silica gel was emptied into a distillation apparatus and heated to 110°C, driving moisture off the silica gel. This moisture was collected and analyzed for tritium by liquid scintillation. The laboratory also weighed the empty canister and calculated the percent moisture of the sample, as the amount of moisture collected divided by the calculated weight of the wet silica gel. The value of the tritium concentration and the calculated percent moisture were reported to the Laboratory in the analytical data package and the electronic data deliverable.

**Table B-1.0-1  
Summary of Field Methods**

Method	Summary
General Instructions for Field Investigations	This procedure provides an overview of instructions regarding activities that were performed before, during, and after field investigations. The procedure covers pre-mobilization activities; mobilization to the site; documentation and sample collection activities; sample media evaluation; surveillance; and completion of lessons learned. It is assumed that field investigations involved the use of standard sampling equipment, personal protective equipment, waste management equipment/procedures, and site-control equipment/materials.
Sample Containers and Preservation	Specific requirements/processes for sample containers, preservation techniques, and holding times were based on the U.S. Environmental Protection Agency guidance for environmental sampling, preservation, and quality assurance. Specific requirements were met for each sample and were printed in the sample collection logs provided by the Laboratory's SMO (size and type of container, preservatives, etc.). All samples were preserved by placing them in insulated containers with ice to maintain a temperature of 4°C.
Handling, Packaging, and Transporting Field Samples	Field team members sealed and labeled samples before packing to ensure sample and transport containers were free of external contamination. All environmental samples were collected, preserved, packaged, and transported to the SMO under chain of custody. The SMO arranged for shipping of the samples to analytical laboratories. Any levels of radioactivity (i.e., action-level or limited-quantity ranges) were documented in SCLs submitted to the SMO.
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented in standard forms generated by the SMO. These forms included SCLs, COC forms, sample container labels, and custody seals. Collection logs were completed at the time of sample collection and were signed by the sampler and a reviewer who verified the logs for completeness and accuracy. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around container lids or openings. COC forms were completed and signed to verify that the samples were not left unattended.
Field QC Samples	Field quality control samples were collected as follows: FDs were collected at a frequency of 10% at the same time as a regular sample and submitted for the same analyses.
Sampling of Sub-Atmospheric Air	Vapor sampling was performed on two monitoring wells in accordance with the current version of EP-ERSS-SOP-5074 and analyzed for tritium. This SOP describes the process of sampling subatmospheric air from vapor ports in monitoring wells and boreholes. The procedure covers presampling activities; SUMMA sampling (a passive collection and containment system of laboratory-quality air samples); adsorbent column sampling; and postsampling activities.

**Table B-1.0-2  
List of Applicable General Procedures for MDA V Pore-Gas Monitoring Activities**

Document Number	LANL Procedure Title
EP-ERSS-SOP-5055	General Instructions for Field Investigations
EP-ERSS-SOP-5056	Sample Containers and Preservation
EP-ERSS-SOP-5057	Handling, Packaging, and Transporting Field Samples
EP-ERSS-SOP-5058	Sample Control and Field Documentation
EP-ERSS-SOP-5059	Field Quality Control Samples
EP-ERSS-SOP-5061	Field Decontamination of Equipment
EP-ERSS-SOP-5074	Sampling for Sub-Atmospheric Air
P 101-6	Personal Protective Equipment
SOP-01.12	Field Site Closeout Checklist
SOP-01.13	Initiating and Managing Data Set Requests
SOP-5181	Notebook Documentation for Environmental Restoration Technical Activities
SOP-5228	ADEP Reporting Requirements for Abnormal Events

# **Appendix C**

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*Quality Assurance/Quality Control Program*

## **C-1.0 INTRODUCTION**

This appendix presents the analytical methods and summarizes the data quality review for the November 2009 pore gas samples collected at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, at Technical Area 21 at Los Alamos National Laboratory (LANL or the Laboratory).

Quality assurance (QA), quality control (QC), and data validation procedures were implemented in accordance with the "Quality Assurance Project Plan Requirements for Sampling and Analysis" (LANL 1996, 054609), and the Laboratory's statement of work (SOW) for analytical services (LANL 2000, 071233). The results of the QA/QC activities were used to estimate the accuracy, bias, and precision of the analytical measurements. QC samples, including blanks, duplicates, matrix spikes (MSs), laboratory control samples (LCSs), initial calibration verifications (ICVs) and continuing calibration verifications (CCVs) were used to assess analytical laboratory accuracy and bias

The type and frequency of QC analyses are described in the analytical services SOW (LANL 2000, 071233). Other QC factors such as sample preservation and holding times were also assessed. The requirements for sample preservation and holding times are presented in the standard operating procedure (SOP) EP-ERSS-SOP-5056, Sample Containers and Preservation. Evaluating these QC indicators allows estimates to be made of the accuracy, bias, and precision of the analytical suites. A focused data validation was also performed for all the data packages (identified by request number) that included a more detailed review of the raw data results. The SOPs used for data validation are presented in Table C-1.0-1. Copies of the analytical data, laboratory logbooks, and instrument printouts are provided in Appendix D (on CD). As a result of the data validation and assessment efforts, qualifiers have been assigned to the appropriate analytical records. Definitions of the data qualifiers are presented in Appendix A.

## **C-2.0 ANALYTICAL DATA ORGANIZATION AND VINTAGE**

The November 2009 pore-gas analytical data were obtained from 10 samples (9 characterization samples and 1 field duplicate sample) collected during the second quarter sampling event from vapor-monitoring well locations 21-24524W and 21-24524S. Complete data packages and sample documentation for the second quarter samples are provided in Appendix D (on CD).

## **C-3.0 RADIONUCLIDE ANALYSIS METHODS**

The vapor samples collected in November 2009 were analyzed by EPA Method 906 for tritium (Table C-3.0-1). Table 2.0-2 summarizes all samples collected and the requested analyses. All tritium results are provided on CD in Appendix D.

### **C-3.1 Radionuclide QA/QC Samples**

The minimum detectable concentration (MDC) for tritium in performance blanks (PBs), method blanks, laboratory duplicates, LCSs, and MS samples were analyzed to assess the accuracy and precision of the radionuclide analysis. The qualifiers and sample types for radionuclides are defined in the analytical services SOW (LANL 2000, 071233), described in the applicable validation SOPs, and discussed briefly below. The validation of radionuclide data using QA/QC samples and other methods may have resulted in the rejection of data or the assignment of various qualifiers to individual sample results.

The MDC for each radionuclide is defined as the minimum activity concentration the analytical laboratory equipment can detect in 95% of the analyzed samples and is used to assess analytical performance.

Uncertainty and MDC results for tritium have been modified in the same manner as the analytical results to account for the bound water found in silica gel used for sample collection.

The PBs and method blanks were used to measure bias and assess potential cross-contamination of samples during preparation and analysis. Blank results should be less than the MDC for each radionuclide.

Laboratory duplicates were used to assess or demonstrate acceptable laboratory method precision at the time of analysis as well as to assess the long-term precision of an analytical method on various matrices. Duplicate results were used to calculate a duplicate error ratio (DER). The DER is based on 1 standard deviation of the sample and the duplicate sample and should be less than 4.

The LCS served as a monitor of the overall performance of each step during the analysis, and the acceptance criteria for LCSs were method-specific. For radionuclide methods, LCS percent recoveries (%Rs) should fall within the control limits of 80% to 120%.

The accuracy of radionuclide analyses was also assessed using MS samples. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS %Rs should be within the acceptance range of 75% to 125%; however, if the sampling result was more than 4 times the amount of the spike added, these acceptance criteria do not apply.

The data quality of the November 2009 MDA V tritium data is summarized below.

#### **C-3.1.1 Tritium Qualified Data**

During the November 2009 monitoring period, 10 pore-gas samples (including 1 field duplicate) were collected and submitted for tritium analysis.

No tritium data were rejected and no data quality issues were identified.

No tritium results were qualified.

All validated tritium investigation pore-gas data collected in November 2009 from MDA V pore gas were used to evaluate tritium.

#### **C-4.0 REFERENCES**

*The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.*

*Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.*

LANL (Los Alamos National Laboratory), March 1996. "Quality Assurance Project Plan Requirements for Sampling and Analysis," Los Alamos National Laboratory document LA-UR-96-441, Los Alamos, New Mexico. (LANL 1996, 054609)

LANL (Los Alamos National Laboratory), December 2000. "University of California, Los Alamos National Laboratory (LANL), I8980SOW0-8S, Statement of Work for Analytical Laboratories," Rev. 1, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2000, 071233)

**Table C-1.0-1**  
**Data Validation Procedures**

Procedure	Title	Effective Date
SOP-5166, Rev. 0	Routine Validation of Gamma Spectroscopy, Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Analytical Data	6/30/2008

**Table C-3.0-1**  
**Analytical Methods for MDA V Pore-Gas Samples**

Analytical Method	Analytical Description	Analytical Suite
EPA Method 906	Liquid Scintillation	Tritium



## **Appendix D**

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*Analytical Suites and Results and Analytical Reports  
(on CD included with this document)*

Appendix E Table ALLANALYSES MDA V Tritium Sampling 2nd Quarter Event 2442

URI	Request Number	Sample ID	Excavated	Sample Technique	Sample Usage	Field Prep	Field QC Type	PRS	Location ID	Depth Range (ft)	Field Matrix	Media	RFI Class	Analyte Code	Analyte	Percent Moisture	Standard MDL	Standard MDA	Dilution Factor	Standard Result	Standard Uncertainty	Standard Units	Qualifier	Lab Sample Type	Analytical Suite	Analytical Method	Lab Code	Analysis Date	Collection Date
66386682	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	327.5000-3	GAS	na	RAD	H-3	Tritium	10.77	344.984		1	7648.58	434.382	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386692	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524S	677.5000-6	GAS	na	RAD	H-3	Tritium	21.29	248.477		1	348.745	80.1438	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386702	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	257.5000-2	GAS	na	RAD	H-3	Tritium	21.12	247.176		1	16664.4	890.429	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386712	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	42.5000-47	GAS	na	RAD	H-3	Tritium	25.45	233.504		1	44020.3	2317.78	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386722	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	300.0000-3	GAS	na	RAD	H-3	Tritium	22.58	242.052		1	67924.4	3567.74	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386732	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	122.5000-1	GAS	na	RAD	H-3	Tritium	26	235.969		1	14159.1	758.918	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386752	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524S	712.5000-7	GAS	na	RAD	H-3	Tritium	20.1	244.406		1	464.458	81.7746	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386762	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	172.5000-1	GAS	na	RAD	H-3	Tritium	25.13	240.18		1	16601.4	886.526	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####
66386772	10-660	MD21-10-5N		VOST	INV	na	na	21-018(a)-99	21-24524W	377.5000-3	GAS	na	RAD	H-3	Tritium	21.13	249.178		1	10457.8	567.821	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####

Monday, November 23, 2009

REQUEST NUMBER: 10-660

**LOS ALAMOS  
NATIONAL LABORATORY**

ATTN: Danny Coleman

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

These Samples are on:

LANL Request Number:10-660  
Per Agreement Number:126310041  
Project Cost Code: MR8R032TNB00

Please analyse the enclosed samples  
according to the schedule indicated:

**SHIP DATE: 11/23/2009**

**TURNAROUND/REPORT DUE: 11/28/2009**

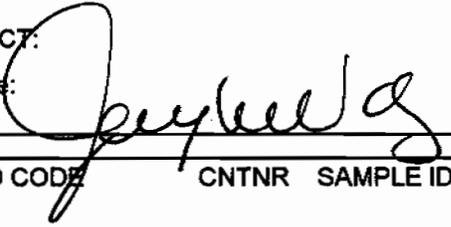
**TURNAROUND REQ'D: 5 Days**

**RAD SCREENING: Not Required**

**LAB REQUEST COMMENTS:**

LANL ER SMO CONTACT:

Signature:



PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-5343	GAS	11/23/2009	
		1	MD21-10-5344	GAS	11/23/2009	
		1	MD21-10-5345	GAS	11/23/2009	
		1	MD21-10-5346	GAS	11/23/2009	
		1	MD21-10-5347	GAS	11/23/2009	
		1	MD21-10-5348	GAS	11/23/2009	
		1	MD21-10-5349	GAS	11/23/2009	
		1	MD21-10-5350	GAS	11/23/2009	
		1	MD21-10-5351	GAS	11/23/2009	

Monday, November 23, 2009

REQUEST NUMBER: 10-660

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-5352	GAS	11/23/2009	

Final Page of REQUEST NUMBER 10-660

Monday, November 23, 2009

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-660

**LOS ALAMOS  
NATIONAL LABORATORY**

REQUEST NUMBER: 10-660

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 11/28/2009

American Radiation Services - Primary

TURNAROUND REQ'D: 5

1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-5343	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5350	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5347	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5352	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5349	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5345	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5348	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5344	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5346	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5351	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:

Date Time

Received By:

Date

Time

*[Handwritten Signature]*

11/23/09 1400

Printed Name

Signature

Received for DISPOSAL By:

Date

Time

Remarks:

Printed Name

Signature

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5343

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID: 21-018(a)-99		OK	SAMPLE TECH CODE:	VOST	
LOCATION ID: 21-24524W		↓	FIELD QC TYPE:	NA	
LOCATION TYPE: BH		↓	FIELD PREP:	NA	
TOP DEPTH: 0		450 ft logs	SAMPLE USAGE:	INV	
BOTTOM DEPTH: 0	1ph 11/23/09	NA	SCREEN/PORT DESC:	geoprobe implant Sullivan part #1	
FIELD MATRIX: GAS		OK	EXCAVATED: YES/NO	(NA)	
COMPOSITE TYPE: NA			COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO/NA (NA)
BOREHOLE: (YES/NO/NA)			BOREHOLE DECLINATION: vertical		BOREHOLE DIRECTION: NA

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor 1/3.1120 gel  
 beginning T = 45°F; rh = 37%; barometer = 30.27" Hg  
 end T = 39°F; rh = 28%; barometer = 30.00" Hg  
 SAMPLE COMMENTS:  
 mass of gel = 131.00g      volume analyzed = 7530 uL  
 initial mass = 565.82g      LPM = 2.8  
 final mass = 613.63g  
 LOCATION DESC: 1 EA unstratd BH, part #1, 450' logs, 2663

**FIELD SCREENING/MEASUREMENT RESULTS:**

NA

COLLECTED BY (PRINT)

Lindsey Hy

REVIEWED BY (PRINT) M Whitaker

<b>RELINQUISHED BY</b> (Printed Name) <u>Lindsey Hy</u> (Signature) <u>[Signature]</u>	<b>Date/Time</b> 11/23/2009 11:50	<b>RECEIVED BY</b> (Printed Name) <u>K. Green</u> (Signature) <u>[Signature]</u>	<b>Date/Time</b> 11/23/09 11:50
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>	<b>RECEIVED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5344

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	OK	SAMPLE TECH CODE:	VOST	
LOCATION ID:	21-24524W		FIELD QC TYPE:	NA	
LOCATION TYPE:	BH		FIELD PREP:	NA	
TOP DEPTH:	0 lph	125.0 ft bags	SAMPLE USAGE:	INV	
BOTTOM DEPTH:	0 11/23/09	NA	SCREEN/PORT DESC:	asplanned implant screen port #2	
FIELD MATRIX:	GAS	OK	EXCAVATED: YES/NO	(NA)	
COMPOSITE TYPE:	NA		COMPOSITE TIME INTERVAL:	NA	WATER FLOWING: YES/NO/NA
BOREHOLE: (YES/NO/NA)	(YES)		BOREHOLE DECLINATION:	vertical	BOREHOLE DIRECTION:
				NA	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor / silica gel  
 beginning: T = 45°F; rh = 37%; barometer = 30.27" Hg  
 end: T = 39°F; rh = 28%; barometer = 30.00" Hg  
 SAMPLE COMMENTS:  
 mass of gel = 140.12g      final mass = 639.60g  
 initial mass = 590.60g

LOCATION DESC:  
 HBA constructed BH, port #2, 125.0' bags, 2btz

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT)

Lindsay Hry

REVIEWED BY (PRINT)

M. Whitaker

<b>RELINQUISHED BY</b> (Printed Name) Lindsay Hry (Signature) <i>Lindsay Hry</i>	<b>Date/Time</b> 11/23/2009 11:50	<b>RECEIVED BY</b> (Printed Name) K. Greene (Signature) <i>K. Greene</i>	<b>Date/Time</b> 11/23/09 11:50
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>	<b>RECEIVED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5345

WORK ORDER:

AS PLANNED	AS COLLECTED	AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):	11/23/2009	MEDIA:	NA
TIME COLLECTED (HH:MM)	0730	SUB-MEDIA:	OTHER
PRS ID: 21-018(a)-99	OK	SAMPLE TECH CODE:	VOST
LOCATION ID: 21-24524W	↓	FIELD QC TYPE:	NA
LOCATION TYPE: BH	↓	FIELD PREP:	NA
TOP DEPTH: 1 ph	↓	SAMPLE USAGE:	INV
BOTTOM DEPTH: 11/24/09	175.0' bgs	SCREEN/PORT DESC:	gauge probe in plant screen port #3
FIELD MATRIX: GAS	NA	EXCAVATED: YES/NO	(NA)
COMPOSITE TYPE: NA	COMPOSITE TIME INTERVAL: NA	WATER FLOWING: YES/NO	(NA)
BOREHOLE: (C) YES/NO/NA	BOREHOLE DECLINATION: vertical	BOREHOLE DIRECTION: NA	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	S day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor/silica gel  
 beginning: T = 45°F; rh = 37%; barometer = 30.277 Hg  
 ending: T = 39°F; rh = 28%; barometer = 30.200 Hg

SAMPLE COMMENTS:  
 mass of gel = 137.27g final mass = 67.72g  
 initial mass = 573.16g

LOCATION DESC:  
 LSA constructed BA, port #3, 175.0' bgs, 2bt IV

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT)

Lindsay Ay

REVIEWED BY (PRINT)

M Whitaker

<b>RELINQUISHED BY</b> (Printed Name) Lindsay Ay (Signature) <i>[Signature]</i>	Date/Time 11/23/2009 11:50	<b>RECEIVED BY</b> (Printed Name) K. G. ... (Signature) <i>[Signature]</i>	Date/Time 11/23/09 11:50
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	Date/Time	<b>RECEIVED BY</b> (Printed Name) (Signature)	Date/Time

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5346

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	OK	SAMPLE TECH CODE:	VOST	
LOCATION ID:	21-24524W		FIELD QC TYPE:	NA	
LOCATION TYPE:	BH	↓	FIELD PREP:	NA	
TOP DEPTH:	± 1ph	260.0' logs	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	± 11/23/09	NA	SCREEN/PORT DESC:	gas probe insert screen port # 4	
FIELD MATRIX:	GAS	OK	EXCAVATED: YES/NO/NA	(NA)	
COMPOSITE TYPE:	NA		COMPOSITE TIME INTERVAL:	NA	
			WATER FLOWING: YES/NO/NA	(NA)	
BOREHOLE:	(YES/NO/NA)		BOREHOLE DECLINATION:	vertical	
			BOREHOLE DIRECTION:	NA	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor / silica gel  
 beginning: T = 45°F; rh = 37%; barometer = 30.27" Hg  
 ending: T = 39°F; rh = 28%; barometer = 30.00" Hg

SAMPLE COMMENTS:  
 mass of gel = 146.12g 1ph 11/23/09 initial mass = 593.87g; final mass = 635.44g

LOCATION DESC:  
 HSA constructed BH part # 4, 260.0' logs, 2 bag formation

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT)

Lindsay Hoy

REVIEWED BY (PRINT)

M. Whitaker

<b>RELINQUISHED BY</b> (Printed Name) Lindsay Hoy (Signature) <i>Lindsay Hoy</i>	<b>Date/Time</b> 11/23/2009 11:50	<b>RECEIVED BY</b> (Printed Name) K. Greene (Signature) <i>[Signature]</i>	<b>Date/Time</b> 11/23/09 11:50
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>	<b>RECEIVED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5347

WORK ORDER:

	AS PLANNED	AS COLLECTED	AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA: NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA: OTHER	
PRS ID: 21-018(a)-99		OK	SAMPLE TECH CODE: VOST	
LOCATION ID: 21-24524W		↓	FIELD QC TYPE: NA	
LOCATION TYPE: BH		↓	FIELD PREP: NA	
TOP DEPTH: 1 ph		302.5 ft bgs	SAMPLE USAGE: INV	
BOTTOM DEPTH: 11/23/09		NA	SCREEN/PORT DESC: grape implement screen, port #5	
FIELD MATRIX: GAS		OK	EXCAVATED: YES/NO (NA)	
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA	WATER FLOWING: YES/NO (NA)	
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: vertical	BOREHOLE DIRECTION: NA	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	Sday	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor / silica gel ; FD collected, sample ID: MD21-10-5352  
 beginning : T = 45°F / rh = 37% ; barometer = 30.27" Hg  
 ending : T = 29°F ; rh = 28% ; barometer = 30.00" Hg  
 SAMPLE COMMENTS:  
 mass outg. = 138.73g ; initial mass = 587.24g ; final mass = 630.80g

LOCATION DESC:  
 H3A constructed BH, port #5, 302.5' bgs, obt

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT) Lindsay Ny      REVIEWED BY (PRINT) MWhitaker

RELINQUISHED BY (Printed Name) Lindsay Ny (Signature) <i>Lindsay Ny</i>	Date/Time 11/23/09 11:50	RECEIVED BY (Printed Name) V. Greene (Signature) <i>V. Greene</i>	Date/Time 11/23/09 11:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5348

WORK ORDER:

	<u>AS PLANNED</u>	<u>AS COLLECTED</u>		<u>AS PLANNED</u>	<u>AS COLLECTED</u>
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	ok
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	ok	SAMPLE TECH CODE:	VOST	
LOCATION ID:	21-24524W	↓	FIELD QC TYPE:	NA	
LOCATION TYPE:	BH	↓	FIELD PREP:	NA	
TOP DEPTH:	- 10h	330.0 ft bgs	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	- 11/23/09	NA	SCREEN/PORT DESC:	geoprobe/implant screen, port # 6	
FIELD MATRIX:	GAS	ok	EXCAVATED: YES/NO	NA	
COMPOSITE TYPE:	NA		COMPOSITE TIME INTERVAL:	NA	WATER FLOWING: YES/NO/NA
BOREHOLE: <input checked="" type="radio"/> YES / NO / NA		BOREHOLE DECLINATION: <u>vertical</u>		BOREHOLE DIRECTION: <u>NA</u>	

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor / silica gel  
 beginning: T = 45°F; rh = 37%; barometer = 30.27" Hg  
 ending: T = 39°F; rh = 28%; barometer = 30.00" Hg  
 SAMPLE COMMENTS:  
 mass of gel = 142.65g; initial mass = 593.94g; final mass = 606.90g

LOCATION DESC:  
 HSA constructed BH, port # 6, 330' bgs, 2ct

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT) Lindsay Day      REVIEWED BY (PRINT) MWH. taylor

RELINQUISHED BY (Printed Name) <u>Lindsay Day</u> (Signature) <u>Lindsay Day</u>	Date/Time 11/23/2009 11:50	RECEIVED BY (Printed Name) <u>K. Bruce</u> (Signature) <u>[Signature]</u>	Date/Time 11/23/09 11:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5349

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	↓
PRS ID: 21-018(a)-99		OK	SAMPLE TECH CODE: VOST		↓
LOCATION ID: 21-24524W		↓	FIELD QC TYPE: NA		↓
LOCATION TYPE: BH		↓	FIELD PREP: NA		↓
TOP DEPTH: 0 lph		380.0 ft bgs	SAMPLE USAGE: INV		↓
BOTTOM DEPTH: 0 11/23/09		NA	SCREEN/PORT DESC: geoprobe implant screen port #7		↓
FIELD MATRIX: GAS		OK	EXCAVATED: YES/NO NA		↓
COMPOSITE TYPE: NA		COMPOSITE TIME INTERVAL: NA			WATER FLOWING: YES/NO NA
BOREHOLE: YES/NO/NA		BOREHOLE DECLINATION: vertical			BOREHOLE DIRECTION: NA

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: tritium vapor/silica gel

beginning: T = 45°F, rh = 37%; barometer = 30.27" Hg  
 ending: T = 39°F, rh = 29%; barometer = 30.00" Hg

SAMPLE COMMENTS:

mass of gel = 143.44g; initial mass = 594.10g; final mass = 630.99g

LOCATION DESC:

USA constructed BH, port #7, 380.0' bgs, 2bot

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT)

Lindsay Kay

REVIEWED BY (PRINT)

MWhitaker

<b>RELINQUISHED BY</b> (Printed Name) Lindsay Kay (Signature)	<b>Date/Time</b> 11/23/2009 11:50	<b>RECEIVED BY</b> (Printed Name) K. G. ... (Signature)	<b>Date/Time</b> 11/23/09 11:50
<b>RELINQUISHED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>	<b>RECEIVED BY</b> (Printed Name) (Signature)	<b>Date/Time</b>

# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5350

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID: 21-018(a)-99		OK	SAMPLE TECH CODE:	VOST	
LOCATION ID: 21-24524S		↓	FIELD QC TYPE:	NA	
LOCATION TYPE: BH		↓	FIELD PREP:	NA	
TOP DEPTH: 1 ph		680.0 ft bags	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH: 11/23/09		NA	SCREEN/PORT DESC:	geoprobe impact still in port # 10	
FIELD MATRIX: GAS		OK	EXCAVATED: YES/NO	(NA)	
COMPOSITE TYPE: NA			COMPOSITE TIME INTERVAL: NA		WATER FLOWING: YES/NO (NA)
BOREHOLE: (Circled) YES/NO/NA		BOREHOLE DECLINATION: vertical			BOREHOLE DIRECTION: NA

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	note

SAMPLE DESC: tritium vapor / silica gel  
 beginning T = 45°F; rh = 37%; barometer = 30.27" Hg  
 ending T = 39°F; rh = 23%; barometer = 30.00" Hg

SAMPLE COMMENTS:  
 mass of gel = 138.19 g; initial mass gel + cartridge = 597.11 g; final mass cartridge + gel = 633.39 g

LOCATION DESC:  
 AR constructed BH, port #10, 680.0' bags, 2 bags

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT)  
 Lindsay Ray

REVIEWED BY (PRINT) M Whitaker

RELINQUISHED BY (Printed Name) Lindsay Ray (Signature) <i>Lindsay Ray</i>	Date/Time 11/23/2009 11:50	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 11/23/09 11:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time



# SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2442

EVENT NAME: 2nd Qtr. Tritium Vapor Monitoring, CU 21-018(a)-99, MDA V, TA-21

SAMPLE ID: MD21-10-5352

WORK ORDER:

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		11/23/2009	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0730	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	OK	SAMPLE TECH CODE:	VOST	
LOCATION ID:	<del>UNK</del> 1ph 11/23/09	21-24524W	FIELD QC TYPE:	FD	
LOCATION TYPE:	GENERIC	OK	FIELD PREP:	NA	
TOP DEPTH:	0.1ph	302.5 ft bgs	SAMPLE USAGE:	QC	
BOTTOM DEPTH:	0.11/23/09	NA	SCREEN/PORT DESC:	graduable implant screen, port #5	
FIELD MATRIX:	GAS	OK	EXCAVATED: YES/NO	NA	
COMPOSITE TYPE:	NA		COMPOSITE TIME INTERVAL:	NA	WATER FLOWING: YES/NO (NA)
BOREHOLE: (YES/NO/NA)	(YES)	BOREHOLE DECLINATION:	vertical	BOREHOLE DIRECTION:	NA

#	PRIORITY	ORDER	CNTNR	PRESERVATIVE	COLLECTED Y/N	SPECIAL INSTRUCTIONS
1	5 day	H3	1 EA SILICA GEL TUBE	None	Y	none

SAMPLE DESC: QC Sample of tritium vapor / silica gel; FO sample of sample ID: MD21-10-5347 beginning; T = 45°F; rh = 37%; barometer = 30.27" Hg  
 ending: T = 39°F; rh = 28%; barometer = 30.00" Hg

SAMPLE COMMENTS:  
 mass of gel = 146.07g; initial mass = 60.59g; final mass = 60.88g

LOCATION DESC:  
 ASA constructed BN, port #5, 302.5' bgs, 2 btt

FIELD SCREENING/MEASUREMENT RESULTS:  
 NA

COLLECTED BY (PRINT) Lindsay Hay REVIEWED BY (PRINT) M Whitaker

RELINQUISHED BY (Printed Name) Lindsay Hay (Signature) <i>Lindsay Hay</i>	Date/Time 11/23/2009 11:50	RECEIVED BY (Printed Name) K. Greene (Signature) <i>K. Greene</i>	Date/Time 11/23/09 11:50
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

## DATA VALIDATION COVER SHEET

5119-1

Records Use only

## Data Validation Cover Sheet



## Section I.

REQUEST NUMBER: 10-660 VALIDATION DATE: 01/12/10 LAB CODE: ARSCONTRACT LABORATORY NAME: American Radiation ServicesVALIDATOR: Kevin A. Lambert ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

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

 OTHER (DESCRIBE): \_\_\_\_\_

## Section II. Completeness Check

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

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

1. It should be noted that an MS was not analyzed. However, an LCS was analyzed and passed acceptance criteria. Thus, no sample data were qualified.
2. It should be noted that an LCS/LCS Duplicate pair was analyzed instead of a field sample Duplicate. No sample data were qualified as a result.

Reviewed by: ETMLevel: 1Date: 1/13/10VALIDATOR'S SIGNATURE: Kevin A. Lambert DATE: 01/12/10

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

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

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

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

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

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



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5343  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-001  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	37458.455	1972.277	198.697	97.491		pC/L	ARS-054/EPA 906.0	12/17/09 15:29	BJ5	N/A

NOTES: Project Cost Code MR8R032TNB00

*PN*

Project Manager Review

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

LELAP Certificate # 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

1 (600) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5344  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-002  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	11968.684	641.512	199.465	97.857		pCi/L	ARS-054/EPA 906.0	12/17/09 18:38	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

DN

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5345  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-003  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	13867.399	740.527	200.626	98.437		pCi/L	ARS-054/EPA 906.0	12/17/09 21:46	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

*DN*  
Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5346  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-660  
 ARS Sample ID: ARS1-09-02989-004  
 Date Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Trace/Chem Recovery
H-3	13569.689	725.061	201.276	98.756		pCi/L	ARS-054/EPA 906.0	12/18/09 00:55	BJS	N/A

NOTES: Project Cost Code MRBR032TN800

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5347  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-005  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	56420.264	2963.481	201.056	98.648		pCi/L	ARS-054/EPA 906.0	12/18/09 04:04	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

  
Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558



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ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5348  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-006  
Data Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	4487.434	254.853	202.403	99.309		pCi/L	ARS-054/EPA 906.0	12/18/09 07:12	BJS	N/A

NOTES: Project Cost Code MRSR032TNB00

DN

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E8755B



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5349  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-007  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	8373.946	454.674	199.526	97.897		pCi/L	ARS-054/EPA 906.0	12/18/09 10:20	RJS	N/A
<b>NOTES: Project Cost Code MRSR032TNB00</b>										

  
Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767  
1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5350  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-008  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	280.392	64.436	199.776	98.020		pCi/L	ARS-054/EPA 906.0	12/18/09 13:28	BJS	N/A

NOTES: Project Cost Code MRSR032TNB00

*DN*

Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5351  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-009  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	377.569	66.475	198.683	97.484		pCVL	ARS-054/EPA 906.0	12/18/09 16:35	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

*BN*

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5352  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-010  
Date Received: 11/23/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Trace/Chem Recovery
H-3	16597.417	883.023	202.313	99.265		pCi/L	ARS-054/EPA 906.0	12/18/09 19:42	BJ5	N/A

NOTES: Project Cost Code MRBR032TNB00

  
Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558

Monday, November 23, 2009

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-660

**LOS ALAMOS**

REQUEST NUMBER: 10-660

**NATIONAL LABORATORY**

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 11/28/2009

American Radiation Services - Primary

TURNAROUND REQ'D: 5

1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-5343	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5350	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5347	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5352	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5349	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5345	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5348	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5344	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5346	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5351	1	SILICA GEL TUBE	H3	None	GAS

<b>Relinquished By:</b>	<b>Date</b>	<b>Time</b>	<b>Received By:</b>	<b>Date</b>	<b>Time</b>
<i>[Signature]</i>	11/23/09	1700	Nancy Barthe	11/25/09	10:30
Printed Name			Printed Name		
Signature			Signature		

Printed Name	Signature	Printed Name	Signature
--------------	-----------	--------------	-----------

Printed Name	Signature	Printed Name	Signature
--------------	-----------	--------------	-----------

**Received for DISPOSAL By:**      **Date**      **Time**      **Remarks:**

Printed Name	Signature
--------------	-----------

Monday, November 23, 2009  
**LOS ALAMOS**  
 NATIONAL LABORATORY

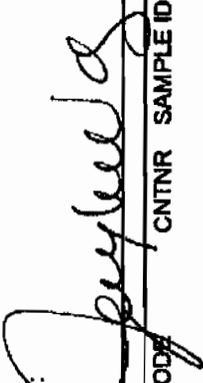
These Samples are on:  
 LANL Request Number: 10-660  
 Per Agreement Number: 126310041  
 Project Cost Code: MR8R032TNB00

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

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 11/23/2009  
 TURNAROUND/REPORT DUE: 11/28/2009  
 TURNAROUND REQ'D: 5 Days

RAD SCREENING: Not Required  
 LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:  
 Signature: 

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA-906.0	1	MD21-10-5343	GAS	11/23/2009	
		1	MD21-10-5344	GAS	11/23/2009	
		1	MD21-10-5345	GAS	11/23/2009	
		1	MD21-10-5346	GAS	11/23/2009	
		1	MD21-10-5347	GAS	11/23/2009	
		1	MD21-10-5348	GAS	11/23/2009	
		1	MD21-10-5349	GAS	11/23/2009	
		1	MD21-10-5350	GAS	11/23/2009	
		1	MD21-10-5351	GAS	11/23/2009	

Monday, November 23, 2009

REQUEST NUMBER: 10-660

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
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EPA:908.0		1	MD21-10-5352	GAS	11/23/2009	
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Final Page of REQUEST NUMBER 10-660



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

# **Request Number: 10-660**



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

# **American Radiation Services Analytical Reports**

for

**Los Alamos National Laboratory  
Request Number: 10-660**

# **Original COC**

REQUEST NUMBER: 10-660

Monday, November 23, 2009

**LOS ALAMOS  
NATIONAL LABORATORY**

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

These Samples are on:  
LANL Request Number: 10-660  
Per Agreement Number: 126310041  
Project Cost Code: MIR8R032TNB00

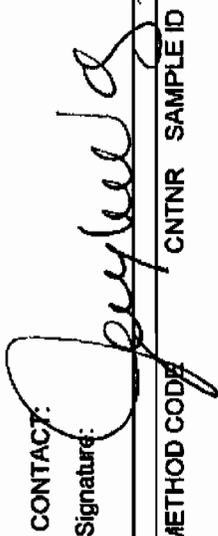
Please analyse the enclosed samples  
according to the schedule indicated:

SHIP DATE: 11/23/2009  
TURNAROUND/REPORT DUE: 11/28/2009  
TURNAROUND REQ'D: 5 Days

RAD SCREENING: Not Required  
LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:

Signature:



PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-5343	GAS	11/23/2009	
		1	MD21-10-5344	GAS	11/23/2009	
		1	MD21-10-5345	GAS	11/23/2009	
		1	MD21-10-5346	GAS	11/23/2009	
		1	MD21-10-5347	GAS	11/23/2009	
		1	MD21-10-5348	GAS	11/23/2009	
		1	MD21-10-5349	GAS	11/23/2009	
		1	MD21-10-5350	GAS	11/23/2009	
		1	MD21-10-5351	GAS	11/23/2009	

Monday, November 23, 2009

REQUEST NUMBER: 10-660

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA-906.0	1	MD21-10-5352	GAS	11/23/2009	

Final Page of REQUEST NUMBER 10-660

Monday, November 23, 2009

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-660

LOS ALAMOS NATIONAL LABORATORY

REQUEST NUMBER: 10-660

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 11/28/2009

American Radiation Services - Primary

TURNAROUND REQ'D: 5

1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-5343	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5350	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5347	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5352	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5349	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5345	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5348	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5344	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5346	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5351	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By: [Signature] Date 11/23/09 Time 1700 Received By: Hancy Barton Date 11-25-09 Time 10:30  
 Printed Name Signature Printed Name Signature

Printed Name Signature Printed Name Signature

Printed Name Signature Printed Name Signature

Received for DISPOSAL By: Date Time Remarks:

Printed Name Signature



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1 (800) 401-4277 • Fax (225) 381-2996

# **American Radiation Services Analytical Reports**

for

**Los Alamos National Laboratory  
Request Number: 10-660**

# **Case Narrative**



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

December 23, 2009

LANL  
Keith Greene  
Drop Point MS H865  
Los Alamos, NM 87545

Request Number: 10-660

LANL Sample ID: MD21-10-5343; MD21-10-5350; MD21-10-5347; MD21-10-5352; MD21-10-5349; MD21-10-5345; MD21-10-5348; MD21-10-5344; MD21-10-5346; MD21-10-5351

Dear Mr. Greene;

On November 25, 2009 ARS International received ten (10) Silica Gel sample(s) to be analyzed for Tritium.

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

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

If you have any questions please do not hesitate to call at 225.381.2991 or email [ProjectManagers@amrad.com](mailto:ProjectManagers@amrad.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'J. M. ...', is written over the typed name.

Laboratory Management  
ARS International



**COVER PAGE**

18980SOW0-8S

Statement of Work for Analytical Laboratories

**PROJECT SAMPLE IDENTIFICATION  
CROSS-REFERENCE  
TO ARS SAMPLE LABORATORY IDs**

Subcontract (LANL Agreement Number) 126310041

<b>Request Number</b>	<b>LANL PROJECT SAMPLE ID NUMBER</b>	<b>American Radiation Services SAMPLE ID NUMBER(S)</b>
10-660	MD21-10-5343	ARS1-09-02989-001
10-660	MD21-10-5350	ARS1-09-02989-002
10-660	MD21-10-5347	ARS1-09-02989-003
10-660	MD21-10-5352	ARS1-09-02989-004
10-660	MD21-10-5349	ARS1-09-02989-005
10-660	MD21-10-5345	ARS1-09-02989-006
10-660	MD21-10-5348	ARS1-09-02989-007
10-660	MD21-10-5344	ARS1-09-02989-008
10-660	MD21-10-5346	ARS1-09-02989-009
10-660	MD21-10-5351	ARS1-09-02989-010

**ANALYTICAL METHODS**

Tritium analyses were performed using EPA 906.0.

**ANALYTICAL RESULTS**

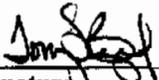
The result data that are flagged with "U" indicate that the activity is below the MDC.



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

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

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

  
Signature

Laboratory Management, ARS International

Title

12-13-07  
Date



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

**American Radiation Services  
Analytical Reports**

for

**Los Alamos National Laboratory**

**Tritium  
by  
Low Level Liquid  
Scintillation Counting**



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5343  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-001  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	37458.455	1972.277	198.697	97.491		pCi/L	ARS-054/EPA 906.0	12/17/09 15:29	BJ5	N/A

NOTES: Project Cost Code MRBR032TNB00

Project Manager Review

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

LELAP Certificate# D1949

NELAP Certificate # E87558



2809 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5344  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-002  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	11968.684	641.512	199.465	97.867		pCi/L	ARS-054/EPA 906.0	12/17/09 18:38	BJS	N/A

NOTES: Project Cost Code MRSR032TNB00

DN

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NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5345  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-003  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	13867.399	740.527	200.626	98.437		pCi/L	ARS-054/EPA 906.0	12/17/09 21:46	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

*DN*

Project Manager Review

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NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5346  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-004  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	13569.889	725.081	201.276	98.756		pCi/L	ARS-054/EPA 906.0	12/18/09 00:55	BJ5	N/A

NOTES: Project Cost Code MR8R032TN800

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NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5347  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-005  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	56420.264	2963.481	201.056	98.648		pCi/L	ARS-054/EPA 906.0	12/18/09 04:04	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

  
Project Manager Review

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NELAP Certificate # E87558



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1 (800) 401-4277 FAX (225) 381-3996

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5348  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-006  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	4487.434	254.853	202.403	99.309		pCi/L	ARS-054/EPA 906.0	12/18/09 07:12	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

*DN*

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5349  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-007  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	8373.946	454.674	199.526	97.897		pCi/L	ARS-054/EPA 906.0	12/18/09 10:20	BJS	N/A

NOTES: Project Cost Code MRSR032TNB00

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5350  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-008  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	280.392	64.436	199.776	98.020		pCi/L	ARS-054/EPA 906.0	12/18/09 13:28	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

DN

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NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5351  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-009  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	377.569	66.476	198.683	97.484		pCi/L	ARS-054/EPA 906.0	12/18/09 16:35	BJ5	N/A
<b>NOTES: Project Cost Code MR0R032TNB00</b>										

*BN*

Project Manager Review

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LELAP Certificate# D1949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5352  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-010  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
H-3	16597.417	883.023	202.313	99.265		pCi/L	ARS-054/EPA 906.0	12/18/09 19:42	BJ5	N/A

NOTES: Project Cost Code MRBR032TNB00

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## QC Results Report

Sample Delivery Group: ARS1-09-02989

Date Received: 11/25/2009

### 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
ARS1-809-05187	LCS	H3	1545.232	110.267	198.736	1230.87		pCi/L	ARS-054/EPA 906.0	12/16/09 9:56	BJS	126	50%-150%

### 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
ARS1-809-05187	MBL	H3	149.516	169.909	197.339	NA	U	pCi/L	ARS-054/EPA 906.0	12/16/09 9:56	BJS

### RER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 1 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	RER	RER Acceptance Range
ARS1-809-05187	DUP	H3	1545.232	110.267	1387.531	103.578		pCi/L	ARS-054/EPA 906.0	12/16/09 9:56	BJS	0.74	< 1

### DER Duplicate Evaluation

Analysis Batch	QC Type	Analysis Description	Result 1	CSU 1 (1s)	Result 2	CSU 1 (1s)	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	DER	DER Acceptance Range
ARS1-809-05187	DUP	H3	1545.232	110.267	1387.531	103.578		pCi/L	ARS-054/EPA 906.0	12/16/09 9:56	BJS	2.08	< 3

Project Manager Review

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# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

### **Tritium**

by

### **Low Level Liquid Scintillation Counting**

# **Samples**



# LSC Instrument Data Transfer Report

\\FACARD2176\_JRNL\BattLab\ARS1-09\Normal LSC 3

Non-BKG Samples Transferred

17

Batch Sample ID

17

Samples Eligible To Save

LSC PID	LSC P#	LSC S#	LSC SHIP_ID	LSC Count Date	LSC CPMA	LSC EFF	LSC COUNT	LSC EFF	LSC COUNT	Analysis Batch	LSC ID	LSC Run
ARS1-809-05187-01	50	1	BACKGROUND	12/16/09 14:16	5.19	34.7500	180.00	34.7500	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-02	50	2	809-05187-01	12/16/09 17:22	11.45	36.1500	180.00	36.1500	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-03	50	3	809-05187-02	12/16/09 20:32	10.78	36.1000	180.00	36.1000	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-04	50	4	809-05187-03	12/16/09 23:41	5.80	36.6600	180.00	36.6600	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-05	50	5	809-05187-04	12/17/09 02:51	15.71	34.1100	180.00	34.1100	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-06	50	6	809-05187-05	12/17/09 06:00	46.90	31.1200	180.00	31.1200	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-07	50	7	809-05187-06	12/17/09 09:09	23.33	34.3100	180.00	34.3100	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-08	50	8	809-05187-07	12/17/09 12:19	7.32	35.6600	180.00	35.6600	180.00	ARS1-809-05187	ARS1-09-02987	1
ARS1-809-05187-09	50	9	809-05187-08	12/17/09 15:28	156.97	36.1200	180.00	36.1200	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-10	50	10	809-05187-09	12/17/09 18:37	53.50	36.1600	180.00	36.1600	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-11	50	11	809-05187-10	12/17/09 21:46	60.84	36.0300	180.00	36.0300	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-12	50	12	809-05187-11	12/18/09 00:54	59.47	36.0000	180.00	36.0000	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-13	50	13	809-05187-12	12/18/09 04:04	233.12	35.9900	180.00	35.9900	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-14	50	14	809-05187-13	12/18/09 07:12	23.04	35.7300	180.00	35.7300	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-15	50	15	809-05187-14	12/18/09 10:20	36.98	36.2100	180.00	36.2100	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-16	50	16	809-05187-15	12/18/09 13:27	6.32	35.9300	180.00	35.9300	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-17	50	17	809-05187-16	12/18/09 16:34	6.72	36.4300	180.00	36.4300	180.00	ARS1-809-05187	ARS1-09-02989	1
ARS1-809-05187-18	50	18	809-05187-17	12/18/09 19:41	71.24	35.7700	180.00	35.7700	180.00	ARS1-809-05187	ARS1-09-02989	1

Procedure		ARS-054			
Variable	Value	Isotope		H-3	
		Calculated Values	Excel	VBA	V/V
Gross Count Rate	11.450000	ACT	1545.232063	1545.232063	OK
Sample Count Mins	180.000000	TPU	110.267134	110.267134	OK
BKG Count Rate	5.190000	NDA	0.000000	0.000000	OK
BKG Count Mins	180.000000	DL	97.509674	97.509674	OK
Instrument Efficiency	0.361500	Net Count Rate	6.260000	6.260000	OK
Sample Aliquot	5.048000	D t 1 (t2 - t1)	0.000000	0.000000	OK
Dilution Factor	1.000000	DF	1.000000	1.000000	OK
Aliquot Conversion Factor	0.091000	Sys Err	0.052280	0.052280	OK
Sample Collection Date (t1)	12/16/09 5:23 PM	K	0.004051	0.004051	OK
Count Date (t2)	12/16/09 5:23 PM	K MDA	0.729211	0.729211	OK
Activity Units = pCi -- BCF =	2.2200	Batch Identifiers and Other Related Information			
CF	1.0000	Batch	ARS1-B09-05187		
Nuclide Abundance	1.000000	Batch ID	ARS1-B09-05187-01		
Half-life Days 1 - Result Isotope	4499.800000	Analysis Code			
TPUF_Calibration Factor	0.041330	SDG	QC Sample		
TPUF_Aliquoting Factor	0.020000	Fraction	N/A QC Sample		
TPUF_Yield Factor	0.000000	Run Number			
TPUF_Decay Ingrowth Factor	0.025000	Client	QC Sample		
TPUF_Analysis Factor	0.000000	Client Profile			
TPUF_Unassigned Factor	0.000000	Client ID	N/A QC Sample		
Activity Units	pCi	Instr File Name	76		
Aliquot Units	L	Instr Detector	P-59-B-Z		
		Instr keV			
		Version/Date	1.0 -- 11/18/2005		
<b>0 Variables Intact Test</b>	<b>OK</b>				

Reviewed by: *DW*

Date: *12-23-09*



Procedure	ARS-054
Variable	Value
Gross Count Rate	5.800000
Sample Count Min	180.000000
BKG Count Rate	5.190000
BKG Count Min	180.000000
Instrument Efficiency	0.366600
Sample Aliquot	5.013000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.601000
Sample Collection Date (t1)	12/16/09 11:42 PM
Count Date (t2)	12/16/09 11:42 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Half-life Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
ACT	149.515664	149.515664	OK
CP	149.515664	149.515664	OK
TPU	119.691356	119.691356	OK
TPU	119.691356	119.691356	OK
DL	96.824483	96.824483	OK
Net Count Rate	0.610000	0.610000	OK
D t 1 (t2 - t1)	0.000000	0.000000	OK
DF	1.000000	1.000000	OK
Sys Err	0.052280	0.052280	OK
K	0.004080	0.004080	OK
K MDA	0.734371	0.734371	OK
Batch Identifiers and Other Related Information			
Batch	ARS1-B09-05187		
Batch ID	ARS1-B09-05187-03		
Analysis Code			
SDG	QC Sample		
Fraction	N/A QC Sample		
Run Number			
Client	QC Sample		
Client Profile			
Client ID	N/A QC Sample		
Instr File Name	76		
Instr Detector	P-S0-S-4		
Instr keV			
Version/Date	1.0 -- 11/18/2005		

Reviewed by: DN

Date: 12-23-09

Procedure	ARS-054
Variable	Value
Gross Count Rate	156.970000
Sample Count Min	180.000000
BKG Count Rate	5.190000
BKG Count Min	180.000000
Instrument Efficiency	0.361200
Sample Aliquot	5.072000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	11/23/09 12:00 PM
Count Date (t2)	12/17/09 3:29 PM
Activity Units - pCi - DCF -	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
<b>Variables Intact Test</b>	<b>OK</b>

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
<b>ACT</b>	<b>37458.455098</b>	<b>37458.455090</b>	<b>OK</b>
<b>TPU</b>	<b>1972.277405</b>	<b>1972.277404</b>	<b>OK</b>
<b>DL</b>	<b>97.490801</b>	<b>97.490801</b>	<b>OK</b>
<b>Net Count Rate</b>	<b>151.780000</b>	<b>151.780000</b>	<b>OK</b>
<b>D t 1 (t2 - t1)</b>	<b>24.145139</b>	<b>24.145139</b>	<b>OK</b>
<b>DF</b>	<b>0.996288</b>	<b>0.996288</b>	<b>OK</b>
<b>Sys Err</b>	<b>0.052280</b>	<b>0.052280</b>	<b>OK</b>
<b>K</b>	<b>0.004052</b>	<b>0.004052</b>	<b>OK</b>
<b>K MDA</b>	<b>0.729352</b>	<b>0.729352</b>	<b>OK</b>
<b>Batch Identifiers and Other Related Information</b>			
<b>Batch</b>	ARS1-B09-05187		
<b>Batch ID</b>	ARS1-B09-05187-08		
<b>Analysis Code</b>	LSC-A-001		
<b>SDG</b>	ARS1-09-02989		
<b>Fraction</b>	001		
<b>Run Number</b>	1		
<b>Client</b>	Los Alamos National Laboratory		
<b>Client Profile</b>	Keith Greene		
<b>Client ID</b>	MO21-10-5343		
<b>Instr File Name</b>	76		
<b>Instr Detector</b>	P-50-S-9		
<b>Instr keV</b>			
<b>Version/Date</b>	1.0 -- 11/18/2005		

Reviewed by: DN

Date: 12-23-09

Procedure		ARS-054			
Variable	Value	Isotope		H-3	
		Calculated Values	Excel	VBA	V/V
Gross Count Rate	53.500000	ACT	11968.683735	11968.683732	OK
Sample Count Min	180.000000	TPU	641.512036	641.512035	OK
BKG Count Rate	5.190000	DL	97.867316	97.867316	OK
BKG Count Min	180.000000	Net Count Rate	48.310000	48.310000	OK
Instrument Efficiency	0.361600	D t 1 (t2 - t1)	24.276389	24.276389	OK
Sample Aliquot	5.047000	DF	0.996267	0.996267	OK
Dilution Factor	1.000000	Sys Err	0.052280	0.052280	OK
Aliquot Conversion Factor	0.001000	K	0.004036	0.004036	OK
Sample Collection Date (t1)	11/23/09 12:00 PM	K MDA	0.726546	0.726546	OK
Count Date (t2)	12/17/09 6:38 PM				
Activity Units - pCi - DCF *	2.2200				
CF	1.0000				
Nuclide Abundance	1.000000				
Half-life Days 1 - Result Isotope	4499.800000				
TPUF_Calibration Factor	0.041330				
TPUF_Aliquoting Factor	0.020000				
TPUF_Yield Factor	0.000000				
TPUF_Decay Ingrowth Factor	0.025000				
TPUF_Analysis Factor	0.000000				
TPUF_Unassigned Factor	0.000000				
Activity Units	pCi				
Aliquot Units	L				
		<b>Batch Identifiers and Other Related Information</b>			
		Batch	ARS1-B09-05187		
		Batch ID	ARS1-B09-05187-09		
		Analysis Code	LSC-A-001		
		SDG	ARS1-09-02989		
		Fraction	002		
		Run Number	1		
		Client	Los Alamos National Laboratory		
		Client Profile	Keith Greene		
		Client ID	MD21-10-5344		
		Instr File Name	76		
		Instr Detector	P-50-E-10		
		Instr keV			
		Version/Date	1.0 -- 11/18/2005		
<b>0</b>	<b>Variables Intact Test</b>	<b>OK</b>			

Reviewed by: *SN*

Date: *12/30/09*



Procedure	ARS-054
Variable	Value
Gross Count Rate	59.470000
Sample Count Mins	180.000000
BKG Count Rate	5.190000
BKG Count Mins	180.000000
Instrument Efficiency	0.360000
Sample Aliquot	5.024000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	11/23/09 12:00 PM
Count Date (t2)	12/18/09 12:55 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.880000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
<b>Variables Intact Test</b>	<b>OK</b>

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
ACT	13569.889216	13569.889213	OK
TPU	725.080629	725.080629	OK
OL	98.756295	98.756295	OK
Net Count Rate	54.280000	54.280000	OK
D t 1 (t2 - t1)	24.538194	24.538194	OK
DF	0.996227	0.996227	OK
Sys Err	0.052280	0.052280	OK
K	0.004080	0.004080	OK
K MDA	0.720006	0.720006	OK
<b>Batch Identifiers and Other Related Information</b>			
Batch	ARS1-B09-05187		
Batch ID	ARS1-B09-05187-11		
Analysis Code	LSC-A-001		
SDG	ARS1-09-02989		
Fraction	004		
Run Number	1		
Client	Los Alamos National Laboratory		
Client Profile	Keith Greene		
Client ID	MD21-10-5346		
Instr File Name	76		
Instr Detector	P-50-9-12		
Instr keV			
Version/Date	1.0 -- 11/18/2005		

Reviewed by: *DN*

Date: *12-23-09*



Procedure		ARS-054			
Variable	Value	Isotope		H-3	
		Calculated Values	Excel	VBA	V/V
Gross Count Rate	23.040000	ACT	4487.434289	4487.434288	OK
Sample Count Mins	180.000000	TPU	254.852765	254.852765	OK
BKG Count Rate	5.190000	DL	99.308908	99.308908	OK
BKG Count Mins	180.000000	Net Count Rate	17.850000	17.850000	OK
Instrument Efficiency	0.357300	D t 1 (t2 - t1)	24.800000	24.800000	OK
Sample Aliquot	5.034000	DF	0.996187	0.996187	OK
Dilution Factor	1.000000	Sys Err	0.052280	0.052280	OK
Aliquot Conversion Factor	0.661000	K	0.603978	0.603978	OK
Sample Collection Date (t1)	11/23/09 12:00 PM	K MDA	0.715999	0.715999	OK
Count Date (t2)	12/18/09 7:12 AM	<b>Batch Identifiers and Other Related Information</b>			
Activity Units = dCi → ICF =	2.2200	Batch	ARS1-B09-05187		
CF	1.0000	Batch ID	ARS1-B09-05187-13		
Nuclide Abundance	1.000000	Analysis Code	LSC-A-001		
Half-life Days 1 - Result Isotope	4499.800000	SDG	ARS1-09-02989		
TPUF_Calibration Factor	0.041330	Fraction	006		
TPUF_Aliquoting Factor	0.020000	Run Number	1		
TPUF_Yield Factor	0.000000	Client	Los Alamos National Laboratory		
TPUF_Decay Ingrowth Factor	0.025000	Client Profile	Keith Greene		
TPUF_Analysis Factor	0.000000	Client ID	MD21-10-5348		
TPUF_Unassigned Factor	0.000000	Instr File Name	76		
Activity Units	dCi	Instr Detector	P-50-S-14		
Aliquot Units	L	Instr keV			
		Version/Date	1.0 -- 11/18/2005		
<b>Variables Intact Test</b>	<b>OK</b>				

Reviewed by: AN

Date: 12-23-09

Procedure	ARS-054
Variable	Value
Gross Count Rate	38.980000
Sample Count Mins	180.000000
BKG Count Rate	5.190000
BKG Count Mins	180.000000
Instrument Efficiency	0.362100
Sample Aliquot	5.039000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	11/23/09 12:00 PM
Count Date (t2)	12/18/09 10:20 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Half-life Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
<b>Variables Intact Test</b>	<b>OK</b>

Isotope	H-3		
Calculated Values	Excel	VBA	V/V
ACT	8373.945916	8373.945914	OK
TPU	454.674398	454.674398	OK
DL	97.897204	97.897204	OK
Net Count Rate	33.790000	33.790000	OK
D t 1 (t2 - t1)	24.930556	24.930556	OK
DF	0.996167	0.996167	OK
Sys Err	0.052280	0.052280	OK
K	0.004035	0.004035	OK
K MDA	0.726324	0.726324	OK
Batch Identifiers and Other Related Information			
Batch	ARS1-B09-05187		
Batch ID	ARS1-B09-05187-14		
Analysis Code	LSC-A-001		
SDG	ARS1-09-02989		
Fraction	007		
Run Number	1		
Client	Los Alamos National Laboratory		
Client Profile	Keith Greene		
Client ID	MD21-10-5349		
Instr File Name	76		
Instr Detector	P-50 S-15		
Instr keV			
Version/Date	1.0 -- 11/18/2005		

Reviewed by: *BN*

Date: *12-23-09*





Procedure		Isotope			
ARS-054		H-3			
Variable	Value	Calculated Values	Excel	VBA	V/V
Gross Count Rate	71.240000	ACT	16597.417420	16597.417416	OK
Sample Count Min	180.000000	TPU	883.022956	883.022956	OK
BKG Count Rate	5.190000	DL	99.264971	99.264971	OK
BKG Count Min	180.000000	Net Count Rate	66.050000	66.050000	OK
Instrument Efficiency	0.357700	D t 1 (t2 - t1)	25.320833	25.320833	OK
Sample Aliquot	5.021000	DF	0.996107	0.996107	OK
Dilution Factor	1.000000	Sys Err	0.052280	0.052280	OK
Aliquot Conversion Factor	0.001000	K	0.003980	0.003980	OK
Sample Collection Date (t1)	11/23/09 12:00 PM	K MDA	0.716316	0.716316	OK
Count Date (t2)	12/18/09 7:42 PM				
Activity Units = pCi -- UCF =	2.2200				
CF	1.0000				
Nuclide Abundance	1.000000				
Half-life Days 1 - Result Isotope	4499.800000				
TPUF_Calibration Factor	0.041330				
TPUF_Aliquoting Factor	0.020000				
TPUF_Yield Factor	0.000000				
TPUF_Decay Ingrowth Factor	0.025000				
TPUF_Analyt Factor	0.000000				
TPUF_Unassigned Factor	0.000000				
Activity Units	pCi	<b>Batch Identifiers and Other Related Information</b>			
Aliquot Units	L	Batch	ARS1-809-05187		
		Batch ID	ARS1-809-05187-12		
		Analysis Code	LSC-A-001		
		SDG	ARS1-09-02989		
		Fraction	010		
		Run Number	1		
		Client	Los Alamos National Laboratory		
		Client Profile	Keith Greene		
		Client ID	MD21-10-5352		
		Instr File Name	76		
		Instr Detector	P-50-S-18		
		Instr keV			
		Version/Date	1.0 -- 11/18/2005		
<b>0 Variables Intact Test</b>	<b>OK</b>				

Reviewed by: AN

Date: 12-23-09



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**American Radiation Services  
Analytical Reports**

for

**Los Alamos National Laboratory**

**Tritium**

by

**Low Level Liquid  
Scintillation Counting**

**Laboratory**

**Records**

Analysis Batch Report



Analysis Batch ID ARS1-B09-05187

Sample ID	Type	Blind 1501	Blind 1502	Blind 1503	Description	Method	Analysis	LSC-A-001	Matrix	SI
ARS1-B09-05187-01	LCS	B-08764				ARS-054				
ARS1-B09-05187-02	LCS	B-08765				TRITIUM IN WATER				
ARS1-B09-05187-03	MBL									
ARS1-B09-05187-04	TRG					SDG	RR	Run		
ARS1-B09-05187-05	TRG					ARS1-09-02987	001	1	MD54-10-748	Client ID
ARS1-B09-05187-06	TRG					ARS1-09-02987	002	1	MD54-10-749	Isotope Group
ARS1-B09-05187-07	TRG					ARS1-09-02987	003	1	MD54-10-808	Lab Deadline
ARS1-B09-05187-08	TRG					ARS1-09-02987	004	1	MD54-10-817	
ARS1-B09-05187-09	TRG					ARS1-09-02989	001	1	MD21-10-5343	
ARS1-B09-05187-10	TRG					ARS1-09-02989	002	1	MD21-10-5344	
ARS1-B09-05187-11	TRG					ARS1-09-02989	003	1	MD21-10-5345	
ARS1-B09-05187-12	TRG					ARS1-09-02989	004	1	MD21-10-5346	
ARS1-B09-05187-13	TRG					ARS1-09-02989	005	1	MD21-10-5347	
ARS1-B09-05187-14	TRG					ARS1-09-02989	006	1	MD21-10-5348	
ARS1-B09-05187-15	TRG					ARS1-09-02989	007	1	MD21-10-5349	
ARS1-B09-05187-16	TRG					ARS1-09-02989	008	1	MD21-10-5350	
ARS1-B09-05187-17	TRG					ARS1-09-02989	009	1	MD21-10-5351	
						ARS1-09-02989	010	1	MD21-10-5352	

40959 WRAD 09-02987-001-12  
 40960 WRAD 09-02987-002-12  
 40961 WRAD 09-02987-003-12  
 40962 WRAD 09-02987-004-12  
 40963 WRAD 09-02989-001-12  
 40964 WRAD 09-02989-002-12  
 40965 WRAD 09-02989-003-12  
 40966 WRAD 09-02989-004-12

40967 WRAD 09-02989-005-12  
 40968 WRAD 09-02989-006-12  
 40969 WRAD 09-02989-007-12  
 40970 WRAD 09-02989-008-12  
 40971 WRAD 09-02989-009-12  
 40972 WRAD 09-02989-010-12

AcctSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPUS	TPUZ	MDA	DL	CU	CUIS	CUZA	Activity/Reports/Units
ARS1-809-05187-01				1H-3		1545.232063	110.2671338	110.2671338	216.1235823	198.7256941	97.50967293	75.05157077	75.05157077	144.71010787	PC
ARS1-809-05187-02				1H-3		1387.531164	203.0121407	103.5776228	203.0121407	199.8423079	98.05263405	144.9116212	73.93450064	144.9116212	PC
ARS1-809-05187-03				1H-3		149.5156645	119.691356	61.06701835	119.691356	197.391978	96.82448302	118.7067802	60.56468377	118.7067802	PC
ARS1-809-05187-04				1H-3		2762.722861	169.9092594	169.9092594	333.0221485	211.4355841	101.7408752	89.48669572	89.48669572	175.3939236	PC
ARS1-809-05187-05				1H-3		12116.7671	652.4528314	652.4528314	1278.80795	233.8853763	114.75598665	158.2742763	156.2742763	306.2925816	PC
ARS1-809-05187-06				1H-3		4695.218892	266.5139245	266.5139245	522.3672921	210.7123077	103.3859997	103.8110962	103.8110962	203.4697486	PC
ARS1-809-05187-07				1H-3		531.1994221	71.3707472	71.3707472	139.8866645	200.7864904	98.51589721	65.74616006	65.74616006	128.8624277	PC
ARS1-809-05187-08				1H-3		37458.45509	1972.227404	1972.227404	2865.663713	198.6972294	97.49080123	234.245323	234.245323	459.1208331	PC
ARS1-809-05187-09				1H-3		11968.68373	641.5120355	641.5120355	1257.36359	199.4646098	97.86721847	141.4670039	141.4670039	277.2759276	PC
ARS1-809-05187-10				1H-3		13867.39861	740.5288535	740.5288535	1451.432833	200.62395908	98.43695184	150.9380572	150.9380572	293.8150721	PC
ARS1-809-05187-11				1H-3		13569.88921	725.0806287	725.0806287	1421.156032	201.2764487	98.75629528	149.8366521	149.8366521	293.879838	PC
ARS1-809-05187-12				1H-3		56420.26391	2963.4812	2963.4812	5608.423152	201.0563107	98.64828455	286.131722	286.131722	560.8181751	PC
ARS1-809-05187-13				1H-3		4487.434288	254.8527649	254.8527649	499.5134193	202.4027364	99.30890836	99.53866583	99.53866583	195.134985	PC
ARS1-809-05187-14				1H-3		8373.945914	454.674398	454.674398	891.1618202	199.525523	97.89720354	122.763541	122.763541	240.6165404	PC
ARS1-809-05187-15				1H-3		260.3918612	64.43590807	64.43590807	126.294298	199.7761379	98.02016772	62.74635815	62.74635815	122.9828862	PC
ARS1-809-05187-16				1H-3		377.5691819	66.47646776	66.47646776	130.2838768	198.6834105	97.48402101	63.47821944	63.47821944	124.4171101	PC
ARS1-809-05187-17				1H-3		16597.41742	883.0229562	883.0229562	1730.724994	202.3131875	99.26469712	163.743237	163.743237	320.9367446	PC

AssaySampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountRate	BKG Counts	BKG CountRate	EFF	ALIQ	SampleCollDate	MidPointCollDate	BP	DL
ARS1-809-05187-01						0.0636511111	180	0.028833333	180	0.3615	5.048	12/21/2009	12/18/2009		
ARS1-809-05187-02						0.0596888889	180	0.028833333	180	0.361	5.027	12/21/2009	12/18/2009		
ARS1-809-05187-03						0.0322222222	180	0.028833333	180	0.3666	5.013	12/21/2009	12/18/2009		
ARS1-809-05187-04						0.0872777778	180	0.028833333	180	0.3411	5.05	11/19/2009	12/17/2009		
ARS1-809-05187-05						0.2605555556	180	0.028833333	180	0.3112	5.004	11/19/2009	12/17/2009		
ARS1-809-05187-06						0.1285	180	0.028833333	180	0.3431	5.038	11/19/2009	12/17/2009		
ARS1-809-05187-07						0.0406666667	180	0.028833333	180	0.3566	5.087	11/19/2009	12/17/2009		
ARS1-809-05187-08						0.8720555556	180	0.028833333	180	0.3612	5.072	11/23/2009	12/17/2009		
ARS1-809-05187-09						0.2972222222	180	0.028833333	180	0.3616	5.047	11/23/2009	12/17/2009		
ARS1-809-05187-10						0.338	180	0.028833333	180	0.3603	5.036	11/23/2009	12/17/2009		
ARS1-809-05187-11						0.3303868889	180	0.028833333	180	0.36	5.024	11/23/2009	12/18/2009		
ARS1-809-05187-12						1.284	180	0.028833333	180	0.3599	5.031	11/23/2009	12/18/2009		
ARS1-809-05187-13						0.2165555556	180	0.028833333	180	0.3573	5.034	11/23/2009	12/18/2009		
ARS1-809-05187-14						0.0351111111	180	0.028833333	180	0.3621	5.039	11/23/2009	12/18/2009		
ARS1-809-05187-15						0.0373333333	180	0.028833333	180	0.3593	5.072	11/23/2009	12/18/2009		
ARS1-809-05187-16						0.3957777778	180	0.028833333	180	0.3643	5.03	11/23/2009	12/18/2009		
ARS1-809-05187-17							180	0.028833333	180	0.3577	5.031	11/23/2009	12/18/2009		

Batch Result Verification Report

AbaktsmpfileID	SDG	Fraction	BP	MDA	SV	Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlantingRecovery	InstrFileName	DetectorID	InstrumentKey	NuclideAbel	TracerReact
ANSI-809-05187-01							2.22	1	11.45	5.19	6.26	76		P-50-S-2			
ANSI-809-05187-02							2.22	1.96	10.78	5.19	5.59	76		P-50-S-3			
ANSI-809-05187-03							2.22	1.96	5.8	5.19	0.61	76		P-50-S-4			
ANSI-809-05187-04							2.22	1	15.71	5.19	10.52	76		P-50-S-5			
ANSI-809-05187-05							2.22	1	46.9	5.19	41.71	76		P-50-S-6			
ANSI-809-05187-06							2.22	1	23.13	5.19	17.94	76		P-50-S-7			
ANSI-809-05187-07							2.22	1	7.32	5.19	2.13	76		P-50-S-8			
ANSI-809-05187-08							2.22	1	156.97	5.19	151.78	76		P-50-S-9			
ANSI-809-05187-09							2.22	1	53.5	5.19	48.31	76		P-50-S-10			
ANSI-809-05187-10							2.22	1	60.84	5.19	55.65	76		P-50-S-11			
ANSI-809-05187-11							2.22	1	59.47	5.19	54.28	76		P-50-S-12			
ANSI-809-05187-12							2.22	1	231.12	5.19	225.93	76		P-50-S-13			
ANSI-809-05187-13							2.22	1	23.04	5.19	17.85	76		P-50-S-14			
ANSI-809-05187-14							2.22	1	38.98	5.19	33.79	76		P-50-S-15			
ANSI-809-05187-15							2.22	1	6.32	5.19	1.13	76		P-50-S-16			
ANSI-809-05187-16							2.22	1	8.72	5.19	1.52	76		P-50-S-17			
ANSI-809-05187-17							2.22	1	71.24	5.19	66.05	76		P-50-S-18			

AbateSampleID	SDS	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	HalfLife1	HalfLife2	HalfLife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	DeltaT2
ARS1-809-05187-01							4499.8				0.04133	0.02	0	0.025	0	0	0	0
ARS1-809-05187-02							4499.8				0.04133	0.02	0	0.025	0	0	0	0
ARS1-809-05187-03							4499.8				0.04133	0.02	0	0.025	0	0	0	0
ARS1-809-05187-04							4499.8				0.04133	0.02	0	0.025	0	0	27.61875	0
ARS1-809-05187-05							4499.8				0.04133	0.02	0	0.025	0	0	27.75	0
ARS1-809-05187-06							4499.8				0.04133	0.02	0	0.025	0	0	27.89194444	0
ARS1-809-05187-07							4499.8				0.04133	0.02	0	0.025	0	0	28.01319444	0
ARS1-809-05187-08							4499.8				0.04133	0.02	0	0.025	0	0	24.14513889	0
ARS1-809-05187-09							4499.8				0.04133	0.02	0	0.025	0	0	24.27838889	0
ARS1-809-05187-10							4499.8				0.04133	0.02	0	0.025	0	0	24.40894444	0
ARS1-809-05187-11							4499.8				0.04133	0.02	0	0.025	0	0	24.53818444	0
ARS1-809-05187-12							4499.8				0.04133	0.02	0	0.025	0	0	24.66944444	0
ARS1-809-05187-13							4499.8				0.04133	0.02	0	0.025	0	0	24.8	0
ARS1-809-05187-14							4499.8				0.04133	0.02	0	0.025	0	0	24.93055556	0
ARS1-809-05187-15							4499.8				0.04133	0.02	0	0.025	0	0	25.06111111	0
ARS1-809-05187-16							4499.8				0.04133	0.02	0	0.025	0	0	25.19097222	0
ARS1-809-05187-17							4499.8				0.04133	0.02	0	0.025	0	0	25.32083333	0

AdaptSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SYSTEM	K_YaI	K_MDA	AnalysisCode	UsertID	ModDate
ARS1-809-05187-01							1					0.052279718	0.004051171	0.729210859	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-02							1					0.052279718	0.004028738	0.729172901	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-03							1					0.052279718	0.003807838	0.734371214	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-04							0.995754657					0.052279718	0.003442317	0.619620724	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-05							0.995734826					0.052279718	0.003820908	0.687763462	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-06							0.995714288					0.052279718	0.004097994	0.723762313	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-07							0.995694157					0.052279718	0.004051956	0.729352023	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-08							0.996287602					0.052279718	0.004036367	0.728546059	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-09							0.996267459					0.052279718	0.004013009	0.722314167	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-10							0.996247424					0.052279718	0.004000033	0.720005878	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-11							0.996227282					0.052279718	0.004004412	0.720794218	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-12							0.996207141					0.052279718	0.003977774	0.719989343	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-13							0.996187107					0.052279718	0.004035135	0.726324252	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-14							0.996167073					0.052279718	0.004030073	0.725413094	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-15							0.99614704					0.052279718	0.004052238	0.725402751	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-16							0.996127113					0.052279718	0.003979535	0.716316262	LSC-A-001	BSTERFFENS	12/21/2009
ARS1-809-05187-17							0.996107187					0.052279718	0.003979535	0.716316262	LSC-A-001	BSTERFFENS	12/21/2009

Assay Definition-

Assay Description:  
 H-3 Normal Level Assay

Assay Type: DPM (Single)

Report Name: Report1  
 Output Data Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20091216\_1410  
 Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20091216\_1410\20091216\_1410.results  
 RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20091216\_1410\H-3 Results.rtf  
 Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl 3\20091216\_1410\H-3 Results.csv  
 Assay File Name: C:\Packard\Tricarb\Assays\H-3 Normal Lvl 3.lsa

Count Conditions-

Nuclide: H-3 Normal  
 Quench Indicator: tSIE/AEC  
 External Std Terminator (sec): 0.5 2s  
 Pre-Count Delay (min): 0.00  
 Quench Set:

Low Energy: UG STD H-3  
 Count Time (min): 180.00  
 Count Mode: Normal  
 Assay Count Cycles: 1 Repeat Sample Count: 1  
 #Vials/sample: 1 Calculate & Reference: Off

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

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

Count Corrections-

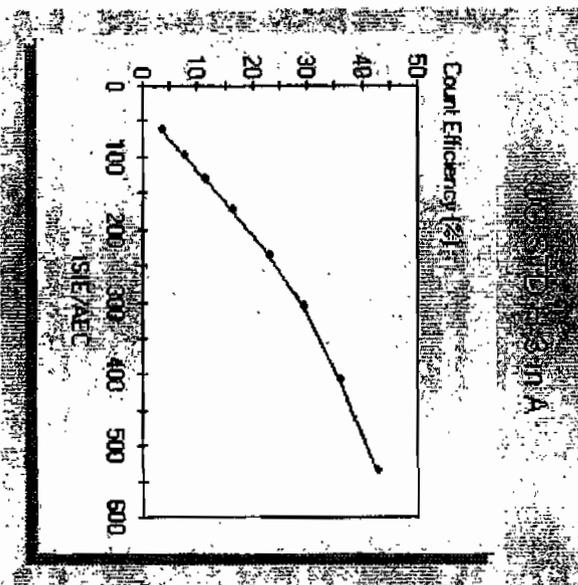
Static Controller: On Luminescence Correction: Off  
 Colored Samples: Off Heterogeneity Monitor: Off  
 Coincidence Time (nsec): 18 Delay Before Burst (nsec): 75

Half Life-

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

A  
B  
C

Cycle 1 Results  
Quench Curve Block Data



Date Acquired: 05/05/2009  
Date Modified:  
UG STD H-3 1d A

tSIE/AEC	Count Efficiency (%)
533.53	42.76
406.26	35.99
306.93	29.10
237.55	22.83
174.55	16.30
131.14	11.32
97.13	7.31
62.75	3.54

#	S#	SMPL_ID	CPMA	DPMI	TSIE	Eff Nucl	In A	Count	Time	DATE	TIME	MESSAGES
50	1	BACKGROUND	5.19	14.94	388.36		34.75	180.00	12/16/2009	2:16:06 PM		88
50	2	B09-05187-01	11.45	31.68	409.25		36.15	180.00	12/16/2009	5:22:59 PM		89
50	3	B09-05187-02	10.78	29.88	408.19		36.10	180.00	12/16/2009	8:32:20 PM		
50	4	B09-05187-03	5.80	15.81	418.83		36.66	180.00	12/16/2009	11:41:43 PM		
50	5	B09-05187-04	15.71	46.05	379.14		34.11	180.00	12/17/2009	2:51:06 AM		
50	6	B09-05187-05	46.90	150.68	336.12		31.12	180.00	12/17/2009	6:00:28 AM		
50	7	B09-05187-06	23.13	67.41	382.02		34.31	180.00	12/17/2009	9:09:52 AM		
50	8	B09-05187-07	7.32	20.52	401.44		35.66	180.00	12/17/2009	12:19:12 PM		
50	9	B09-05187-08	156.97	434.63	408.53		36.12	180.00	12/17/2009	3:28:34 PM		
50	10	B09-05187-09	53.50	147.95	409.36		36.16	180.00	12/17/2009	6:37:55 PM		
50	11	B09-05187-10	60.84	168.87	406.85		36.03	180.00	12/17/2009	9:46:15 PM		
50	12	B09-05187-11	59.47	165.22	406.31		36.00	180.00	12/18/2009	12:54:55 AM		
50	13	B09-05187-12	231.12	642.14	406.24		35.99	180.00	12/18/2009	4:04:01 AM		
50	14	B09-05187-13	23.04	64.49	402.43		35.73	180.00	12/18/2009	7:12:00 AM		
50	15	B09-05187-14	38.98	107.66	410.29		36.21	180.00	12/18/2009	10:20:16 AM		
50	16	B09-05187-15	6.32	17.59	405.31		35.93	180.00	12/18/2009	1:27:36 PM		
50	17	B09-05187-16	6.72	18.44	414.52		36.43	180.00	12/18/2009	4:34:42 PM		
50	18	B09-05187-17	71.24	199.18	402.96		35.77	180.00	12/18/2009	7:41:36 PM		

ARS-054

ID_31001_054	ABatch	ABatchSampleID	ClientID	Aliquot1	AliquotUnits1	IC_ID1	Aliquot2	AliquotUnits2	IC_ID2	UserID	ModDate	%
4197	ARS1-B09-05187	ARS1-B09-05187-01					5.048 g			BSTEFFENS	12/16/2009 09:56:41	
4198	ARS1-B09-05187	ARS1-B09-05187-02					5.027 g			BSTEFFENS	12/16/2009 09:56:41	
4199	ARS1-B09-05187	ARS1-B09-05187-03					5.013 g			BSTEFFENS	12/16/2009 09:56:41	
4200	ARS1-B09-05187	ARS1-B09-05187-04	MD54-10-748				5.05 g		40959	BSTEFFENS	12/16/2009 09:56:41	
4201	ARS1-B09-05187	ARS1-B09-05187-05	MD54-10-749				5.004 g		40960	BSTEFFENS	12/16/2009 09:56:41	
4202	ARS1-B09-05187	ARS1-B09-05187-06	MD54-10-808				5.038 g		40961	BSTEFFENS	12/16/2009 09:56:41	
4203	ARS1-B09-05187	ARS1-B09-05187-07	MD54-10-817				5.087 g		40962	BSTEFFENS	12/16/2009 09:56:41	
4204	ARS1-B09-05187	ARS1-B09-05187-08	MD21-10-5343				5.072 g		40963	BSTEFFENS	12/16/2009 09:56:41	
4205	ARS1-B09-05187	ARS1-B09-05187-09	MD21-10-5344				5.047 g		40964	BSTEFFENS	12/16/2009 09:56:41	
4206	ARS1-B09-05187	ARS1-B09-05187-10	MD21-10-5345				5.036 g		40965	BSTEFFENS	12/16/2009 09:56:41	
4207	ARS1-B09-05187	ARS1-B09-05187-11	MD21-10-5346				5.024 g		40966	BSTEFFENS	12/16/2009 09:56:41	
4208	ARS1-B09-05187	ARS1-B09-05187-12	MD21-10-5347				5.031 g		40967	BSTEFFENS	12/16/2009 09:56:42	
4209	ARS1-B09-05187	ARS1-B09-05187-13	MD21-10-5348				5.034 g		40968	BSTEFFENS	12/16/2009 09:56:42	
4210	ARS1-B09-05187	ARS1-B09-05187-14	MD21-10-5349				5.039 g		40969	BSTEFFENS	12/16/2009 09:56:42	
4211	ARS1-B09-05187	ARS1-B09-05187-15	MD21-10-5350				5.072 g		40970	BSTEFFENS	12/16/2009 09:56:42	
4212	ARS1-B09-05187	ARS1-B09-05187-16	MD21-10-5351				5.03 g		40971	BSTEFFENS	12/16/2009 09:56:42	
4213	ARS1-B09-05187	ARS1-B09-05187-17	MD21-10-5352				5.031 g		40972	BSTEFFENS	12/16/2009 09:56:42	

LCS Report  
Analytical Batch: ARS1-B09-05187

88

BinID	Acct#	AcctSubID	BinGroup	Slot	InclType	ExpectedAddition	ExposureValue	EmpYrM	CrossYr	NetWt	UrgID	ModDate	ExpectedValue_CT	HighPurityCountRate	ModDate
B-08764	ARS1-B09-05187	ARS1-B09-05187-01	B-M3	S-0217	H-3	2	1.231821508	0	1	1	1	12/11/2009	1.230873127	12/16/2009	1.230873127
B-08765	ARS1-B09-05187	ARS1-B09-05187-02	B-M3	S-0217	H-3	2	1.231821508	0	1	1	1	12/11/2009	1.230873127	12/16/2009	1.230873127

## Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
12-11-09	1245	B09-05065-07	B09-05065	1519	[Handwritten Signature]
↓	↓	B09-05065-08	↓	↓	
↓	↓	B09-05065-09	↓	↓	
↓	↓	B09-05065-10	↓	↓	
↓	↓	B09-05065-11	↓	↓	
↓	↓	B09-05065-12	↓	↓	
↓	↓	B09-05065-13	↓	↓	
↓	↓	B09-05065-14	↓	↓	
↓	↓	B09-05065-15	↓	↓	
↓	↓	B09-05065-16	↓	↓	
↓	↓	B09-05065-17	↓	↓	
↓	↓	B09-05065-18	↓	↓	
↓	↓	B09-05065-19	↓	↓	
↓	↓	B09-05065-20	↓	↓	
↓	↓	B09-05065-21	↓	↓	
↓	↓	B09-05065-22	↓	↓	
12-15-09	1037	SNC 117	QA	QA	
12-16-09	1220	SNC 117	QA	QA	
↓	↓	Background	B09-05187	1410	
↓	↓	B09-05187-01	↓	↓	

## Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
12-16-09	1220	B09-05187-02	B09-05187	1410	
↓	↓	B09-05187-03	↓	↓	
↓	↓	B09-05187-04	↓	↓	
↓	↓	B09-05187-05	↓	↓	
↓	↓	B09-05187-06	↓	↓	
↓	↓	B09-05187-07	↓	↓	
↓	↓	B09-05187-08	↓	↓	
↓	↓	B09-05187-09	↓	↓	
↓	↓	B09-05187-10	↓	↓	
↓	↓	B09-05187-11	↓	↓	
↓	↓	B09-05187-12	↓	↓	
↓	↓	B09-05187-13	↓	↓	
↓	↓	B09-05187-14	↓	↓	
↓	↓	B09-05187-15	↓	↓	
↓	↓	B09-05187-16	↓	↓	
↓	↓	B09-05187-17	↓	↓	
12-17-09	1201	SNL 117 <del>B09-05187-18</del>	QA	QA	
↓	↓	Background	B09-05240	2224	
↓	↓	B09-05240-01	↓	↓	
↓	↓	B09-05240-02	↓	↓	



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# **American Radiation Services Analytical Reports**

**for**

## **Los Alamos National Laboratory**

### **Tritium**

**by**

### **Low Level Liquid Scintillation Counting**

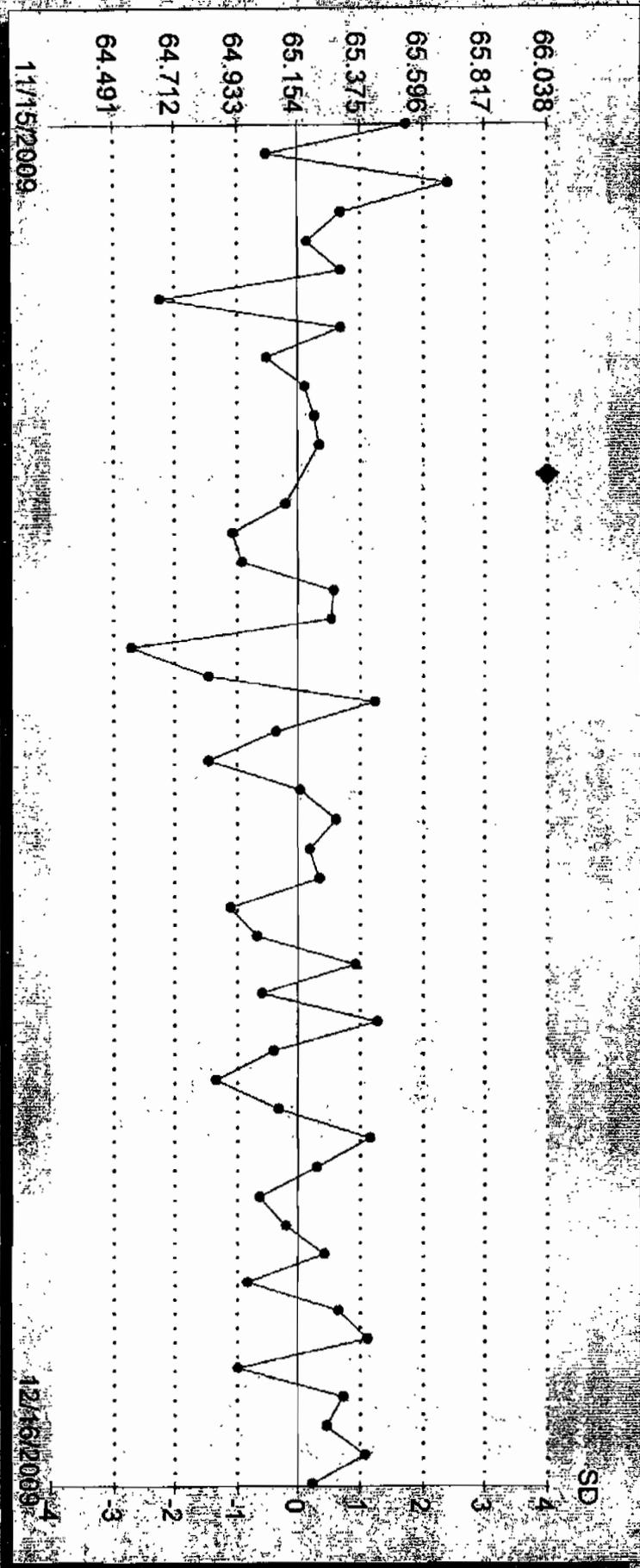
# **Control Charts**

3R Efficiency : 1336  
Total # pts : 47  
Valid # pts : 65.16  
Mean : 65.16  
SD : 0.22

Date	Value	Valid pt
Nov 15, 2009	65.54	X
Nov 15, 2009	65.04	X
Nov 16, 2009	65.69	X
Nov 16, 2009	65.31	X
Nov 16, 2009	65.19	X
Nov 16, 2009	65.31	X
Nov 16, 2009	64.66	X
Nov 16, 2009	65.31	X
Nov 17, 2009	65.04	X
Nov 20, 2009	65.18	X
Nov 24, 2009	65.21	X
Nov 30, 2009	65.23	X
Dec 02, 2009	79.93	
Dec 03, 2009	65.11	X
Dec 03, 2009	64.92	X
Dec 05, 2009	64.95	X
Dec 05, 2009	65.28	X
Dec 05, 2009	65.27	X
Dec 05, 2009	64.56	X
Dec 05, 2009	64.83	X
Dec 05, 2009	65.42	X
Dec 05, 2009	65.07	X
Dec 05, 2009	64.83	X
Dec 05, 2009	65.16	X
Dec 06, 2009	65.29	X
Dec 06, 2009	65.19	X
Dec 06, 2009	65.23	X
Dec 06, 2009	64.91	X
Dec 06, 2009	65.00	X
Dec 06, 2009	65.36	X
Dec 06, 2009	65.02	X
Dec 06, 2009	65.44	X
Dec 06, 2009	65.07	X
Dec 06, 2009	64.86	X
Dec 06, 2009	65.09	X
Dec 06, 2009	65.41	X
Dec 06, 2009	65.22	X
Dec 06, 2009	65.01	X
Dec 07, 2009	65.11	X
Dec 07, 2009	65.25	X
Dec 07, 2009	64.97	X
Dec 07, 2009	65.30	X
Dec 07, 2009	65.40	X
Dec 07, 2009	64.93	X
Dec 07, 2009	65.31	X
Dec 08, 2009	65.26	X
Mar 15, 2009	65.40	X



3R Efficiency : 1336  
Total # pts : 47  
Valid # pts : 65.16  
Mean : 0.22  
SD

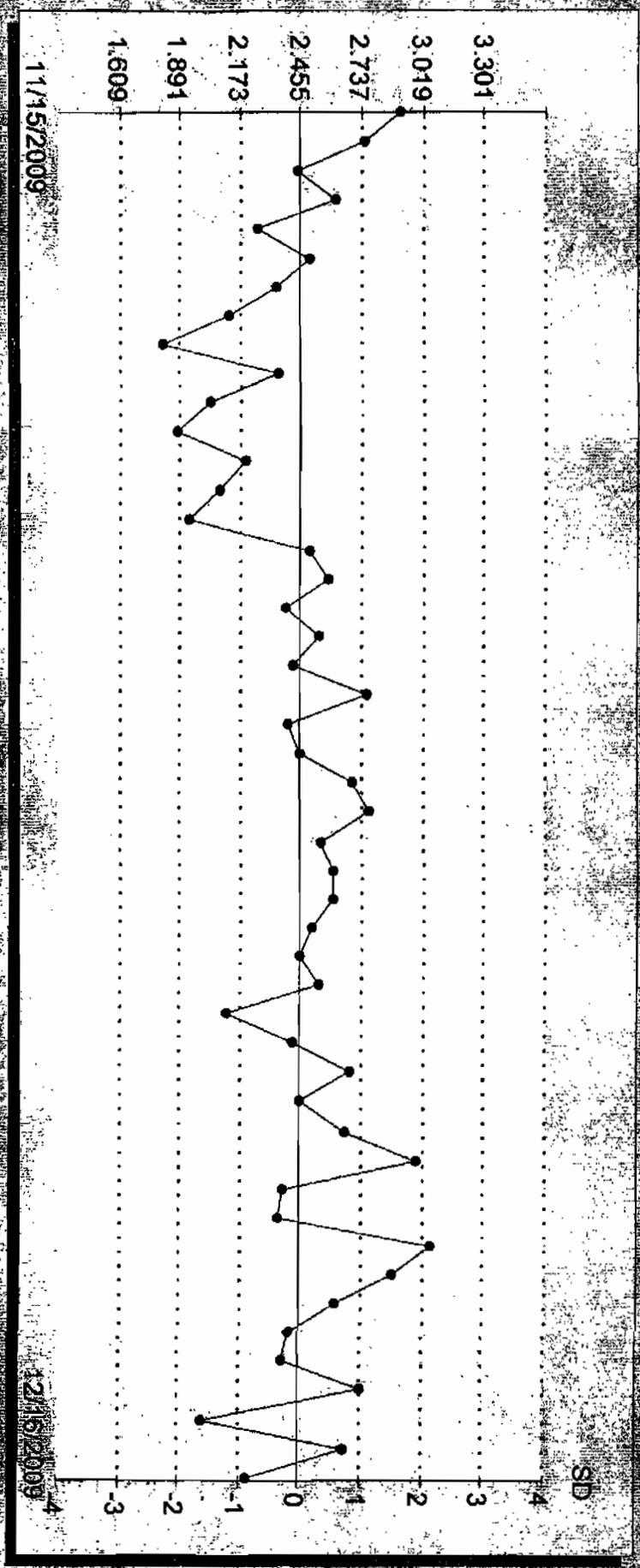


3H Background  
 Total # pts : 1301  
 Valid # pts : 48  
 Mean : 2.45  
 SD : 0.28

Date	Value	Valid pt
Nov 15, 2009	2.91	X
Nov 15, 2009	2.74	X
Nov 16, 2009	2.43	X
Nov 16, 2009	2.62	X
Nov 16, 2009	2.25	X
Nov 16, 2009	2.49	X
Nov 16, 2009	2.34	X
Nov 16, 2009	2.12	X
Nov 17, 2009	1.81	X
Nov 20, 2009	2.35	X
Nov 24, 2009	2.03	X
Nov 30, 2009	1.88	X
Dec 02, 2009	2.20	X
Dec 03, 2009	2.07	X
Dec 03, 2009	1.93	X
Dec 05, 2009	2.49	X
Dec 05, 2009	2.58	X
Dec 05, 2009	2.38	X
Dec 05, 2009	2.54	X
Dec 05, 2009	2.41	X
Dec 05, 2009	2.76	X
Dec 05, 2009	2.39	X
Dec 05, 2009	2.45	X
Dec 05, 2009	2.69	X
Dec 06, 2009	2.76	X
Dec 06, 2009	2.55	X
Dec 06, 2009	2.60	X
Dec 06, 2009	2.61	X
Dec 06, 2009	2.50	X
Dec 06, 2009	2.44	X
Dec 06, 2009	2.54	X
Dec 06, 2009	2.11	X
Dec 06, 2009	2.41	X
Dec 06, 2009	2.68	X
Dec 06, 2009	2.45	X
Dec 06, 2009	2.66	X
Dec 06, 2009	2.99	X
Dec 06, 2009	2.37	X
Dec 07, 2009	2.35	X
Dec 07, 2009	3.05	X
Dec 07, 2009	2.88	X
Dec 07, 2009	2.61	X
Dec 07, 2009	2.41	X
Dec 07, 2009	2.37	X
Dec 08, 2009	2.00	X
Mar 15, 2009	2.66	X

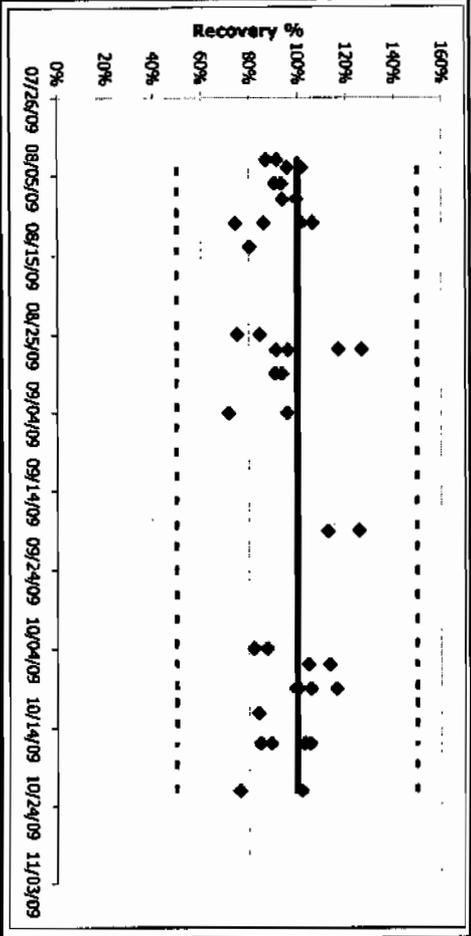


3E Background  
Total # pts : 1301  
Valid # pts : 48  
Mean : 2.45  
SD : 0.28



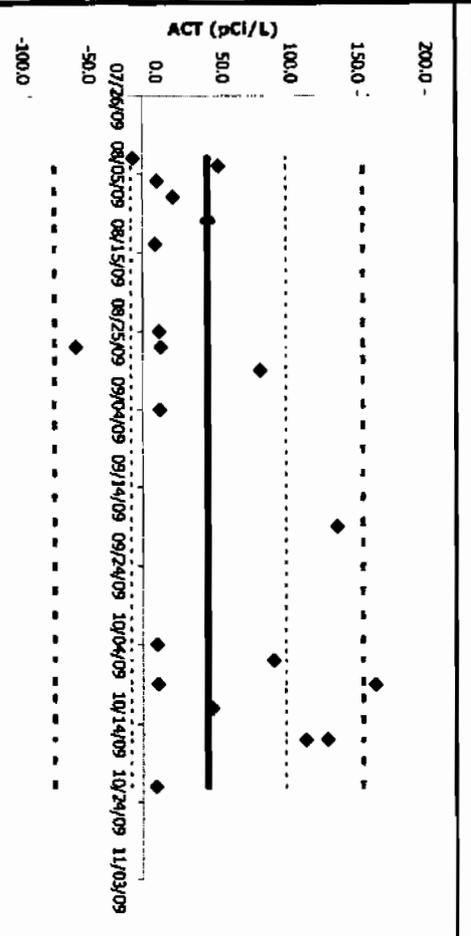
# QC Chart

H-3 LCS



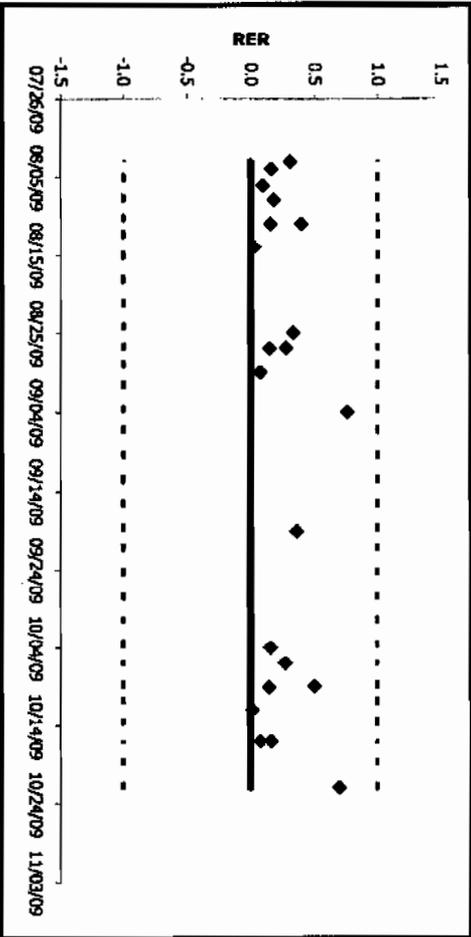
Average	0.9519	STDEV	0.1338	n	21	UCL	1.5000	LCL	0.5000
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H-3 Blank



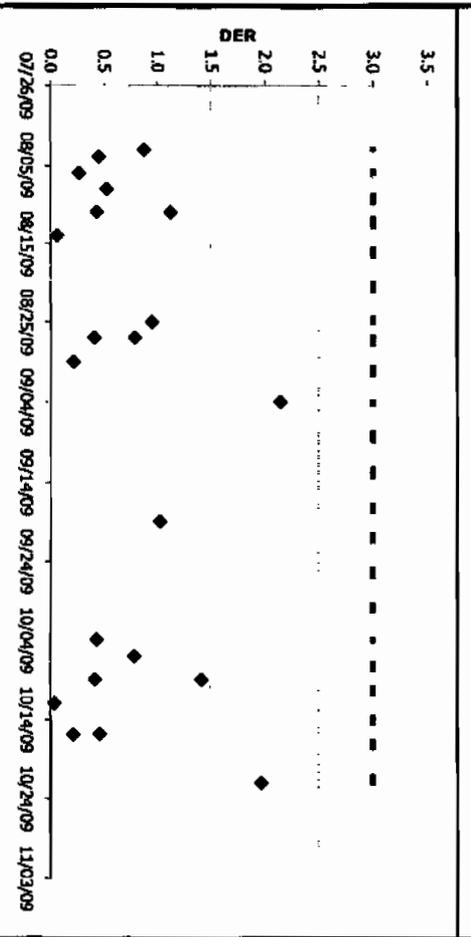
Average	38.6981	STDEV	57.2703	n	21	UCL	153.2388	LCL	-75.8425
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H-3 RER



n	21	UCL	1.0000	LCL	-1.0000
---	----	-----	--------	-----	---------

H-3 DER



n	21	UCL	3.0000
---	----	-----	--------



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# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

### **Low Level Liquid Scintillation Counting**

# **Calibration Information**

STD ID: S-0217

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data	
Planning		Parent Solution Reference #		
Planning Comments	H-3 Normal Level LCS	Parent Solution #		
Target dpm/g (on dil. date)	2.8	Parent Principal Radionuclide	Half Life (Days)	4425.8000000
Target Final Volume mL	2000	Parent Reference Date	07/04/2009 12:40	
Appx. mass g of Parent Soln		Parent Certified Act	Cert Act/Vol Units	
Appx. vol ml of Parent Soln		Parent Cert Act Uncert 1 Sigma		
Expected Addition for Analysis g	2	Parent Sp. Gravity/G/Ml		
Standards Preparation / Dilution		Parent Supplier		
Secondary Solution #		Parent Date Recvd	07/19/09	
Dilution Date (New Ref Date)	07/19/2009 12:40	Parent Received By		
Ampoule, Empty (g)		Parent Cert Exp Date		
Ampoule /Solution Gross (g)		Parent Matrix		
Net Wt Removed (g)		Certified dpm/g At Ref Date		
Transfer Container, empty (g)	0	Certified dpm/g on 07/19/2009 12:40		
Container Plus Solution (g)	1.879	Parent Comments		
Net Wt Transferred (g)				
DPM Xferred on 07/19/2009 12:40				
Diluent/matrix	H2O		Parent Tech	
Diluent Density Cont, empty (g)		Is_Primary		
Test Mass of 5 ml of Diluent (g)		Is_LCS		
Diluent Density Test - (g/ml)		Is_Tracer		
Dilution Empty Container Mass (g)	1	Is_Calib		
Dilution Full Cont.g (if measured)	2003			
Dilution Final Volume ml (if measured)				
Final Dilution Density (g/ml)				
Final Dilution Measured Mass g				
Comments	H-3 Normal LCS: New Mix to replace expended S-0204			
Final Dilution dpm/g				
Final Dil New Ref Date/Time				



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

VERIFICATION DATE 7/30/2009 10:56 *date counted*  
 STANDARD REFERENCE # S-0217

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

Radionuclide H-3      Dilution Reference Date 7/19/2009 12:40

Dilution Activity 1.28 pCi per gram → dpm/g      2.80  
 Verif. Date Decay Corrected 1.26 pCi per gram → dpm/g      2.79

*Minimum of 3 Required*

TRND	Sample Count	Count Time (min)	Detector	Efficiency	Std. (dpm)	Net Weight	Decay Corrected Activity Result (dpm/g)	Decay Corrected Activity Result (pCi/g)
S-0217-V1(5)	10.72	1	LSC	0.3631	5.47	5.031	2.87	1.29
S-0217-V2(5)	10.62	1	LSC	0.3621	5.47	5.011	2.84	1.28
S-0217-V3(5)	10.44	1	LSC	0.3636	5.47	5.000	2.73	1.23

		Average	<u>2.82</u>	<u>1.27</u>
		Two Sigma Uncertainty	<u>0.14</u>	<u>0.06</u>
<b>10% Max.</b>	<b>PASS</b>	Standard Deviation percent of known concentration	<u>2.61%</u>	<u>2.61%</u>
		Target Activity	<u>2.79</u>	<u>1.26</u>
<b>5% Max</b>	<b>PASS</b>	% Diff	<u>0.86%</u>	<u>0.86%</u>

Verification Expiration Date: July 30, 2010

Prepared & Counted By Halley Ann      Date: 7/30/2009 10:56  
 Verified & Approved By Doreen E Mulligan      Date: 8-6-09  
 QC Approval [Signature]      Date: 7-30-09

ARS INTERNATIONAL		Add/Edit Secondary Stds	Parent Standard Data
Planning		Parent Solution Reference #	
Planning Comments	Create an intermediate level standard for use in creating LCS stock solutions and MSs.	Parent Solution #	
Target dpm/g (on dil, date)	3443	Parent Principal Radioisotope	Half Life (Days)
Target Final Volume mL	200	Parent Reference Date	
Approx mass g of Parent Soln		Parent Certified Act	Cert Act/Vol Units
Approx vol ml of Parent Soln		Parent Cert Act Uncert 1 Sigma	
Expected Addition for Analysis g	1	Parent Sp. Gravity G/ML	
Standards Preparation / Dilution		Parent Supplier	
Secondary Solution #		Parent Date Recvd	
Dilution Data (New Ref Date)	05/04/2009 14:28	Parent Received By	
Ampoule, Empty (g)		Parent Cert Exp Date	
Ampoule /Solution Gross (g)		Parent Matrix	
Net Wt Removed (g)		Certified dpm/g At Ref Date	
Transfer Container, empty (g)	13.136	Certified dpm/g on 05/04/2009 14:28	
Container Plus Solution (g)	14.583		
Net Wt Transferred (g)		Parent Comments	
DPM Xferred on 05/04/2009 14:28			
Diluent/matrix	DE H2O	Parent Tech	
Diluent Density Cont, empty (g)		Is_Primary	
Test Mass of 5 ml of Diluent (g)		Is_LCS	
Diluent Density Test - (g/mL)		Is_Tracer	
Dilution Empty Container Mass (g)	68.227	Is_Calib	
Dilution Full Cont.g (if measured)	270.479		
Dilution Final Volume ml (if measured)	200		
Final Dilution Density (g/mL)			
Final Dilution Measured Mass g			
Comments	Intermediate level H3 standard. Dilution performed as stated above by B Steffens. -BJS 5/4/09		
Final Dilution dpm/g			
Final Dil New Ref Date/Time			



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

VERIFICATION DATE 5/5/2009 23:42 date counted  
 STANDARD REFERENCE # S-0209

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

Radionuclide H-3 Dilution Reference Date 5/4/2009 14:28

Dilution Activity 1616.63 pCi per gram ==> dpm/g 3588.91  
 Verif. Date Decay Corrected 1616.28 pCi per gram ==> dpm/g 3588.15

*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-0209-V1	6740.28	1	LSC	0.3632	5.88	5.042	3677.47	1656.52
S-0209-V2	6726.63	1	LSC	0.3611	5.88	5.041	3692.10	1663.11
S-0209-V3	6748.40	1	LSC	0.3635	5.88	5.043	3678.15	1656.82
S-0209-V4	6748.92	1	LSC	0.3651	5.88	5.038	3665.94	1651.33
S-0209-V5	6771.51	1	LSC	0.3603	5.88	5.054	3715.43	1673.62

Average	3685.82	1660.28
Two Sigma Uncertainty	37.19	16.75
Standard Deviation percent of known concentration	0.53%	0.53%
Target Activity	3588.15	1616.28
% Diff	2.72%	2.72%

10% Max **PASS**      5% Max **PASS**

Verification Expiration Date: May 5, 2010

Prepared & Counted By [Signature] Date: 5/5/2009 23:42  
 Verified & Approved By [Signature] Date: 5/6/09 15:51  
 QC Approval [Signature] Date: 5/6/09



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

# **Percent Moisture**



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5343  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-660  
 ARS Sample ID: ARS1-09-02989-001  
 Date Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	QUB	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	25.451	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A

**NOTES: Project Cost Code MR8R032TNB00**

Project Manager Review

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

LELAP Certificate # 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5344  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-002  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 $\sigma$	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	26.007	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A

NOTES: Project Cost Code MR8R032TNB00

Project Manager Review

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NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5345  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-660  
 ARS Sample ID: ARS1-09-02989-003  
 Date Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	25.126	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A

**NOTES: Project Cost Code MR8R032TNB00**

*PN*

Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5346  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-004  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	21.123	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A
<b>NOTES: Project Cost Code MRBR032TNB00</b>										

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # EB7558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5347  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-660  
 ARS Sample ID: ARS1-09-02989-005  
 Data Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	22.584	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJ5	N/A

**NOTES: Project Cost Code MRBR032TNB00**

*DN*

Project Manager Review

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LELAP Certificate# 01949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5348  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-660  
 ARS Sample ID: ARS1-09-02989-006  
 Date Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	10.774	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A

**NOTES: Project Cost Code MR8R032TNB00**

*DN*

Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558



2609 North River Road, Port Allen, Louisiana 70767

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

**ARS Sample Delivery Group:** ARS1-09-02989  
**Client Sample ID:** MD21-10-5349  
**Sample Collection Date:** 11/23/09  
**Sample Matrix:** Silica

**Request or PO Number:** 10-660  
**ARS Sample ID:** ARS1-09-02989-007  
**Date Received:** 11/25/09  
**Report Date:** 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	21.133	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BIS	N/A

**NOTES: Project Cost Code MR8R032TNB00**

Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5350  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-008  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	21.292	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJ5	N/A
<b>NOTES: Project Cost Code MR8R032TNB00</b>										

DTN

Project Manager Review

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

LELAP Certificate# 01949

NE LAP Certificate # EB7558



2609 North River Road, Port Allen, Louisiana 70767

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

ARS Sample Delivery Group: ARS1-09-02989  
Client Sample ID: MD21-10-5351  
Sample Collection Date: 11/23/09  
Sample Matrix: Silica

Request or PO Number: 10-660  
ARS Sample ID: ARS1-09-02989-009  
Date Received: 11/25/09  
Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	20.098	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A

**NOTES: Project Cost Code MR8R032TNB00**

Project Manager Review

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LELAP Certificate # 01949

NELAP Certificate # E87558



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

ARS Sample Delivery Group: ARS1-09-02989  
 Client Sample ID: MD21-10-5352  
 Sample Collection Date: 11/23/09  
 Sample Matrix: Silica

Request or PO Number: 10-650  
 ARS Sample ID: ARS1-09-02989-010  
 Date Received: 11/25/09  
 Report Date: 12/23/09

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
Percent Moisture	9.021	N/A	N/A	N/A		%	Percent Moisture	12/16/09 00:00	BJS	N/A
<b>NOTES: Project Cost Code MR8R032TNB00</b>										

*AN*

Project Manager Review

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

LELAP Certificate# 01949

NELAP Certificate # E87558



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# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

# **Percent Moisture Laboratory Records**

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

SDG Number ARS1-09-02987, 02899  
 Client LANL

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD54-10-748	ARS1-09-02987-001	590	438	152	13.135	5.05	8.64144737
MD54-10-749	ARS1-09-02987-002	604	453	148	7.475	5.004	5.05087568
MD54-10-808	ARS1-09-02987-003	605	454	151	11.237	5.038	7.44172185
MD54-10-817	ARS1-09-02987-004	604	457	147	8.814	5.087	5.99591837
MD21-10-5343	ARS1-09-02989-001	614	437	178	45.303	5.072	25.4511236
MD21-10-5344	ARS1-09-02989-002	642	452	188	48.894	5.047	26.0074668
MD21-10-5345	ARS1-09-02989-003	620	437	182	45.73	5.036	25.1263736
MD21-10-5346	ARS1-09-02989-004	636	448	188	39.712	5.024	21.1234043
MD21-10-5347	ARS1-09-02989-005	635	449	185	41.78	5.031	22.5837838
MD21-10-5348	ARS1-09-02989-006	610	452	158	17.023	5.034	10.7740506
MD21-10-5349	ARS1-09-02989-007	635	451	183	38.674	5.039	21.1333333
MD21-10-5350	ARS1-09-02989-008	635	460	175	37.261	5.072	21.292
MD21-10-5351	ARS1-09-02989-009	635	451	182	36.578	5.03	20.0978022
76 MD21-10-5352	ARS1-09-02989-010	615	456	158	14.253	5.031	9.02086608

Balance ID: 0102HT1331122173560P  
 Pipettor ID: FJ40469

Signature B. J. Stott Date 12-16-09

LCS- 5.048  
 LCSD- 5.027  
 BLK- 5.013

Port Allen, LA  
 PERCENT MOISTURE DETERMINATION IN SOILS

SDG Number ARS1-09-02987, 02898  
 Client LANL

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD54-10-748	ARS1-09-02987-001	590	438	152	13.135	5.050	#DIV/0!
MD54-10-749	ARS1-09-02987-002	604	453	148	7.475	5.004	#DIV/0!
MD54-10-808	ARS1-09-02987-003	605	454	151	11.237	5.038	#DIV/0!
MD54-10-817	ARS1-09-02987-004	604	457	147	8.814	5.087	#DIV/0!
MD21-10-5343	ARS1-09-02989-001	614	437	178	45.303	5.072	#DIV/0!
MD21-10-5344	ARS1-09-02989-002	642	452	188	48.894	5.047	#DIV/0!
MD21-10-5345	ARS1-09-02989-003	620	437	182	45.730	5.036	#DIV/0!
MD21-10-5346	ARS1-09-02989-004	636	448	188	39.712	5.024	#DIV/0!
MD21-10-5347	ARS1-09-02989-005	635	449	185	41.780	5.031	#DIV/0!
MD21-10-5348	ARS1-09-02989-006	610	452	158	17.023	5.034	#DIV/0!
MD21-10-5349	ARS1-09-02989-007	635	451	183	38.674	5.039	#DIV/0!
MD21-10-5350	ARS1-09-02989-008	635	460	175	37.261	5.072	#DIV/0!
MD21-10-5351	ARS1-09-02989-009	635	451	182	36.578	5.030	#DIV/0!
MD21-10-5352	ARS1-09-02989-010	615	456	158	14.253	5.031	#DIV/0!

Balance ID: 0102/H1331122173560P  
 Pipettor ID: FJ40469

*[Signature]*

Date 12-16-09

Signature



2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

# **American Radiation Services Analytical Reports**

for

## **Los Alamos National Laboratory**

# **Folder Duplicate**



## Report Compilation Checklist

ARS SDG:	<u>09-02989</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 checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

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

LEVEL 3 COMPONENTS	1st Reviewer		
9) Efficiencies are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
10) Calibrations are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
11) Backgrounds are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
12) Spectrum Analysis is Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
13) Spectral Plots are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
14) Plateaus are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
15) Control Charts are Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A
16) Other:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

LEVEL 4 COMPONENTS	1st Reviewer		
17) Preparation Raw Data Present 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 checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A

12-23-09  
 Report Generator Signature                      Date

12-23-09  
 Management Review Signature                      Date







SDG Report - Samples and Containers

SDG Specific Data		TAT Days		Project Type	
Sample Count	ARS1-09-02989 ✓	Date Received	30	COC Number	Environmental
Client	Los Alamos National Laboratory	Client Deadline	11/25/2009	PO Number	MR8R032TNB00
Client Code	114	Internal Deadline	12/24/2009	Job Number	10660
Profile Number	PN-00094	Lab Deadline	12/22/2009	Job Location	
Comments	PER AGREEMENT NUMBER:126310041				

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
→	001	MO21-10-5343 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38751	1					80 ✓	23 ✓		N/A				
→	002	MO21-10-5344 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38752	1					70 ✓	23 ✓		N/A				
→	003	MO21-10-5345 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38753	1					80 ✓	23 ✓		N/A				
→	004	MO21-10-5346 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38754	1					70 ✓	23 ✓		N/A				
→	005	MO21-10-5347 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38755	1					80 ✓	23 ✓		N/A				
→	006	MO21-10-5348 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38756	1					70 ✓	23 ✓		N/A				
→	007	MO21-10-5349 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38757	1					60 ✓	22 ✓		N/A				
→	008	MO21-10-5350 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38758	1					70 ✓	23 ✓		N/A				
→	009	MO21-10-5351 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38759	1					70 ✓	22 ✓		N/A				
→	010	MO21-10-5352 ✓	SI	11/23/09 12:00 PM	11/23/09 12:00 PM	H	90	5	06						
		38760	1					70 ✓	24 ✓		N/A				

**SDG Report - Analysis Assignments**

Temp SDG	ARSI-09-02989
Client	Los Alamos National Laboratory
Sample Count	1-10
Analysis Count	1-10

Analysis Code	LSC-A-001
Analysis Description	Tribum In (Water [Aqueous, AQ])
Sample Count	10

Analysis Code	Fraction	Assigned
LSC-A-001	001	X
LSC-A-001	002	X
LSC-A-001	003	X
LSC-A-001	004	X
LSC-A-001	005	X
LSC-A-001	006	X
LSC-A-001	007	X
LSC-A-001	008	X
LSC-A-001	009	X
LSC-A-001	010	X



COMPANY NAME: LOS ALAMOS

SDG: 09-02989

External and Internal Surveys

**SHIPPING CONTAINER**  
 Good Condition  Yes  No  
 Radioactive  Yes  No  
 UN2910  Yes  No  
 Sec. Seals  Yes  No  
 Seals Intact  Yes  No  N/A  
 COC  Yes  No  
 Air Bill  Yes  No

**SAMPLE CONTAINER(S)**  
 Good Condition  Yes  No  
 Sec. Seals  Yes  No  
 Seal Intact  Yes  No  N/A  
 Marked Radioactive  Yes  No  
 # Samples Rcv 10  
 Matrix [ AF , AQ , BI , FE , LT , (SI) SO , UR , VG ]

Exposure Rate Meter: <u>264266</u>	Serial No.: <u>242861</u>	Calibration Due Date: <u>4/20/10</u>
Count Rate Meter: <u>154859</u>	Serial No.: <u>184559</u>	Calibration Due Date: <u>4/6/10</u>
Background Exposure Rate (µR/hr) <u>23</u>	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd) <u>24</u> µR/hr	
Background Count Rate (cpm) <u>60</u>	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd) <u>70</u> cpm	
	Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd) <u>60</u> cpm	

Standard Chemistry

Sample Label/Comments/Notes	pH Orig	pH Final	Temp	VOA Headpace	Weight(g) / Volume(ml)	µR/hr	cpm
<u>M021-10-5343</u>					<u>1g</u>	<u>23</u>	<u>80</u>
<u>5344</u>		<u>N/A</u>			<u>1g</u>	<u>23</u>	<u>70</u>
<u>5345</u>					<u>1g</u>	<u>23</u>	<u>80</u>
<u>5346</u>					<u>1g</u>	<u>23</u>	<u>70</u>
<u>5347</u>					<u>1g</u>	<u>23</u>	<u>80</u>
<u>5348</u>					<u>1g</u>	<u>23</u>	<u>70</u>
<u>5349</u>			<u>N/A</u>		<u>1g</u>	<u>22</u>	<u>60</u>
<u>5350</u>					<u>1g</u>	<u>23</u>	<u>70</u>
<u>5351</u>					<u>1g</u>	<u>22</u>	<u>70</u>
<u>5352</u>					<u>1g</u>	<u>24</u>	<u>70</u>

Surveyors' Name: William Steple

Date/Time Surveyed: 12-2-09 7:40

Monday, November 23, 2009

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-660

LOS ALAMOS NATIONAL LABORATORY

REQUEST NUMBER: 10-660

ATTN: Danny Coleman

TURNAROUND/REPORT DUE: 11/28/2009

American Radiation Services - Primary

TURNAROUND REQ'D: 5

1726 Wooddale Court

Baton Rouge, LA 70806

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-5343	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5350	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5347	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5352	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5349	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5345	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5348	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5344	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5346	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-5351	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By: [Signature] Date 11/23/09 Time 1400 Received By: Nancy Barton Date 11-25-09 Time 10:30  
 Printed Name Signature Printed Name Signature

Printed Name Signature Printed Name Signature  
 Printed Name Signature Printed Name Signature

Received for DISPOSAL By: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Remarks: \_\_\_\_\_

Printed Name Signature

**SAMPLE CHECK-IN COMMENT SHEET**

**SDG: 09-02989**

**NOTES**

[Empty rectangular box for notes]

Appendix E Table QC MDA V Tritium Sampling 2nd Quarter Event 2442

URI	Request Number	Sample ID	Excavated	Sample Technique	Sample Usage	Field Prep	Field QC Type	PRS	Location ID	Depth Range (ft)	Field Matrix	Media	RFI Class	Analyte Code	Analyte	Percent Moisture	Standard MDL	Standard MDA	Dilution Factor	Standard Result	Standard Uncertainty	Standard Units	Qualifier	Lab Sample Type	Analytical Suite	Analytical Method	Lab Code	Analysis Date	Collection Date
66386742	10-660	MD21-10-5N		VOST	QC	na	FD	21-018(a)-99	21-24524W	300.0000-3	GAS	na	RAD	H-3	Tritium	9.02		405.9	1	33299.3	1771.6	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	#####	#####