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Date: JUN 23 2010
Refer To: EP2010-0242

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, February 2010

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, February 2010.

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,

George J. Rael, Manager
Environmental Projects Office
Los Alamos Site Office

33681

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, February 2010 (LA-UR-10-3951)

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IRM-RMMSO, MS A150 (date-stamped letter emailed)

LA-UR-10-3951
July 2010
EP2010-0242

Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, February 2010

Los Alamos
NATIONAL LABORATORY
EST. 1943

Prepared by the Environmental Programs Directorate

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LA-UR-10-3951
EP2010-0242

Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, February 2010

July 2010

Responsible project manager:

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EXECUTIVE SUMMARY

This periodic monitoring report summarizes the latest results of the vapor-monitoring activities conducted during February 2010 at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, within Technical Area 21 at Los Alamos National Laboratory (the Laboratory). The objectives of vapor monitoring at MDA V are (1) to collect additional samples from vapor-monitoring wells 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 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 three quarters. The first quarterly sampling was completed June–October 2009 for one sampling event. The second quarterly sampling at MDA V consisted of samples collected during the November 2009 event. The third quarterly sampling at MDA V consisted of samples collected during the February 2010 event. This report presents sampling data collected during the third quarter.

Vapor data collected from third quarter samples are presented and compared in this report. Pore-gas data from the previous quarters of vapor sampling at MDA V (June–October 2009 and November 2009) are also presented and compared with the current quarter data, as appropriate, for assessing trends over time.

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

Data collected during the fourth quarter (April 2010) will be presented in the fourth quarter monitoring report, as required by the New Mexico Environment Department's September 3, 2009, letter to the Laboratory.

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Appendix A Acronyms and Abbreviations, Metric Conversion Table, and Data Qualifier Definitions

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1.0 INTRODUCTION

This report presents the results of vapor-monitoring activities conducted during February 2010 at Material Disposal Area (MDA) V, Consolidated Unit 21-018(a)-99, located on Delta Prime (DP) Mesa in Technical Area 21 (TA-21) at Los Alamos National Laboratory (LANL or the Laboratory) (Figure 1.0-1). These activities are conducted per the requirements outlined in the approved MDA V well installation work plan (LANL 2007, 098944; NMED 2007, 098946). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with U.S. Department of Energy policy.

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

MDA V has been sampled previously for subsurface pore gas in 2005 and 2006. During these sampling events, location 21-24524 reported the maximum detected tritium activity of 271,192 pCi/L at total depth (TD) of 380 ft below the location of the former absorption beds. In June 2006, this borehole was plugged and abandoned in accordance with the approved MDA V investigation work plan.

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 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). Monitoring well 21-24524W has seven ports from depths of 45 ft below ground surface (bgs) to 380 ft bgs, and 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 three quarters. The first quarterly sampling during fiscal year (FY) 2010 was completed from June–October 2009 (LANL 2009, 108134) and consisted of one sampling event. The second quarterly sampling at MDA V was completed in November 2009 and consisted of one sampling event (LANL 2010, 109094). The third quarterly sampling at MDA V was completed in February 2010 and consisted of one sampling event. This report presents sampling data collected during the third quarter. First and second quarter vapor data are also included in section 5.0 of this report, as appropriate, for comparison with previously collected data and for assessing trends over time. Table 1.0-1 summarizes and clarifies vapor-monitoring sampling quarters, events, and dates.

All pore-gas samples collected from the MDA V vapor-monitoring wells were submitted for off-site analysis of tritium.

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 deep 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. A 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 best management practices have been installed, including straw wattles 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-6, 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), three 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 February 2010, 10 pore-gas samples (9 characterization and 1 quality assurance [QA]/quality control [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 February 2010 pore-gas sampling depths and sample collection dates by well location. Table 2.0-2 summarizes the February 2010 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 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 in Appendix D (on CD). No investigation-derived waste was generated during execution of vapor-monitoring activities at MDA V.

The February 2010 pore-gas field-screening results are presented in section 4, and the pore-gas analytical results are presented in section 5. Any deviations from the scope of activities 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_2) and oxygen (%O_2) 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 February 2010 sampling events at vapor-monitoring wells 21-24524W and 21-24524S by sampling depth.

Atmospheric information was obtained from http://www.srh.noaa.gov/data/obhistory/KLAM.html 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 February 2010 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 (RACER) website 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 one monitoring-well system rather than separately for 21-24524W and 21-24524S. Certain activity trends observed during the February 2010 sampling period in wells 21-24524W and 21-24524S (Figure 5.1-1) are similar to those reported in June–October 2009 (LANL 2009, 108134) and November 2009 (LANL 2010, 109094).

First quarter (June–October 2009) and second quarter (November 2009) results were similar. Third quarter (February 2010) results were also similar to those of the first and second quarters and were as follows:

- Vapor-port samples collected between the 42.5 and 305 ft bgs (ports 1–5) indicated two peaks in tritium activity. The first peak of 35,063 pCi/L was detected at 42.5 to 47.5 ft bgs (port 1), and the second peak of 69,612 pCi/L was detected at 300 to 305 ft bgs (port 5).
- Tritium activity decreased to 13,546 pCi/L at 122.5 to 127.5 ft bgs (port 2), increased to 69,612 pCi/L at 300 to 305 ft bgs (port 5), and decreased to nondetect in the bottom two ports sampled at 677.5 to 682.5 ft bgs (port 10) and 712.5 to 717.5 ft bgs (port 11).

Comparisons among the first quarter (June–October 2009), second quarter (November 2009), and third quarter (February 2010) vapor-port monitoring results are presented below.

- Third quarter tritium results indicate a trend similar to those detected during the first and second quarters: a peak of tritium activity (18,980 pCi/L in June–October 2009; 44,020 pCi/L in November 2009; and 35,063 pCi/L in February 2010) at 42.5 to 47.5 ft bgs (port 1). A higher peak of tritium activity (46,830 pCi/L in June–October 2009; 67,924 pCi/L in November 2009; and 69,612 pCi/L in February 2010) occurred at 300 to 305 ft bgs (port 5). Below port 5, tritium activities decreased to TD.

- Two samples collected during third quarter sampling, one from each of the deepest vapor ports 10 and 11 (677.5 to 682.5 ft bgs and 712.5 to 717.5 ft bgs, respectively), had nondetect activities during February 2010 monitoring event. The June–October 2009 samples from ports 10 and 11 had measured tritium activities of 495 pCi/L and 1,713 pCi/L, respectively, while the November 2009 samples from ports 10 and 11 had tritium activities of 349 pCi/L and 464 pCi/L, respectively.
- The third quarter tritium activities are higher than the first quarter results and lower than the second quarter results from 42.5 to 177.5 ft bgs (ports 1–3). The third quarter tritium activities are higher than the first and second quarter results from 257.5 to 332.5 ft bgs; however, they are lower in the bottom three depths sampled (377.5 to 717.5 ft bgs, ports 7, 10, and 11, respectively. The largest change observed occurred at the depth of 257.5–262.5 ft bgs (port 4), which had a tritium activity of 1324 pCi/L in June–October 2009; 16,664 pCi/L in November 2010; and 24,174 pCi/L in February 2010.
- The first, second, and third quarter tritium activities continue to be lower than activities in samples collected during the 2005 and 2006 investigations at the original location of vapor-monitoring well 21-24524 (LANL 2006, 094361; LANL 2007, 098942). The maximum tritium activity during the 2005 and 2006 investigations measured 271,192 pCi/L at a depth of 379 to 380 ft bgs. In comparison, tritium activities from first, second, and third quarter data from 377.5 to 382.5 ft bgs were 9808 pCi/L, 10,458 pCi/L, and 8866 pCi/L, respectively.

6.0 SUMMARY

Vapor-monitoring wells 21-24524W and 21-24524S were sampled in February 2010, and the results of the third quarter monitoring activities indicate trends similar to those reported during first and second quarter monitoring activities (LANL 2009, 108134; LANL 2009, 109094).

Consistent with previous results, the highest tritium activities were detected at a depth of 300 to 305 ft bgs (port 5), at activities of 46,830 pCi/L in August–October 2009; 67,924 pCi/L in November 2009; and 69,612 in February 2010. Below port 6, tritium activities decreased to 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). Data collected in April 2010 will be presented in the fourth quarter periodic monitoring report, as required by NMED's September 3, 2009, letter to the Laboratory.

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), 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), October 2007. “Subsurface Vapor-Monitoring Plan for Material Disposal Area T at Technical Area 21,” Los Alamos National Laboratory document LA-UR-07-7037, Los Alamos, New Mexico. (LANL 2007, 098944)

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)

LANL (Los Alamos National Laboratory), April 2010. “Periodic Monitoring Report for Vapor-Sampling Activities at Material Disposal Area V, Consolidated Unit 21-018(a)-99, at Technical Area 21, November 2009,” Los Alamos National Laboratory document LA-UR-10-1758, Los Alamos, New Mexico. (LANL 2010, 109094)

NMED (New Mexico Environment Department), October 31, 2007. “Approval with Modifications, Subsurface Vapor-Monitoring Plan for MDA T,” 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 2007, 098946)

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.

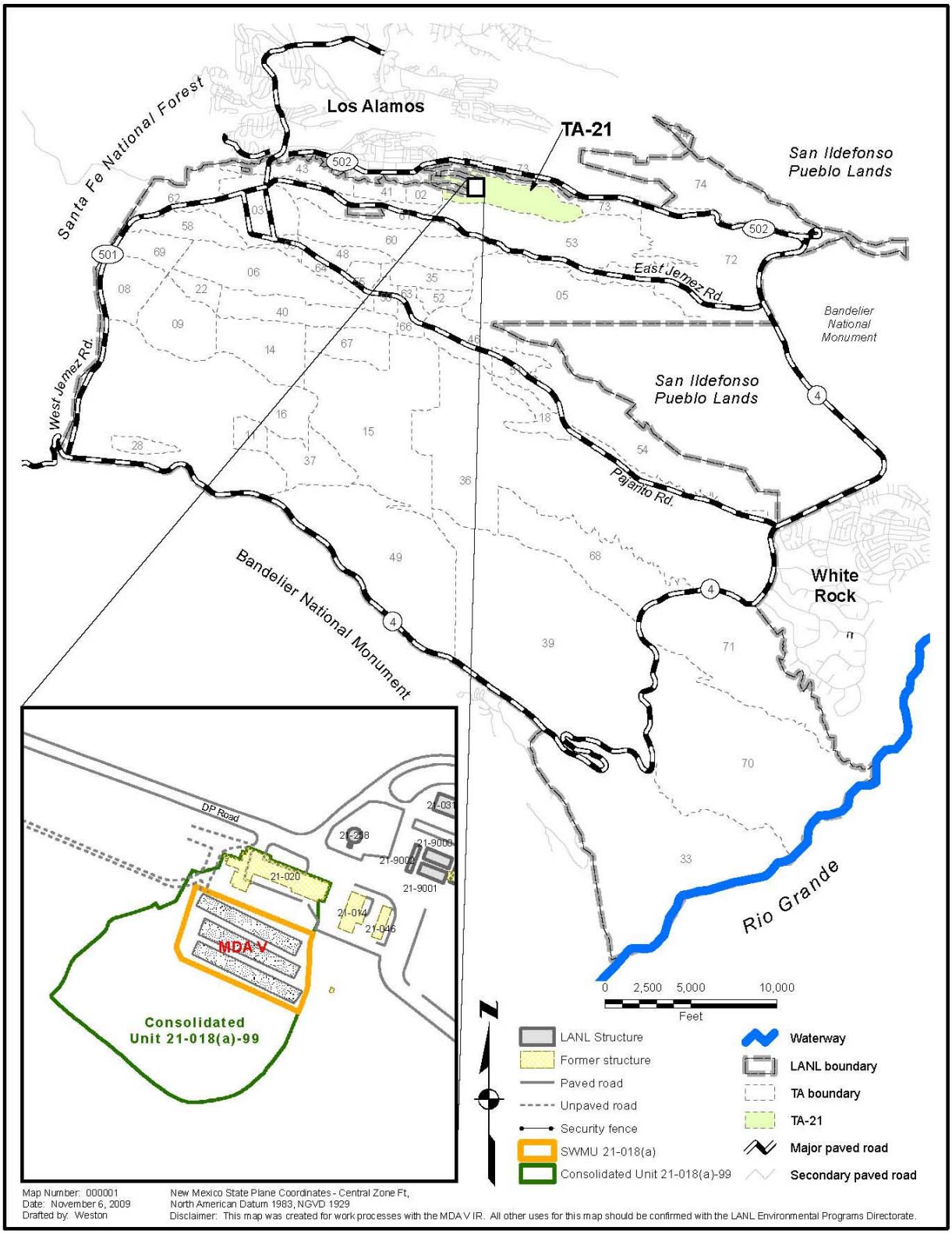

Figure 1.0-1 Location of MDA V at TA-21

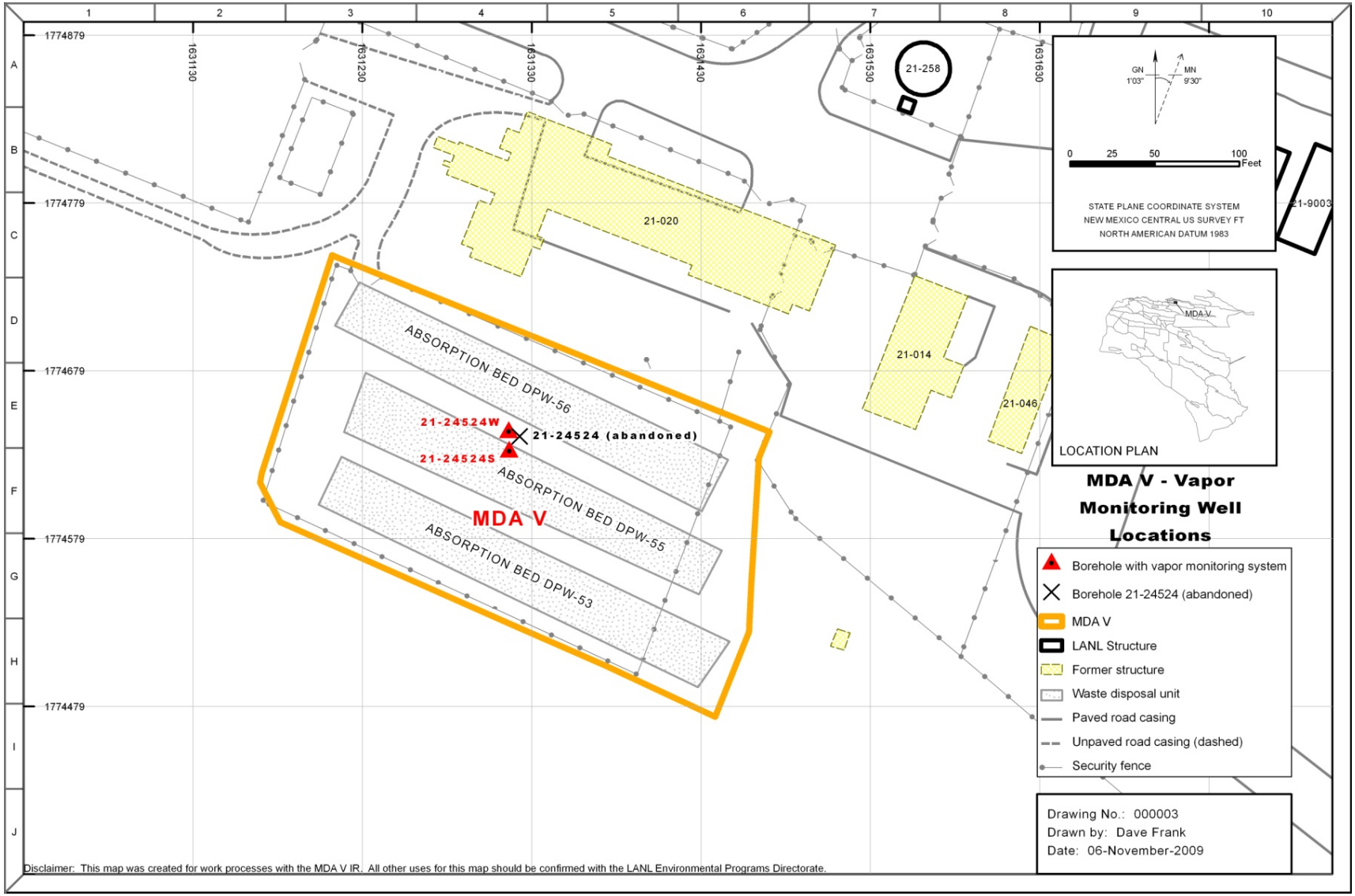

Figure 1.0-2 Locations of MDA V vapor-monitoring wells and associated structures and features

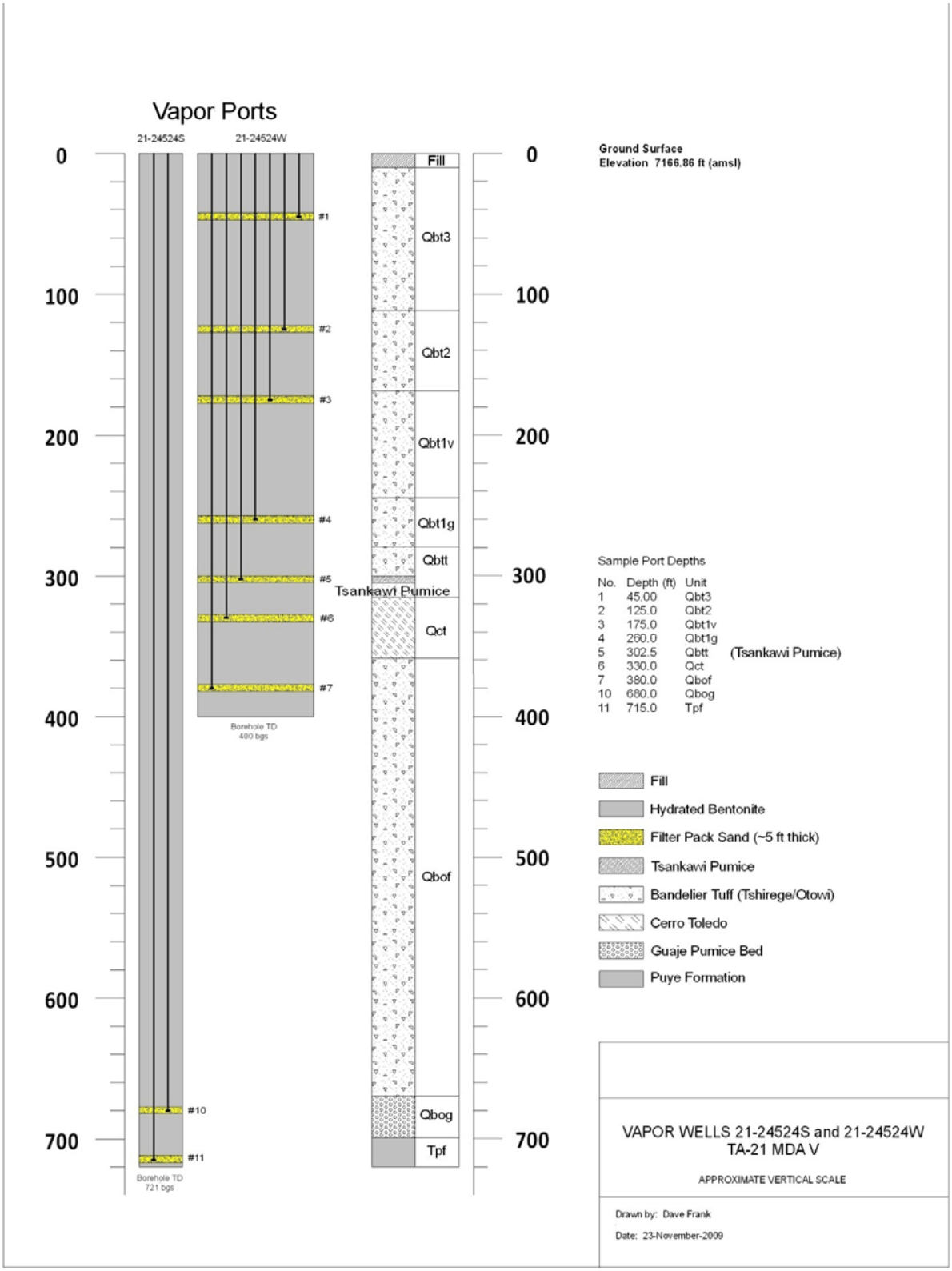

Figure 1.0-3 Schematic of vapor-monitoring wells 21-24524W/21-24524S installation at MDA V

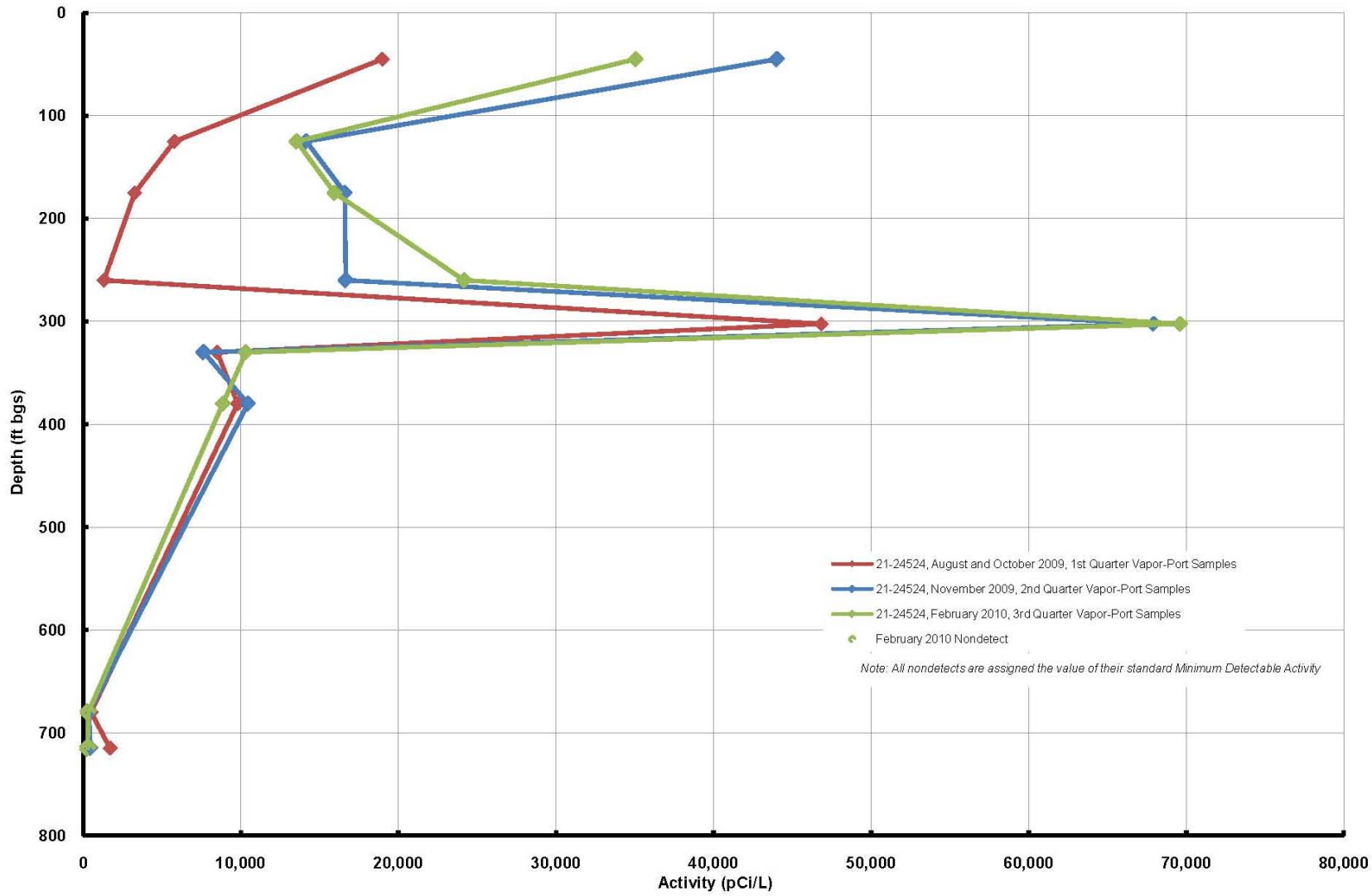

Figure 5.1-1 Vertical profile of tritium vapor-port samples from vapor-monitoring wells 21-24524W and 21-24524S, August 2009–February 2010

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

Quarter/Monitoring Event	Date	Event ID	Vapor-Monitoring Wells Sampled	Associated Report
Third (current) Quarter, FY2010	February 2010	2561	21-24524S/ 21-24524W	February 2010 MDA V periodic monitoring report
Second Quarter, FY2010	November 2009	2442	21-24524S/ 21-24524W	November 2009 MDA V periodic monitoring report (LANL 2010, 109094)
First Quarter, FY2010	June–October 2009	2215/756	21-24524S/ 21-24524W[a]	June–October 2009 MDA V periodic monitoring report (LANL 2009,108134)
2006 Investigation	May–June 2006	9902	21-24524[b]	Investigation report for MDA V (LANL 2006, 094361)
2005 Investigation	July–August 2005	5782	21-24524	Investigation report for MDA V (LANL 2006, 094361)

[a] Vapor-monitoring wells 21-24524S and 21-24524W were completed in 2009 and are within 10 ft of original borehole location 21-24524. Vapor-monitoring wells 21-24524S and 21-24524W were evaluated as a single well.

[b] Vapor-monitoring well 21-24524 was abandoned in June 2006.

Table 2.0-1
MDA V Pore-Gas Sampling Depths and Collection Dates, August 2009–February 2010

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)	Third Quarter Collection Date (Event ID 2561)
21-24524W	1	42.5	47.5	08/20/2009	11/23/2009	02/01/2010
21-24524W	2	122.5	127.5	08/20/2009	11/23/2009	02/01/2010
21-24524W	3	172.5	177.5	08/20/2009	11/23/2009	02/02/2010
21-24524W	4	257.5	262.5	08/20/2009	11/23/2009	02/01/2010
21-24524W	5	300.0	305.0	08/20/2009	11/23/2009	02/01/2010
21-24524W	6	327.5	332.5	08/20/2009	11/23/2009	02/02/2010
21-24524W	7	377.5	382.5	08/20/2009	11/23/2009	02/01/2010
21-24524S	10	677.5	682.5	10/14/2009	11/23/2009	02/01/2010
21-24524S	11	712.5	717.5	10/14/2009	11/23/2009	02/01/2010

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, February 2010

Sample ID	Vapor- Monitoring Well ID	Sampling Port	Depth (ft bgs)	Collection Date	Field QC Type	Request Number
MD21-10-10151	21-24524W	1	42.5–47.5	02/01/2010	n/a*	10-1546
MD21-10-10152	21-24524W	2	122.5–127.5	02/01/2010	n/a	10-1546
MD21-10-10153	21-24524W	3	172.5–177.5	02/02/2010	n/a	10-1546
MD21-10-10154	21-24524W	4	257.5–262.5	02/01/2010	n/a	10-1546
MD21-10-10160	21-24524W	4	257.5–262.5	02/01/2010	FD	10-1546
MD21-10-10155	21-24524W	5	300–305	02/01/2010	n/a	10-1546
MD21-10-10156	21-24524W	6	327.5–332.5	02/02/2010	n/a	10-1546
MD21-10-10157	21-24524W	7	377.5–382.5	02/01/2010	n/a	10-1546
MD21-10-10158	21-24524S	10	677.5–682.5	02/01/2010	n/a	10-1546
MD21-10-10159	21-24524S	11	712.5–717.5	02/01/2010	n/a	10-1546

*n/a = Not applicable.

Table 4.0-1
Summary of Field-Screening Results, February 2010

Event ID	Collection Date	Sampling Quarter	Location ID	Sampling Port Number	Top Depth (ft bgs)	Bottom Depth (ft bgs)	$\%CO_2$	$\%O_2$
2561	02/01/2010	Third	21-24524W	1	42.5	47.5	1.6	19.0
2561	02/01/2010	Third	21-24524W	2	122.5	127.5	0.4	20.2
2561	02/02/2010	Third	21-24524W	3	172.5	177.5	0.4	20.2
2561	02/01/2010	Third	21-24524W	4	257.5	262.5	0.2	20.4
2561	02/01/2010	Third	21-24524W	5	300.0	305.0	0.0	20.6
2561	02/02/2010	Third	21-24524W	6	327.5	332.5	0.2	20.4
2561	02/01/2010	Third	21-24524W	7	377.5	382.5	0.2	20.5
2561	02/01/2010	Third	21-24524S	10	677.5	682.5	0.0	20.1
2561	02/01/2010	Third	21-24524S	11	712.5	717.5	0.4	19.8

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, February 2010

Sampling Quarter	Date of Measurement	Average Barometric Pressure (in Hg)*	Average Relative Humidity (%)*	Average Temperature (°F)*
Third Quarter	02/01/2010	29.97	66	32

* Data from http://www.srh.noaa.gov/data/obhistory/KLAM.html.

Table 5.1-1
Summary of Tritium Results for Vapor Samples
Collected at Monitoring Well 21-24524, August 2009–February 2010

Sample ID	Vapor-Monitoring Well ID	Depth (ft bgs)	Collection Date	Tritium Result (pCi/L)
1st Quarter, August/October 2009 Samples				
MD21-09-12336	21-24524W	42.5–47.5	08/20/2009	18980
MD21-09-12337	21-24524W	122.5–127.5	08/20/2009	5791
MD21-09-12338	21-24524W	172.5–177.5	08/20/2009	3268
MD21-09-12339	21-24524W	257.5–262.5	08/20/2009	1324
MD21-09-12340	21-24524W	300–305	08/20/2009	46830
MD21-09-12341	21-24524W	327.5–332.5	08/20/2009	8495
MD21-09-12342	21-24524W	377.5–382.5	08/20/2009	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
2nd Quarter, November 2009 Samples				
MD21-10-5343	21-24524W	42.5–47.5	11/23/2009	44020
MD21-10-5344	21-24524W	122.5–127.5	11/23/2009	14159
MD21-10-5345	21-24524W	172.5–177.5	11/23/2009	16601
MD21-10-5346	21-24524W	257.5–262.5	11/23/2009	16664
MD21-10-5347	21-24524W	300–305	11/23/2009	67924
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	10458
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
3rd Quarter, February 2010 Samples				
MD21-10-10151	21-24524W	42.5–47.5	02/01/2010	35063
MD21-10-10152	21-24524W	122.5–127.5	02/01/2010	13546
MD21-10-10153	21-24524W	172.5–177.5	02/02/2010	15951
MD21-10-10154	21-24524W	257.5–262.5	02/01/2010	24174
MD21-10-10155	21-24524W	300–305	02/01/2010	69612
MD21-10-10156	21-24524W	327.5–332.5	02/02/2010	10327
MD21-10-10157	21-24524W	377.5–382.5	02/01/2010	8866
MD21-10-10158	21-24524S	677.5–682.5	02/01/2010	—*
MD21-10-10159	21-24524S	712.5–717.5	02/01/2010	—

*— = Not detected.

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

%R	percent recovery
bgs	below ground surface
CCV	continuing calibration verification
COC	chain of custody
DER	duplicate error ratio
EPA	Environmental Protection Agency (U.S.)
ICV	initial calibration verifications
FD	field duplicate
FY	fiscal year
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
MDA	material disposal area
MDC	minimum detectable concentration
MS	matrix spike
NMED	New Mexico Environment Department
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 (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°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

Field Methods

B-1.0 INTRODUCTION

This appendix summarizes the field methods used during the third quarter fiscal year 2010 sampling activities conducted in February 2010 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 conducted in accordance with the current version of EP-ERSS-SOP-5074. Before each sampling event, each sampling port was purged and monitored with a LANDTEC GEM2000 instrument (or equivalent) until the percent carbon dioxide (%CO_2) and percent oxygen (O_2%) levels stabilized at values representative of subsurface pore-gas conditions. Each instrument rental was shipped factory-calibrated to the Laboratory and returned to a LANDTEC authorized service facility for service/calibration, as needed. As described in the LANDTEC documentation, accuracies for %O_2 and %CO_2 for LANDTEC instrumentation are +/- 1.0% and +/- 3.0%, respectively. Once purging and field screening were complete, vapor samples were collected for tritium analysis. Field-screening results were recorded on the appropriate sample collection log (SCL) and/or in the field logbook. Field chains-of-custody forms and SCLs are provided in Appendix D.

The %CO_2 and %O_2 levels are presented in Table 4.0-1 of this report. The calibrations of %CO_2 and %O_2 levels were within the manufacturer's acceptable calibration limits. The February 2010 %CO_2 levels ranged from 0% to 1.6%, are within acceptable limits, and are representative of subsurface pore-gas conditions. The February %O_2 levels ranged from 19.0% to 20.6%, are within acceptable limits, and are representative of subsurface pore-gas conditions.

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 sampling information was recorded in the appropriate SCL (Appendix D on CD). 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, 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 activity and the calculated percent moisture were reported to the Laboratory in the analytical data package provided in Appendix D (on CD).

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 to be performed before, during, and after field investigations. The procedure covers premobilization 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, 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 them to ensure sample and transport containers were free of external contamination. All environmental samples were collected, preserved, packaged, and transported to the SMO under COC. 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 the samples were not left unattended.
Field Quality Control Samples	Field quality control samples were collected as follows: Field duplicates 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	Laboratory 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

Quality Assurance/Quality Control Program

C-1.0 INTRODUCTION

This appendix presents the analytical methods and summarizes the data quality review for the pore-gas samples collected in February 2010 during the third quarter fiscal year 2010 monitoring event 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 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 SOP used for data validation is 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 February 2010 pore-gas analytical data were obtained from 10 samples (9 characterization samples and 1 field duplicate sample) collected during the third quarter sampling event from vapor-monitoring well locations 21-24524W and 21-24524S. Table 2.0-1 of the periodic monitoring report summarizes all samples collected and the analyses requested. Complete data packages and sample documentation for the third quarter samples are provided in Appendix D (on CD).

C-3.0 RADIONUCLIDE ANALYSIS METHODS

The vapor samples collected in February 2010 were analyzed by U.S. Environmental Protection Agency (EPA) Method 906.0 for tritium (Table C-3.0-1). All tritium results are provided in Appendix D (on CD).

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

The accuracy of radionuclide analyses is 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 is more than 4 times the amount of the spike added, these acceptance criteria do not apply.

The quality of the third quarter MDA V tritium data is summarized below.

C-3.1.1 Tritium Qualified Data

During the February 2010 monitoring event, 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.

Two tritium results were qualified as (U) because the associated sample activity was less than or equal to the MDC.

All validated tritium investigation pore-gas data collected in February 2010 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 New Mexico Environment Department 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	06/30/2008

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

Analytical Method	Analytical Description	Analytical Suite
EPA Method 906.0	Liquid Scintillation	Tritium

Appendix D

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

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

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:10-1546
Per Agreement Number:126310041
Project Cost Code: MR8R032TNB00

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 2/2/2010
TURNAROUND/REPORT DUE: 2/7/2010
TURNAROUND REQ'D: 5 Days

RAD SCREENING: Yes, Below Background
LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:
Signature:

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10151	GAS	2/1/2010	
		1	MD21-10-10152	GAS	2/1/2010	
		1	MD21-10-10153	GAS	2/2/2010	
		1	MD21-10-10154	GAS	2/1/2010	
		1	MD21-10-10155	GAS	2/1/2010	
		1	MD21-10-10156	GAS	2/2/2010	
		1	MD21-10-10157	GAS	2/1/2010	
		1	MD21-10-10158	GAS	2/1/2010	
		1	MD21-10-10159	GAS	2/1/2010	

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10160	GAS	2/1/2010	

Final Page of REQUEST NUMBER 10-1546

Tuesday, February 02, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1546C

REQUEST NUMBER: 10-1546

LOS ALAMOS

NATIONAL LABORATORY

ATTN: Danny Coleman

American Radiation Services - Primary

1726 Wooddale Court

Baton Rouge, LA 70806

TURNAROUND/REPORT DUE: 2/7/2010

TURNAROUND REQ'D: 5

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-10157	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10151	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10158	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10155	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10159	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10156	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10160	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10152	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10153	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10154	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:	Date	Time	Received By:	Date	Time
[signature]	2/2/10	3:00			
Printed Name / Signature			Printed Name / Signature		
Printed Name / Signature			Printed Name / Signature		
Printed Name / Signature			Printed Name / Signature		

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

Printed Name Signature

Remarks:

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10156 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/2/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		1035	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:	327.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	332.5		SCREEN/PORT DESC:	Geo Probe soil/gas implant, port #6	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 27°F; rh = 74%; barometer = 29.98" Hg - start time 1200, 2/1/2010
end: T = 30°F; rh = 55%; barometer = 30.11" Hg - end time see above

SAMPLE COMMENTS:
Mass gel = 140.57g final mass = 601.69 g
initial mass = 591.15g volume purged = 1898.042 l

LOCATION DESC:
HSA constructed BH, port #6, Qct

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** [signature]

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay	2/2/2010	(Printed Name) Sherri Sherwood	2/2/10
(Signature) [signature]	1410	(Signature) Sherri Sherwood	1410
RELINQUISHED BY	**Date/Time**	**RECEIVED BY**	**Date/Time**
(Printed Name)		(Printed Name)	
(Signature)		(Signature)	

5 DAY TURN AROUND

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10153 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/2/2010	MEDIA:	NA	ok
TIME COLLECTED (HH:MM)		1035	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:	172.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	177.5		SCREEN/PORT DESC:	Geo Probe soil/gas implant, port #3	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 27°F; rh = 74%; barometer = 29.98" Hg - start time 1200, 2/1/2010
end: T = 30°F; rh = 55%; barometer = 30.11" Hg - end time see above

SAMPLE COMMENTS:
mass gel = 138.37g final mass = 606.32g
initial mass = 593.51g volume purged = 2326.117l

LOCATION DESC:
HSA constructed BH, port #3, Obtlv

FIELD SCREENING/MEASUREMENT RESULTS:
NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** [illegible]

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay	2/2/2010 1410	(Printed Name) Sherri Sherwood	2/2/10 1410
(Signature) [illegible]		(Signature) Sherri Sherwood	
RELINQUISHED BY	**Date/Time**	**RECEIVED BY**	**Date/Time**
(Printed Name)		(Printed Name)	
(Signature)		(Signature)	

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10151 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0830	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:	42.5	↓	SAMPLE USAGE:	INV	↓
BOTTOM DEPTH:	47.5	↓	SCREEN/PORT DESC:		Geoprobe soil/gas implant, port #1
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 cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:
mass of gel = 135.13g final mass = 598.30g
initial mass = 569.72g volume pnt gel = 9461.370l

LOCATION DESC:
HSA constructed BH, port #1, ~~45.0' bgs~~ lph 2/1/2010, 2bt3

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Ary REVIEWED BY (PRINT) Lindsay Ary

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Ary (Signature) [signature]	2/1/2010 1440	(Printed Name) Sherri Sherwood (Signature) Sherri Sherwood	2/1/10 1440
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10152 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0830	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:	122.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	127.5		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #2	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg end time see above

SAMPLE COMMENTS:
mass of gel = 136.74g final mass = 626.53g
Initial mass = 590.45g volume purged = 5045.163 l

LOCATION DESC:
HSA constructed BH, port #2, 9bt2

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** Lindsay Hay

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay	2/1/2010	(Printed Name) Sherri Sherwood	2/1/10
(Signature) [signature]	1440	(Signature) Sherri Sherwood	1440
RELINQUISHED BY	**Date/Time**	**RECEIVED BY**	**Date/Time**
(Printed Name)		(Printed Name)	
(Signature)		(Signature)	

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10154 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0830	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:	257.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	262.5		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #4	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:
mass of gel = 134.04g final mass = 601.32g
initial mass = 57.24g volume purged = 5432.771 l

LOCATION DESC:
HSA constructed BH, port #4, 2bt/g

FIELD SCREENING/MEASUREMENT RESULTS:
NA

field duplicate sample ID: MD21-10-10160 collected in parallel

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** Lindsay Hay

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay (Signature)	2/1/2010 1440	(Printed Name) Sherri Sherwood (Signature) Sherri Sherwood	2/1/10 1440
RELINQUISHED BY	**Date/Time**	**RECEIVED BY**	**Date/Time**
(Printed Name) (Signature)		(Printed Name) (Signature)	

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10160 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0830	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	OK	SAMPLE TECH CODE:	VOST	
LOCATION ID:	UNK		FIELD QC TYPE:	FD	
LOCATION TYPE:	GENERIC		FIELD PREP:	NA	
TOP DEPTH:	0		SAMPLE USAGE:	QC	
BOTTOM DEPTH:	0		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #4	
FIELD MATRIX:	GAS		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: QC Sample of FD sample of sample ID: MD21-10-10154
tritium vapor / silica gel cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:
mass of gel = 139.60g final mass = 627.88g
initial mass = 591.34g volume purged = 4659.753 l

LOCATION DESC:
HSA constructed BH, port #4, 2bt lg

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Hoy **REVIEWED BY (PRINT)** Lindsay Hoy

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hoy (Signature) [signature]	2/1/2010 1440	(Printed Name) Sherri Sherwood (Signature) [signature]	2/1/10 1440
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10155 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	Ok
TIME COLLECTED (HH:MM)		0830	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:	300		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	305		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #5	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:
mass of gel = 135.76g final mass = 618.14g
initial mass = 566.77 g volume purged = 6090.717 l

LOCATION DESC:
HSA constructed BH, port #5, 2btt

FIELD SCREENING/MEASUREMENT RESULTS:
NA

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

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay	2/1/2010	(Printed Name) Sherri Sherwood	2/1/10
(Signature) [signature]	1440	(Signature) [signature]	1440
RELINQUISHED BY	**Date/Time**	**RECEIVED BY**	**Date/Time**
(Printed Name)		(Printed Name)	
(Signature)		(Signature)	

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10157 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	012
TIME COLLECTED (HH:MM)		0830	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	012	SAMPLE TECH CODE:	VOST	
LOCATION ID:	21-24524W		FIELD QC TYPE:	NA	
LOCATION TYPE:	BH		FIELD PREP:	NA	
TOP DEPTH:	377.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	382.5		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #7	
FIELD MATRIX:	GAS		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 cartridge
beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:
mass of gel = 136.85g final mass = 604.45g
initial mass = 574.61g volume purged = 5587.921 l

LOCATION DESC:
HSA constructed BH, port #7, Qbof

FIELD SCREENING/MEASUREMENT RESULTS:
NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** Lindsay Hay

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay (Signature) [signature]	2/1/2010 1440	(Printed Name) Sherry Sherwood (Signature) [signature]	2/1/10 1440
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10158 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	02
TIME COLLECTED (HH:MM)		0830	SUB-MEDIA:	OTHER	
PRS ID:	21-018(a)-99	02	SAMPLE TECH CODE:	VOST	
LOCATION ID:	21-24524S		FIELD QC TYPE:	NA	
LOCATION TYPE:	BH		FIELD PREP:	NA	
TOP DEPTH:	677.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	682.5		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #10	
FIELD MATRIX:	GAS		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 cartridge

Beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10
end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:

mass of gel = 134.61g final mass = 618.56g
Initial mass = 595.15g volume purged = 4076.031 l

LOCATION DESC:

AR constructed BH, port #10, Q bog

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** Lindsay Hay

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay (Signature) [signature]	2/1/2010 1440	(Printed Name) Sheri Sherwood (Signature) [signature]	2/1/10 1440
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

5 Day Turn Around

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 2561 **EVENT NAME:** 3rd Qtr. MDA V Tritium Vapor Monitoring - CU 21-018(a)-99

SAMPLE ID: MD21-10-10159 **WORK ORDER:**

	AS PLANNED	AS COLLECTED		AS PLANNED	AS COLLECTED
DATE COLLECTED(MM/DD/YYYY):		2/1/2010	MEDIA:	NA	OK
TIME COLLECTED (HH:MM)		0830	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:	712.5		SAMPLE USAGE:	INV	
BOTTOM DEPTH:	717.5		SCREEN/PORT DESC:	Geoprobe soil/gas implant, port #1	
FIELD MATRIX:	GAS		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 cartridge

beginning: T = 23°F; rh = 100%; barometer = 30.08" Hg - start time 1245, 1/29/10

end: T = 27°F; rh = 74%; barometer = 29.98" Hg - end time see above

SAMPLE COMMENTS:

mass of gel = 141.60g final mass = 623.04g

Initial mass = 589.51g volume purged = 6261.228 l

LOCATION DESC:

FIELD SCREENING/MEASUREMENT RESULTS:

NA

COLLECTED BY (PRINT) Lindsay Hay **REVIEWED BY (PRINT)** Lindsay Hay

RELINQUISHED BY	Date/Time	RECEIVED BY	Date/Time
(Printed Name) Lindsay Hay (Signature) [signature]	2/1/2010 1440	(Printed Name) Sherri Sherwood (Signature) Sherri Sherwood	2/1/10 1440
RELINQUISHED BY (Printed Name) (Signature)	Date/Time	RECEIVED BY (Printed Name) (Signature)	Date/Time

5 Day Turn Around

DATA VALIDATION COVER SHEET

5119-1

Data Validation Cover Sheet

Records Use only

Los Alamos NATIONAL LABORATORY EST. 1943

Section I.

REQUEST NUMBER: 10-1546 VALIDATION DATE: 02/17/2010 LAB CODE: ARS

CONTRACT LABORATORY NAME: American Radiation Services

VALIDATOR: Mary Donivan ORGANIZATION: Analytical Quality Associates, Inc.

ANALYTICAL SUITE (CHECK ALL THAT APPLY):

- ☐ TPH-GRO
- ☐ TPH-DRO
- ☐ GENERAL CHEMISTRY
- ☐ HIGH EXPLOSIVES
- ☐ METALS
- ☒ RADIOCHEMISTRY
- ☐ DIOXIN FURANS
- ☐ PCB CONGENERS
- ☐ LCMSMS HIGH EXPLOSIVES
- ☐ LCMSMS PERCHLORATES
- ☐ ORGANOCHLORINE PESTICIDES/POLYCHLORINATED BIPHENYLS
- ☐ OTHER (DESCRIBE): Tritium only

Section II. Completeness Check

YES	NO	N/A	(CHECK ONE)	YES	NO	N/A	(CHECK ONE)
☒	☐	☐	1. CHAIN-OF-CUSTODY FORM(S)	☒	☐	☐	6. RAW/BSS DATA
☒	☐	☐	2. CASE NARRATIVE	☒	☐	☐	7. QUALITY CONTROL FORMS
☒	☐	☐	3. SAMPLE RESULT FORMS	☐	☐	☒	8. QUANTITATION REPORTS
☐	☐	☒	4. SAMPLE CHROMATOGRAMS	☐	☐	☒	9. TICS FORMS
☐	☐	☒	5. STANDARD CHROMATOGRAMS	☐	☐	☒	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 no Duplicate or MS samples were analyzed. However, an LCS and LCSD were analyzed and met acceptance criteria and, thus, no sample data were qualified, based on professional judgment.
2. It should also be noted that the LCS/LCSD RER was calculated by the laboratory using the 1-sigma TPU values. Thus, the LCS/LCSD RER was hand-calculated using the 2-sigma TPU values and was found to be within specifications. No sample data were qualified as a result.

Reviewed by: Monica Dymerski **Level I** **Date:** 02/17/10

VALIDATOR'S SIGNATURE: Mary A. Donivan DATE: 02/17/2010

RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2

Rad Analytical Data Validation Checklist

Records Use only

Los Alamos NATIONAL LABORATORY

Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
☐	☒	☐	1. The holding time was >1 and ≤2 times the applicable holding time requirement.	UJ, R9	J-, R9
☐	☒	☐	2. The holding time was >2 times the applicable holding time requirement.	R, R9a	J-, R9a
☐	☐	☒	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
☐	☐	☒	4. The analyte should be regarded as rejected because spectral interferences prevent positive identification of the analytes.	R, R5a	R, R5a
☐	☒	☐	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
☐	☐	☒	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
☐	☒	☐	7. The sample result is ≤5X the concentration of the related analyte in the method blank.	U, R4	N/A
☐	☒	☐	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
☐	☐	☒	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
☐	☒	☐	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
☐	☐	☒	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 Los Alamos NATIONAL LABORATORY

Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
☐	☐	☒	12. The tracer is < the Lower Acceptance Level (LAL) but ≥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
☐	☐	☒	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
☐	☐	☒	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
☐	☒	☐	15. The LCS percent recovery was <10%. Follow the external laboratory limits located within the associated data package.	R, R12	R, R12
☐	☒	☐	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
☐	☒	☐	17. The LCS percent recovery was > the UAL. Follow the external laboratory limits located within the associated data package.	N/A	J+, R12b
☐	☒	☐	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
☐	☒	☐	19. Associated duplicate sample has DER or RER > the analytical laboratory's acceptance limits.	R, R10	J, J10
☒	☐	☐	20. The duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use. Contact the SMO or external laboratory for information.	R, R6	R, R6

RAD ANALYTICAL DATA VALIDATION CHECKLIST

5119-2 Rad Analytical Data Validation Checklist	Records Use only Los Alamos NATIONAL LABORATORY EST. 1943

Yes	No	N/A		Assign Qualifier Listed Below If Criterion = Yes	
(Check One)				Non-detected Analyte	Detected Analyte
☐	☐	☒	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
☐	☐	☒	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
☐	☐	☒	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
☒	☐	☐	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
☐	☒	☐	25. Duplicate, dilution, or reanalysis.	UJ, R88	J, R88
☐	☒	☐	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
☒	☐	☐	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

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10151	**ARS Sample ID:**	ARS1-10-00166-001
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	26917.295	1423.099	231.943	113.952		pCi/L	ARS-054/EPA 906.0	02/04/10 05:42	BJS	

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.

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02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10152	**ARS Sample ID:**	ARS1-10-00166-002
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	10901.303	587.806	228.917	112.465		pCi/L	ARS-054/EPA 906.0	02/04/10 08:51	BJS	

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.

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ARS INTERNATIONAL
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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10153	**ARS Sample ID:**	ARS1-10-00166-003
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	9430.914	513.731	250.948	123.289		pCi/L	ARS-054/EPA 906.0	02/04/10 12:01	BJS	

NOTES: Project Cost Code - MR8R032TNB00

VAM
Project Manager Review

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

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MAD
02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10154	**ARS Sample ID:**	ARS1-10-00166-004
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	18809.321	1000.271	236.492	116.187		pCi/L	ARS-054/EPA 906.0	02/04/10 15:10	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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MAD
02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10155	**ARS Sample ID:**	ARS1-10-00166-005
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	59541.633	3127.740	230.925	113.452		pCi/L	ARS-054/EPA 906.0	02/04/10 18:20	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10156	**ARS Sample ID:**	ARS1-10-00166-006
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	5571.365	316.681	261.346	128.397		pCi/L	ARS-054/EPA 906.0	02/04/10 21:29	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10157	**ARS Sample ID:**	ARS1-10-00166-007
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	6853.975	378.500	230.205	113.098		pCi/L	ARS-054/EPA 906.0	02/05/10 00:38	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10158	**ARS Sample ID:**	ARS1-10-00166-008
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	-13.552	69.841	234.325	115.122	U	pCi/L	ARS-054/EPA 906.0	02/05/10 03:48	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10159	**ARS Sample ID:**	ARS1-10-00166-009
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	93.813	70.380	231.726	113.845	U	pCi/L	ARS-054/EPA 906.0	02/05/10 06:57	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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02/17/10

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10160	**ARS Sample ID:**	ARS1-10-00166-010
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	19153.506	1017.963	233.288	114.613		pCi/L	ARS-054/EPA 906.0	02/05/10 10:07	BJS	

NOTES: Project Cost Code - MR8R032TNB00

VJM

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

MAD
02/17/10

Tuesday, February 02, 2010

LOS ALAMOS
NATIONAL LABORATORY

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

LAB REQUEST COMMENTS:

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1546C
REQUEST NUMBER: 10-1546

TURNAROUND/REPORT DUE: 2/7/2010
TURNAROUND REQ'D: 5

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-10157	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10151	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10158	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10155	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10159	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10156	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10160	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10152	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10153	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10154	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:		Date	Time	Received By:		Date	Time
		2/2/10	3:00	William Stickle	William Stickle	2-3-10	10:00
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			

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

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:10-1546
Per Agreement Number:126310041
Project Cost Code: MR8R032TNB00

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 2/2/2010
TURNAROUND/REPORT DUE: 2/7/2010
TURNAROUND REQ'D: 5 Days

RAD SCREENING: Yes, Below Background
LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:
Signature:

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10151	GAS	2/1/2010	
		1	MD21-10-10152	GAS	2/1/2010	
		1	MD21-10-10153	GAS	2/2/2010	
		1	MD21-10-10154	GAS	2/1/2010	
		1	MD21-10-10155	GAS	2/1/2010	
		1	MD21-10-10156	GAS	2/2/2010	
		1	MD21-10-10157	GAS	2/1/2010	
		1	MD21-10-10158	GAS	2/1/2010	
		1	MD21-10-10159	GAS	2/1/2010	

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10160	GAS	2/1/2010	

Final Page of REQUEST NUMBER 10-1546

ARS INTERNATIONAL
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: 10-1546

ARS INTERNATIONAL

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1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory Request Number: 10-1546

Original COC

Tuesday, February 02, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1546C

REQUEST NUMBER: 10-1546

LOS ALAMOS
NATIONAL LABORATORY

ATTN: Danny Coleman

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

LAB REQUEST COMMENTS:

TURNAROUND/REPORT DUE: 2/7/2010

TURNAROUND REQ'D: 5

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-10157	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10151	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10158	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10155	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10159	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10156	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10160	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10152	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10153	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10154	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:		Date	Time	Received By:		Date	Time
		2/2/10	3:00	William Stickle	William Stickle	2-3-10	10:00
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			

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

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:10-1546
Per Agreement Number:126310041
Project Cost Code: MR8R032TNB00

Please analyse the enclosed samples according to the schedule indicated:

SHIP DATE: 2/2/2010
TURNAROUND/REPORT DUE: 2/7/2010
TURNAROUND REQ'D: 5 Days

RAD SCREENING: Yes, Below Background
LAB REQUEST COMMENTS:

LANL ER SMO CONTACT:
Signature:

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10151	GAS	2/1/2010	
		1	MD21-10-10152	GAS	2/1/2010	
		1	MD21-10-10153	GAS	2/2/2010	
		1	MD21-10-10154	GAS	2/1/2010	
		1	MD21-10-10155	GAS	2/1/2010	
		1	MD21-10-10156	GAS	2/2/2010	
		1	MD21-10-10157	GAS	2/1/2010	
		1	MD21-10-10158	GAS	2/1/2010	
		1	MD21-10-10159	GAS	2/1/2010	

Tuesday, February 02, 2010

REQUEST NUMBER: 10-1546

PRIORITY	METHOD CODE	CNTNR	SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	SPECIAL INSTRUCTIONS
	EPA:906.0	1	MD21-10-10160	GAS	2/1/2010	

Final Page of REQUEST NUMBER 10-1546

Tuesday, February 02, 2010

LAB CHAIN OF CUSTODY DOCUMENT NUMBER: 10-1546C

REQUEST NUMBER: 10-1546

LOS ALAMOS

NATIONAL LABORATORY

ATTN: Danny Coleman

American Radiation Services - Primary

1726 Wooddale Court

Baton Rouge, LA 70806

TURNAROUND/REPORT DUE: 2/7/2010

TURNAROUND REQ'D: 5

LAB REQUEST COMMENTS:

SAMPLE ID	CTNR	CTNR DESC	ORDER	PRESERV	MATRIX
MD21-10-10157	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10151	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10158	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10155	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10159	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10156	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10160	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10152	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10153	1	SILICA GEL TUBE	H3	None	GAS
MD21-10-10154	1	SILICA GEL TUBE	H3	None	GAS

Relinquished By:		Date	Time	Received By:		Date	Time
		2/2/10	3:00	William Stickle	William Stickle	2-3-10	10:00
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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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory Request Number: 10-1546

Case Narrative

ARS INTERNATIONAL
2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

February 5, 2010

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

Request Number: 10-1546
LANL Sample ID: MD21-10-10151, MD21-10-10152, MD21-10-10153, MD21-10-10154, MD21-10-10155, MD21-10-10156, MD21-10-10157, MD21-10-10158, MD21-10-10159, MD21-10-10160

Dear Mr. Greene;

On February 3, 2010, ARS International received 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.

Sincerely,

Virgene Mulligan

Virgene Mulligan
Vice President – Laboratory Services
ARS International

ARS INTERNATIONAL
2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

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

Request Number	LANL PROJECT SAMPLE ID NUMBER	American Radiation Services SAMPLE ID NUMBER(S)
10-1546	MD21-10-10151	ARS1-10-00166-001
10-1546	MD21-10-10152	ARS1-10-00166-002
10-1546	MD21-10-10153	ARS1-10-00166-003
10-1546	MD21-10-10154	ARS1-10-00166-004
10-1546	MD21-10-10155	ARS1-10-00166-005
10-1546	MD21-10-10156	ARS1-10-00166-006
10-1546	MD21-10-10157	ARS1-10-00166-007
10-1546	MD21-10-10158	ARS1-10-00166-008
10-1546	MD21-10-10159	ARS1-10-00166-009
10-1546	MD21-10-10160	ARS1-10-00166-010

ANALYTICAL METHODS

Tritium analyses were performed using **EPA 906 (ARS-054)**

ANALYTICAL RESULTS

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

ARS INTERNATIONAL
2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

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	Title	Date
Wayne Mullican	Vice President – Laboratory Services, ARS International	2-5-10

ARS INTERNATIONAL
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

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10151	**ARS Sample ID:**	ARS1-10-00166-001
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	26917.295	1423.099	231.943	113.952		pCi/L	ARS-054/EPA 906.0	02/04/10 05:42	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10152	**ARS Sample ID:**	ARS1-10-00166-002
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	10901.303	587.806	228.917	112.465		pCi/L	ARS-054/EPA 906.0	02/04/10 08:51	BJS	

NOTES: Project Cost Code - MR8R032TNB00

VHM
Project Manager Review

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LELAP Certificate# 01949 NELAP Certificate # E87558

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10153	**ARS Sample ID:**	ARS1-10-00166-003
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	9430.914	513.731	250.948	123.289		pCi/L	ARS-054/EPA 906.0	02/04/10 12:01	BJS	

NOTES: Project Cost Code - MR8R032TNB00

VHM

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10154	**ARS Sample ID:**	ARS1-10-00166-004
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	18809.321	1000.271	236.492	116.187		pCi/L	ARS-054/EPA 906.0	02/04/10 15:10	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10155	**ARS Sample ID:**	ARS1-10-00166-005
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	59541.633	3127.740	230.925	113.452		pCi/L	ARS-054/EPA 906.0	02/04/10 18:20	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10156	**ARS Sample ID:**	ARS1-10-00166-006
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	5571.365	316.681	261.346	128.397		pCi/L	ARS-054/EPA 906.0	02/04/10 21:29	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10157	**ARS Sample ID:**	ARS1-10-00166-007
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	6853.975	378.500	230.205	113.098		pCi/L	ARS-054/EPA 906.0	02/05/10 00:38	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10158	**ARS Sample ID:**	ARS1-10-00166-008
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	-13.552	69.841	234.325	115.122	U	pCi/L	ARS-054/EPA 906.0	02/05/10 03:48	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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

ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10159	**ARS Sample ID:**	ARS1-10-00166-009
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	93.813	70.380	231.726	113.845	U	pCi/L	ARS-054/EPA 906.0	02/05/10 06:57	BJS	

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS INTERNATIONAL
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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10160	**ARS Sample ID:**	ARS1-10-00166-010
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	19153.506	1017.963	233.288	114.613		pCi/L	ARS-054/EPA 906.0	02/05/10 10:07	BJS	

NOTES: Project Cost Code - MR8R032TNB00

VJM

Project Manager Review

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LELAP Certificate# 01949 NELAP Certificate # E87558

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

QC Results Report

Sample Delivery Group: ARS1-10-00166
Date Received: 2/3/2010

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-B10-00640	LCS	H3	1251.602	102.121	221.278	1221.62		pCi/L	ARS-054/EPA 906.0	2/3/2010 2021	BJS	102	75%-125%

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-B10-00640	MBL	H3	-109.267	126.767	219.684	NA		pCi/L	ARS-054/EPA 906.0	2-4-10 0235	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 AcceptanceRange
ARS1-B10-00640	DUP	H3	1251.602	102.121	1166.724	98.364		pCi/L	ARS-054/EPA 906.0	2-3-10 2328	BJS	0.42	< 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 AcceptanceRange
ARS1-B10-00640	DUP	H3	1251.602	102.121	1166.724	98.364		pCi/L	ARS-054/EPA 906.0	2-3-10 2328	BJS	1.20	< 3

Project Manager Review

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LELAP Certificate# 01949 NELAP Certificate # E87558

ARS INTERNATIONAL
2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Tritium by Low Level Liquid Scintillation Counting Samples

LSC Instrument Data Transfer Report

\\PACKARD3170_NEW\Results\ARS\H-3 Normal Lvl\

Batch Sample ID	Non-BKG Sample Count	Calibration Sample ID
ARS1-B10-00640	13	13

LSC 2

Sample ID	LSC Vial	LSC Vial Type	Count Time	Sample Description	LSC Date/Time	Net Cpm	Net Dpm	Quench	Efficiency	Batch Sample ID	Calibration Sample ID	Check Std
BKG	44		1	BACKGROUND	02/03/10 17:14	6.00	396.97	35.3500	180.00	ARS1-B10-00640		
ARS1-B10-00640-01	44		2	B10-00640-01	02/03/10 20:21	10.89	392.35	35.0300	180.00	ARS1-B10-00640		
ARS1-B10-00640-02	44		3	B10-00640-02	02/03/10 23:28	10.59	395.92	35.2800	180.00	ARS1-B10-00640		
ARS1-B10-00640-03	44		4	B10-00640-03	02/04/10 02:35	5.57	395.85	35.2700	180.00	ARS1-B10-00640		
ARS1-B10-00640-04	44		5	B10-00640-04	02/04/10 05:41	106.33	370.06	33.4800	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-05	44		6	B10-00640-05	02/04/10 08:51	47.17	376.52	33.9300	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-06	44		7	B10-00640-06	02/04/10 12:00	38.49	331.23	30.7800	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-07	44		8	B10-00640-07	02/04/10 15:10	74.76	359.47	32.7400	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-08	44		9	B10-00640-08	02/04/10 18:19	228.91	370.74	33.5300	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-09	44		10	B10-00640-09	02/04/10 21:28	24.43	314.27	29.6100	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-10	44		11	B10-00640-10	02/05/10 00:38	31.74	373.44	33.7100	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-11	44		12	B10-00640-11	02/05/10 03:47	5.95	362.85	32.9800	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-12	44		13	B10-00640-12	02/05/10 06:57	6.35	369.59	33.4500	180.00	ARS1-B10-00640	ARS1-10-00166	1
ARS1-B10-00640-13	44		14	B10-00640-13	02/05/10 10:06	76.98	366.56	33.2400	180.00	ARS1-B10-00640	ARS1-10-00166	1

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	10.890000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.350300
Sample Aliquot	5.024000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/3/10 8:21 PM
Count Date (t2)	2/3/10 8:21 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	H-3		
Calculated Values	**[illegible]**	**VBA**	**V/V**
ACT	**1251.601620**	**1251.601620**	**OK**
CU	**[illegible]**	**[illegible]**	**OK**
TPU	**102.120746**	**102.120746**	**OK**
MDA	**[illegible]**	**[illegible]**	**OK**
DL	**108.712011**	**108.712011**	**OK**
Net Count Rate	**4.890000**	**4.890000**	**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	**0.003907**	**0.003907**	**OK**
K MDA	**0.703259**	**0.703259**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	73
Instr Detector	P-44-S-2
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: DJM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	10.590000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.352800
Sample Aliquot	5.023000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/3/10 11:28 PM
Count Date (t2)	2/3/10 11:28 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**[illegible]**	**VBA**	**V/V**
ACT	1166.723530	1166.723530	OK
CU	151.051010	151.051010	OK
TPU	192.794129	192.794129	OK
MDA	219.753242	219.753242	OK
DL	107.963149	107.963149	OK
Net Count Rate	4.590000	4.590000	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	0.003934	0.003934	OK
K MDA	0.708137	0.708137	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	73
Instr Detector	P-44-S-3
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: YM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	5.570000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.352700
Sample Aliquot	5.026000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/4/10 2:35 AM
Count Date (t2)	2/4/10 2:35 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-109.266627	-109.266627	OK
CU	126.271570	126.271570	OK
TPU	126.766982	126.766982	OK
MDA	219.684341	219.684341	OK
DL	107.929299	107.929299	OK
Net Count Rate	-0.430000	-0.430000	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	0.003935	0.003935	OK
K MDA	0.708359	0.708359	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Run Number	
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	73
Instr Detector	P-44-S-4
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VFM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	106.330000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.334800
Sample Aliquot	5.017000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 5:42 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	26917.295495	26917.295494	OK
CU	211.039662	211.039662	OK
TPU	1423.099010	1423.099010	OK
MDA	231.942658	231.942658	OK
DL	113.951719	113.951719	OK
Net Count Rate	100.330000	100.330000	OK
D t 1 (t2 - t1)	2.737500	2.737500	OK
DF	0.999578	0.999578	OK
Sys Err	0.052280	0.052280	OK
K	0.003727	0.003727	OK
K MDA	0.670922	0.670922	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-04
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	001
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10151
Instr File Name	73
Instr Detector	P-44-S-5
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	47.170000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.339300
Sample Aliquot	5.016000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 8:51 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**10901.303233**	**10901.303232**	**OK**
CU	**140.914212**	**140.914212**	**OK**
TPU	**587.805996**	**587.805996**	**OK**
MDA	**228.916751**	**228.916751**	**OK**
DL	**112.465114**	**112.465114**	**OK**
Net Count Rate	**41.170000**	**41.170000**	**OK**
D t 1 (t2 - t1)	**2.868750**	**2.868750**	**OK**
DF	**0.999558**	**0.999558**	**OK**
Sys Err	**0.052280**	**0.052280**	**OK**
K	**0.003777**	**0.003777**	**OK**
K MDA	**0.679790**	**0.679790**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-05
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	002
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10152
Instr File Name	73
Instr Detector	P-44-S-6
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: DFM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	38.490000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.307800
Sample Aliquot	5.044000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 12:01 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	9430.914021	9430.914021	OK
CU	144.310869	144.310869	OK
TPU	513.730975	513.730975	OK
K MDA	250.948205	250.948205	OK
DL	123.289005	123.289005	OK
Net Count Rate	32.490000	32.490000	OK
D t 1 (t2 - t1)	3.000694	3.000694	OK
DF	0.999538	0.999538	OK
Sys Err	0.052280	0.052280	OK
K	0.003445	0.003445	OK
K MDA	0.620110	0.620110	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-06
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	003
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10153
Instr File Name	73
Instr Detector	P-44-S-7
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VJM Date: 2-5-10

Calculation Verification

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	74.760000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.327400
Sample Aliquot	5.032000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 3:10 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	18809.320582	18809.320581	OK
CU	183.231081	183.231081	OK
TPU	1000.271429	1000.271429	OK
MDA	236.492439	236.492439	OK
DL	116.186993	116.186993	OK
Net Count Rate	68.760000	68.760000	OK
D t 1 (t2 - t1)	3.131944	3.131944	OK
DF	0.999518	0.999518	OK
Sys Err	0.052280	0.052280	OK
K	0.003656	0.003656	OK
K MDA	0.658014	0.658014	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-07
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	004
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10154
Instr File Name	73
Instr Detector	P-44-S-8
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: YJM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	228.910000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.335300
Sample Aliquot	5.032000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 6:20 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	59541.632918	59541.632916	OK
CU	305.144800	305.144800	OK
TPU	3127.740422	3127.740422	OK
MDA	250.925136	250.925136	OK
DL	113.451819	113.451819	OK
Net Count Rate	222.910000	222.910000	OK
D t 1 (t2 - t1)	3.263889	3.263889	OK
DF	0.999497	0.999497	OK
Sys Err	0.052280	0.052280	OK
K	0.003744	0.003744	OK
K MDA	0.673878	0.673878	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-08
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	005
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10155
Instr File Name	73
Instr Detector	P-44-S-9
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VYM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	24.430000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.296100
Sample Aliquot	5.035000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/4/10 9:29 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**[illegible]**	**VBA**	**V/V**
ACT	5571.364958	5571.364958	OK
UCU	[illegible]	[illegible]	OK
TPU	316.681092	316.681092	OK
MDA	261.346262	261.346262	OK
DL	128.397494	128.397494	OK
Net Count Rate	18.430000	18.430000	OK
D t 1 (t2 - t1)	3.395139	3.395139	OK
DF	0.999477	0.999477	OK
Sys Err	0.052280	0.052280	OK
K	0.003308	0.003308	OK
K MDA	0.595438	0.595438	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-09
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	006
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10156
Instr File Name	73
Instr Detector	P-44-S-10
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VJM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	31.740000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.337100
Sample Aliquot	5.021000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/5/10 12:38 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values		**VBA**	**V/V**
ACT	6853.974818	6853.974817	OK
CU	121.926654	121.926654	OK
TPU	378.499808	378.499808	OK
MDA	230.204591	230.204591	OK
DL	113.097820	113.097820	OK
Net Count Rate	25.740000	25.740000	OK
D t 1 (t2 - t1)	3.526389	3.526389	OK
DF	0.999457	0.999457	OK
Sys Err	0.052280	0.052280	OK
K	0.003755	0.003755	OK
K MDA	0.675987	0.675987	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-10
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	007
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10157
Instr File Name	73
Instr Detector	P-44-S-11
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: YM **Date:** 2-5-10

Calculation Verification

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	5.950000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.329800
Sample Aliquot	5.042000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/5/10 3:48 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-13.552152	-13.552152	OK
TCU	69.837064	69.837064	OK
TPU	69.840657	69.840657	OK
MDA	234.324819	234.324819	OK
DL	115.122057	115.122057	OK
Net Count Rate	-0.050000	-0.050000	OK
D t 1 (t2 - t1)	3.658333	3.658333	OK
DF	0.999437	0.999437	OK
Sys Err	0.052280	0.052280	OK
K	0.003689	0.003689	OK
K MDA	0.664101	0.664101	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-11
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	008
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10158
Instr File Name	73
Instr Detector	P-44-S-12
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VTM Date: 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	6.350000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.334500
Sample Aliquot	5.027000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/5/10 6:57 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	93.813120	93.813120	OK
SD	70.208996	70.208996	OK
TPU	70.380093	70.380093	OK
MDA	281.726422	281.726422	OK
DL	113.845484	113.845484	OK
Net Count Rate	0.350000	0.350000	OK
D t 1 (t2 - t1)	3.789583	3.789583	OK
DF	0.999416	0.999416	OK
Sys Err	0.052280	0.052280	OK
K	0.003731	0.003731	OK
K MDA	0.671548	0.671548	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-12
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	009
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10199
Instr File Name	73
Instr Detector	P-4d-S-13
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VJM **Date:** 2-5-10

Procedure	ARS-054
Variable	**Value**
Gross Count Rate	76.980000
Sample Count Mins	180.000000
BKG Count Rate	6.000000
BKG Count Mins	180.000000
Instrument Efficiency	0.332400
Sample Aliquot	5.025000
Dilution Factor	1.000000
Aliquot Conversion Factor	0.001000
Sample Collection Date (t1)	2/1/10 12:00 PM
Count Date (t2)	2/5/10 10:07 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.0000
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	4499.800000
TPUF_Calibration Factor	0.041330
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.000000
TPUF_Decay Ingrowth Factor	0.025000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	OK

Isotope	H-3		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	19153.506076	19153.506075	OK
CU	183.215728	183.215728	OK
TPU	1017.963450	1017.963450	OK
MDA	233.287951	233.287951	OK
DL	114.612652	114.612652	OK
Net Count Rate	70.980000	70.980000	OK
D t 1 (t2 - t1)	3.921528	3.921528	OK
DF	0.999396	0.999396	OK
Sys Err	0.052280	0.052280	OK
K	0.003706	0.003706	OK
K MDA	0.667053	0.667053	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B10-00640
Batch ID	ARS1-B10-00640-13
Analysis Code	LSC-A-001
SDG	ARS1-10-00166
Fraction	010
Run Number	1
Client	Los Alamos National Laboratory
Client Profile	Keith Greene
Client ID	MD21-10-10160
Instr File Name	73
Instr Detector	P-44-S-14
Instr keV	
Version/Date	1.0 -- 11/18/2005

Reviewed by: VJM Date: 2-5-10

ARS INTERNATIONAL
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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

ARS INTERNATIONAL

Analysis Batch ID **ARS1-B10-00640**

Method	ARS-054	Analysis	LSC-A-001	Matrix	SI
Description	TRITIUM IN WATER				

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3
ARS1-B10-00640-01	LCS	B-09070		
ARS1-B10-00640-02	LCSD	B-09071		
ARS1-B10-00640-03	MBL			
ARS1-B10-00640-04	TRG			
ARS1-B10-00640-05	TRG			
ARS1-B10-00640-06	TRG			
ARS1-B10-00640-07	TRG			
ARS1-B10-00640-08	TRG			
ARS1-B10-00640-09	TRG			
ARS1-B10-00640-10	TRG			
ARS1-B10-00640-11	TRG			
ARS1-B10-00640-12	TRG			
ARS1-B10-00640-13	TRG			

SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-10-00166	001	1	MD21-10-10151	STD	02/03/10
ARS1-10-00166	002	1	MD21-10-10152	STD	02/03/10
ARS1-10-00166	003	1	MD21-10-10153	STD	02/03/10
ARS1-10-00166	004	1	MD21-10-10154	STD	02/03/10
ARS1-10-00166	005	1	MD21-10-10155	STD	02/03/10
ARS1-10-00166	006	1	MD21-10-10156	STD	02/03/10
ARS1-10-00166	007	1	MD21-10-10157	STD	02/03/10
ARS1-10-00166	008	1	MD21-10-10158	STD	02/03/10
ARS1-10-00166	009	1	MD21-10-10159	STD	02/03/10
ARS1-10-00166	010	1	MD21-10-10160	STD	02/03/10

46296
10-00166-001-12
WRAD

46297
10-00166-002-12
WRAD

46298
10-00166-003-12
WRAD

46299
10-00166-004-12
WRAD

46300
10-00166-005-12
WRAD

46301
10-00166-006-12
WRAD

46302
10-00166-007-12
WRAD

46303
10-00166-008-12
WRAD

46304
10-00166-009-12
WRAD

46305
10-00166-010-12
WRAD

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B10-00640-01				1	H-3	1251.60162	102.1207458	102.1207458	200.1566617	221.2775106	108.7120112	78.40356848	78.40356848	153.6709942	pCi
ARS1-B10-00640-02				1	H-3	1166.72353	192.7941288	98.36435145	192.7941288	219.7532418	107.9631491	151.2510098	77.16888254	151.2510098	pCi
ARS1-B10-00640-03				1	H-3	-109.2666271	126.7669824	64.67703185	126.7669824	219.6843407	107.9292985	126.2715699	64.42427035	126.2715699	pCi
ARS1-B10-00640-04	ARS1-10-00166	001	MD21-10-10151	1	H-3	26917.29549	1423.09901	1423.09901	2789.27406	231.9426578	113.9517194	211.9396617	211.9396617	415.401737	pCi
ARS1-B10-00640-05	ARS1-10-00166	002	MD21-10-10152	1	H-3	10901.30323	587.8059962	587.8059962	1152.099753	228.9167506	112.4651135	143.911212	143.911212	282.0659756	pCi
ARS1-B10-00640-06	ARS1-10-00166	003	MD21-10-10153	1	H-3	9430.914021	513.7309745	513.7309745	1006.91271	250.948205	123.2890048	144.3108632	144.3108632	282.8492919	pCi
ARS1-B10-00640-07	ARS1-10-00166	004	MD21-10-10154	1	H-3	18809.32058	1000.271429	1000.271429	1960.532001	236.4924388	116.1869933	183.2310807	183.2310807	359.1329182	pCi
ARS1-B10-00640-08	ARS1-10-00166	005	MD21-10-10155	1	H-3	59541.63292	3127.740422	3127.740422	6130.371227	230.9251362	113.4518186	305.1446	305.1446	598.0834161	pCi
ARS1-B10-00640-09	ARS1-10-00166	006	MD21-10-10156	1	H-3	5571.364958	316.6810921	316.6810921	620.6949405	261.3462618	128.3974935	124.2942381	124.2942381	243.6167067	pCi
ARS1-B10-00640-10	ARS1-10-00166	007	MD21-10-10157	1	H-3	6853.974817	378.499808	378.499808	741.8596237	230.2045914	113.0978202	121.9266544	121.9266544	238.9762427	pCi
ARS1-B10-00640-11	ARS1-10-00166	008	MD21-10-10158	1	H-3	-13.55215232	69.84065734	69.84065734	136.8876884	234.3248186	115.1220575	69.83706353	69.83706353	136.8806445	pCi
ARS1-B10-00640-12	ARS1-10-00166	009	MD21-10-10159	1	H-3	93.81312006	70.38009275	70.38009275	137.9449818	231.7264216	113.8454842	70.2089959	70.2089959	137.609632	pCi
ARS1-B10-00640-13	ARS1-10-00166	010	MD21-10-10160	1	H-3	19153.50608	1017.96345	1017.96345	1995.208362	233.2879508	114.612652	183.2157275	183.2157275	359.102826	pCi

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_DL
ARS1-B10-00640-01			L			0.0605	180	0.033333333	180	0.3503	5.024	2/5/2010	2/3/2010	
ARS1-B10-00640-02			L			0.058833333	180	0.033333333	180	0.3528	5.023	2/5/2010	2/3/2010	
ARS1-B10-00640-03			L			0.030944444	180	0.033333333	180	0.3527	5.026	2/5/2010	2/4/2010	
ARS1-B10-00640-04	ARS1-10-00166	001	L			0.590722222	180	0.033333333	180	0.3348	5.017	2/1/2010	2/4/2010	
ARS1-B10-00640-05	ARS1-10-00166	002	L			0.262055556	180	0.033333333	180	0.3393	5.016	2/1/2010	2/4/2010	
ARS1-B10-00640-06	ARS1-10-00166	003	L			0.213833333	180	0.033333333	180	0.3078	5.044	2/1/2010	2/4/2010	
ARS1-B10-00640-07	ARS1-10-00166	004	L			0.415333333	180	0.033333333	180	0.3274	5.032	2/1/2010	2/4/2010	
ARS1-B10-00640-08	ARS1-10-00166	005	L			1.271722222	180	0.033333333	180	0.3353	5.032	2/1/2010	2/4/2010	
ARS1-B10-00640-09	ARS1-10-00166	006	L			0.135722222	180	0.033333333	180	0.2961	5.035	2/1/2010	2/4/2010	
ARS1-B10-00640-10	ARS1-10-00166	007	L			0.176333333	180	0.033333333	180	0.3371	5.021	2/1/2010	2/5/2010	
ARS1-B10-00640-11	ARS1-10-00166	008	L			0.033055556	180	0.033333333	180	0.3298	5.042	2/1/2010	2/5/2010	
ARS1-B10-00640-12	ARS1-10-00166	009	L			0.035277778	180	0.033333333	180	0.3345	5.027	2/1/2010	2/5/2010	
ARS1-B10-00640-13	ARS1-10-00166	010	L			0.427666667	180	0.033333333	180	0.3324	5.025	2/1/2010	2/5/2010	

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B10-00640-01					2.22	1	10.89	6	4.89		73	P-44-S-2			
ARS1-B10-00640-02					2.22	1.96	10.59	6	4.59		73	P-44-S-3			
ARS1-B10-00640-03					2.22	1.96	5.57	6	-0.43		73	P-44-S-4			
ARS1-B10-00640-04	ARS1-10-00166	001			2.22	1	106.33	6	100.33		73	P-44-S-5			
ARS1-B10-00640-05	ARS1-10-00166	002			2.22	1	47.17	6	41.17		73	P-44-S-6			
ARS1-B10-00640-06	ARS1-10-00166	003			2.22	1	38.49	6	32.49		73	P-44-S-7			
ARS1-B10-00640-07	ARS1-10-00166	004			2.22	1	74.76	6	68.76		73	P-44-S-8			
ARS1-B10-00640-08	ARS1-10-00166	005			2.22	1	228.91	6	222.91		73	P-44-S-9			
ARS1-B10-00640-09	ARS1-10-00166	006			2.22	1	24.43	6	18.43		73	P-44-S-10			
ARS1-B10-00640-10	ARS1-10-00166	007			2.22	1	31.74	6	25.74		73	P-44-S-11			
ARS1-B10-00640-11	ARS1-10-00166	008			2.22	1	5.95	6	-0.05		73	P-44-S-12			
ARS1-B10-00640-12	ARS1-10-00166	009			2.22	1	6.35	6	0.35		73	P-44-S-13			
ARS1-B10-00640-13	ARS1-10-00166	010			2.22	1	76.98	6	70.98		73	P-44-S-14			

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	DeltaT2
ARS1-B10-00640-01								4499.8			0.04133	0.02	0	0.025	0	0	0	
ARS1-B10-00640-02								4499.8			0.04133	0.02	0	0.025	0	0	0	
ARS1-B10-00640-03								4499.8			0.04133	0.02	0	0.025	0	0	0	
ARS1-B10-00640-04	ARS1-10-00166	001						4499.8			0.04133	0.02	0	0.025	0	0	2.7375	
ARS1-B10-00640-05	ARS1-10-00166	002						4499.8			0.04133	0.02	0	0.025	0	0	2.86875	
ARS1-B10-00640-06	ARS1-10-00166	003						4499.8			0.04133	0.02	0	0.025	0	0	3.000694444	
ARS1-B10-00640-07	ARS1-10-00166	004						4499.8			0.04133	0.02	0	0.025	0	0	3.131944444	
ARS1-B10-00640-08	ARS1-10-00166	005						4499.8			0.04133	0.02	0	0.025	0	0	3.263888889	
ARS1-B10-00640-09	ARS1-10-00166	006						4499.8			0.04133	0.02	0	0.025	0	0	3.395138889	
ARS1-B10-00640-10	ARS1-10-00166	007						4499.8			0.04133	0.02	0	0.025	0	0	3.526388889	
ARS1-B10-00640-11	ARS1-10-00166	008						4499.8			0.04133	0.02	0	0.025	0	0	3.658333333	
ARS1-B10-00640-12	ARS1-10-00166	009						4499.8			0.04133	0.02	0	0.025	0	0	3.789583333	
ARS1-B10-00640-13	ARS1-10-00166	010						4499.8			0.04133	0.02	0	0.025	0	0	3.921527778	

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B10-00640-01							1					0.052279718	0.003906994	0.703258917		BSTEFFENS	2/5/2010
ARS1-B10-00640-02							1					0.052279718	0.003934094	0.708136914		BSTEFFENS	2/5/2010
ARS1-B10-00640-03							1					0.052279718	0.003935328	0.708359012		BSTEFFENS	2/5/2010
ARS1-B10-00640-04	ARS1-10-00166	001					0.999578406					0.052279718	0.003727343	0.670921787	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-05	ARS1-10-00166	002					0.999558197					0.052279718	0.003776613	0.679790282	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-06	ARS1-10-00166	003					0.999537881					0.052279718	0.003445053	0.620109566	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-07	ARS1-10-00166	004					0.999517673					0.052279718	0.003655634	0.658014198	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-08	ARS1-10-00166	005					0.999497358					0.052279718	0.003743767	0.673878059	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-09	ARS1-10-00166	006					0.999477151					0.052279718	0.003307986	0.595437568	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-10	ARS1-10-00166	007					0.999456944					0.052279718	0.003755485	0.67598731	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-11	ARS1-10-00166	008					0.999436631					0.052279718	0.003689451	0.664101154	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-12	ARS1-10-00166	009					0.999416425					0.052279718	0.003730821	0.67154786	LSC-A-001	BSTEFFENS	2/5/2010
ARS1-B10-00640-13	ARS1-10-00166	010					0.999396112					0.052279718	0.003705849	0.667052807	LSC-A-001	BSTEFFENS	2/5/2010

Assay Definition-

Assay Description:
H3 Normal Lvl

Assay Type: DPM (Single)
Report Name: Report1
Output Data Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20100203_1709
Raw Results Path: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20100203_1709\20100203_1709.results
RTF File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20100203_1709\H3 Results.rtf
Comma-Delimited File Name: C:\Packard\Tricarb\Results\ARS\H-3 Normal Lvl\20100203_1709\H3 Results.csv
Assay File Name: C:\Packard\TriCarb\Assays\H-3 Normal Lvl.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

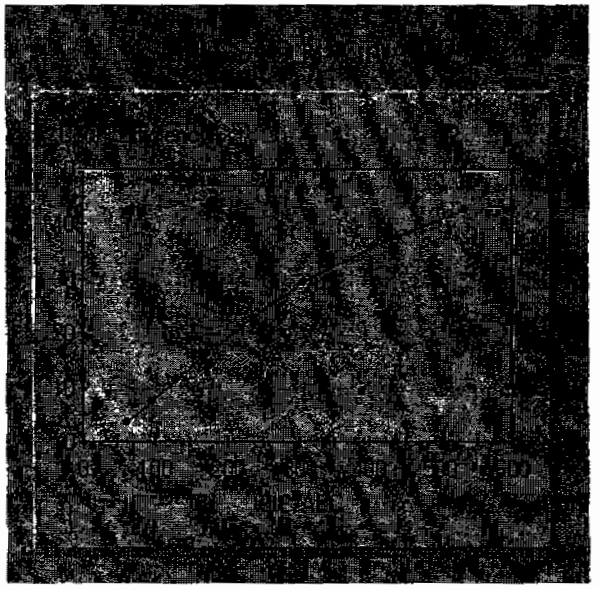
Half Life-

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 in 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

Protocol# 44 - H-3 Normal Lvl.lsa User: ARS

P#	S#	SMPL_ID	CPMA	DPM1	tSIE	Eff Nucl In A	Count Time	DATE	TIME	MESSAGES
44	1	BACKGROUND	6.00	16.99	396.97	35.35	180.00	2/3/2010	5:14:21 PM	
44	2	B10-00640-01	10.89	31.09	392.35	35.03	180.00	2/3/2010	8:21:12 PM	
44	3	B10-00640-02	10.59	30.01	395.92	35.28	180.00	2/3/2010	11:28:09 PM	
44	4	B10-00640-03	5.57	15.80	395.85	35.27	180.00	2/4/2010	2:35:01 AM	
44	5	B10-00640-04	106.33	317.59	370.06	33.48	180.00	2/4/2010	5:41:56 AM	
44	6	B10-00640-05	47.17	139.01	376.52	33.93	180.00	2/4/2010	8:51:21 AM	
44	7	B10-00640-06	38.49	125.05	331.23	30.78	180.00	2/4/2010	12:00:46 PM	
44	8	B10-00640-07	74.76	228.33	359.47	32.74	180.00	2/4/2010	3:10:11 PM	
44	9	B10-00640-08	228.91	682.77	370.74	33.53	180.00	2/4/2010	6:19:37 PM	
44	10	B10-00640-09	24.43	82.50	314.27	29.61	180.00	2/4/2010	9:28:59 PM	
44	11	B10-00640-10	31.74	94.14	373.44	33.71	180.00	2/5/2010	12:38:22 AM	
44	12	B10-00640-11	5.95	18.05	362.85	32.98	180.00	2/5/2010	3:47:44 AM	
44	13	B10-00640-12	6.35	18.97	369.59	33.45	180.00	2/5/2010	6:57:12 AM	
44	14	B10-00640-13	76.98	231.61	366.56	33.24	180.00	2/5/2010	10:06:34 AM	

ARS-054

ID_31001_054	ABatch	ABatchSampleID	ClientID	Aliquot1	AliquotUnits1	IC_ID1	Aliquot2	AliquotUnits2	IC_ID2	UserID	ModDate
4513	ARS1-B10-00640	ARS1-B10-00640-01					5.024	g		BSTEFFENS	02/04/2010 09:40:08
4514	ARS1-B10-00640	ARS1-B10-00640-02					5.023	g		BSTEFFENS	02/04/2010 09:40:08
4515	ARS1-B10-00640	ARS1-B10-00640-03					5.026	g		BSTEFFENS	02/04/2010 09:40:08
4516	ARS1-B10-00640	ARS1-B10-00640-04	MD21-10-10151				5.017	g	46296	BSTEFFENS	02/04/2010 09:40:08
4517	ARS1-B10-00640	ARS1-B10-00640-05	MD21-10-10152				5.016	g	46297	BSTEFFENS	02/04/2010 09:40:08
4518	ARS1-B10-00640	ARS1-B10-00640-06	MD21-10-10153				5.044	g	46298	BSTEFFENS	02/04/2010 09:40:08
4519	ARS1-B10-00640	ARS1-B10-00640-07	MD21-10-10154				5.032	g	46299	BSTEFFENS	02/04/2010 09:40:08
4520	ARS1-B10-00640	ARS1-B10-00640-08	MD21-10-10155				5.032	g	46300	BSTEFFENS	02/04/2010 09:40:08
4521	ARS1-B10-00640	ARS1-B10-00640-09	MD21-10-10156				5.035	g	46301	BSTEFFENS	02/04/2010 09:40:08
4522	ARS1-B10-00640	ARS1-B10-00640-10	MD21-10-10157				5.021	g	46302	BSTEFFENS	02/04/2010 09:40:08
4523	ARS1-B10-00640	ARS1-B10-00640-11	MD21-10-10158				5.042	g	46303	BSTEFFENS	02/04/2010 09:40:08
4524	ARS1-B10-00640	ARS1-B10-00640-12	MD21-10-10159				5.027	g	46304	BSTEFFENS	02/04/2010 09:40:08
4525	ARS1-B10-00640	ARS1-B10-00640-13	MD21-10-10160				5.025	g	46305	BSTEFFENS	02/04/2010 09:40:08

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
2-2-10	0856	BIO-00492-05	BIO-00492	1054	[illegible]
↓	↓	BIO-00492-06	↓	↓	[illegible]
↓	↓	BIO-00492-07	↓	↓	[illegible]
↓	↓	BIO-00492-08	↓	↓	[illegible]
↓	↓	BIO-00492-09	↓	↓	[illegible]
↓	↓	BIO-00492-10	↓	↓	[illegible]
2-3-10	15:36	SNC 117	QA	QA	[illegible]
↓	↓	Background	BIO-00640	1709	[illegible]
↓	↓	BIO-00640-01	↓	↓	[illegible]
↓	↓	BIO-00640-02	↓	↓	[illegible]
↓	↓	BIO-00640-03	↓	↓	[illegible]
↓	↓	BIO-00640-04	↓	↓	[illegible]
↓	↓	BIO-00640-05	↓	↓	[illegible]
↓	↓	BIO-00640-06	↓	↓	[illegible]
↓	↓	BIO-00640-07	↓	↓	[illegible]
↓	↓	BIO-00640-08	↓	↓	[illegible]
↓	↓	BIO-00640-09	↓	↓	[illegible]
↓	↓	BIO-00640-10	↓	↓	[illegible]
↓	↓	BIO-00640-11	↓	↓	[illegible]
↓	↓	BIO-00640-12	↓	↓	[illegible]

Reviewed By: JB Date: 2-8-10
Initials

Beta Liquid Scintillation Counter Log Book

Date	Time	ARS Sample I.D. Number	Batch Number	Liquid Scintillation File Number	Technician Initials
2-3-10	1536	B10-00640-13	B10-00440	1709	[illegible]
2-4-10	1227	SNC 117	QA	QA	[illegible]
↓	↓	Background	B10-00512	File number not yet assigned [illegible] 2-5-10	[illegible]
↓	↓	B10-00512-01	↓		[illegible]
↓	↓	B10-00512-02	↓	↓	[illegible]
↓	↓	B10-00512-03	↓	↓	[illegible]
↓	↓	B10-00512-04	↓	↓	[illegible]
↓	↓	B10-00512-05	↓	↓	[illegible]
↓	↓	B10-00512-06	↓	↓	[illegible]
↓	↓	B10-00512-07	↓	↓	[illegible]
↓	↓	B10-00512-08	↓	↓	[illegible]
↓	↓	B10-00512-09	↓	↓	[illegible]
↓	↓	B10-00512-10	↓	↓	[illegible]
↓	↓	B10-00512-11	↓	↓	[illegible]
		JB 2-8-10			

Reviewed By: JB Date: 2-8-10
Initials

LCS Report
Analytical Batch: ARS1-B10-00640

BlandID	ABatch	ABatchSampleID	BlandGroup	StcID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-09070	ARS1-B10-00640	ARS1-B10-00640-01	B-H3	S-0217	H-3	2	1.222747136	0	1	1	BSTEFFENS	1/28/2010	1.221617549	2/3/2010	1.221617549
B-09071	ARS1-B10-00640	ARS1-B10-00640-02	B-H3	S-0217	H-3	2	1.222747136	0	1	1	BSTEFFENS	1/28/2010	1.221617549	2/3/2010	1.221617549

ARS INTERNATIONAL
2609 North River Road • Port Allen, Louisiana 70767
1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

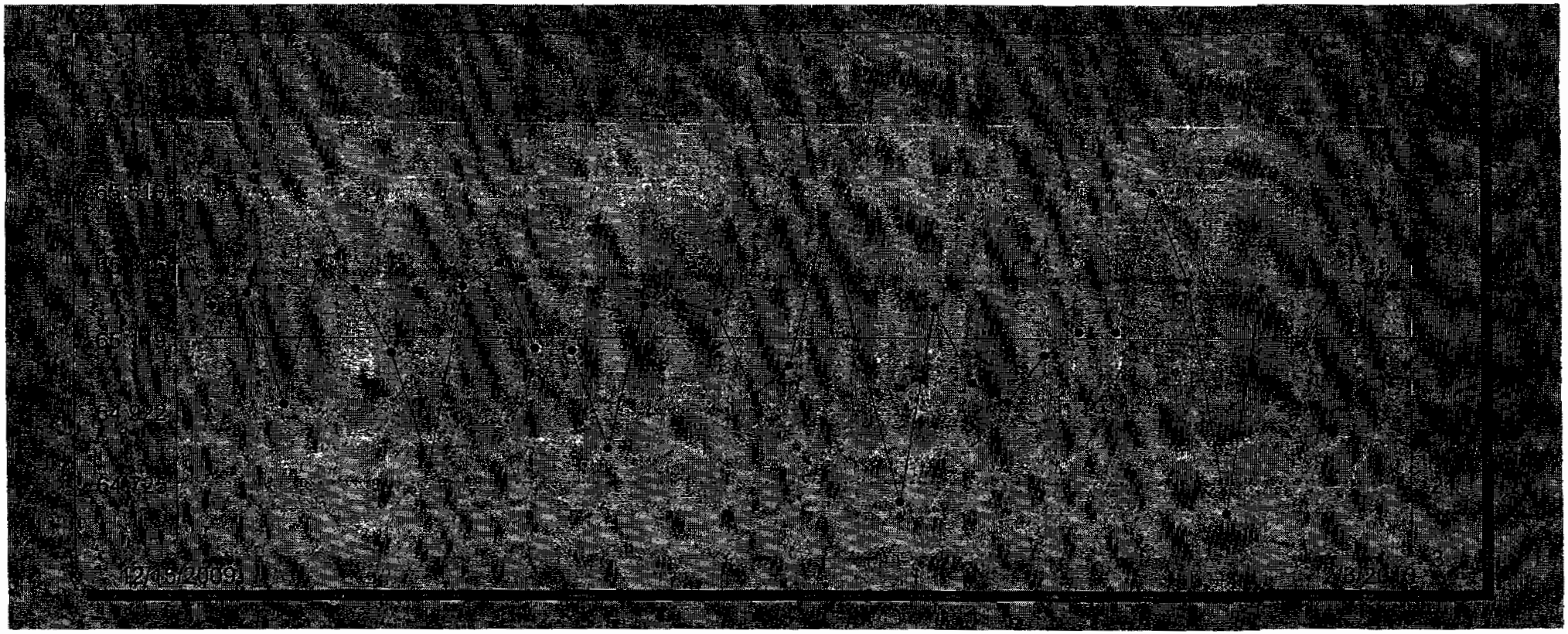
Tritium by Low Level Liquid Scintillation Counting

Control Charts

3H Efficiency
Total # pts : 1369
Valid # pts : 35
Mean : 65.12
SD : 0.20

Date	Value	Valid Pt
Dec 15, 2009	65.40	X
Dec 16, 2009	65.21	X
Dec 21, 2009	65.24	X
Dec 25, 2009	64.94	X
Dec 26, 2009	65.32	X
Dec 27, 2009	65.25	X
Dec 27, 2009	65.08	X
Dec 27, 2009	64.77	X
Dec 27, 2009	65.26	X
Dec 27, 2009	65.32	X
Dec 27, 2009	65.09	X
Dec 27, 2009	65.09	X
Dec 27, 2009	64.82	X
Dec 27, 2009	65.20	X
Dec 27, 2009	65.21	X
Dec 27, 2009	65.19	X
Dec 27, 2009	64.96	X
Dec 27, 2009	65.04	X
Dec 27, 2009	65.44	X
Dec 28, 2009	65.06	X
Dec 28, 2009	64.67	X
Dec 28, 2009	65.20	X
Dec 28, 2009	64.99	X
Dec 28, 2009	64.94	X
Dec 28, 2009	65.07	X
Dec 28, 2009	65.13	X
Jan 02, 2010	65.14	X
Jan 04, 2010	65.51	X
Jan 08, 2010	65.27	X
Jan 19, 2010	64.64	X
Jan 22, 2010	65.25	X
Jan 25, 2010	65.10	X
Jan 28, 2010	65.24	X
Feb 02, 2010	65.13	X
Feb 03, 2010	65.04	X

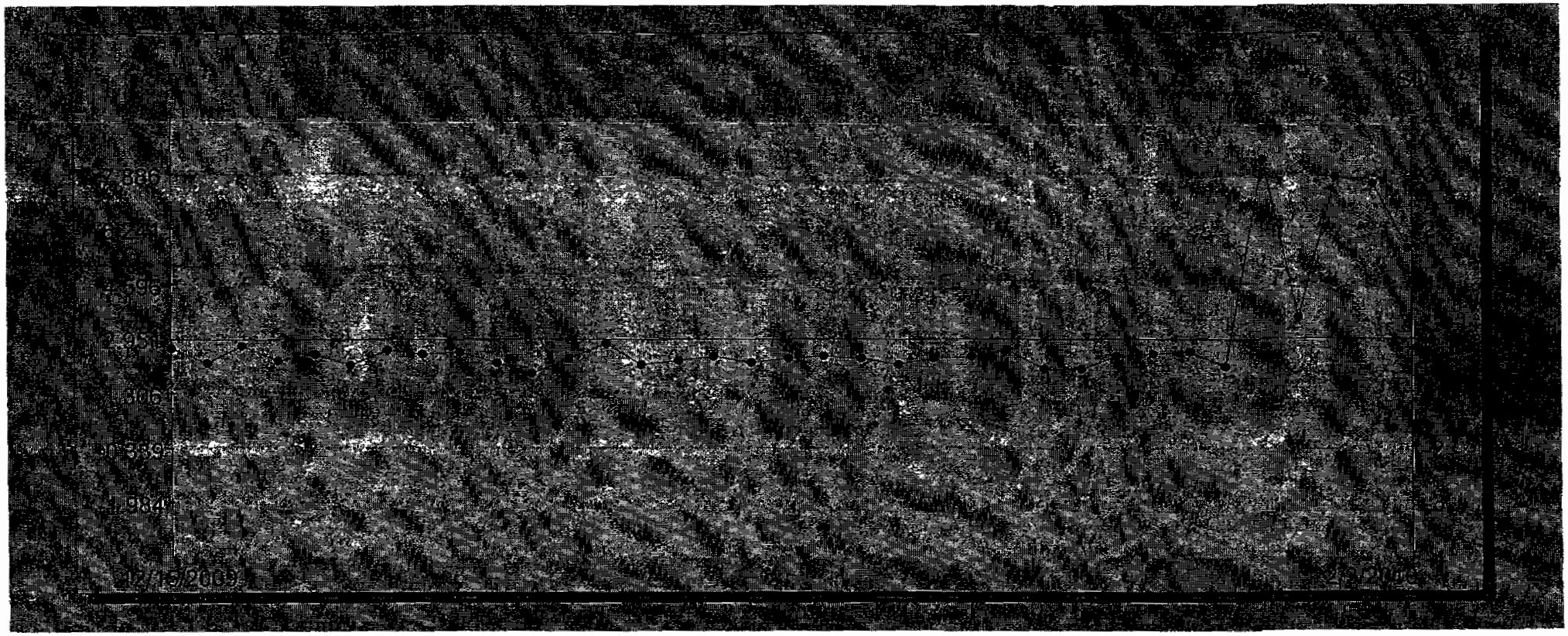
3H Efficiency
Total # pts : 1369
Valid # pts : 35
Mean : 65.12
SD : 0.20



3H Background
Total # pts : 1334
Valid # pts : 35
Mean : 2.95
SD : 1.64

Date	Value	Valid Pt
Dec 15, 2009	2.66	X
Dec 16, 2009	2.20	X
Dec 21, 2009	2.76	X
Dec 25, 2009	2.29	X
Dec 26, 2009	2.48	X
Dec 27, 2009	2.17	X
Dec 27, 2009	2.58	X
Dec 27, 2009	2.48	X
Dec 27, 2009	2.54	X
Dec 27, 2009	2.24	X
Dec 27, 2009	1.90	X
Dec 27, 2009	2.37	X
Dec 27, 2009	2.79	X
Dec 27, 2009	2.14	X
Dec 27, 2009	2.27	X
Dec 27, 2009	2.40	X
Dec 27, 2009	2.20	X
Dec 27, 2009	2.31	X
Dec 27, 2009	2.42	X
Dec 28, 2009	2.33	X
Dec 28, 2009	2.12	X
Dec 28, 2009	2.36	X
Dec 28, 2009	2.42	X
Dec 28, 2009	2.58	X
Dec 28, 2009	2.00	X
Dec 28, 2009	2.01	X
Jan 02, 2010	2.39	X
Jan 04, 2010	2.48	X
Jan 08, 2010	2.52	X
Jan 19, 2010	2.08	X
Jan 22, 2010	8.28	X
Jan 25, 2010	3.59	X
Jan 28, 2010	7.73	X
Feb 02, 2010	7.52	X
Feb 03, 2010	5.64	X

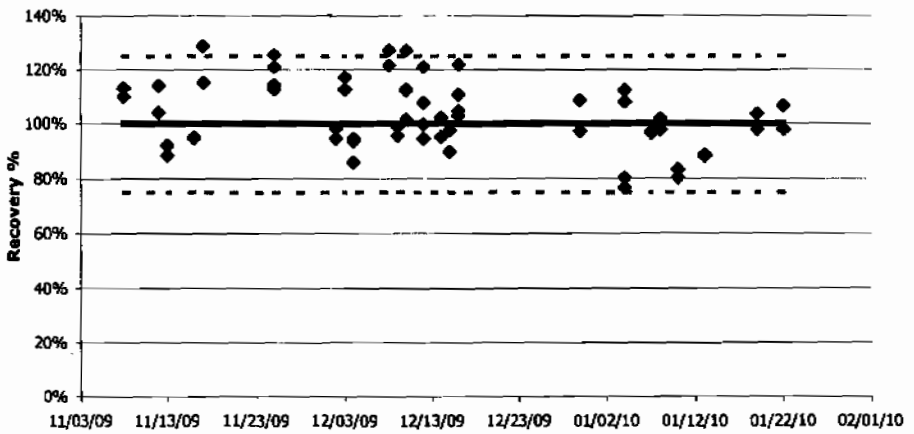
3H Background
Total # pts : 1334
Valid # pts : 35
Mean : 2.95
SD : 1.64



American Radiation Services
Baton Rouge Laboratory

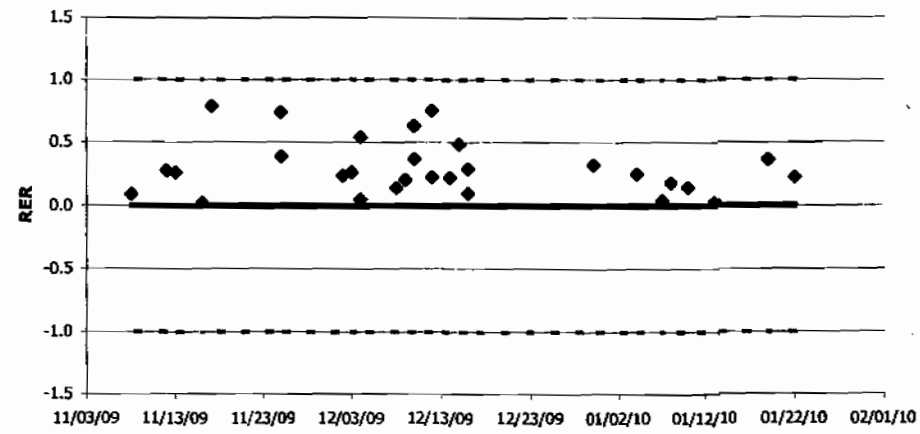
QC Chart

H-3 LCS



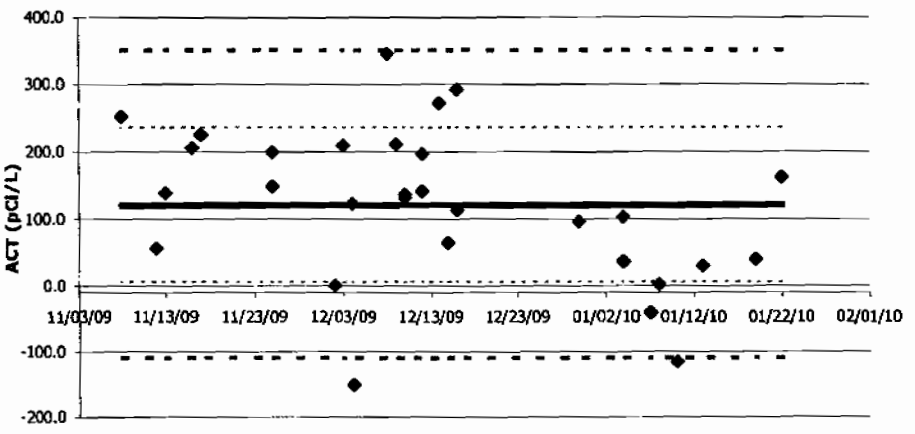
Average	STDEV	n	UCL	LCL
1.0311	0.1255	30	1.2500	0.7500

H-3 RER



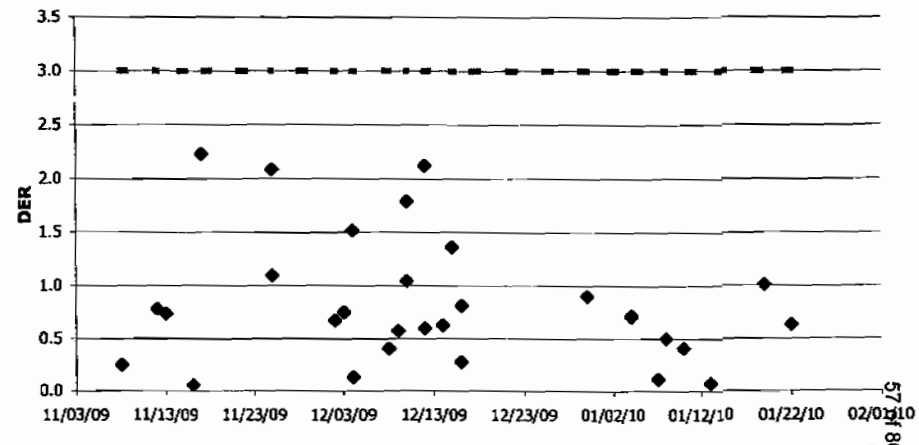
		n	UCL	LCL
		30	1.0000	-1.0000

H-3 Blank



Average	STDEV	n	UCL	LCL
120.9968	115.0613	30	351.1194	-109.1257

H-3 DER



		n	UCL	
		30	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-0209

ARS INTERNATIONAL

Add/Edit Secondary Stds

Planning	
Planning Comments	Create an intermediate level standard for use in creating LCS stock solutions and MSs.
Target dpm/g (on dil. date)	3443
Target Final volume mL	200
Appx mass g of Parent Sol'n	[illegible]
Appx vol ml of Parent Sol'n	[illegible]
Expected Addition for Analysis g	1

Standards Preparation / Dilution	
Secondary Solution #	[illegible]
Dilution Date (New Ref Date)	05/04/2009 14:28
Ampoule, Empty (g)	
Ampoule /Solution Gross (g)	
Net Wt Removed (g)	[illegible]
Transfer Container, empty (g)	13.126
Container Plus Solution (g)	14.583
Net Wt Transferred (g)	[illegible]
DPM Xferred on 05/04/2009 14:28	[illegible]
Diluent/matrix	DI H2O
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	[illegible]
Dilution Empty Container Mass (g)	68.227
Dilution Full Cont g (if measured)	270.479
Dilution Final Volume ml (if measured)	200
Final Dilution Density (g/mL)	[illegible]
Final Dilution Measured Mass g	[illegible]
Comments	Intermediate level H3 standard. Dilution performed as stated above by B Steffens. -BJS 5/4/09
Final Dilution dpm/g	[illegible]
Final Dil New Ref Date/Time	[illegible]

Parent Standard Data

Parent Solution Reference #	[illegible]
Parent Solution #	[illegible]
Parent Principal Radionuclide	[illegible] Half Life (Days) [illegible]
Parent Reference Date	[illegible]
Parent Certified Act	[illegible] Certi Act/Vol Units [illegible]
Parent Cert Act Uncert 1 Sigma	[illegible]
Parent Sp. Gravity G/Ml	[illegible]
Parent Supplier	[illegible]
Parent Date Recvd	[illegible]
Parent Received By	[illegible]
Parent Cert Exp Date	[illegible]
Parent Matrix	H2O
Certified dpm/g At Ref Date	[illegible]
Certified dpm/g on 05/04/2009 14:28	[illegible]
Parent Comments	S-0081 intermediate dilution - information entered upon dilution receipt - [illegible] RTS
Parent Tech	[illegible]
Is_Primary	FALSE
Is_LCS	FALSE
Is_Tracer	FALSE
Is_Calib	FALSE

Printed: 5/6/2009 8:19 AM

ARS INTERNATIONAL

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

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	6740.26	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
10% Max *PASS*	Standard Deviation percent of known concentration	0.53%	0.53%
	Target Activity	3588.15	1616.28
5% Max *PASS*	% Diff	2.72%	2.72%

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

STD ID: S-0217

ARS INTERNATIONAL

Add/Edit *Secondary Stds*

Planning	
Planning Comments	H-3 Normal Level LCS
Target dpm/g (on dil. date)	2.8
Target Final volume mL	2000
Appx mass g of Parent Sol'n	[redacted]
Appx vol ml of Parent Sol'n	[redacted]
Expected Addition for Analysis g	2

Standards Preparation / Dilution	
Secondary Solution #	[redacted]
Dilution Date (New Ref Date)	07/19/2009 12:40
Ampoule, Empty (g)	
Ampoule /Solution Gross (g)	
Net Wt Removed (g)	[redacted]
Transfer Container, empty (g)	0
Container Plus Solution (g)	1.579
Net Wt Transferred (g)	[redacted]
DPM Xferred on 07/19/2009 12:40	[redacted]
Diluent/matrix	H2O
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	[redacted]
Dilution Empty Container Mass (g)	1
Dilution Full Cont g (if measured)	2003
Dilution Final Volume ml (if measured)	
Final Dilution Density (g/mL)	[redacted]
Final Dilution Measured Mass g	[redacted]
Comments	H-3 Normal LCS: New Mix to replace expended S-0204
Final Dilution dpm/g	[redacted]
Final Dil New Ref Date/Time	[redacted]

Parent Standard Data

Parent Solution Reference #	[redacted]
Parent Solution #	[redacted]
Parent Principal Radionuclide	[redacted]
Half Life (Days)	[redacted]
Parent Reference Date	[redacted]
Parent Certified Act	[redacted]
Certi Act/Vol Units	[redacted]
Parent Cert Act Uncert 1 Sigma	[redacted]
Parent Sp. Gravity G/Ml	[redacted]
Parent Supplier	[redacted]
Parent Date Recvd	[redacted]
Parent Received By	[redacted]
Parent Cert Exp Date	[redacted]
Parent Matrix	[redacted]
Certified dpm/g At Ref Date	[redacted]
Certified dpm/g on 07/19/2009 12:40	[redacted]
Parent Comments	[redacted]
Parent Tech	[redacted]
Is_Primary	[redacted]
Is_LCS	[redacted]
Is_Tracer	[redacted]
Is_Calib	[redacted]

Printed: 7/30/2009 2:12 PM

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QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE 7/30/2009 10:56 *date counted*
STANDARD REFERENCE # [redacted]

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

Radionuclide H-3 Dilution Reference Date 7/19/2009 12:49

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

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-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	2.82	1.27
	Two Sigma Uncertainty	0.14	0.06
10% Max *PASS*	Standard Deviation percent of known concentration	2.61%	2.61%
	Target Activity	2.79	1.26
5% Max *PASS*	% Diff	0.86%	0.86%

Verification Expiration Date: July 30, 2010

Prepared & Counted By Hallie Dm Date: 7/30/2009 10:56
Verified & Approved By Virginia Mulligan Date: 8-6-09
QC Approval [illegible] Date: 7-30-09

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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

Percent Moisture

ARS INTERNATIONAL
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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10151	**ARS Sample ID:**	ARS1-10-00166-001
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	15.152	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10152	**ARS Sample ID:**	ARS1-10-00166-002
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	16.191	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10153	**ARS Sample ID:**	ARS1-10-00166-003
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	10.318	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10154	**ARS Sample ID:**	ARS1-10-00166-004
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Cham Recovery
Percent Moisture	17.488	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10155	**ARS Sample ID:**	ARS1-10-00166-005
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	22.242	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10156	**ARS Sample ID:**	ARS1-10-00166-006
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	9.216	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 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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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10157	**ARS Sample ID:**	ARS1-10-00166-007
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	18.891	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10158	**ARS Sample ID:**	ARS1-10-00166-008
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	15.803	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10159	**ARS Sample ID:**	ARS1-10-00166-009
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	20.465	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

DHR
Project Manager Review

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ARS Sample Delivery Group:	ARS1-10-00166	**Request or PO Number:**	10-1546
Client Sample ID:	MD21-10-10160	**ARS Sample ID:**	ARS1-10-00166-010
Sample Collection Date:	02/01/10	**Date Received:**	02/03/10
Sample Matrix:	Silica	**Report Date:**	02/05/10

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	21.999	N/A	N/A	N/A	N/A	%	Percent Moisture	02/04/10 00:00	BJS	N/A

NOTES: Project Cost Code - MR8R032TNB00

Project Manager Review

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for

Los Alamos National Laboratory

Percent Moisture Laboratory Records

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for

Los Alamos National Laboratory

Folder Duplicate

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

SDG Number: ARS1-10-00166
Client: LANL

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD21-10-10151	ARS1-10-00166-001	598	434	164	24.85	5.017	**15.152439**
MD21-10-10152	ARS1-10-00166-002	627	454	173	28.01	5.016	**16.1907514**
MD21-10-10153	ARS1-10-00166-003	608	455	152	15.684	5.044	**10.3184211**
MD21-10-10154	ARS1-10-00166-004	602	437	164	28.681	5.032	**17.4884146**
MD21-10-10155	ARS1-10-00166-005	619	433	186	41.371	5.032	**22.2424731**
MD21-10-10156	ARS1-10-00166-006	603	450	152	14.009	5.035	**9.21644737**
MD21-10-10157	ARS1-10-00166-007	605	438	166	31.359	5.021	**18.8909639**
MD21-10-10158	ARS1-10-00166-008	619	461	158	24.968	5.042	**15.8025316**
MD21-10-10159	ARS1-10-00166-009	623	448	176	36.018	5.027	**20.4647727**
MD21-10-10160	ARS1-10-00166-010	628	452	176	38.719	5.025	**21.9994318**

Balance ID: 0102/H1331122173560P
Pipettor ID: FJ40469

Signature: [illegible] Date: 2-4-16

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

SDG Number: ARS1-10-00166
Client: LANL

LCS - 5.024
LCSD - 5.023
BLK - 5.026

LANL ID	ARS ID	weight of cylinder with gel (g)	weight of empty cylinder (g)	Weight of gel (g)	amount of liquid collected (ml)	amount of liquid tested (ml)	% moisture
MD21-10-10151	ARS1-10-00166-001	598	434	164	24.850	5.017	#DIV/0!
MD21-10-10152	ARS1-10-00166-002	627	454	173	28.010	5.016	#DIV/0!
MD21-10-10153	ARS1-10-00166-003	608	455	152	15.684	5.044	#DIV/0!
MD21-10-10154	ARS1-10-00166-004	602	437	164	28.681	5.032	#DIV/0!
MD21-10-10155	ARS1-10-00166-005	619	433	186	41.371	5.032	#DIV/0!
MD21-10-10156	ARS1-10-00166-006	603	450	152	14.009	5.035	#DIV/0!
MD21-10-10157	ARS1-10-00166-007	605	438	166	31.359	5.021	#DIV/0!
MD21-10-10158	ARS1-10-00166-008	619	461	158	24.968	5.042	#DIV/0!
MD21-10-10159	ARS1-10-00166-009	623	448	176	36.018	5.027	#DIV/0!
MD21-10-10160	ARS1-10-00166-010	628	452	176	38.719	5.025	#DIV/0!

Balance ID: 0102/H1331122173560P
Pipettor ID: FJ40469

Signature: [signature] Date: 2-3-10

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American Radiation Services Analytical Reports

for

Los Alamos National Laboratory

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ARS INTERNATIONAL

Report Compilation Checklist

ARS SDG: 10-00166 **Client Name:** LANL **Sample Matrix:** Silica Gel

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

LEVEL 2 COMPONENTS	1st Reviewer	
6) Batch Quality Control Report is Present and Accurate?	~~Yes~~ No N/A	
7) DQO Report is Present and Accurate?	~~Yes~~ No N/A	
8) Client Specific Batch QC Components are Present and Complete?	~~Yes~~ No N/A	

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

LEVEL 4 COMPONENTS	1st Reviewer	
17) Preparation Raw Data Present and Complete?	~~Yes~~ No N/A	
18) Instrument Raw Data Present and Complete?	~~Yes~~ No N/A	
19) Calibration Certificates Present?	~~Yes~~ No N/A	
20) Copies of Log Book Pages Present?	~~Yes~~ No N/A	
21) Sample Receiving Documentation Present?	~~Yes~~ No N/A	
22) LIMS Reports Present?	~~Yes~~ No N/A	
23) Applicable Correspondence Present?	~~Yes~~ No N/A	
24) Other:	Yes No ~~N/A~~	

Virginia Mulligan 2-5-10
Report Generator Signature Date

2-8-10
Management Review Signature Date

ARS INTERNATIONAL

LSC
Technical Review Checklist

ARS SDG 10-00166

Sample Matrix: Silica Gel **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

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

ARS A. Batch ID(s):	**Batch A:** B10-00640	**Batch B:** N/A	**Batch C:** N/A
Test Method(s):	LSC-A-001	N/A	N/A

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Verifier Review
1) 100% of Manual Transcriptions Verified?	Yes No N/A	Yes No N/A
2) 100% of Manual Calculations Verified?	Yes No N/A	Yes No N/A
3) Blank Composition/Configuration Matches Calibration?	Yes No N/A	Yes No N/A
4) Deviations from procedure are documented and verified?	Yes No N/A	Yes No N/A
5) Appropriate Cocktail Selected?	Yes No N/A	Yes No N/A

6) Sample Prep Anomaly? ☒ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

[signature]	2-3-10	[signature]	2-3-10
Chemist Signature	Date	Verifier Review Signature	Date

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations Valid and Current?	Yes No N/A	Yes No N/A
2) Backgrounds Valid and Current?	Yes No N/A	Yes No N/A
3) Source Checks Completed and Acceptable?	Yes No N/A	Yes No N/A

[signature]	2-5-10
QA Officer Signature	Date

	Analyst Review	Technicial Review
4) Background Checks Complete and Acceptable?	Yes No N/A	Yes No N/A
5) 100% of Manually Entered Parameters Verified Accurate?	Yes No N/A	Yes No N/A
6) Appropriate QC samples initiated at required frequency?	Yes No N/A	Yes No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) Analysis Parameters Checked and Correct and Peak Shapes are Acceptable?	Yes No N/A	Yes No N/A
b) Spectra show no Evidence of Interferences?	Yes No N/A	Yes No N/A
c) Sample Quench for All Samples within Range of Quench Curve?	Yes No N/A	Yes No N/A

7) Analysis Anomaly? ☒ No ☐ Yes (See Comments) NCR # (If initiated): _____

[signature]	2-5-10	N/A	
Analyst Signature	Date	Technicial Reviewer Signature	Date

ARS INTERNATIONAL

Batch A: B10-00640

LSC
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) Activity + 3xCSU a Negative Number?	Yes (No) N/A	Yes ~~No~~ N/A
2) RDL Criteria are Met?	(Yes) No N/A	~~Yes~~ No N/A
3) Method Blank Criterion Met?	(Yes) No N/A	~~Yes~~ No N/A
4) LCS/LCD Criteria Met?	(Yes) No N/A	~~Yes~~ No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	(Yes) No N/A	~~Yes~~ No N/A
6) MS/MSD Criteria Met?	Yes No (N/A)	Yes No ~~N/A~~
7) Batch QC Anomaly? ☒ No ☐ Yes (See Tech Notes) NCR # (If initiated):		

Project Manager Signature	Date	QA Officer Signature	Date
YM	2-5-10	JBoyd	2-8-10

GENERAL COMMENTS

ARS FILE TRACKING SHEET

SDG: 10-00166

Task	Date / Time	Initials
Date & Time Samples Received	2-3-10 / 10:00	WGB
ICOC Initiated / Storage Location: 06	2-3-10 / 10:42	WGB
Technical Checks Performed	See Batch	
Report Written	2-5-10/1703	VTM
Quality Assurance Checks Performed on Report		
Management Check Performed on Report	2-9-10 0814	JB
Preliminary Report Sent	2-5-10/ 1705	VTM
Report E-mailed		
Report Faxed		
Report Reviewed		
Report Mailed		
Invoice Completed Invoice #:		
Report Imaged		

SPECIAL REQUIREMENTS

Requirement	Yes	No
3 Hour Rush		✓
24 Hour Rush		✓
48 Hour Rush		✓
Special Invoicing *see notes* Mgmt. Approval:		✓

NOTES:

ARS-062
07/03/2009

COMPANY NAME: LOS ALAMOS NATIONAL LAB **SDG:** 10-00166

SHIPPING CONTAINER

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

COC PRESENT WITH SAMPLES

COC	☑ Yes	☐ No

SAMPLE CONTAINER(S)

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

Samples Rcv 10

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

External and Internal Surveys

Exposure Rate Meter: M5242861 Serial No.: MM-2PR26166 Calibration Due Date: 4-20-10

Count Rate Meter: M2154857 Serial No.: MM-2PR18459 Calibration Due Date: 4-6-10

Background Exposure Rate (µR/hr): 22 Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd): 22 µR/hr

Background Count Rate (cpm): 70 Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd): 70 cpm

Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd): 70 cpm

Sample Label/Comments/Notes	pH Orig (pH ≤ 2 is Acceptable)	pH Final	Mark if Preserve	Acid Lot #	Weight(g) / Volume(mL)	µR/hr (Acceptance Limits <500 µR/hr)	cpm (Acceptance Limits <100 cpm/cm²)
MD21-10-10151						22	70
10152						22	70
10153		N/A				22	70
10154						22	70
10155						22	80
10156						22	70
10157			N/A			22	80
10158						22	70
10159						22	70
10160						23	70

Surveyors' Name: William Stahle Date/Time Surveyed: 2-3-10 10:12

DQO Report for SDG
ARS1-10-00166

Analysis Code	Group	Isotope	Activity Units	Aliquot Units	ProcedureNo	RDL	LCS_LL	LCS_UL	MS_LL	MS_UL	RadY_LL	RadY_UL	GravY_LL	GravY_LL	RER	RPD	DilutionReq	RoughPreaReq	BlankCorrectionNDA	BlankCorrectionAll	CountTimeRes	AliquotRequired
LSC-A-001	STD	H-3	pCi	L	ARS-054	2.50E+02	50	150	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-10-00166	TAT Days	5	Project Type	Environmental
Sample Count	Rpt Level 4	Date Received	2/3/2010	COC Number	10-1546C
Client	Los Alamos National Laboratory	Client Deadline	2/7/2010	PO Number	MR8RO32TNB00
Client Code	114	Internal Deadline	2/5/2010	Job Number	126310041
Profile Number	PN-00094	Lab Deadline	2/3/2010	Job Location	
Comments					

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
001	MD21-10-10151	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46001	1		1.00			70	22		N	N/A				
002	MD21-10-10152	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46002	1		1.00			70	22		N	N/A				
003	MD21-10-10153	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46003	1		1.00			70	22		N	N/A				
004	MD21-10-10154	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46004	1		1.00			70	22		N	N/A				
005	MD21-10-10155	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46005	1		1.00			80	22		N	N/A				
006	MD21-10-10156	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46006	1		1.00			70	22		N	N/A				
007	MD21-10-10157	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46007	1		1.00			80	22		N	N/A				
008	MD21-10-10158	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46008	1		1.00			70	22		N	N/A				
009	MD21-10-10159	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46009	1		1.00			70	22		N	N/A				
010	MD21-10-10160	SI	02/01/10 12:00 PM	02/01/10 12:00 PM	H	90	5	O6							
→															
	46010	1		1.00			70	23		N	N/A				

SDG Report - Analysis Assignments

Temp SDG	ARS1-10-00166	Sample Count	
Client	Los Alamos National Laboratory	Analysis Count	1-10

Samples Count Totals per Analysis

Analysis Code	Analysis Description	Samples Count
LSC-A-001	Tritium in (Water [Aqueous, AQ])	10

Analyses Assigned Per Fraction

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

Appendix E Allanalyses MDA V Tritium Vapor Monitiring 3rd Quarter
Event 2561

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
68615062	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	377.5000-3	GAS	na	RAD	H-3	Tritium	18.891		297.772	1	8865.7	489.594	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/5/2010	2/1/2010
68615072	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	42.5000-47	GAS	na	RAD	H-3	Tritium	15.152		302.129	1	35062.5	1853.73	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/1/2010
68615082	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524S	677.5000-6	GAS	na	RAD	H-3	Tritium	15.803		320.558	1	-18.5394	95.5425	pCi/L	U	CS	H3	EPA:906.0	ARSL	2/5/2010	2/1/2010
68615092	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	300.0000-3	GAS	na	RAD	H-3	Tritium	22.242		269.983	1	69612.4	3656.76	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/1/2010
68615102	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524S	712.5000-7	GAS	na	RAD	H-3	Tritium	20.465		294.357	1	119.169	89.4022	pCi/L	U	CS	H3	EPA:906.0	ARSL	2/5/2010	2/1/2010
68615112	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	327.5000-3	GAS	na	RAD	H-3	Tritium	9.216		484.42	1	10326.8	586.986	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/2/2010
68615132	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	122.5000-1	GAS	na	RAD	H-3	Tritium	16.191		284.441	1	13545.5	730.381	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/1/2010
68615142	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	172.5000-1	GAS	na	RAD	H-3	Tritium	10.318		424.431	1	15950.6	868.878	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/2/2010
68615152	10-1546	MD21-10-1	N	VOST	INV	na	na	21-018(a)-99	21-24524W	257.5000-2	GAS	na	RAD	H-3	Tritium	17.488		303.938	1	24173.6	1285.54	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/4/2010	2/1/2010

Appendix E QC MDA V Tritium Vapor Monitiring 3rd Quarter
Event 2561

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
68615122	10-1546	MD21-10-10160	N	VOST	QC	na	FD	21-018(a)-9	21-24524W	257.5000-26	GAS	na	RAD	H-3	Tritium	21.999		290.329	1	23836.7	1266.87	pCi/L	NQ	CS	H3	EPA:906.0	ARSL	2/5/2010	2/1/2010