



September 08, 2014

Mr. Scot Fitzgerald
CH2MHill Plateau Remediation Company
MISN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Re: CHPRC SAF F11-031 | Spent GAC
Work Order: 355700
SDG: GEL355700

Dear Mr. Fitzgerald:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 29, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4505.

Sincerely,

Heather Shaffer
Project Manager

Purchase Order: 302853ES20
Chain of Custody: F11-031-071
Enclosures



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Case Narrative

September 11, 2014

**Receipt Narrative
for
Hanford MSA (51204)
SDG: GEL355700
Work Order: 355700**

September 08, 2014

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on August 29, 2014 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following sample:

<u>Laboratory ID</u>	<u>Client ID</u>
355700001	B2XNL8

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.



Heather Shaffer
Project Manager

Chain of Custody and Supporting Documentation

September 11, 2014

Effective 11/7/2013
Revision 0 Effective November 2013

Sample Receipt and Review Form

GL-CHL-SR-001 Rev 0
Page 1 of 1



SAMPLE RECEIPT & REVIEW FORM

Client: HMSA		SDG/AR/COC/Work Order: 35570	
Received By: Chris Zuercher		Date Received: 8-29-14	
Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0cpm
Classified Radioactive II or III by RSO?		<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?		<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
Samples identified as Foreign Soil?		<input checked="" type="checkbox"/>	

Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*		<input checked="" type="checkbox"/>		Preservation Method: Ice bags Blue ice Dry ice <u>None</u> Other (describe) 23c *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: 130532792 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4	Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>		Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?		<input checked="" type="checkbox"/>		Sample ID's and containers affected:
7	Are Encore containers present?			<input checked="" type="checkbox"/>	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			<input checked="" type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14	Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 7709 7890 6570

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials **HZ** Date **09/21/14** Page **1** of **1**

Laboratory Certifications

List of current GEL Certifications as of 08 September 2014

State	Certification
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-14-9
Utah NELAP	SC000122014-14
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

Radiological Analysis

September 11, 2014
Radiochemistry Case Narrative
Hanford MSA (HMSA)
SDG GEL355700
Work Order 355700

Method/Analysis Information

Product: Alphaspec Am241 Solid
Analytical Method: AMCMISO_EIE_PREC_AEA
Prep Method: Dry Soil Prep
Analytical Batch Number: 1415580
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203158453	MB for batch 1415580
1203158455	Laboratory Control Sample (LCS)
1203158454	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Alphaspec Np, Solid
Analytical Method:	DOE EML HASL 300
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1415581
Prep Batch Number:	1415507

Sample ID	Client ID
355700001	B2XNL8
1203158456	MB for batch 1415581
1203158458	Laboratory Control Sample (LCS)
1203158457	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-032 REV# 19.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Alphaspec Pu, Solid
Analytical Method: PUIISO_PLATE_AEA
Prep Method: Dry Soil Prep
Analytical Batch Number: 1415582
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203158459	MB for batch 1415582
1203158461	Laboratory Control Sample (LCS)
1203158460	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Alphaspec Th, Solid (Th232)
Analytical Method: THISO_IE_PLATE_AEA
Prep Method: Dry Soil Prep
Analytical Batch Number: 1415583
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203158462	MB for batch 1415583
1203158464	Laboratory Control Sample (LCS)
1203158463	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-038 REV# 16.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Alphaspec U, Solid
Analytical Method: UIISO_IE_PRECIP_AEA
Prep Method: Dry Soil Prep
Analytical Batch Number: 1415584
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203158465	MB for batch 1415584
1203158467	Laboratory Control Sample (LCS)
1203158466	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-011 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

September 11, 2014

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Sample 355700001 (B2XNL8) was recounted due to a suspected false positive. The recount is reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Manual Integration

No manual integrations were performed on data in this batch.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gammascpec Solid-Cs137,Co60,Eu152,Eu154,E155, Pa231**
Analytical Method: **GAMMA_GS**
Prep Method: **Dry Soil Prep**
Analytical Batch Number: **1415531**
Prep Batch Number: **1415507**

Sample ID	Client ID
355700001	B2XNL8
1203158293	MB for batch 1415531
1203158295	Laboratory Control Sample (LCS)
1203158294	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: **Gamma I129, Solid**
Analytical Method: I129_SEP_LEPS_GS
Analytical Batch Number: 1415923

Sample ID	Client ID
355700001	B2XNL8
1203159279	MB for batch 1415923
1203159282	Laboratory Control Sample (LCS)
1203159280	355700001(B2XNL8) Sample Duplicate (DUP)
1203159281	355700001(B2XNL8) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-006 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Sr90, solid
Analytical Method: SRTOT_SEP_PRECIP_GPC
Prep Method: Dry Soil Prep
Analytical Batch Number: 1416105
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203159737	MB for batch 1416105
1203159739	Laboratory Control Sample (LCS)
1203159738	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with

GL-RAD-A-004 REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

All chemical recoveries meet the required acceptance limits for this sample set.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: GFPC, Gross A/B, solid
Analytical Method: 9310_ALPHABETA_GPC
Prep Method: Dry Soil Prep
Analytical Batch Number: 1416106
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203159740	MB for batch 1416106
1203159744	Laboratory Control Sample (LCS)
1203159741	355700001(B2XNL8) Sample Duplicate (DUP)
1203159742	355700001(B2XNL8) Matrix Spike (MS)
1203159743	355700001(B2XNL8) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001B REV# 17.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met. The discrimination settings are calibrated in beta discriminating mode to reduce beta to alpha crosstalk.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

All chemical recoveries meet the required acceptance limits for this sample set.

Gross Alpha/Beta Preparation Information

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

Recounts

Samples 1203159742 (B2XNL8), 1203159743 (B2XNL8) and 1203159744 (LCS) were recounted due to high recovery. The recounts are reported. Samples 1203159741 (B2XNL8) and 355700001 (B2XNL8) were recounted due to high relative percent difference/relative error ratio. The recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1332139 was generated due to Failed RPD for MS/MSD, or PS/PSD and Failed Recovery for MSD/PSD. 1. The matrix spike 1203159742 and matrix spike duplicate 1203159743 do not meet the beta relative percent difference nor relative error ratio requirement due to the matrix of the samples. 2. The matrix spike duplicate 1203159743 does not meet the beta recovery requirement due to the matrix of the sample. 1. Reporting results 2. Reporting results

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Liquid Scint Tc99, Solid
Analytical Method:	TC99_EIE_LSC
Analytical Batch Number:	1415796

Sample ID	Client ID
355700001	B2XNL8
1203158957	MB for batch 1415796
1203158959	Laboratory Control Sample (LCS)
1203158958	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-059 REV# 3.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

September 11, 2014

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Liquid Scint Ni63, Solid
Analytical Method: NI63_LSC
Prep Method: Dry Soil Prep
Analytical Batch Number: 1416093
Prep Batch Number: 1415507

Sample ID	Client ID
355700001	B2XNL8
1203159696	MB for batch 1416093
1203159698	Laboratory Control Sample (LCS)
1203159697	355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-022 REV# 16.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

September 11, 2014

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product:	Liquid Scint Se79, Solid
Analytical Method:	SE79_SEP_IE_LSC
Prep Method:	Dry Soil Prep
Analytical Batch Number:	1416095
Prep Batch Number:	1415507

Sample ID	Client ID
355700001	B2XNL8
1203159699	MB for batch 1416095
1203159701	Laboratory Control Sample (LCS)

September 11, 2014

1203159700 355700001(B2XNL8) Sample Duplicate (DUP)

The samples in this SDG were analyzed on a "dry weight" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-031 REV# 11.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Chemical Recoveries

All chemical recoveries meet the required acceptance limits for this sample set.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

September 11, 2014

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: LSC, Tritium Dist, Solid

Analytical Method: TRITIUM_DIST_LSC

Analytical Batch Number: 1416096

Sample ID	Client ID
355700001	B2XNL8
1203159702	MB for batch 1416096
1203159705	Laboratory Control Sample (LCS)
1203159703	355700001(B2XNL8) Sample Duplicate (DUP)
1203159704	355700001(B2XNL8) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

September 11, 2014

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

Samples were recounted due to high recovery. The recounts are reported.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Method/Analysis Information

Product: Liquid Scint C14, Solid
Analytical Method: C14_LSC
Analytical Batch Number: 1416098

Sample ID	Client ID
355700001	B2XNL8
1203159706	MB for batch 1416098
1203159709	Laboratory Control Sample (LCS)
1203159707	355700001(B2XNL8) Sample Duplicate (DUP)
1203159708	355700001(B2XNL8) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-003 REV# 15.

Calibration Information:

Calibration Information

All initial and continuing calibration requirements have been met.

Standards Information

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

Sample Geometry

All counting sources were prepared in the same geometry as the calibration standards.

Quality Control (QC) Information:

Blank Information

The blank volume is representative of the sample volume in this batch.

Designated QC

The following sample was used for QC: 355700001 (B2XNL8).

QC Information

All of the QC samples met the required acceptance limits.

Technical Information:

Holding Time

All sample procedures for this sample set were performed within the required holding time.

Sample Re-prep/Re-analysis

None of the samples in this sample set required reprep or reanalysis.

Recounts

None of the samples in this sample set were recounted.

Miscellaneous Information:

Data Exception (DER) Documentation

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

Sample-Specific MDA/MDC

The MDA/MDC reported on the certificate of analysis is a sample-specific MDA/MDC.

Additional Comments

Additional comments were not required for this sample set.

Qualifier Information

Manual qualifiers were not required.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

September 11, 2014

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

HMSA001 Hanford MSA (51204)

Client SDG: GEL355700 GEL Work Order: 355700

The Qualifiers in this report are defined as follows:

N Spike Sample recovery is outside control limits.

U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: Kate Gellatly

Date: 11 SEP 2014

Title: Analyst I

DATA EXCEPTION REPORT

Mo.Day Yr. 09-SEP-14	Division: Radiochemistry	Quality Criteria: Specifications	Type: Process
Instrument Type: GFPC	Test / Method: EPA 900.0/SW846 9310/SM 7110B Modified	Matrix Type: Solid	Client Code: HMSA
Batch ID: 1416106	Sample Numbers: See Below		

Potentially affected work order(s)(SDG): 355700(GEL355700)

Application Issues:

Failed RPD for MS/MSD, or PS/PSD

Failed Recovery for MSD/PSD

Specification and Requirements Exception Description:	DER Disposition:
<p>1. The matrix spike 1203159742 and matrix spike duplicate 1203159743 do not meet the beta relative percent nor relative error ratio requirement due to the matrix of the samples.</p> <p>2. The matrix spike duplicate 1203159743 does not meet the beta recovery requirement due to the matrix of the sample.</p>	<p>1. Reporting results</p> <p>2. Reporting results</p>

Originator's Name:

Kenshalla Oston 09-SEP-14

Data Validator/Group Leader:

Nat Long 10-SEP-14

Sample Data Summary

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Address : Company
 MISN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F11-031 | Spent GAC

Report Date: September 10, 2014

Client Sample ID: B2XNL8
 Sample ID: 355700001
 Matrix: OTHER SOLID
 Collect Date: 28-AUG-14
 Receive Date: 29-AUG-14
 Collector: Client
 Moisture: 14%

Project: HMSA00111
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Alpha Spec Analysis													
<i>Alphaspec Am241 Solid "Dry Weight Corrected"</i>													
Americium-241	U	0.0868	+/-0.244	0.260	+/-0.244	1.00	pCi/g		HAKB	09/05/14	0956	1415580	1
<i>Alphaspec Np, Solid "Dry Weight Corrected"</i>													
Neptunium-237	U	-0.216	+/-0.409	1.26	+/-0.409	1.00	pCi/g		HAKB	09/08/14	0948	1415581	2
<i>Alphaspec Pu, Solid "Dry Weight Corrected"</i>													
Plutonium-238	U	0.0248	+/-0.259	0.540	+/-0.259	1.00	pCi/g		HAKB	09/05/14	0956	1415582	3
Plutonium-239/240	U	0.046	+/-0.255	0.490	+/-0.256	1.00	pCi/g						
<i>Alphaspec Th, Solid (Th232) "Dry Weight Corrected"</i>													
Thorium-232	U	-0.0412	+/-0.165	0.439	+/-0.166	1.00	pCi/g		HAKB	09/06/14	1734	1415583	4
<i>Alphaspec U, Solid "Dry Weight Corrected"</i>													
Uranium-233/234	U	-0.0709	+/-0.164	0.487	+/-0.165	1.00	pCi/g		HAKB	09/08/14	0950	1415584	5
Uranium-235/236	U	0.0694	+/-0.260	0.438	+/-0.261	1.00	pCi/g						
Uranium-238	U	0.351	+/-0.358	0.354	+/-0.362	1.00	pCi/g						
Rad Gamma Spec Analysis													
<i>Gamma I129, Solid "As Received"</i>													
Iodine-129	U	-0.285	+/-0.350	0.612	+/-0.374	2.00	pCi/g		BSW1	09/04/14	0930	1415923	6
<i>Gammasespec Solid-Cs137,Co60,Eu152,Eu154,E155, Pa231 "Dry Weight Corrected"</i>													
Cesium-137	U	0.0171	+/-0.0166	0.0296	+/-0.0183	0.100	pCi/g		MXR1	09/03/14	0939	1415531	7
Cobalt-60	U	-0.00492	+/-0.0207	0.036	+/-0.0209	0.050	pCi/g						
Europium-152	U	-0.000988	+/-0.0358	0.0593	+/-0.0358	0.100	pCi/g						
Europium-154	U	0.0117	+/-0.0585	0.105	+/-0.0587		pCi/g						
Europium-155	U	0.00343	+/-0.0218	0.0362	+/-0.0219		pCi/g						
Protactinium-231	U	-0.0992	+/-0.495	0.824	+/-0.497		pCi/g						
Rad Gas Flow Proportional Counting													
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>													
Alpha	U	0.892	+/-2.04	3.92	+/-2.04	4.00	pCi/g		GXR1	09/05/14	1444	1416106	8
Beta	N	4.59	+/-2.13	3.04	+/-2.23	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>													
Strontium-90	U	-0.401	+/-0.612	1.19	+/-0.612	2.00	pCi/g		KSD1	09/05/14	1238	1416105	9
Rad Liquid Scintillation Analysis													
<i>LSC, Tritium Dist, Solid "As Received"</i>													
Tritium	U	-0.743	+/-11.9	22.0	+/-11.9	30.0	pCi/g		BYS1	09/04/14	1141	1416096	10
<i>Liquid Scint C14, Solid "As Received"</i>													
Carbon-14	U	-1.03	+/-2.19	3.87	+/-2.19	5.00	pCi/g		BYS1	09/04/14	0600	1416098	11
<i>Liquid Scint Ni63, Solid "Dry Weight Corrected"</i>													
Nickel-63	U	-3.03	+/-4.18	7.49	+/-4.18	10.0	pCi/g		TYJ1	09/05/14	2204	1416093	12

Certificate of Analysis

Company : CH2MHill Plateau Remediation
 Address : Company
 MISN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352
 Contact: Mr. Scot Fitzgerald
 Project: CHPRC SAF F11-031 | Spent GAC
 Client Sample ID: B2XNL8
 Sample ID: 355700001

Report Date: September 10, 2014

Project: HMSA00111
 Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Liquid Scintillation Analysis													
<i>Liquid Scint Se79, Solid "Dry Weight Corrected"</i>													
Selenium-79	U	1.90	+/-3.62	6.13	+/-3.64	10.0	pCi/g		EXK2	09/05/14	1113	1416095	13
<i>Liquid Scint Tc99, Solid "As Received"</i>													
Technetium-99	U	4.28	+/-6.78	11.5	+/-6.80	15.0	pCi/g		MYM	09/07/14	1313	1415796	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	KYW2	08/29/14	1332	1415507

The following Analytical Methods were performed

Method	Description
1	DOE EML HASL-300, Am-05-RC Modified
2	DOE EML HASL 300
3	DOE EML HASL-300, Pu-11-RC Modified
4	DOE EML HASL-300, Th-01-RC Modified
5	DOE EML HASL-300, U-02-RC Modified
6	DOE EML HASL-300,I-01 Modified
7	DOE HASL 300, 4.5.2.3/Ga-01-R
8	EPA 900.0/SW846 9310/SM 7110B Modified
9	EPA 905.0 Modified
10	EPA 906.0 Modified
11	EPA EERF C-01 Modified
12	DOE RESL Ni-1, Modified
13	NERC ORD
14	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Americium-243 Tracer	Alphaspec Am241 Solid "Dry Weight Corrected"	1415580	62.6	(15%-125%)
Americium-243 Tracer	Alphaspec Np, Solid "Dry Weight Corrected"	1415581	37.9	(15%-125%)
Plutonium-242 Tracer	Alphaspec Pu, Solid "Dry Weight Corrected"	1415582	70.6	(15%-125%)
Thorium-229 Tracer	Alphaspec Th, Solid (Th232) "Dry Weight Corrected"	1415583	85.4	(15%-125%)
Uranium-232 Tracer	Alphaspec U, Solid "Dry Weight Corrected"	1415584	92.0	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1416105	101	(25%-125%)
Nickel Carrier	Liquid Scint Ni63, Solid "Dry Weight Corrected"	1416093	72.3	(25%-125%)
Selenium Carrier	Liquid Scint Se79, Solid "Dry Weight Corrected"	1416095	60.0	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "As Received"	1415796	73.2	(15%-125%)

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Certificate of Analysis

Company : CH2MHill Plateau Remediation
Address : Company
 MISN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald
Project: CHPRC SAF F11-031 | Spent GAC

Client Sample ID: B2XNL8
Sample ID: 355700001

Report Date: September 10, 2014

Project: HMSA00111
Client ID: HMSA001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer Recovery	Test									Batch ID	Recovery%	Acceptable Limits	

Notes:
TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

Quality Control Data

~~September 11, 2014~~
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QC Summary

Report Date: September 11, 2014
 Page 1 of 7

Client : CH2MHill Plateau Remediation Company
 MISN R3-50 CHPRC
 PO Box 1600
 Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 355700

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1415580								
QC1203158453	MB								
Americium-241			U	-0.0217	pCi/g			HAKB	09/05/1409:56
				Uncert: +/-0.187					
				TPU: +/-0.188					
QC1203158454	355700001	DUP							
Americium-241		U	0.0868	U	-0.103	pCi/g			
				Uncert: +/-0.244		RPD: 0	N/A		
				TPU: +/-0.244		RER: 1.19	(0-2)		
QC1203158455	LCS								
Americium-241		32.9			31.8	pCi/g	REC: 97	(80%-120%)	
				Uncert: +/-2.96					
				TPU: +/-5.08					
Batch	1415581								
QC1203158456	MB								
Neptunium-237			U	-0.109	pCi/g			HAKB	09/08/1409:48
				Uncert: +/-0.175					
				TPU: +/-0.175					
QC1203158457	355700001	DUP							
Neptunium-237		U	-0.216	U	-0.186	pCi/g			09/08/1409:48
				Uncert: +/-0.409		RPD: 0	N/A		
				TPU: +/-0.409		RER: 0.127	(0-2)		
QC1203158458	LCS								
Neptunium-237		40.7			41.2	pCi/g	REC: 101	(80%-120%)	09/08/1409:48
				Uncert: +/-3.72					
				TPU: +/-5.86					
Batch	1415582								
QC1203158459	MB								
Plutonium-238			U	0.074	pCi/g			HAKB	09/05/1409:56
				Uncert: +/-0.285					
				TPU: +/-0.286					
Plutonium-239/240			U	0.123	pCi/g				
				Uncert: +/-0.280					
				TPU: +/-0.280					
QC1203158460	355700001	DUP							
Plutonium-238		U	0.0248	U	-0.072	pCi/g			
				Uncert: +/-0.259		RPD: 0	N/A		
				TPU: +/-0.259		RER: 0.615	(0-2)		
Plutonium-239/240		U	0.046	U	-0.072	pCi/g			
				Uncert: +/-0.255		RPD: 0	N/A		
				TPU: +/-0.256		RER: 0.757	(0-2)		
QC1203158461	LCS								
Plutonium-238					7.54	pCi/g			
				Uncert: +/-1.49					
				TPU: +/-1.82					
						REC:			

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QC Summary

Workorder: 355700

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Alpha Spec									
Batch	1415582								
Plutonium-239/240	41.8			38.0	pCi/g	91	(80%-120%)		
	Uncert:			+/-3.31					
	TPU:			+/-6.17					
Batch	1415583								
QC1203158462	MB								
Thorium-232			U	-0.00377	pCi/g			HAKB	09/06/1417:34
	Uncert:			+/-0.137					
	TPU:			+/-0.138					
QC1203158463	355700001	DUP							
Thorium-232		U	-0.0412	U	-0.12	pCi/g			
	Uncert:		+/-0.165		+/-0.187	RPD: 0	N/A		
	TPU:		+/-0.166		+/-0.187	RER: 0.615	(0-2)		
QC1203158464	LCS								
Thorium-230	25.6			22.5	pCi/g	REC: 88	(80%-120%)		
	Uncert:			+/-2.27					
	TPU:			+/-4.63					
Thorium-232				1.38	pCi/g				
	Uncert:			+/-0.577					
	TPU:			+/-0.627					
Batch	1415584								
QC1203158465	MB								
Uranium-233/234			U	0.128	pCi/g			HAKB	09/05/1409:56
	Uncert:			+/-0.291					
	TPU:			+/-0.292					
Uranium-235/236			U	-0.0211	pCi/g				
	Uncert:			+/-0.182					
	TPU:			+/-0.183					
Uranium-238			U	0.197	pCi/g				
	Uncert:			+/-0.283					
	TPU:			+/-0.285					
QC1203158466	355700001	DUP							
Uranium-233/234		U	-0.0709	U	0.0381	pCi/g			
	Uncert:		+/-0.164		+/-0.212	RPD: 0	N/A		
	TPU:		+/-0.165		+/-0.212	RER: 0.795	(0-2)		
Uranium-235/236		U	0.0694	U	0.0689	pCi/g			
	Uncert:		+/-0.260		+/-0.258	RPD: 0	N/A		
	TPU:		+/-0.261		+/-0.259	RER: 0.00247	(0-2)		
Uranium-238		U	0.351	U	0.147	pCi/g			
	Uncert:		+/-0.358		+/-0.251	RPD: 0	N/A		
	TPU:		+/-0.362		+/-0.252	RER: 0.909	(0-2)		
QC1203158467	LCS								
Uranium-233/234				5.83	pCi/g				
	Uncert:			+/-1.24					
	TPU:			+/-1.54					
Uranium-235/236			U	0.103	pCi/g				
	Uncert:			+/-0.284					
	TPU:			+/-0.284					
Uranium-238	5.75			4.81	pCi/g	REC: 84	(80%-120%)		
	Uncert:			+/-1.11					
	TPU:			+/-1.34					

QC Summary

Workorder: 355700

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1415531								
QC1203158293	MB								
Cesium-137			U	0.00472	pCi/g			MXR1	09/03/1409:41
				Uncert: +/-0.0196					
				TPU: +/-0.0197					
Cobalt-60			U	0.00493	pCi/g				
				Uncert: +/-0.0212					
				TPU: +/-0.0213					
Europium-152			U	-0.0129	pCi/g				
				Uncert: +/-0.0564					
				TPU: +/-0.0567					
Europium-154			U	-0.0455	pCi/g				
				Uncert: +/-0.0581					
				TPU: +/-0.0617					
Europium-155			U	-0.0122	pCi/g				
				Uncert: +/-0.0499					
				TPU: +/-0.0502					
Protactinium-231			U	-0.363	pCi/g				
				Uncert: +/-0.806					
				TPU: +/-0.823					
QC1203158294	355700001	DUP							
Cesium-137		U 0.0171	U	0.00975	pCi/g				09/03/1409:45
		Uncert: +/-0.0166		+/-0.0282		RPD: 0	N/A		
		TPU: +/-0.0183		+/-0.0286		RER: 0.422	(0-2)		
Cobalt-60		U -0.00492	U	0.0165	pCi/g				
		Uncert: +/-0.0207		+/-0.0239		RPD: 0	N/A		
		TPU: +/-0.0209		+/-0.025		RER: 1.29	(0-2)		
Europium-152		U -0.000988	U	-0.00965	pCi/g				
		Uncert: +/-0.0358		+/-0.0549		RPD: 0	N/A		
		TPU: +/-0.0358		+/-0.0551		RER: 0.258	(0-2)		
Europium-154		U 0.0117	U	0.120	pCi/g				
		Uncert: +/-0.0585		+/-0.0599		RPD: 0	N/A		
		TPU: +/-0.0587		+/-0.0814		RER: 2.12	(0-2)		
Europium-155		U 0.00343	U	0.0213	pCi/g				
		Uncert: +/-0.0218		+/-0.0393		RPD: 0	N/A		
		TPU: +/-0.0219		+/-0.0405		RER: 0.759	(0-2)		
Protactinium-231		U -0.0992	U	0.0871	pCi/g				
		Uncert: +/-0.495		+/-0.766		RPD: 0	N/A		
		TPU: +/-0.497		+/-0.767		RER: 0.399	(0-2)		
QC1203158295	LCS								
Americium-241		491		572	pCi/g	REC: 117	(80%-120%)		09/03/1410:53
		Uncert: +/-7.12							
		TPU: +/-48.8							
Cesium-137		188		201	pCi/g	REC: 107	(80%-120%)		
		Uncert: +/-4.21							
		TPU: +/-25.2							
Cobalt-60		211		219	pCi/g	REC: 104	(80%-120%)		
		Uncert: +/-4.93							
		TPU: +/-17.6							
Europium-152			U	2.89	pCi/g				
		Uncert: +/-2.20							

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Parname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date	Time
Rad Gamma Spec										
Batch	1415531									
Europium-154		TPU:		+/-2.58						
			U	-1.59	pCi/g					
		Uncert:		+/-1.82						
		TPU:		+/-1.96						
Europium-155			U	-1.28	pCi/g					
		Uncert:		+/-1.64						
		TPU:		+/-1.74						
Protactinium-231			U	-4.66	pCi/g					
		Uncert:		+/-32.1						
		TPU:		+/-32.1						
Batch	1415923									
QC1203159279	MB									
Iodine-129			U	0.542	pCi/g			BSW1	09/04/1409:30	
		Uncert:		+/-0.416						
		TPU:		+/-0.419						
QC1203159280	355700001	DUP								
Iodine-129		U	-0.285	U	0.255	pCi/g			09/04/1409:31	
		Uncert:	+/-0.350		+/-0.742		RPD: 0	N/A		
		TPU:	+/-0.374		+/-0.751		RER: 1.26	(0-2)		
QC1203159281	355700001	MS								
Iodine-129		33.2	U	-0.285	26.6	pCi/g	REC: 80	(75%-125%)	09/04/1409:31	
		Uncert:	+/-0.350		+/-3.94					
		TPU:	+/-0.374		+/-4.76					
QC1203159282	LCS									
Iodine-129		33.2			34.5	pCi/g	REC: 104	(80%-120%)	09/04/1411:07	
		Uncert:			+/-3.05					
		TPU:			+/-4.61					
Rad Gas Flow										
Batch	1416105									
QC1203159737	MB									
Strontium-90			U	-0.383	pCi/g			KSD1	09/05/1412:38	
		Uncert:		+/-0.403						
		TPU:		+/-0.403						
QC1203159738	355700001	DUP								
Strontium-90		U	-0.401	U	-0.243	pCi/g			09/05/1412:39	
		Uncert:	+/-0.612		+/-0.367		RPD: 0	N/A		
		TPU:	+/-0.612		+/-0.367		RER: 0.433	(0-3)		
QC1203159739	LCS									
Strontium-90		44.9			39.7	pCi/g	REC: 88	(75%-125%)		
		Uncert:			+/-2.13					
		TPU:			+/-7.46					
Batch	1416106									
QC1203159740	MB									
Alpha			U	-0.419	pCi/g			GXR1	09/04/1416:15	
		Uncert:		+/-1.39						
		TPU:		+/-1.39						
Beta			U	1.27	pCi/g					
		Uncert:		+/-1.78						
		TPU:		+/-1.79						

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gas Flow									
Batch	1416106								
QC1203159741	355700001	DUP							
Alpha		U	0.892	U	-0.0426	pCi/g			09/05/1414:45
		Uncert:	+/-2.04		+/-1.93		RPD: 0	N/A	
		TPU:	+/-2.04		+/-1.93		RER: 0.652	(0-3)	
Beta		N	4.59		7.27	pCi/g			
		Uncert:	+/-2.13		+/-3.86		RPD: 45	(0% - 100%)	
		TPU:	+/-2.23		+/-3.99		RER: 1.15	(0-3)	
QC1203159742	355700001	MS							
Alpha		115	U	0.892	95.2	pCi/g	REC: 83	(75%-125%)	09/08/1417:16
		Uncert:	+/-2.04		+/-13.0				
		TPU:	+/-2.04		+/-25.2				
Beta		421	N	4.59	405	pCi/g	REC: 95	(75%-125%)	
		Uncert:	+/-2.13		+/-15.8				
		TPU:	+/-2.23		+/-58.1				
QC1203159743	355700001	MSD							
Alpha		125	U	0.892	115	pCi/g	REC: 92	(75%-125%)	
		Uncert:	+/-2.04		+/-15.8		RPD: 19	(0%-20%)	
		TPU:	+/-2.04		+/-26.7		RER: 1.06	(0-3)	
Beta		455	N	4.59	616	pCi/g	REC: 135*	(75%-125%)	
		Uncert:	+/-2.13		+/-21.8		RPD: 42*	(0%-20%)	
		TPU:	+/-2.23		+/-84.7		RER: 4.04*	(0-3)	
QC1203159744	LCS								
Alpha		113			110	pCi/g	REC: 98	(75%-125%)	09/10/1415:28
		Uncert:			+/-11.0				
		TPU:			+/-24.8				
Beta		413			484	pCi/g	REC: 117	(75%-125%)	
		Uncert:			+/-17.1				
		TPU:			+/-69.0				
Rad Liquid Scintillation									
Batch	1415796								
QC1203158957	MB								
Technetium-99				U	1.28	pCi/g		MYM1	09/07/1413:46
		Uncert:			+/-4.77				
		TPU:			+/-4.78				
QC1203158958	355700001	DUP							
Technetium-99		U	4.28	U	2.46	pCi/g			09/07/1414:19
		Uncert:	+/-6.78		+/-6.96		RPD: 0	N/A	
		TPU:	+/-6.80		+/-6.97		RER: 0.366	(0-2)	
QC1203158959	LCS								
Technetium-99		250			234	pCi/g	REC: 94	(80%-120%)	09/07/1414:52
		Uncert:			+/-9.47				
		TPU:			+/-28.8				
Batch	1416093								
QC1203159696	MB								
Nickel-63				U	-1.78	pCi/g		TYJ1	09/05/1422:30
		Uncert:			+/-4.05				
		TPU:			+/-4.05				
QC1203159697	355700001	DUP							
Nickel-63		U	-3.03	U	-4.15	pCi/g			09/05/1422:56
		Uncert:	+/-4.18		+/-4.30		RPD: 0	N/A	

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1416093								
		TPU:	+/-4.18	+/-4.30					
						RER: 0.366	(0-2)		
QC1203159698	LCS								
Nickel-63		256		266	pCi/g	REC: 104	(80%-120%)		09/05/1423:23
		Uncert:		+/-10.6					
		TPU:		+/-50.1					
Batch	1416095								
QC1203159699	MB								
Selenium-79			U	0.752	pCi/g			EXK2	09/05/1412:15
		Uncert:		+/-2.46					
		TPU:		+/-2.46					
QC1203159700	355700001	DUP							
Selenium-79			U	1.90	U	3.33			09/05/1413:17
		Uncert:	+/-3.62	+/-4.03		RPD: 55	N/A		
		TPU:	+/-3.64	+/-4.10		RER: 0.511	(0-2)		
QC1203159701	LCS								
Selenium-79		901		905	pCi/g	REC: 100	(80%-120%)		09/05/1414:18
		Uncert:		+/-18.3					
		TPU:		+/-204					
Batch	1416096								
QC1203159702	MB								
Tritium			U	3.82	pCi/g			BYS1	09/04/1411:57
		Uncert:		+/-12.0					
		TPU:		+/-12.0					
QC1203159703	355700001	DUP							
Tritium			U	-0.743	U	-2.53			09/04/1412:13
		Uncert:	+/-11.9	+/-12.0		RPD: 0	N/A		
		TPU:	+/-11.9	+/-12.0		RER: 0.207	(0-2)		
QC1203159704	355700001	MS							
Tritium		66.7	U	-0.743		76.7			09/04/1412:30
		Uncert:	+/-11.9	+/-17.5					
		TPU:	+/-11.9	+/-24.7					
QC1203159705	LCS								
Tritium		66.7		76.3	pCi/g	REC: 114	(80%-120%)		09/04/1412:46
		Uncert:		+/-17.6					
		TPU:		+/-24.7					
Batch	1416098								
QC1203159706	MB								
Carbon-14			U	-1.69	pCi/g			BYS1	09/04/1406:22
		Uncert:		+/-2.22					
		TPU:		+/-2.22					
QC1203159707	355700001	DUP							
Carbon-14			U	-1.03	U	-0.568			09/04/1406:43
		Uncert:	+/-2.19	+/-2.28		RPD: 0	N/A		
		TPU:	+/-2.19	+/-2.28		RER: 0.288	(0-2)		
QC1203159708	355700001	MS							
Carbon-14		99.6	U	-1.03		96.9			09/04/1407:05
		Uncert:	+/-2.19	+/-4.60					
		TPU:	+/-2.19	+/-8.46					

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Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Liquid Scintillation									
Batch	1416098								
QC1203159709	LCS								
Carbon-14	97.4			94.0	pCi/g	REC: 97 (80%-120%)			09/04/1407:26
	Uncert:			+/-4.48					
	TPU:			+/-8.22					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.
- U Analyzed for but not detected above limiting criteria. Includes MDL, MDA, PQL, zero, counting error, and total analytical error.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Z Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

** Indicates analyte is a surrogate compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.