TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-15374-1
Client Project/Site: HDP

For:
Perma-Fix Environmental Services Inc.
2800 Solway Road
Knoxville, Tennessee 37931

Attn: Brian Miller

Authorized for release by:
12/21/2015 4:07:56 PM

Ivan Vania, Project Manager II
(314)298-8566
ivan.vania@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Chain of Custody 5
Receipt Checklists 6
Definitions/Glossary 7
Method Summary 8
Sample Summary 9
Client Sample Results 10
QC Sample Results 21
QC Association Summary 24
Tracer Carrier Summary 27

Job ID: 160-15374-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Perma-Fix Environmental Services Inc.

Project: HDP

Report Number: 160-15374-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 12/15/2015; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 20.2 C.

TECHNETIUM-99 (ICPMS)

Samples L08-07-01-T-E-S-00 (160-15374-1), L08-07-02-T-E-S-00 (160-15374-2), L08-07-03-T-E-S-00 (160-15374-3), L08-07-04-T-R-S-00 (160-15374-4), L08-07-05-T-E-S-00 (160-15374-5), L08-07-06-T-E-S-00 (160-15374-6), L08-07-07-T-E-S-00 (160-15374-7), L08-07-08-T-E-S-00 (160-15374-8), L08-07-09-T-E-S-00 (160-15374-9), L08-07-10-T-E-B-00 (160-15374-10), L08-07-11-T-E-B-00 (160-15374-11) and L08-07-08-T-E-Q-00 (160-15374-12) were analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared on 12/15/2015 and analyzed on 12/17/2015.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS

Samples L08-07-01-T-E-S-00 (160-15374-1), L08-07-02-T-E-S-00 (160-15374-2), L08-07-03-T-E-S-00 (160-15374-3),

Job ID: 160-15374-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

L08-07-04-T-R-S-00 (160-15374-4), L08-07-05-T-E-S-00 (160-15374-5), L08-07-06-T-E-S-00 (160-15374-6), L08-07-07-T-E-S-00 (160-15374-7), L08-07-08-T-E-S-00 (160-15374-8), L08-07-09-T-E-S-00 (160-15374-9), L08-07-10-T-E-B-00 (160-15374-10), L08-07-11-T-E-B-00 (160-15374-11) and L08-07-08-T-E-Q-00 (160-15374-12) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 12/16/2015.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CESIUM-137 & OTHER GAMMA EMITTERS (GS)

Samples L08-07-01-T-E-S-00 (160-15374-1), L08-07-02-T-E-S-00 (160-15374-2), L08-07-03-T-E-S-00 (160-15374-3), L08-07-04-T-R-S-00 (160-15374-4), L08-07-05-T-E-S-00 (160-15374-5), L08-07-06-T-E-S-00 (160-15374-6), L08-07-07-T-E-S-00 (160-15374-7), L08-07-08-T-E-S-00 (160-15374-8), L08-07-09-T-E-S-00 (160-15374-9), L08-07-10-T-E-B-00 (160-15374-10), L08-07-11-T-E-B-00 (160-15374-11) and L08-07-08-T-E-Q-00 (160-15374-12) were analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were leached on 12/15/2015, prepared on 12/16/2015 and analyzed on 12/17/2015.

Preparation Batch 160-227692:
Radium-226 is reported in these samples at the client's request. Radium-226 is reported from the 609.31 keV line of bismuth-214. Because the samples have not had a 21-day ingrowth, the activity for radium-226 is an estimated value and may be biased low. This bias is caused by the disruption of secular equilibrium between radium-226 and bismuth-214 by the loss of radon-222 during sample preparation. L08-07-01-T-E-S-00 (160-15374-1), L08-07-02-T-E-S-00 (160-15374-2), L08-07-03-T-E-S-00 (160-15374-3), L08-07-04-T-R-S-00 (160-15374-4), L08-07-05-T-E-S-00 (160-15374-5), L08-07-06-T-E-S-00 (160-15374-6), L08-07-07-T-E-S-00 (160-15374-7), L08-07-08-T-E-S-00 (160-15374-8), L08-07-09-T-E-S-00 (160-15374-9), L08-07-10-T-E-B-00 (160-15374-10), L08-07-11-T-E-B-00 (160-15374-11), L08-07-08-T-E-Q-00 (160-15374-12), (LCS 160-227692/2-A), (MB 160-227692/1-A) and (160-15374-A-1-F DU).

The replicate error ratio was outside of the acceptance limits of 1 for protactinium-231. Both the sample and duplicate activity were less than the MDC. The data is reported. L08-07-01-T-E-S-00 (160-15374-1), L08-07-02-T-E-S-00 (160-15374-2), L08-07-03-T-E-S-00 (160-15374-3), L08-07-04-T-R-S-00 (160-15374-4), L08-07-05-T-E-S-00 (160-15374-5), L08-07-06-T-E-S-00 (160-15374-6), L08-07-07-T-E-S-00 (160-15374-7), L08-07-08-T-E-S-00 (160-15374-8), L08-07-09-T-E-S-00 (160-15374-9), L08-07-10-T-E-B-00 (160-15374-10), L08-07-11-T-E-B-00 (160-15374-11), L08-07-08-T-E-Q-00 (160-15374-12), (LCS 160-227692/2-A), (MB 160-227692/1-A) and (160-15374-A-1-F DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TestAmerica St. Louis
13715 Rider Trail North

Earth City, MO 63045
phone 314.298.8566 fax

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Brian Miller	Site Contact: Ellen Jakub	Date: 12/15/2015	COC No: 121515-FSS1
Perma-Fix Environmental Services	Tel/Fax: (314) 810-3333	Lab Contact: Ivan Vania	Carrier: Courier	1 of 1 COCs
2800 Solway Road	Analysis Turnaround Time			
Knoxville, TN 37931	☑ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(865) 690-0501 Phone	TAT if different from Below _____			Walk-in Client:
(865) 539-9868 FAX	☐ 2 weeks			Lab Sampling:
Project Name: Hematite Decommissioning Project	☑ 1 week			
Site: Westinghouse Hematite, MO	☐ 2 days			Job / SDG No.:
P O # 832953	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Gamma Spec Westinghouse Hematite Library	Alpha Spec	ICP/MS (Tc-99)	Gamma Spec (With post-21 day ingrowth)	Sample Specific Notes:
L08-07-01-T-E-S-00	12/12/15	0930	G	Soil	1	N		X		X	X	Matt Cushman
L08-07-02-T-E-S-00	12/12/15	0935	G	Soil	1	N		X		X	X	Matt Cushman
L08-07-03-T-E-S-00	12/12/15	0940	G	Soil	1	N		X		X	X	Matt Cushman
L08-07-04-T-R-S-00	12/12/15	1000	C	Soil	1	N		X		X	X	Matt Cushman
L08-07-05-T-E-S-00	12/12/15	1005	C	Soil	1	N		X		X	X	Matt Cushman
L08-07-06-T-E-S-00	12/12/15	0955	G	Soil	1	N		X		X	X	Brian Miller
L08-07-07-T-E-S-00	12/12/15	0950	G	Soil	1	N		X		X	X	Brian Miller
L08-07-08-T-E-S-00	12/12/15	0945	G	Soil	1	N		X		X	X	Brian Miller
L08-07-09-T-E-S-00	12/12/15	0940	G	Soil	1	N		X		X	X	Brian Miller
L08-07-10-T-E-B-00	12/12/15	1035	G	Soil	1	N		X		X	X	Matt Cushman
L08-07-11-T-E-B-00	12/12/15	1040	G	Soil	1	N		X		X	X	Matt Cushman
L08-07-08-T-E-Q-00	12/12/15	0945	G	Soil	1	N		X		X	X	Brian Miller

160-15374 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other None

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☑ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Potential for Radiological Contamination

Custody Seals Intact: ☑ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by: Ellen C. Jakub	Company: Perma-Fix	Date/Time: 12/14/15 0915	Received by:	Company: Cross Roads	Date/Time: 12-15-15 0915
Relinquished by:	Company: Cross Roads	Date/Time: 12/15 1100	Received by:	Company:	Date/Time: 12-15-15 1100
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Perma-Fix Environmental Services Inc.

Job Number: 160-15374-1

Login Number: 15374
List Number: 1
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Perma-Fix Environmental Services Inc.
Project/Site: HDP

TestAmerica Job ID: 160-15374-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL
Moisture	Percent Moisture	EPA	TAL SL
6020A	Metals (ICP/MS), Tc-99 in Activity	SW846	TAL SL
GA-01-R	Cesium-137 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Perma-Fix Environmental Services Inc.
Project/Site: HDP

TestAmerica Job ID: 160-15374-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-15374-1	L08-07-01-T-E-S-00	Solid	12/12/15 09:30	12/15/15 11:00
160-15374-2	L08-07-02-T-E-S-00	Solid	12/12/15 09:35	12/15/15 11:00
160-15374-3	L08-07-03-T-E-S-00	Solid	12/12/15 09:40	12/15/15 11:00
160-15374-4	L08-07-04-T-R-S-00	Solid	12/12/15 10:00	12/15/15 11:00
160-15374-5	L08-07-05-T-E-S-00	Solid	12/12/15 10:05	12/15/15 11:00
160-15374-6	L08-07-06-T-E-S-00	Solid	12/12/15 09:55	12/15/15 11:00
160-15374-7	L08-07-07-T-E-S-00	Solid	12/12/15 09:50	12/15/15 11:00
160-15374-8	L08-07-08-T-E-S-00	Solid	12/12/15 09:45	12/15/15 11:00
160-15374-9	L08-07-09-T-E-S-00	Solid	12/12/15 09:40	12/15/15 11:00
160-15374-10	L08-07-10-T-E-B-00	Solid	12/12/15 10:35	12/15/15 11:00
160-15374-11	L08-07-11-T-E-B-00	Solid	12/12/15 10:40	12/15/15 11:00
160-15374-12	L08-07-08-T-E-Q-00	Solid	12/12/15 09:45	12/15/15 11:00

Client Sample ID: L08-07-01-T-E-S-00 — Lab Sample ID: 160-15374-1

Date Collected: 12/12/15 09:30 — **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.09**		0.119	0.163		0.0973	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Americium 241	0.0143	U	0.0480	0.0481		0.0806	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Bismuth 212	**0.838**		0.331	0.342		0.457	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Bismuth 214	**0.774**		0.0916	0.122		0.0611	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Lead 212	**0.984**		0.0810	0.151		0.0670	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Lead 214	**0.898**		0.0734	0.119		0.0593	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Potassium 40	**17.7**		1.14	2.14		0.310	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Protactinium 234m	0.292	U	3.07	3.07		5.43	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Protactinium 231	0.679	U	0.305	0.313		0.995	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Radium 226	**0.774**		0.0916	0.122		0.0611	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Thorium 234	**1.25**		0.481	0.498		0.750	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Uranium 235	0.134	U	0.126	0.126		0.205	pCi/g	12/16/15 13:25	12/17/15 17:25	1
Thorium 232	**1.09**		0.119	0.163		0.0973	pCi/g	12/16/15 13:25	12/17/15 17:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.375*		*0.0513*	*0.0644*		*0.0374*	*pCi/g*	*12/16/15 13:25*	*12/17/15 17:25*	*1*

Client Sample ID: L08-07-01-T-E-S-00 — Lab Sample ID: 160-15374-1

Date Collected: 12/12/15 09:30 — **Matrix: Solid**
Date Received: 12/15/15 11:00 — **Percent Solids: 83.2**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.000028**	**J**	0.000069	0.000021	mg/Kg	☼	12/15/15 14:41	12/17/15 16:48	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**0.477**		0.211	0.215	1.38	0.236	pCi/g	12/15/15 14:41	12/17/15 16:48	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*87*		*30 - 110*	*12/15/15 14:41*	*12/17/15 16:48*	*1*

Client Sample ID: L08-07-02-T-E-S-00 — Lab Sample ID: 160-15374-2

Date Collected: 12/12/15 09:35 — **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.06**		0.116	0.158		0.123	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Americium 241	-0.0214	U	0.0543	0.0544		0.0908	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Bismuth 212	**0.859**		0.281	0.295		0.296	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Bismuth 214	**0.809**		0.0898	0.123		0.0602	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Lead 212	**0.979**		0.0744	0.147		0.0626	pCi/g	12/16/15 13:25	12/17/15 17:27	1

Client Sample ID: L08-07-02-T-E-S-00 Lab Sample ID: 160-15374-2
Date Collected: 12/12/15 09:35 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead 214	**0.918**		0.0890	0.131		0.0707	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Potassium 40	**17.5**		1.07	2.08		0.287	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Protactinium 234m	0.000	U	3.05	3.05		6.21	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Protactinium 231	-0.467	U	0.603	0.605		0.996	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Radium 226	**0.809**		0.0898	0.123		0.0602	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Thorium 234	**1.33**		0.281	0.313		0.749	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Uranium 235	**0.314**		0.152	0.156		0.201	pCi/g	12/16/15 13:25	12/17/15 17:27	1
Thorium 232	**1.06**		0.116	0.158		0.123	pCi/g	12/16/15 13:25	12/17/15 17:27	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-210	*1.48*		*0.575*	*0.601*		*0.742*	*pCi/g*	*12/16/15 13:25*	*12/17/15 17:27*	*1*
Tl-208	*0.309*		*0.0386*	*0.0502*		*0.0276*	*pCi/g*	*12/16/15 13:25*	*12/17/15 17:27*	*1*

Client Sample ID: L08-07-02-T-E-S-00 Lab Sample ID: 160-15374-2
Date Collected: 12/12/15 09:35 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 80.7**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.00011**		0.000067	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:01	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**1.87**		0.0685	0.185	1.33	0.228	pCi/g	12/15/15 14:41	12/17/15 17:01	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*93*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:01*	*1*

Client Sample ID: L08-07-03-T-E-S-00 Lab Sample ID: 160-15374-3
Date Collected: 12/12/15 09:40 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.24**		0.163	0.206		0.0604	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Americium 241	-0.00417	U	0.0526	0.0526		0.0890	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Bismuth 212	**1.51**		0.460	0.486		0.384	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Bismuth 214	**0.805**		0.0993	0.130		0.0646	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Lead 212	**1.05**		0.0821	0.159		0.0651	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Lead 214	**0.849**		0.0835	0.122		0.0747	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Potassium 40	**17.4**		1.24	2.17		0.360	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Protactinium 234m	0.310	U	2.51	2.51		6.23	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Protactinium 231	0.768	U	0.372	0.382		1.06	pCi/g	12/16/15 13:25	12/17/15 18:02	1

Client Sample ID: L08-07-03-T-E-S-00 Lab Sample ID: 160-15374-3

Date Collected: 12/12/15 09:40 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	**0.805**		0.0993	0.130		0.0646	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Thorium 234	**0.897**		0.277	0.292		0.741	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Uranium 235	0.144	U	0.134	0.135		0.204	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Thorium 232	**1.24**		0.163	0.206		0.0604	pCi/g	12/16/15 13:25	12/17/15 18:02	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.361*		*0.0653*	*0.0753*		*0.0517*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:02*	*1*

Client Sample ID: L08-07-03-T-E-S-00 Lab Sample ID: 160-15374-3

Date Collected: 12/12/15 09:40 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 83.3**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.000023**	**J**	0.000067	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:06	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**0.402**		0.0292	0.0471	1.34	0.229	pCi/g	12/15/15 14:41	12/17/15 17:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*90*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:06*	*1*

Client Sample ID: L08-07-04-T-R-S-00 Lab Sample ID: 160-15374-4

Date Collected: 12/12/15 10:00 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**0.895**		0.111	0.143		0.119	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Americium 241	0.0165	U	0.0525	0.0525		0.0879	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Bismuth 212	**1.29**		0.409	0.431		0.368	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Bismuth 214	**0.782**		0.0950	0.125		0.0665	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Lead 212	**1.01**		0.0816	0.154		0.0678	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Lead 214	**0.867**		0.0917	0.128		0.0714	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Potassium 40	**17.0**		1.07	2.04		0.194	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Protactinium 234m	-0.0139	U	2.85	2.85		5.10	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Protactinium 231	0.425	U	0.276	0.280		0.926	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Radium 226	**0.782**		0.0950	0.125		0.0665	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Thorium 234	**1.57**		0.695	0.714		0.852	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Uranium 235	**0.249**		0.130	0.132		0.168	pCi/g	12/16/15 13:25	12/17/15 18:00	1
Thorium 232	**0.895**		0.111	0.143		0.119	pCi/g	12/16/15 13:25	12/17/15 18:00	1

Client Sample ID: L08-07-04-T-R-S-00 Lab Sample ID: 160-15374-4

Date Collected: 12/12/15 10:00 **Matrix: Solid**
Date Received: 12/15/15 11:00

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.291		0.0386	0.0490		0.0259	pCi/g	12/16/15 13:25	12/17/15 18:00	1

Client Sample ID: L08-07-04-T-R-S-00 Lab Sample ID: 160-15374-4

Date Collected: 12/12/15 10:00 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 80.8**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000070	0.000021	mg/Kg	☼	12/15/15 14:41	12/17/15 17:10	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**0.340**		0.0782	0.0842	1.39	0.239	pCi/g	12/15/15 14:41	12/17/15 17:10	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	89		30 - 110	12/15/15 14:41	12/17/15 17:10	1

Client Sample ID: L08-07-05-T-E-S-00 Lab Sample ID: 160-15374-5

Date Collected: 12/12/15 10:05 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.31**		0.129	0.184		0.121	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Americium 241	-0.0176	U	0.421	0.421		0.102	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Bismuth 212	**1.35**		0.442	0.463		0.404	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Bismuth 214	**0.928**		0.106	0.143		0.0772	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Lead 212	**1.19**		0.0845	0.176		0.0736	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Lead 214	**0.946**		0.0907	0.134		0.0798	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Potassium 40	**23.0**		1.19	2.60		0.267	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Protactinium 234m	3.36	U	3.10	3.12		4.97	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Protactinium 231	0.623	U	0.263	0.272		1.15	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Radium 226	**0.928**		0.106	0.143		0.0772	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Thorium 234	**1.63**		0.518	0.545		0.802	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Uranium 235	0.0328	U	0.118	0.118		0.260	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Thorium 232	**1.31**		0.129	0.184		0.121	pCi/g	12/16/15 13:25	12/17/15 18:01	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.62		0.625	0.653		0.777	pCi/g	12/16/15 13:25	12/17/15 18:01	1
Tl-208	0.395		0.0459	0.0613		0.0343	pCi/g	12/16/15 13:25	12/17/15 18:01	1

Client Sample ID: L08-07-05-T-E-S-00 Lab Sample ID: 160-15374-5

Date Collected: 12/12/15 10:05 Matrix: Solid
Date Received: 12/15/15 11:00 Percent Solids: 80.2

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000070	0.000021	mg/Kg	☼	12/15/15 14:41	12/17/15 17:14	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.0830	U	0.147	0.147	1.41	0.241	pCi/g	12/15/15 14:41	12/17/15 17:14	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*89*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:14*	*1*

Client Sample ID: L08-07-06-T-E-S-00 Lab Sample ID: 160-15374-6

Date Collected: 12/12/15 09:55 Matrix: Solid
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.03**		0.125	0.164		0.111	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Americium 241	-0.0264	U	0.0614	0.0614		0.102	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Bismuth 212	**1.08**		0.330	0.349		0.332	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Bismuth 214	**0.681**		0.0793	0.106		0.0741	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Lead 212	**1.00**		0.0736	0.149		0.0571	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Lead 214	**0.844**		0.0785	0.118		0.0567	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Potassium 40	**18.0**		1.08	2.14		0.291	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Protactinium 234m	3.19	U	3.03	3.05		4.80	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Protactinium 231	-0.669	U	0.677	0.681		1.11	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Radium 226	**0.681**		0.0793	0.106		0.0741	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Thorium 234	**2.19**		0.513	0.562		0.759	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Uranium 235	**0.414**		0.147	0.153		0.181	pCi/g	12/16/15 13:25	12/17/15 18:02	1
Thorium 232	**1.03**		0.125	0.164		0.111	pCi/g	12/16/15 13:25	12/17/15 18:02	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.319*		*0.0416*	*0.0532*		*0.0325*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:02*	*1*

Client Sample ID: L08-07-06-T-E-S-00 Lab Sample ID: 160-15374-6

Date Collected: 12/12/15 09:55 Matrix: Solid
Date Received: 12/15/15 11:00 Percent Solids: 81.0

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.000067**	**J**	0.000070	0.000021	mg/Kg	☼	12/15/15 14:41	12/17/15 17:19	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**1.14**		0.342	0.357	1.39	0.238	pCi/g	12/15/15 14:41	12/17/15 17:19	1

Client Sample ID: L08-07-06-T-E-S-00 — Lab Sample ID: 160-15374-6

Date Collected: 12/12/15 09:55 — Matrix: Solid
Date Received: 12/15/15 11:00 — Percent Solids: 81.0

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	89		30 - 110	12/15/15 14:41	12/17/15 17:19	1

Client Sample ID: L08-07-07-T-E-S-00 — Lab Sample ID: 160-15374-7

Date Collected: 12/12/15 09:50 — Matrix: Solid
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.09		0.137	0.177		0.115	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Americium 241	-0.00576	U	0.0697	0.0697		0.117	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Bismuth 212	1.40		0.477	0.499		0.431	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Bismuth 214	0.828		0.0949	0.128		0.0593	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Lead 212	1.02		0.0848	0.157		0.0713	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Lead 214	0.850		0.103	0.136		0.0811	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Potassium 40	17.4		1.24	2.17		0.342	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Protactinium 234m	2.37	U	3.95	3.95		6.63	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Protactinium 231	-0.580	U	0.774	0.777		1.28	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Radium 226	0.828		0.0949	0.128		0.0593	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Thorium 234	1.95		0.321	0.381		0.794	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Uranium 235	0.433		0.142	0.149		0.203	pCi/g	12/16/15 13:25	12/17/15 18:43	1
Thorium 232	1.09		0.137	0.177		0.115	pCi/g	12/16/15 13:25	12/17/15 18:43	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.340		0.0460	0.0580		0.0327	pCi/g	12/16/15 13:25	12/17/15 18:43	1

Client Sample ID: L08-07-07-T-E-S-00 — Lab Sample ID: 160-15374-7

Date Collected: 12/12/15 09:50 — Matrix: Solid
Date Received: 12/15/15 11:00 — Percent Solids: 84.9

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.00010		0.000065	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:36	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	1.80		0.246	0.297	1.30	0.223	pCi/g	12/15/15 14:41	12/17/15 17:36	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	90		30 - 110	12/15/15 14:41	12/17/15 17:36	1

Client Sample ID: L08-07-08-T-E-S-00 Lab Sample ID: 160-15374-8

Date Collected: 12/12/15 09:45 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.00**		0.106	0.147		0.0818	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Americium 241	0.00389	U	0.0563	0.0563		0.0946	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Bismuth 212	**1.13**		0.333	0.353		0.307	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Bismuth 214	**0.734**		0.0868	0.116		0.0625	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Lead 212	**1.01**		0.0697	0.148		0.0576	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Lead 214	**0.805**		0.0753	0.113		0.0588	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Potassium 40	**16.7**		0.963	1.96		0.369	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Protactinium 234m	3.08	U	2.48	2.50		4.04	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Protactinium 231	0.686	U	0.228	0.240		0.994	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Radium 226	**0.734**		0.0868	0.116		0.0625	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Thorium 234	**1.84**		0.477	0.515		0.721	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Uranium 235	**0.334**		0.143	0.147		0.191	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Thorium 232	**1.00**		0.106	0.147		0.0818	pCi/g	12/16/15 13:25	12/17/15 18:44	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-210	*1.41*		*0.568*	*0.591*		*0.714*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:44*	*1*
Tl-208	*0.265*		*0.0326*	*0.0427*		*0.0249*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:44*	*1*

Client Sample ID: L08-07-08-T-E-S-00 Lab Sample ID: 160-15374-8

Date Collected: 12/12/15 09:45 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 81.7**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.000057**	**J**	0.000068	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:40	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**0.979**		0.148	0.173	1.36	0.233	pCi/g	12/15/15 14:41	12/17/15 17:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*90*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:40*	*1*

Client Sample ID: L08-07-09-T-E-S-00 Lab Sample ID: 160-15374-9

Date Collected: 12/12/15 09:40 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.02**		0.143	0.176		0.123	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Americium 241	-0.0244	U	0.0570	0.0571		0.0951	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Bismuth 212	**1.31**		0.457	0.477		0.432	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Bismuth 214	**0.846**		0.0982	0.132		0.0666	pCi/g	12/16/15 13:25	12/17/15 18:44	1

Client Sample ID: L08-07-09-T-E-S-00 Lab Sample ID: 160-15374-9

Date Collected: 12/12/15 09:40 Matrix: Solid
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead 212	**0.996**		0.0789	0.151		0.0664	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Lead 214	**0.863**		0.0876	0.125		0.0719	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Potassium 40	**18.5**		1.13	2.21		0.201	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Protactinium 234m	0.0782	U	2.83	2.83		5.07	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Protactinium 231	0.563	U	0.310	0.316		1.03	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Radium 226	**0.846**		0.0982	0.132		0.0666	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Thorium 234	**1.91**		0.526	0.563		0.795	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Uranium 235	**0.251**		0.141	0.143		0.205	pCi/g	12/16/15 13:25	12/17/15 18:44	1
Thorium 232	**1.02**		0.143	0.176		0.123	pCi/g	12/16/15 13:25	12/17/15 18:44	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-210	*1.66*		*0.511*	*0.547*		*0.645*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:44*	*1*
Tl-208	*0.349*		*0.0496*	*0.0614*		*0.0377*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:44*	*1*

Client Sample ID: L08-07-09-T-E-S-00 Lab Sample ID: 160-15374-9

Date Collected: 12/12/15 09:40 Matrix: Solid
Date Received: 12/15/15 11:00 Percent Solids: 82.1

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.00014**		0.000067	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:44	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**2.37**		0.184	0.285	1.35	0.230	pCi/g	12/15/15 14:41	12/17/15 17:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*90*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:44*	*1*

Client Sample ID: L08-07-10-T-E-B-00 Lab Sample ID: 160-15374-10

Date Collected: 12/12/15 10:35 Matrix: Solid
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.18**		0.145	0.187		0.109	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Americium 241	-0.0356	U	0.156	0.156		0.124	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Bismuth 212	**1.87**		0.573	0.604		0.471	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Bismuth 214	**0.898**		0.102	0.138		0.0742	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Lead 212	**1.19**		0.0928	0.180		0.0798	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Lead 214	**1.06**		0.0889	0.142		0.0696	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Potassium 40	**21.4**		1.12	2.43		0.256	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Protactinium 234m	**9.82**		3.53	3.66		3.36	pCi/g	12/16/15 13:25	12/17/15 18:45	1

Client Sample ID: L08-07-10-T-E-B-00 Lab Sample ID: 160-15374-10

Date Collected: 12/12/15 10:35 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Protactinium 231	0.556	U	0.234	0.242		1.24	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Radium 226	**0.898**		0.102	0.138		0.0742	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Thorium 234	**6.60**		1.09	1.29		1.15	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Uranium 235	**1.77**		0.182	0.257		0.214	pCi/g	12/16/15 13:25	12/17/15 18:45	1
Thorium 232	**1.18**		0.145	0.187		0.109	pCi/g	12/16/15 13:25	12/17/15 18:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Tl-208	*0.332*		*0.0451*	*0.0566*		*0.0374*	*pCi/g*	*12/16/15 13:25*	*12/17/15 18:45*	*1*

Client Sample ID: L08-07-10-T-E-B-00 Lab Sample ID: 160-15374-10

Date Collected: 12/12/15 10:35 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 90.4**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	**0.00011**		0.000060	0.000018	mg/Kg	☼	12/15/15 14:41	12/17/15 17:49	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	**1.96**		0.321	0.368	1.21	0.207	pCi/g	12/15/15 14:41	12/17/15 17:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*92*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:49*	*1*

Client Sample ID: L08-07-11-T-E-B-00 Lab Sample ID: 160-15374-11

Date Collected: 12/12/15 10:40 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	**1.12**		0.139	0.180		0.108	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Americium 241	-0.00173	U	0.0478	0.0478		0.0811	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Bismuth 212	**1.02**		0.427	0.440		0.436	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Bismuth 214	**0.722**		0.0838	0.113		0.0784	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Lead 212	**1.07**		0.0808	0.160		0.0663	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Lead 214	**0.970**		0.0861	0.133		0.0671	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Potassium 40	**19.2**		1.14	2.28		0.298	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Protactinium 234m	2.51	U	2.93	2.94		4.79	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Protactinium 231	0.741	U	0.246	0.259		1.05	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Radium 226	**0.722**		0.0838	0.113		0.0784	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Thorium 234	**1.24**		0.498	0.515		0.787	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Uranium 235	0.129	U	0.142	0.142		0.222	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Thorium 232	**1.12**		0.139	0.180		0.108	pCi/g	12/16/15 13:25	12/17/15 18:46	1

Client Sample ID: L08-07-11-T-E-B-00 Lab Sample ID: 160-15374-11

Date Collected: 12/12/15 10:40 **Matrix: Solid**
Date Received: 12/15/15 11:00

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Pb-210	1.46		0.501	0.530		0.687	pCi/g	12/16/15 13:25	12/17/15 18:46	1
Tl-208	0.363		0.0440	0.0579		0.0289	pCi/g	12/16/15 13:25	12/17/15 18:46	1

Client Sample ID: L08-07-11-T-E-B-00 Lab Sample ID: 160-15374-11

Date Collected: 12/12/15 10:40 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 73.6**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000029	J	0.000075	0.000023	mg/Kg	☼	12/15/15 14:41	12/17/15 17:53	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.498		0.0966	0.107	1.50	0.257	pCi/g	12/15/15 14:41	12/17/15 17:53	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	90		30 - 110	12/15/15 14:41	12/17/15 17:53	1

Client Sample ID: L08-07-08-T-E-Q-00 Lab Sample ID: 160-15374-12

Date Collected: 12/12/15 09:45 **Matrix: Solid**
Date Received: 12/15/15 11:00

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	1.02		0.106	0.149		0.0808	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Americium 241	0.0420	U	0.0482	0.0484		0.0689	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Bismuth 212	1.36		0.350	0.377		0.301	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Bismuth 214	0.824		0.0826	0.119		0.0530	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Lead 212	1.04		0.0653	0.150		0.0517	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Lead 214	0.898		0.0731	0.119		0.0552	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Potassium 40	17.5		1.01	2.05		0.256	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Protactinium 234m	2.37	U	2.38	2.39		3.31	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Protactinium 231	-0.493	U	0.600	0.602		0.987	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Radium 226	0.824		0.0826	0.119		0.0530	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Thorium 234	1.85		0.508	0.544		0.776	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Uranium 235	0.357		0.148	0.152		0.185	pCi/g	12/16/15 13:25	12/17/15 19:19	1
Thorium 232	1.02		0.106	0.149		0.0808	pCi/g	12/16/15 13:25	12/17/15 19:19	1

Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.320		0.0451	0.0560		0.0364	pCi/g	12/16/15 13:25	12/17/15 19:19	1

Client Sample ID: L08-07-08-T-E-Q-00 **Lab Sample ID: 160-15374-12**
Date Collected: 12/12/15 09:45 **Matrix: Solid**
Date Received: 12/15/15 11:00 **Percent Solids: 81.2**

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.00016		0.000068	0.000020	mg/Kg	☼	12/15/15 14:41	12/17/15 17:57	1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	2.75		0.279	0.376	1.35	0.232	pCi/g	12/15/15 14:41	12/17/15 17:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*91*		*30 - 110*	*12/15/15 14:41*	*12/17/15 17:57*	*1*

Method: 6020A - Metals (ICP/MS), Tc-99

Lab Sample ID: MB 160-227483/1-A
Matrix: Solid
Analysis Batch: 228248

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 227483

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000055	0.000016	mg/Kg		12/15/15 14:41	12/17/15 16:40	1

Lab Sample ID: LCS 160-227483/2-A
Matrix: Solid
Analysis Batch: 228248

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.00123	0.00131		mg/Kg		107	80 - 120

Lab Sample ID: 160-15374-1 MS
Matrix: Solid
Analysis Batch: 228248

Client Sample ID: L08-07-01-T-E-S-00
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.000028	J	0.00148	0.00157		mg/Kg	☼	105	75 - 125

Lab Sample ID: 160-15374-1 MSD
Matrix: Solid
Analysis Batch: 228248

Client Sample ID: L08-07-01-T-E-S-00
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Technetium 99	0.000028	J	0.00148	0.00161		mg/Kg	☼	107	75 - 125	3	30

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Lab Sample ID: MB 160-227483/1-A
Matrix: Solid
Analysis Batch: 228249

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 227483

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.05947	U	0.00915	0.0107	1.09	0.187	pCi/g	12/15/15 14:41	12/17/15 16:40	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*92*		*30 - 110*	*12/15/15 14:41*	*12/17/15 16:40*	*1*

Lab Sample ID: LCS 160-227483/2-A
Matrix: Solid
Analysis Batch: 228249

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	21.0	22.44		2.10	1.04	0.178	pCi/g	107	80 - 120

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Re	*96*		*30 - 110*

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity (Continued)

Lab Sample ID: 160-15374-1 MS
Matrix: Solid
Analysis Batch: 228249

Client Sample ID: L08-07-01-T-E-S-00
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	0.477		25.3	26.93		2.65	1.27	0.218	pCi/g	105	75 - 125

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Re	*94*		*30 - 110*

Lab Sample ID: 160-15374-1 MSD
Matrix: Solid
Analysis Batch: 228249

Client Sample ID: L08-07-01-T-E-S-00
Prep Type: Total/NA
Prep Batch: 227483

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Technetium 99	0.477		25.3	27.62		2.64	1.34	0.230	pCi/g	107	75 - 125	0.13	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Re	*89*		*30 - 110*

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-227692/1-A
Matrix: Solid
Analysis Batch: 227894

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 227692

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.01722	U	0.0160	0.0161		0.0236	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Americium 241	-0.003145	U	0.0140	0.0140		0.0246	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Bismuth 212	0.003318	U	0.0816	0.0816		0.161	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Bismuth 214	-0.01445	U	0.578	0.578		0.0494	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Lead 212	-0.006289	U	0.0573	0.0573		0.0268	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Lead 214	0.01693	U	0.0128	0.0129		0.0230	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Potassium 40	-0.06940	U	2.78	2.78		0.277	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Protactinium 234m	0.1186	U	0.616	0.616		2.12	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Protactinium 231	0.02703	U	0.0473	0.0474		0.339	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Radium 226	-0.01445	U	0.578	0.578		0.0494	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Thorium 234	0.09844	U	0.130	0.130		0.217	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Uranium 235	0.02431	U	0.0293	0.0294		0.0551	pCi/g	12/16/15 13:25	12/17/15 17:26	1
Thorium 232	0.01722	U	0.0160	0.0161		0.0236	pCi/g	12/16/15 13:25	12/17/15 17:26	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*12/16/15 13:25*	*12/17/15 17:26*	*1*

Method: GA-01-R - Cesium-137 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-227692/2-A
Matrix: Solid
Analysis Batch: 227750

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 227692

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	106.3		11.1		0.528	pCi/g	106	87 - 116
Cesium 137	34.3	38.16		3.94	0.200	0.162	pCi/g	111	87 - 120
Cobalt 60	32.9	35.86		3.55		0.0781	pCi/g	109	87 - 115

Lab Sample ID: 160-15374-1 DU
Matrix: Solid
Analysis Batch: 227894

Client Sample ID: L08-07-01-T-E-S-00
Prep Type: Total/NA
Prep Batch: 227692

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	1.09		1.033		0.148		0.108	pCi/g	0.17	1
Americium 241	0.0143	U	-0.0007813	U	0.0432		0.0732	pCi/g	0.17	1
Bismuth 212	0.838		1.167		0.356		0.296	pCi/g	0.47	1
Bismuth 214	0.774		0.6792		0.106		0.0590	pCi/g	0.42	1
Lead 212	0.984		0.9524		0.146		0.0700	pCi/g	0.11	1
Lead 214	0.898		0.8225		0.111		0.0575	pCi/g	0.33	1
Potassium 40	17.7		17.88		2.08		0.283	pCi/g	0.04	1
Protactinium 234m	0.292	U	4.547		2.82		3.92	pCi/g	0.72	1
Protactinium 231	0.679	U	-0.4403	U F	0.562		0.924	pCi/g	1.28	1
Radium 226	0.774		0.6792		0.106		0.0590	pCi/g	0.42	1
Thorium 234	1.25		0.8337		0.253		0.686	pCi/g	0.56	1
Uranium 235	0.134	U	0.1359	U	0.0950		0.166	pCi/g	0.01	1
Thorium 232	1.09		1.033		0.148		0.108	pCi/g	0.17	1

Other Detected Radionuclides	*Sample Result*	*Sample Qual*	*DU Result*	*DU Qual*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*RER*	*RER Limit*
Tl-208	*0.375*		*0.3132*		*0.0528*		*0.0318*	*pCi/g*	*0.53*	*1*

Metals

Prep Batch: 227483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-1 MS	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-1 MSD	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	None	
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	None	
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	None	
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	None	
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	None	
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	None	
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	None	
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	None	
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	None	
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	None	
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	None	
LCS 160-227483/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-227483/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 228248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-1 MS	L08-07-01-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-1 MSD	L08-07-01-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	6020A	227483
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	6020A	227483
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	6020A	227483
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	6020A	227483
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	6020A	227483
LCS 160-227483/2-A	Lab Control Sample	Total/NA	Solid	6020A	227483
MB 160-227483/1-A	Method Blank	Total/NA	Solid	6020A	227483

General Chemistry

Analysis Batch: 227510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-1 DU	L08-07-01-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	Moisture	
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	Moisture	
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 227510 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	Moisture	
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	Moisture	
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	Moisture	

Rad

Leach Batch: 227471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-1 DU	L08-07-01-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	Dry and Grind	
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	Dry and Grind	
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	Dry and Grind	
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 227483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-1 MS	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-1 MSD	L08-07-01-T-E-S-00	Total/NA	Solid	None	
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	None	
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	None	
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	None	
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	None	
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	None	
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	None	
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	None	
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	None	
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	None	
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	None	
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	None	
LCS 160-227483/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-227483/1-A	Method Blank	Total/NA	Solid	None	

Prep Batch: 227692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-1	L08-07-01-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-1 DU	L08-07-01-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-2	L08-07-02-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-3	L08-07-03-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-4	L08-07-04-T-R-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-5	L08-07-05-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-6	L08-07-06-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471

Rad (Continued)

Prep Batch: 227692 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-15374-7	L08-07-07-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-8	L08-07-08-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-9	L08-07-09-T-E-S-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-10	L08-07-10-T-E-B-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-11	L08-07-11-T-E-B-00	Total/NA	Solid	Fill_Geo-0	227471
160-15374-12	L08-07-08-T-E-Q-00	Total/NA	Solid	Fill_Geo-0	227471
LCS 160-227692/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-227692/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Tracer/Carrier Summary

Client: Perma-Fix Environmental Services Inc.
Project/Site: HDP

TestAmerica Job ID: 160-15374-1

Method: 6020A - Metals (ICP/MS), Tc-99 in Activity

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)							
Lab Sample ID	Client Sample ID	Re (30-110)							
160-15374-1	L08-07-01-T-E-S-00	87							
160-15374-1 MS	L08-07-01-T-E-S-00	94							
160-15374-1 MSD	L08-07-01-T-E-S-00	89							
160-15374-2	L08-07-02-T-E-S-00	93							
160-15374-3	L08-07-03-T-E-S-00	90							
160-15374-4	L08-07-04-T-R-S-00	89							
160-15374-5	L08-07-05-T-E-S-00	89							
160-15374-6	L08-07-06-T-E-S-00	89							
160-15374-7	L08-07-07-T-E-S-00	90							
160-15374-8	L08-07-08-T-E-S-00	90							
160-15374-9	L08-07-09-T-E-S-00	90							
160-15374-10	L08-07-10-T-E-B-00	92							
160-15374-11	L08-07-11-T-E-B-00	90							
160-15374-12	L08-07-08-T-E-Q-00	91							
LCS 160-227483/2-A	Lab Control Sample	96							
MB 160-227483/1-A	Method Blank	92							

Tracer/Carrier Legend

Re = Re