

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: 160-10219-1

Client Project/Site: HDP

For:

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

Attn: Brian Miller



Authorized for release by:
1/28/2015 4:28:43 PM

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

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Case Narrative

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

TestAmerica Job ID: 160-10219-1

Job ID: 160-10219-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Perma-Fix Environmental Services Inc.

Project: HDP

Report Number: 160-10219-1

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 01/21/2015; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the coolers at receipt was 20.0 C.

TECHNETIUM-99 (ICPMS)

Samples L10-04-13-B-E-B-00 (160-10219-1), L10-04-14-B-E-B-00 (160-10219-2), L10-03-01-B-E-S-00 (160-10219-3), L10-03-02-B-E-S-00 (160-10219-4), L10-03-03-B-E-S-00 (160-10219-5), L10-03-04-B-E-S-00 (160-10219-6), L10-03-05-B-E-S-00 (160-10219-7), L10-03-06-B-E-S-00 (160-10219-8), L10-03-07-B-E-S-00 (160-10219-9), L10-03-07-B-E-Q-00 (160-10219-10), L10-03-08-B-R-S-00 (160-10219-11) and L10-03-09-B-E-S-00 (160-10219-12) were analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared on 01/26/2015 and analyzed on 01/27/2015.

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

PERCENT SOLIDS

Samples L10-04-13-B-E-B-00 (160-10219-1), L10-04-14-B-E-B-00 (160-10219-2), L10-03-01-B-E-S-00 (160-10219-3),

Case Narrative

Client: Perma-Fix Environmental Services Inc.
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Laboratory: TestAmerica St. Louis (Continued)

L10-03-02-B-E-S-00 (160-10219-4), L10-03-03-B-E-S-00 (160-10219-5), L10-03-04-B-E-S-00 (160-10219-6), L10-03-05-B-E-S-00 (160-10219-7), L10-03-06-B-E-S-00 (160-10219-8), L10-03-07-B-E-S-00 (160-10219-9), L10-03-07-B-E-Q-00 (160-10219-10), L10-03-08-B-R-S-00 (160-10219-11) and L10-03-09-B-E-S-00 (160-10219-12) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 01/22/2015.

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 L10-04-13-B-E-B-00 (160-10219-1), L10-04-14-B-E-B-00 (160-10219-2), L10-03-01-B-E-S-00 (160-10219-3), L10-03-02-B-E-S-00 (160-10219-4), L10-03-03-B-E-S-00 (160-10219-5), L10-03-04-B-E-S-00 (160-10219-6), L10-03-05-B-E-S-00 (160-10219-7), L10-03-06-B-E-S-00 (160-10219-8), L10-03-07-B-E-S-00 (160-10219-9), L10-03-07-B-E-Q-00 (160-10219-10), L10-03-08-B-R-S-00 (160-10219-11) and L10-03-09-B-E-S-00 (160-10219-12) were analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were leached on 01/21/2015, and prepared and analyzed on 01/26/2015.

Preparation Batch 170185:

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.

The RER was outside of the acceptance limit of 1 for protactinium-231. Both the sample and duplicate activity were less than the MDC. (160-10219-1 DU), (LCS 160-170185/2-A), (MB 160-170185/1-A), L10-03-01-B-E-S-00 (160-10219-3), L10-03-02-B-E-S-00 (160-10219-4), L10-03-03-B-E-S-00 (160-10219-5), L10-03-04-B-E-S-00 (160-10219-6), L10-03-05-B-E-S-00 (160-10219-7), L10-03-06-B-E-S-00 (160-10219-8), L10-03-07-B-E-Q-00 (160-10219-10), L10-03-07-B-E-S-00 (160-10219-9), L10-03-08-B-R-S-00 (160-10219-11), L10-03-09-B-E-S-00 (160-10219-12), L10-04-13-B-E-B-00 (160-10219-1), L10-04-14-B-E-B-00 (160-10219-2)

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

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

Client Contact		Project Manager: Brian Miller		Site Contact: Ellen Jakub		Date: 01/21/15		COC No: 012115-FSS2	
Perma-Fix Environmental Services		Tel/Fax: (314) 810-3333		Lab Contact: Ivan Vania		Carrier: Courier		Page 1 of 1	
2800 Solway Road		Analysis Turnaround Time		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
Knoxville, TN 37931		<input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
(865) 690-0501		TAT if different from Below		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
(865) 539-9868		<input type="checkbox"/> 2 weeks		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
Project Name: Hematite Decommissioning Project		<input checked="" type="checkbox"/> 1 week		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
Site: Westinghouse Hematite, MO		<input type="checkbox"/> 2 days		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
P O # 832953		<input type="checkbox"/> 1 day		Gamma Spec (Ra-226, Th-232, U-235, U-238)		Alpha Spec		ICP/MS (Tc-99)	
Sample Identification		Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Sample Specific Notes:		
L10-03-01-B-E-S-00	1/20/15	14:40	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-02-B-E-S-00	1/20/15	14:45	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-03-B-E-S-00	1/20/15	14:50	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-04-B-E-S-00	1/20/15	14:50	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-05-B-E-S-00	1/20/15	15:10	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-06-B-E-S-00	1/20/15	15:10	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-07-B-E-S-00	1/20/15	15:25	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-07-B-E-Q-00	1/20/15	15:25	G	Soil	1	N	X	X	LSA 10-03 systematic
L10-03-08-B-R-S-00	1/20/15	15:35	C	Soil	1	N	X	X	LSA 10-03 systematic (root stratum)
L10-03-09-B-E-S-00	1/20/15	15:55	G	Soil	1	N	X	X	LSA 10-03 systematic
N / A									
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.									
<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown									
Special Instructions/QC Requirements & Comments: Dry and homogenize samples before analyses; potential for radiological contamination									
Custody Seal No.:		Cooler Temp. (°C):		Obs'd:		Cor'd:		Therm ID No.:	
Relinquished by: <i>Brian Miller</i>		Date/Time: 01/21/15 0930		Received by: <i>Ellen Jakub</i>		Company: <i>TestAmerica</i>		Date/Time: 1/21/15 930	
Relinquished by: <i>Brian Miller</i>		Date/Time: 1/21/15 1535		Received by: <i>Ellen Jakub</i>		Company: <i>TA ST</i>		Date/Time: 1.21.15 1027	
Relinquished by: <i>Brian Miller</i>		Date/Time:		Received in Laboratory by:		Company:		Date/Time:	
Hematite Decommissioning Project		Perma-Fix (for Westinghouse) Non-Proprietary Class 3		Procedure: HDP-PR-QA-006, Chain of Custody		Revision: 3			

Login Sample Receipt Checklist

Client: Perma-Fix Environmental Services Inc.

Job Number: 160-10219-1

Login Number: 10219

List Source: TestAmerica St. Louis

List Number: 1

Creator: Clarke, Jill C

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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?	False	
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 $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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

TestAmerica Job ID: 160-10219-1

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.
α	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: 160-10219-1

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: 160-10219-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10219-1	L10-04-13-B-E-B-00	Solid	01/20/15 14:20	01/21/15 10:27
160-10219-2	L10-04-14-B-E-B-00	Solid	01/20/15 14:35	01/21/15 10:27
160-10219-3	L10-03-01-B-E-S-00	Solid	01/20/15 14:40	01/21/15 10:27
160-10219-4	L10-03-02-B-E-S-00	Solid	01/20/15 14:45	01/21/15 10:27
160-10219-5	L10-03-03-B-E-S-00	Solid	01/20/15 14:50	01/21/15 10:27
160-10219-6	L10-03-04-B-E-S-00	Solid	01/20/15 14:50	01/21/15 10:27
160-10219-7	L10-03-05-B-E-S-00	Solid	01/20/15 15:10	01/21/15 10:27
160-10219-8	L10-03-06-B-E-S-00	Solid	01/20/15 15:10	01/21/15 10:27
160-10219-9	L10-03-07-B-E-S-00	Solid	01/20/15 15:25	01/21/15 10:27
160-10219-10	L10-03-07-B-E-Q-00	Solid	01/20/15 15:25	01/21/15 10:27
160-10219-11	L10-03-08-B-R-S-00	Solid	01/20/15 15:35	01/21/15 10:27
160-10219-12	L10-03-09-B-E-S-00	Solid	01/20/15 15:55	01/21/15 10:27

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-04-13-B-E-B-00

Lab Sample ID: 160-10219-1

Date Collected: 01/20/15 14:20

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 79.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000071	0.000021	mg/Kg	☆	01/26/15 12:40	01/27/15 15:20	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	-0.0398	U	0.0397	0.0399	1.42	0.243	pCi/g	01/26/15 12:40	01/27/15 15:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	89		30 - 110					01/26/15 12:40	01/27/15 15:20	1

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	1.19		0.135	0.182		0.147	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Americium 241	-0.00355	U	0.108	0.108		0.180	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Bismuth 212	1.57		0.384	0.417		0.337	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Bismuth 214	0.964		0.0954	0.138		0.0843	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Lead 212	1.28		0.0779	0.183		0.0650	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Lead 214	1.17		0.0937	0.153		0.0660	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Potassium 40	18.9		1.12	2.24		0.292	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Protactinium 234m	30.5		6.12	6.85		4.37	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Protactinium 231	-0.708	U	0.683	0.687		1.11	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Radium 226	0.964		0.0954	0.138		0.0843	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Thorium 234	23.8		1.17	2.75		1.29	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Uranium 235	5.70		0.278	0.643		0.310	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Thorium 232	1.19		0.135	0.182		0.147	pCi/g	01/26/15 12:29	01/26/15 19:49	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.410		0.0522	0.0674		0.0408	pCi/g	01/26/15 12:29	01/26/15 19:49	1

Client Sample ID: L10-04-14-B-E-B-00

Lab Sample ID: 160-10219-2

Date Collected: 01/20/15 14:35

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 84.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000063	0.000019	mg/Kg	☆	01/26/15 12:40	01/27/15 15:40	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	0.110	U	0.0579	0.0588	1.25	0.215	pCi/g	01/26/15 12:40	01/27/15 15:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	94		30 - 110					01/26/15 12:40	01/27/15 15:40	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-04-14-B-E-B-00

Lab Sample ID: 160-10219-2

Date Collected: 01/20/15 14:35

Matrix: Solid

Date Received: 01/21/15 10:27

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.14		0.206	0.236		0.143	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Americium 241	-0.0493	U	0.197	0.197		0.240	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Bismuth 212	1.26		0.448	0.467		0.410	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Bismuth 214	0.951		0.113	0.150		0.0682	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Lead 212	0.956		0.0883	0.152		0.0946	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Lead 214	0.900		0.0989	0.136		0.0883	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Potassium 40	18.2		1.37	2.31		0.335	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Protactinium 234m	50.8		8.76	10.2		5.85	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Protactinium 231	-0.662	U	0.934	0.936		1.55	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Radium 226	0.951		0.113	0.150		0.0682	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Thorium 234	43.1		2.13	4.98		1.92	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Uranium 235	1.02		0.242	0.263		0.312	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Thorium 232	1.14		0.206	0.236		0.143	pCi/g	01/26/15 12:29	01/26/15 20:23	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.378		0.0571	0.0693		0.0440	pCi/g	01/26/15 12:29	01/26/15 20:23	1

Client Sample ID: L10-03-01-B-E-S-00

Lab Sample ID: 160-10219-3

Date Collected: 01/20/15 14:40

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 68.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000080	0.000024	mg/Kg	☼	01/26/15 12:40	01/27/15 15:44	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Technetium 99	0.0517	U	0.0944	0.0945	1.61	0.275	pCi/g	01/26/15 12:40	01/27/15 15:44	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/26/15 12:40	01/27/15 15:44	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.45		0.173	0.228		0.0998	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Americium 241	0.0308	U	0.0671	0.0671		0.112	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Bismuth 212	1.68		0.462	0.494		0.387	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Bismuth 214	1.09		0.121	0.166		0.0857	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Lead 212	1.41		0.0894	0.203		0.0726	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Lead 214	1.08		0.106	0.154		0.0777	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Potassium 40	18.3		1.19	2.21		0.261	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Protactinium 234m	1.76	U	3.43	3.43		5.81	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Protactinium 231	1.18		0.485	0.502		0.720	pCi/g	01/26/15 12:29	01/26/15 20:24	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-01-B-E-S-00

Lab Sample ID: 160-10219-3

Date Collected: 01/20/15 14:40

Matrix: Solid

Date Received: 01/21/15 10:27

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	1.09		0.121	0.166		0.0857	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Thorium 234	0.995		0.332	0.348		0.953	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Uranium 235	0.212		0.125	0.127		0.192	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Thorium 232	1.45		0.173	0.228		0.0998	pCi/g	01/26/15 12:29	01/26/15 20:24	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.416		0.0557	0.0704		0.0462	pCi/g	01/26/15 12:29	01/26/15 20:24	1

Client Sample ID: L10-03-02-B-E-S-00

Lab Sample ID: 160-10219-4

Date Collected: 01/20/15 14:45

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 67.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000079	0.000024	mg/Kg	☼	01/26/15 12:40	01/27/15 15:47	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	-0.0558	U	0.0523	0.0526	1.58	0.271	pCi/g	01/26/15 12:40	01/27/15 15:47	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	94		30 - 110					01/26/15 12:40	01/27/15 15:47	1

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	1.17		0.183	0.219		0.123	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Americium 241	0.00179	U	0.0684	0.0684		0.116	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Bismuth 212	1.89		0.494	0.532		0.385	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Bismuth 214	1.10		0.130	0.173		0.0920	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Lead 212	1.52		0.0951	0.219		0.0708	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Lead 214	1.17		0.114	0.167		0.0885	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Potassium 40	19.5		1.34	2.41		0.278	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Protactinium 234m	1.58	U	2.90	2.91		4.95	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Protactinium 231	-0.901	U	0.884	0.889		1.44	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Radium 226	1.10		0.130	0.173		0.0920	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Thorium 234	1.79		0.709	0.733		0.925	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Uranium 235	0.177	U	0.150	0.152		0.273	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Thorium 232	1.17		0.183	0.219		0.123	pCi/g	01/26/15 12:29	01/26/15 20:56	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.462		0.0581	0.0753		0.0389	pCi/g	01/26/15 12:29	01/26/15 20:56	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-03-B-E-S-00

Lab Sample ID: 160-10219-5

Date Collected: 01/20/15 14:50

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 72.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000077	0.000023	mg/Kg	☼	01/26/15 12:40	01/27/15 15:51	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	-0.0681	U	0.0990	0.0992	1.54	0.264	pCi/g	01/26/15 12:40	01/27/15 15:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	90		30 - 110					01/26/15 12:40	01/27/15 15:51	1

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	1.43		0.205	0.252		0.148	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Americium 241	0.0394	U	0.0753	0.0754		0.126	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Bismuth 212	1.23		0.517	0.533		0.719	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Bismuth 214	0.896		0.126	0.156		0.0827	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Lead 212	1.21		0.104	0.188		0.103	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Lead 214	1.02		0.114	0.155		0.0792	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Potassium 40	16.5		1.39	2.19		0.214	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Protactinium 234m	2.66	U	4.44	4.44		7.22	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Protactinium 231	0.503	U	0.297	0.302		1.76	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Radium 226	0.896		0.126	0.156		0.0827	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Thorium 234	0.820	U	0.366	0.376		1.04	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Uranium 235	0.0772	U	0.171	0.172		0.313	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Thorium 232	1.43		0.205	0.252		0.148	pCi/g	01/26/15 12:29	01/26/15 20:57	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.445		0.0646	0.0794		0.0429	pCi/g	01/26/15 12:29	01/26/15 20:57	1

Client Sample ID: L10-03-04-B-E-S-00

Lab Sample ID: 160-10219-6

Date Collected: 01/20/15 14:50

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 75.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000074	0.000022	mg/Kg	☼	01/26/15 12:40	01/27/15 15:55	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	-0.0136	U	0.0299	0.0300	1.47	0.252	pCi/g	01/26/15 12:40	01/27/15 15:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	90		30 - 110					01/26/15 12:40	01/27/15 15:55	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-04-B-E-S-00

Lab Sample ID: 160-10219-6

Date Collected: 01/20/15 14:50

Matrix: Solid

Date Received: 01/21/15 10:27

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.31		0.123	0.182		0.0904	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Americium 241	-0.00109	U	0.0659	0.0659		0.111	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Bismuth 212	1.42		0.422	0.447		0.398	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Bismuth 214	0.906		0.0962	0.135		0.0682	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Lead 212	1.21		0.0761	0.174		0.0722	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Lead 214	0.934		0.0799	0.126		0.0678	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Potassium 40	18.1		1.03	2.12		0.204	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Protactinium 234m	0.982	U	2.52	2.52		4.34	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Protactinium 231	0.311	U	0.447	0.448		0.742	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Radium 226	0.906		0.0962	0.135		0.0682	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Thorium 234	0.877		0.305	0.319		0.770	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Uranium 235	0.124	U	0.151	0.152		0.250	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Thorium 232	1.31		0.123	0.182		0.0904	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.363		0.0518	0.0641		0.0412	pCi/g	01/26/15 12:29	01/26/15 21:35	1

Client Sample ID: L10-03-05-B-E-S-00

Lab Sample ID: 160-10219-7

Date Collected: 01/20/15 15:10

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 72.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000076	0.000023	mg/Kg	☼	01/26/15 12:40	01/27/15 15:59	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Technetium 99	0.113	U	0.100	0.101	1.52	0.261	pCi/g	01/26/15 12:40	01/27/15 15:59	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	90		30 - 110					01/26/15 12:40	01/27/15 15:59	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.18		0.156	0.197		0.139	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Americium 241	0.0163	U	0.0653	0.0653		0.110	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Bismuth 212	1.81		0.471	0.508		0.373	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Bismuth 214	0.891		0.116	0.149		0.0832	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Lead 212	1.38		0.0912	0.200		0.0679	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Lead 214	1.05		0.0976	0.146		0.0895	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Potassium 40	15.9		1.23	2.04		0.284	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Protactinium 234m	2.32	U	3.34	3.34		5.56	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Protactinium 231	-0.729	U	0.872	0.876		1.43	pCi/g	01/26/15 12:29	01/26/15 21:33	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-05-B-E-S-00

Lab Sample ID: 160-10219-7

Date Collected: 01/20/15 15:10

Matrix: Solid

Date Received: 01/21/15 10:27

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	0.891		0.116	0.149		0.0832	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Thorium 234	1.59		0.830	0.847		1.05	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Uranium 235	0.130	U	0.150	0.151		0.247	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Thorium 232	1.18		0.156	0.197		0.139	pCi/g	01/26/15 12:29	01/26/15 21:33	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.449		0.0620	0.0775		0.0431	pCi/g	01/26/15 12:29	01/26/15 21:33	1

Client Sample ID: L10-03-06-B-E-S-00

Lab Sample ID: 160-10219-8

Date Collected: 01/20/15 15:10

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 82.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000065	0.000019	mg/Kg	☼	01/26/15 12:40	01/27/15 16:03	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	0.273		0.0380	0.0456	1.30	0.222	pCi/g	01/26/15 12:40	01/27/15 16:03	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	93		30 - 110					01/26/15 12:40	01/27/15 16:03	1

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	0.982		0.151	0.181		0.143	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Americium 241	0.0114	U	0.0712	0.0712		0.120	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Bismuth 212	1.57		0.417	0.448		0.298	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Bismuth 214	0.902		0.109	0.144		0.0632	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Lead 212	0.968		0.0870	0.153		0.0876	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Lead 214	0.994		0.107	0.149		0.0830	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Potassium 40	18.0		1.38	2.30		0.338	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Protactinium 234m	1.19	U	3.47	3.47		6.07	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Protactinium 231	0.592	U	0.385	0.391		0.883	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Radium 226	0.902		0.109	0.144		0.0632	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Thorium 234	0.899	U	0.350	0.362		0.972	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Uranium 235	0.152	U	0.154	0.155		0.268	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Thorium 232	0.982		0.151	0.181		0.143	pCi/g	01/26/15 12:29	01/26/15 21:34	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.417		0.0685	0.0810		0.0491	pCi/g	01/26/15 12:29	01/26/15 21:34	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-07-B-E-S-00

Lab Sample ID: 160-10219-9

Date Collected: 01/20/15 15:25

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 68.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000039	J	0.000080	0.000024	mg/Kg	☼	01/26/15 12:40	01/27/15 16:07	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	0.669		0.0257	0.0667	1.61	0.275	pCi/g	01/26/15 12:40	01/27/15 16:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	92		30 - 110					01/26/15 12:40	01/27/15 16:07	1

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	1.15		0.122	0.169		0.0992	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Americium 241	0.0234	U	0.0584	0.0584		0.0975	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Bismuth 212	1.53		0.387	0.418		0.310	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Bismuth 214	0.945		0.119	0.154		0.0882	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Lead 212	1.17		0.0773	0.170		0.0643	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Lead 214	1.03		0.0859	0.137		0.0695	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Potassium 40	18.5		1.18	2.23		0.393	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Protactinium 234m	1.29	U	2.83	2.83		4.85	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Protactinium 231	0.441	U	0.214	0.219		1.12	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Radium 226	0.945		0.119	0.154		0.0882	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Thorium 234	1.37		0.536	0.555		0.845	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Uranium 235	0.332		0.150	0.154		0.179	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Thorium 232	1.15		0.122	0.169		0.0992	pCi/g	01/26/15 12:29	01/26/15 21:35	1
Other Detected			Count Uncert.	Total Uncert.						
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.337		0.0492	0.0604		0.0383	pCi/g	01/26/15 12:29	01/26/15 21:35	1

Client Sample ID: L10-03-07-B-E-Q-00

Lab Sample ID: 160-10219-10

Date Collected: 01/20/15 15:25

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 69.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000065	J	0.000080	0.000024	mg/Kg	☼	01/26/15 12:40	01/27/15 16:18	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	1.11		0.189	0.215	1.59	0.273	pCi/g	01/26/15 12:40	01/27/15 16:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/26/15 12:40	01/27/15 16:18	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-07-B-E-Q-00

Lab Sample ID: 160-10219-10

Date Collected: 01/20/15 15:25

Matrix: Solid

Date Received: 01/21/15 10:27

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.34		0.165	0.214		0.0829	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Americium 241	-0.00602	U	0.0669	0.0669		0.113	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Bismuth 212	1.90		0.513	0.549		0.415	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Bismuth 214	0.916		0.104	0.141		0.0742	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Lead 212	1.12		0.0792	0.165		0.0769	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Lead 214	1.18		0.0897	0.152		0.0723	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Potassium 40	21.4		1.20	2.49		0.242	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Protactinium 234m	3.31	U	2.53	2.55		5.18	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Protactinium 231	0.362	U	0.201	0.205		1.27	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Radium 226	0.916		0.104	0.141		0.0742	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Thorium 234	1.05		0.319	0.337		0.924	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Uranium 235	0.0841	U	0.143	0.143		0.259	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Thorium 232	1.34		0.165	0.214		0.0829	pCi/g	01/26/15 12:29	01/26/15 22:08	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.396		0.0439	0.0601		0.0288	pCi/g	01/26/15 12:29	01/26/15 22:08	1

Client Sample ID: L10-03-08-B-R-S-00

Lab Sample ID: 160-10219-11

Date Collected: 01/20/15 15:35

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 80.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000040	J	0.000066	0.000020	mg/Kg	☼	01/26/15 12:40	01/27/15 16:22	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Technetium 99	0.687		0.142	0.156	1.31	0.225	pCi/g	01/26/15 12:40	01/27/15 16:22	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	95		30 - 110					01/26/15 12:40	01/27/15 16:22	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Actinium 228	1.21		0.143	0.189		0.154	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Americium 241	-0.00414	U	0.0600	0.0600		0.102	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Bismuth 212	1.46		0.408	0.436		0.333	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Bismuth 214	0.937		0.119	0.154		0.0835	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Lead 212	1.23		0.0825	0.179		0.0623	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Lead 214	0.994		0.0934	0.139		0.0821	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Potassium 40	18.4		1.27	2.27		0.344	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Protactinium 234m	3.08	U	1.55	1.58		6.78	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Protactinium 231	-0.681	U	0.795	0.798		1.31	pCi/g	01/26/15 12:29	01/26/15 22:07	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10219-1

Client Sample ID: L10-03-08-B-R-S-00

Lab Sample ID: 160-10219-11

Date Collected: 01/20/15 15:35

Matrix: Solid

Date Received: 01/21/15 10:27

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	0.937		0.119	0.154		0.0835	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Thorium 234	1.10		0.300	0.322		0.832	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Uranium 235	0.133	U	0.143	0.143		0.184	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Thorium 232	1.21		0.143	0.189		0.154	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.310		0.0454	0.0556		0.0429	pCi/g	01/26/15 12:29	01/26/15 22:07	1

Client Sample ID: L10-03-09-B-E-S-00

Lab Sample ID: 160-10219-12

Date Collected: 01/20/15 15:55

Matrix: Solid

Date Received: 01/21/15 10:27

Percent Solids: 81.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000066	0.000020	mg/Kg	☼	01/26/15 12:40	01/27/15 16:26	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	0.202	U	0.0672	0.0697	1.33	0.227	pCi/g	01/26/15 12:40	01/27/15 16:26	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	92		30 - 110					01/26/15 12:40	01/27/15 16:26	1

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	1.19		0.157	0.198		0.114	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Americium 241	-0.0288	U	0.114	0.114		0.114	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Bismuth 212	1.41		0.425	0.450		0.359	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Bismuth 214	0.800		0.107	0.136		0.0711	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Lead 212	0.859		0.0853	0.140		0.0959	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Lead 214	0.917		0.107	0.144		0.0815	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Potassium 40	15.2		1.20	1.97		0.175	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Protactinium 234m	0.885	U	3.40	3.40		5.99	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Protactinium 231	0.495	U	0.323	0.328		1.26	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Radium 226	0.800		0.107	0.136		0.0711	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Thorium 234	1.49		0.550	0.572		0.852	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Uranium 235	0.209	U	0.186	0.187		0.231	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Thorium 232	1.19		0.157	0.198		0.114	pCi/g	01/26/15 12:29	01/26/15 22:07	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.362		0.0582	0.0693		0.0429	pCi/g	01/26/15 12:29	01/26/15 22:07	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10219-1

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

Lab Sample ID: MB 160-170191/1-A

Matrix: Solid

Analysis Batch: 170638

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 170191

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000052	0.000016	mg/Kg		01/26/15 12:40	01/27/15 15:13	1

Lab Sample ID: LCS 160-170191/2-A

Matrix: Solid

Analysis Batch: 170638

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 170191

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.00123	0.00125		mg/Kg		101	80 - 120

Lab Sample ID: 160-10219-1 MS

Matrix: Solid

Analysis Batch: 170638

Client Sample ID: L10-04-13-B-E-B-00

Prep Type: Total/NA

Prep Batch: 170191

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	ND		0.00155	0.00159		mg/Kg	☼	103	75 - 125

Lab Sample ID: 160-10219-1 MSD

Matrix: Solid

Analysis Batch: 170638

Client Sample ID: L10-04-13-B-E-B-00

Prep Type: Total/NA

Prep Batch: 170191

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Technetium 99	ND		0.00153	0.00155		mg/Kg	☼	101	75 - 125	3	30

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

Lab Sample ID: MB 160-170191/1-A

Matrix: Solid

Analysis Batch: 170639

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 170191

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	-0.03003	U	0.0652	0.0652	1.04	0.178	pCi/g	01/26/15 12:40	01/27/15 15:13	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	96		30 - 110	01/26/15 12:40	01/27/15 15:13	1

Lab Sample ID: LCS 160-170191/2-A

Matrix: Solid

Analysis Batch: 170639

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 170191

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	21.1	21.32		2.21	1.02	0.175	pCi/g	101	80 - 120

Carrier	LCS %Yield	LCS Qualifier	Limits
Re	98		30 - 110

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10219-1

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

Lab Sample ID: 160-10219-1 MS

Matrix: Solid

Analysis Batch: 170639

Client Sample ID: L10-04-13-B-E-B-00

Prep Type: Total/NA

Prep Batch: 170191

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	-0.0398	U	26.6	27.24		2.77	1.36	0.234	pCi/g	103	75 - 125
MS MS											
Carrier	%Yield	Qualifier	Limits								
Re	92		30 - 110								

Lab Sample ID: 160-10219-1 MSD

Matrix: Solid

Analysis Batch: 170639

Client Sample ID: L10-04-13-B-E-B-00

Prep Type: Total/NA

Prep Batch: 170191

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	-0.0398	U	26.2	26.52		2.59	1.35	0.232	pCi/g	101	75 - 125	0.13	1
MSD MSD													
Carrier	%Yield	Qualifier	Limits										
Re	92		30 - 110										

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

Lab Sample ID: MB 160-170185/1-A

Matrix: Solid

Analysis Batch: 170227

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 170185

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	-0.005315	U	0.0401	0.0401		0.0759	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Americium 241	0.004552	U	0.0116	0.0116		0.0204	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Bismuth 212	-0.03168	U	0.117	0.117		0.218	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Bismuth 214	-0.003098	U	0.0221	0.0221		0.0427	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Lead 212	-0.008697	U	0.251	0.251		0.0276	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Lead 214	-0.009146	U	0.221	0.221		0.0348	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Potassium 40	-0.01289	U	0.184	0.184		0.300	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Protactinium 234m	0.0000	U	0.330	0.330		1.21	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Protactinium 231	0.006747	U	0.147	0.147		0.286	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Radium 226	-0.003098	U	0.0221	0.0221		0.0427	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Thorium 234	0.008337	U	0.0137	0.0137		0.236	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Uranium 235	0.02973	U	0.0349	0.0350		0.0571	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Thorium 232	-0.005315	U	0.0401	0.0401		0.0759	pCi/g	01/26/15 12:29	01/26/15 19:46	1
Count Total										
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	01/26/15 12:29	01/26/15 19:46	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10219-1

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

Lab Sample ID: LCS 160-170185/2-A

Matrix: Solid

Analysis Batch: 170228

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 170185

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	96.06		10.0		0.616	pCi/g	95	87 - 116
Cesium 137	35.0	33.03		3.47	0.200	0.229	pCi/g	94	87 - 120
Cobalt 60	37.0	35.30		3.57		0.131	pCi/g	95	87 - 115

Lab Sample ID: 160-10219-1 DU

Matrix: Solid

Analysis Batch: 170227

Client Sample ID: L10-04-13-B-E-B-00

Prep Type: Total/NA

Prep Batch: 170185

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	1.19		1.290		0.199		0.138	pCi/g	0.26	1
Americium 241	-0.00355	U	0.02824	U	0.108		0.180	pCi/g	0.15	1
Bismuth 212	1.57		1.914		0.670		0.562	pCi/g	0.32	1
Bismuth 214	0.964		1.035		0.160		0.0836	pCi/g	0.24	1
Lead 212	1.28		1.285		0.186		0.0689	pCi/g	0.02	1
Lead 214	1.17		1.230		0.170		0.0815	pCi/g	0.20	1
Potassium 40	18.9		17.84		2.19		0.245	pCi/g	0.25	1
Protactinium 234m	30.5		29.04		7.15		5.29	pCi/g	0.10	1
Protactinium 231	-0.708	U	0.4810	U F	0.263		1.34	pCi/g	1.25	1
Radium 226	0.964		1.035		0.160		0.0836	pCi/g	0.24	1
Thorium 234	23.8		23.22		2.73		1.40	pCi/g	0.1	1
Uranium 235	5.70		5.522		0.687		0.369	pCi/g	0.14	1
Thorium 232	1.19		1.290		0.199		0.138	pCi/g	0.26	1
Total										
Other Detected Radionuclides	Sample Result	Sample Qual	DU Result	DU Qual	Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tl-208	0.410		0.4034		0.0656		0.0365	pCi/g	0.05	1

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10219-1

Metals

Prep Batch: 170191

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-1 MS	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-1 MSD	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	None	
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	None	
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	None	
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	None	
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	None	
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	None	
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	None	
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	None	
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	None	
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	None	
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	None	
LCS 160-170191/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-170191/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 170638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	6020A	170191
160-10219-1 MS	L10-04-13-B-E-B-00	Total/NA	Solid	6020A	170191
160-10219-1 MSD	L10-04-13-B-E-B-00	Total/NA	Solid	6020A	170191
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	6020A	170191
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	6020A	170191
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	6020A	170191
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	6020A	170191
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	6020A	170191
LCS 160-170191/2-A	Lab Control Sample	Total/NA	Solid	6020A	170191
MB 160-170191/1-A	Method Blank	Total/NA	Solid	6020A	170191

General Chemistry

Analysis Batch: 169748

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	Moisture	
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	Moisture	
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	Moisture	

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10219-1

General Chemistry (Continued)

Analysis Batch: 169748 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	Moisture	
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	Moisture	
160-10219-12 DU	L10-03-09-B-E-S-00	Total/NA	Solid	Moisture	

Rad

Leach Batch: 169634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	Dry and Grind	
160-10219-1 DU	L10-04-13-B-E-B-00	Total/NA	Solid	Dry and Grind	
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	Dry and Grind	
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	Dry and Grind	
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 170185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-1 DU	L10-04-13-B-E-B-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	Fill_Geo-0	169634
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	Fill_Geo-0	169634
LCS 160-170185/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-170185/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Prep Batch: 170191

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-1	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-1 MS	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-1 MSD	L10-04-13-B-E-B-00	Total/NA	Solid	None	
160-10219-2	L10-04-14-B-E-B-00	Total/NA	Solid	None	
160-10219-3	L10-03-01-B-E-S-00	Total/NA	Solid	None	
160-10219-4	L10-03-02-B-E-S-00	Total/NA	Solid	None	
160-10219-5	L10-03-03-B-E-S-00	Total/NA	Solid	None	
160-10219-6	L10-03-04-B-E-S-00	Total/NA	Solid	None	

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10219-1

Rad (Continued)

Prep Batch: 170191 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10219-7	L10-03-05-B-E-S-00	Total/NA	Solid	None	
160-10219-8	L10-03-06-B-E-S-00	Total/NA	Solid	None	
160-10219-9	L10-03-07-B-E-S-00	Total/NA	Solid	None	
160-10219-10	L10-03-07-B-E-Q-00	Total/NA	Solid	None	
160-10219-11	L10-03-08-B-R-S-00	Total/NA	Solid	None	
160-10219-12	L10-03-09-B-E-S-00	Total/NA	Solid	None	
LCS 160-170191/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-170191/1-A	Method Blank	Total/NA	Solid	None	

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-10219-1

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)	
160-10219-1	L10-04-13-B-E-B-00	89	
160-10219-1 MS	L10-04-13-B-E-B-00	92	
160-10219-1 MSD	L10-04-13-B-E-B-00	92	
160-10219-2	L10-04-14-B-E-B-00	94	
160-10219-3	L10-03-01-B-E-S-00	91	
160-10219-4	L10-03-02-B-E-S-00	94	
160-10219-5	L10-03-03-B-E-S-00	90	
160-10219-6	L10-03-04-B-E-S-00	90	
160-10219-7	L10-03-05-B-E-S-00	90	
160-10219-8	L10-03-06-B-E-S-00	93	
160-10219-9	L10-03-07-B-E-S-00	92	
160-10219-10	L10-03-07-B-E-Q-00	91	
160-10219-11	L10-03-08-B-R-S-00	95	
160-10219-12	L10-03-09-B-E-S-00	92	
LCS 160-170191/2-A	Lab Control Sample	98	
MB 160-170191/1-A	Method Blank	96	

Tracer/Carrier Legend

Re = Re