

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: 160-10325-1

Client Project/Site: HDP

For:

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

Attn: Brian Miller

Elizabeth M. Hoerchler

Authorized for release by:

2/6/2015 3:34:40 PM

Elizabeth Hoerchler, Project Mgmt. Assistant
elizabeth.hoerchler@testamericainc.com

Designee for

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

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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: 160-10325-1

Job ID: 160-10325-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

Client: Perma-Fix Environmental Services Inc.

Project: HDP

Report Number: 160-10325-1

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 01/30/2015; the samples arrived in good condition, and properly preserved. The temperature of the coolers at receipt was 20.0 C.

TECHNETIUM-99 (ICPMS)

Samples L10-01-01-B-S-S-00 (160-10325-1), L10-01-02-B-R-S-00 (160-10325-2), L10-01-04-B-S-S-00 (160-10325-3), L10-01-05-B-R-S-00 (160-10325-4), L10-01-07-B-R-S-00 (160-10325-5), L10-01-08-B-E-S-00 (160-10325-6), L10-01-09-B-R-S-00 (160-10325-7), L10-01-10-B-E-S-00 (160-10325-8), L10-01-11-B-R-S-00 (160-10325-9), L10-01-12-B-E-S-00 (160-10325-10), L10-01-13-B-E-S-00 (160-10325-11), L10-01-13-B-E-Q-00 (160-10325-12), L10-01-14-B-E-S-00 (160-10325-13), L10-01-15-B-S-S-00 (160-10325-14), L10-01-16-B-R-S-00 (160-10325-15) and L10-01-18-B-E-B-00 (160-10325-16) were analyzed for Technetium-99 (ICPMS) in accordance with EPA SW-846 Method 6020A. The samples were prepared on 01/31/2015 and analyzed on 02/02/2015.

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

PERCENT SOLIDS

Samples L10-01-01-B-S-S-00 (160-10325-1), L10-01-02-B-R-S-00 (160-10325-2), L10-01-04-B-S-S-00 (160-10325-3), L10-01-05-B-R-S-00 (160-10325-4), L10-01-07-B-R-S-00 (160-10325-5), L10-01-08-B-E-S-00 (160-10325-6), L10-01-09-B-R-S-00

Case Narrative

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

TestAmerica Job ID: 160-10325-1

Job ID: 160-10325-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

(160-10325-7), L10-01-10-B-E-S-00 (160-10325-8), L10-01-11-B-R-S-00 (160-10325-9), L10-01-12-B-E-S-00 (160-10325-10), L10-01-13-B-E-S-00 (160-10325-11), L10-01-13-B-E-Q-00 (160-10325-12), L10-01-14-B-E-S-00 (160-10325-13), L10-01-15-B-S-S-00 (160-10325-14), L10-01-16-B-R-S-00 (160-10325-15) and L10-01-18-B-E-B-00 (160-10325-16) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 02/02/2015.

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 L10-01-01-B-S-S-00 (160-10325-1), L10-01-02-B-R-S-00 (160-10325-2), L10-01-04-B-S-S-00 (160-10325-3), L10-01-05-B-R-S-00 (160-10325-4), L10-01-07-B-R-S-00 (160-10325-5), L10-01-08-B-E-S-00 (160-10325-6), L10-01-09-B-R-S-00 (160-10325-7), L10-01-10-B-E-S-00 (160-10325-8), L10-01-11-B-R-S-00 (160-10325-9), L10-01-12-B-E-S-00 (160-10325-10), L10-01-13-B-E-S-00 (160-10325-11), L10-01-13-B-E-Q-00 (160-10325-12), L10-01-14-B-E-S-00 (160-10325-13), L10-01-15-B-S-S-00 (160-10325-14), L10-01-16-B-R-S-00 (160-10325-15) and L10-01-18-B-E-B-00 (160-10325-16) were analyzed for Cesium-137 & Other Gamma Emitters (GS) in accordance with DOE GA-01-R. The samples were dried on 02/02/2015, and prepared and analyzed on 02/03/2015.

Prep Batch: 171821

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.

(160-10325-1 DU), (LCS 160-171821/2-A), (MB 160-171821/1-A), L10-01-01-B-S-S-00 (160-10325-1), L10-01-02-B-R-S-00 (160-10325-2), L10-01-04-B-S-S-00 (160-10325-3), L10-01-05-B-R-S-00 (160-10325-4), L10-01-07-B-R-S-00 (160-10325-5), L10-01-08-B-E-S-00 (160-10325-6), L10-01-09-B-R-S-00 (160-10325-7), L10-01-10-B-E-S-00 (160-10325-8), L10-01-11-B-R-S-00 (160-10325-9), L10-01-12-B-E-S-00 (160-10325-10), L10-01-13-B-E-Q-00 (160-10325-12), L10-01-13-B-E-S-00 (160-10325-11), L10-01-14-B-E-S-00 (160-10325-13), L10-01-15-B-S-S-00 (160-10325-14), L10-01-16-B-R-S-00 (160-10325-15), L10-01-18-B-E-B-00 (160-10325-16)

Method(s) Dry and Grind: L10-01-01-B-S-S-00 (160-10325-1), L10-01-02-B-R-S-00 (160-10325-2), L10-01-04-B-S-S-00 (160-10325-3), L10-01-05-B-R-S-00 (160-10325-4), L10-01-07-B-R-S-00 (160-10325-5), L10-01-08-B-E-S-00 (160-10325-6), L10-01-09-B-R-S-00 (160-10325-7), L10-01-10-B-E-S-00 (160-10325-8), L10-01-11-B-R-S-00 (160-10325-9), L10-01-12-B-E-S-00 (160-10325-10), L10-01-13-B-E-Q-00 (160-10325-12), L10-01-13-B-E-S-00 (160-10325-11), L10-01-14-B-E-S-00 (160-10325-13), L10-01-15-B-S-S-00 (160-10325-14), L10-01-16-B-R-S-00 (160-10325-15), L10-01-18-B-E-B-00 (160-10325-16) Samples were dried for 41 hours because they were very wet clay.

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

Chain of Custody Record

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

Client Contact		Project Manager: Brian Miller		Site Contact: Ellen Jakub		Date: 01/30/15		COC No: 013015-FSS1						
Perma-Fix Environmental Services		Tel/Fax: (314) 810-3333		Lab Contact: Ivan Vania		Carrier: Courier		1 of 2 COCs						
2800 Solway Road		Analysis Turnaround Time						Sampler:						
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 21 day ingrowth)	Sample Specific Notes:	
L10-01-01-B-S-S-00		1/28/15	13:14	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-02-B-R-S-00		1/28/15	14:00	C	Soil	1	N	X	X	X			LSA 10-01	
L10-01-04-B-S-S-00		1/28/15	14:15	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-05-B-R-S-00		1/29/15	11:00	C	Soil	1	N	X	X	X			LSA 10-01	
L10-01-07-B-R-S-00		1/29/15	11:30	C	Soil	1	N	X	X	X			LSA 10-01	
L10-01-08-B-E-S-00		1/29/15	11:35	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-09-B-R-S-00		1/28/15	15:00	C	Soil	1	N	X	X	X			LSA 10-01	
L10-01-10-B-E-S-00		1/28/15	15:10	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-11-B-R-S-00		1/28/15	16:45	C	Soil	1	N	X	X	X			LSA 10-01	
L10-01-12-B-E-S-00		1/28/15	16:55	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-13-B-E-S-00		1/28/15	14:30	G	Soil	1	N	X	X	X			LSA 10-01	
L10-01-13-B-E-Q-00		1/28/15	14:30	G	Soil	1	N	X	X	X			LSA 10-01	
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: Dry and homogenize samples before analyses; potential for radiological contamination														
Custody Seals Intact: ☐ Yes ☐ No		Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____		Corr'd: _____		Therm ID No.:						
Relinquished by: <i>Brian Miller</i>		Company: Perma-Fix		Date/Time: 01/30/15 1730		Received by: <i>Gourier</i>		Company: TestAmerica						
Relinquished by: <i>MA</i>		Company: PERMA-FIX		Date/Time: 1/30/15 1805		Received by: <i>MA</i>		Company: TestAmerica						
Relinquished by: <i>MA</i>		Company: PERMA-FIX		Date/Time: 1/30/15 1805		Received in Laboratory by: <i>MA</i>		Company: TestAmerica						
Hematite Decommissioning Project		Perma-Fix (for Westinghouse) Non-Proprietary Class 3				Procedure: HDP-PR-QA-006, Chain of Custody								
Revision: 3														

160-10325 Chain of Custody



Chain of Custody Record

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

Client Contact		Project Manager: Brian Miller		Site Contact: Ellen Jakub		Date: 1/30/15		COC No: 013015-FSS1							
Perma-Fix Environmental Services		Tel/Fax: (314) 810-3333		Lab Contact: Ivan Vania		Carrier: Courier		2 of 2 COCs							
2800 Solway Road		Analysis Turnaround Time						Sampler:							
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 (post-21 day ingrowth)	Sample Specific Notes:			
L10-01-14-B-E-S-00	1/28/15	14:25	G	Soil	1	N		X	X	X		LSA 10-01			
L10-01-15-B-S-S-00	1/28/15	15:15	G	Soil	1	N		X	X	X		LSA 10-01			
L10-01-16-B-R-S-00	1/28/15	16:05	C	Soil	1	N		X	X	X		LSA 10-01			
L10-01-18-B-E-B-00	1/29/15	16:00	G	Soil	1	N		X	X	X		LSA 10-01 biased sample (4 K ncpm)			
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.						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)									
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown						☒ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months									
Special Instructions/QC Requirements & Comments: Dry and homogenize samples prior to analyses; potential for radiological contamination															
Custody Seals Intact: ☐ Yes ☐ No			Custody Seal No.:			Cooler Temp. (°C): Obs'd: _____			Corr'd: _____			Therm ID No.:			
Relinquished by: <i>Brian Miller</i>			Company: Perma-Fix			Date/Time: 01/30/15 1730			Received by: <i>Courier</i>			Company: TestAmerica Perma-Fix		Date/Time: 01/30/15 1730	
Relinquished by: <i>[Signature]</i>			Company: PERMA-FIX			Date/Time: 1/30/15 1805			Received by: <i>[Signature]</i>			Company: TestAmerica		Date/Time: 1/30/15 18:05	
Relinquished by:			Company:			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: 160-10325-1

Login Number: 10325

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.	True	
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: 160-10325-1

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.

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: 160-10325-1

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: 160-10325-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-10325-1	L10-01-01-B-S-S-00	Solid	01/28/15 13:14	01/30/15 18:05
160-10325-2	L10-01-02-B-R-S-00	Solid	01/28/15 14:00	01/30/15 18:05
160-10325-3	L10-01-04-B-S-S-00	Solid	01/28/15 14:15	01/30/15 18:05
160-10325-4	L10-01-05-B-R-S-00	Solid	01/28/15 11:00	01/30/15 18:05
160-10325-5	L10-01-07-B-R-S-00	Solid	01/28/15 11:30	01/30/15 18:05
160-10325-6	L10-01-08-B-E-S-00	Solid	01/28/15 11:35	01/30/15 18:05
160-10325-7	L10-01-09-B-R-S-00	Solid	01/28/15 15:00	01/30/15 18:05
160-10325-8	L10-01-10-B-E-S-00	Solid	01/28/15 15:10	01/30/15 18:05
160-10325-9	L10-01-11-B-R-S-00	Solid	01/28/15 16:45	01/30/15 18:05
160-10325-10	L10-01-12-B-E-S-00	Solid	01/28/15 16:55	01/30/15 18:05
160-10325-11	L10-01-13-B-E-S-00	Solid	01/28/15 14:30	01/30/15 18:05
160-10325-12	L10-01-13-B-E-Q-00	Solid	01/28/15 14:30	01/30/15 18:05
160-10325-13	L10-01-14-B-E-S-00	Solid	01/28/15 14:25	01/30/15 18:05
160-10325-14	L10-01-15-B-S-S-00	Solid	01/28/15 15:15	01/30/15 18:05
160-10325-15	L10-01-16-B-R-S-00	Solid	01/28/15 16:05	01/30/15 18:05
160-10325-16	L10-01-18-B-E-B-00	Solid	01/28/15 16:00	01/30/15 18:05

Detection Summary

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

TestAmerica Job ID: 160-10325-1

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

Lab Sample ID: 160-10325-1

No Detections.

Client Sample ID: L10-01-02-B-R-S-00

Lab Sample ID: 160-10325-2

No Detections.

Client Sample ID: L10-01-04-B-S-S-00

Lab Sample ID: 160-10325-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Technetium 99	0.000031	J	0.000064	0.000019	mg/Kg	1		✱	6020A	Total/NA

Client Sample ID: L10-01-05-B-R-S-00

Lab Sample ID: 160-10325-4

No Detections.

Client Sample ID: L10-01-07-B-R-S-00

Lab Sample ID: 160-10325-5

No Detections.

Client Sample ID: L10-01-08-B-E-S-00

Lab Sample ID: 160-10325-6

No Detections.

Client Sample ID: L10-01-09-B-R-S-00

Lab Sample ID: 160-10325-7

No Detections.

Client Sample ID: L10-01-10-B-E-S-00

Lab Sample ID: 160-10325-8

No Detections.

Client Sample ID: L10-01-11-B-R-S-00

Lab Sample ID: 160-10325-9

No Detections.

Client Sample ID: L10-01-12-B-E-S-00

Lab Sample ID: 160-10325-10

No Detections.

Client Sample ID: L10-01-13-B-E-S-00

Lab Sample ID: 160-10325-11

No Detections.

Client Sample ID: L10-01-13-B-E-Q-00

Lab Sample ID: 160-10325-12

No Detections.

Client Sample ID: L10-01-14-B-E-S-00

Lab Sample ID: 160-10325-13

No Detections.

Client Sample ID: L10-01-15-B-S-S-00

Lab Sample ID: 160-10325-14

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica St. Louis

Detection Summary

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-16-B-R-S-00

Lab Sample ID: 160-10325-15

No Detections.

Client Sample ID: L10-01-18-B-E-B-00

Lab Sample ID: 160-10325-16

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

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

Lab Sample ID: 160-10325-1

Date Collected: 01/28/15 13:14

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 76.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000073	0.000022	mg/Kg	☆	01/31/15 10:48	02/02/15 16:24	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	0.363		0.0880	0.0941	1.45	0.249	pCi/g	01/31/15 10:48	02/02/15 16:24	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	90		30 - 110					01/31/15 10:48	02/02/15 16:24	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	0.797		0.161	0.180		0.217	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Americium 241	-0.0118	U	2.50	2.50		0.120	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Bismuth 212	1.28		0.482	0.500		0.409	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Bismuth 214	0.680		0.130	0.148		0.0983	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Lead 212	0.820		0.116	0.157		0.102	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Lead 214	0.809		0.102	0.132		0.0638	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Potassium 40	16.2		1.59	2.30		0.482	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Protactinium 234m	0.000	U	0.924	0.924		6.70	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Protactinium 231	0.391	U	0.447	0.449		1.33	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Radium 226	0.680		0.130	0.148		0.0983	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Thorium 234	0.655	U	0.473	0.478		1.31	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Uranium 235	0.290		0.249	0.250		0.284	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Thorium 232	0.797		0.161	0.180		0.217	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.250		0.0570	0.0626		0.0501	pCi/g	02/03/15 10:44	02/03/15 13:26	1

Client Sample ID: L10-01-02-B-R-S-00

Lab Sample ID: 160-10325-2

Date Collected: 01/28/15 14:00

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 81.7

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	☆	01/31/15 10:48	02/02/15 16:36	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	0.0193	U	0.0687	0.0688	1.32	0.227	pCi/g	01/31/15 10:48	02/02/15 16:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	92		30 - 110					01/31/15 10:48	02/02/15 16:36	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-02-B-R-S-00

Lab Sample ID: 160-10325-2

Date Collected: 01/28/15 14:00

Matrix: Solid

Date Received: 01/30/15 18:05

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		0.121	0.170		0.0775	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Americium 241	-0.00964	U	0.0660	0.0660		0.111	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Bismuth 212	1.45		0.439	0.464		0.374	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Bismuth 214	0.838		0.0992	0.132		0.0693	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Lead 212	1.21		0.0779	0.175		0.0554	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Lead 214	0.929		0.0822	0.127		0.0654	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Potassium 40	20.0		1.23	2.39		0.331	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Protactinium 234m	1.17	U	3.21	3.21		5.54	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Protactinium 231	0.654	U	0.274	0.283		1.25	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Radium 226	0.838		0.0992	0.132		0.0693	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Thorium 234	0.886		0.321	0.334		0.841	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Uranium 235	0.153	U	0.139	0.140		0.239	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Thorium 232	1.18		0.121	0.170		0.0775	pCi/g	02/03/15 10:44	02/03/15 15:22	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.376		0.0517	0.0647		0.0358	pCi/g	02/03/15 10:44	02/03/15 15:22	1

Client Sample ID: L10-01-04-B-S-S-00

Lab Sample ID: 160-10325-3

Date Collected: 01/28/15 14:15

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 85.3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	0.000031	J	0.000064	0.000019	mg/Kg	☼	01/31/15 10:48	02/02/15 16:47	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	0.530		0.0233	0.0540	1.29	0.220	pCi/g	01/31/15 10:48	02/02/15 16:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 16:47	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	1.08		0.129	0.170		0.119	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Americium 241	0.00112	U	0.0625	0.0625		0.106	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Bismuth 212	1.66		0.347	0.388		0.218	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Bismuth 214	0.766		0.0858	0.117		0.0544	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Lead 212	1.16		0.0745	0.168		0.0527	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Lead 214	0.885		0.0822	0.123		0.0734	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Potassium 40	20.8		1.21	2.45		0.237	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Protactinium 234m	1.48	U	3.06	3.07		5.22	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Protactinium 231	0.435	U	0.227	0.231		1.05	pCi/g	02/03/15 10:44	02/03/15 13:28	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-04-B-S-S-00

Lab Sample ID: 160-10325-3

Date Collected: 01/28/15 14:15

Matrix: Solid

Date Received: 01/30/15 18:05

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	0.766		0.0858	0.117		0.0544	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Thorium 234	0.993		0.314	0.331		0.870	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Uranium 235	0.188		0.132	0.134		0.171	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Thorium 232	1.08		0.129	0.170		0.119	pCi/g	02/03/15 10:44	02/03/15 13:28	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.322		0.0471	0.0577		0.0367	pCi/g	02/03/15 10:44	02/03/15 13:28	1

Client Sample ID: L10-01-05-B-R-S-00

Lab Sample ID: 160-10325-4

Date Collected: 01/28/15 11:00

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 84.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000064	0.000019	mg/Kg	☼	01/31/15 10:48	02/02/15 16:51	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	0.0156	U	0.0155	0.0156	1.28	0.220	pCi/g	01/31/15 10:48	02/02/15 16:51	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
	92		30 - 110					01/31/15 10:48	02/02/15 16:51	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	1.16		0.181	0.216		0.122	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Americium 241	0.0264	U	0.0733	0.0734		0.123	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Bismuth 212	1.41		0.526	0.546		0.463	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Bismuth 214	0.855		0.133	0.160		0.0902	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Lead 212	0.971		0.0941	0.157		0.100	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Lead 214	0.925		0.110	0.146		0.0860	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Potassium 40	18.4		1.46	2.38		0.311	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Protactinium 234m	2.21	U	3.24	3.25		10.4	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Protactinium 231	0.374	U	0.369	0.371		1.05	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Radium 226	0.855		0.133	0.160		0.0902	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Thorium 234	0.824	U	0.832	0.836		1.08	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Uranium 235	0.0306	U	0.0890	0.0891		0.282	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Thorium 232	1.16		0.181	0.216		0.122	pCi/g	02/03/15 10:44	02/03/15 13:26	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.332		0.0593	0.0686		0.0446	pCi/g	02/03/15 10:44	02/03/15 13:26	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-07-B-R-S-00

Lab Sample ID: 160-10325-5

Date Collected: 01/28/15 11:30

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 82.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000062	0.000019	mg/Kg	☼	01/31/15 10:48	02/02/15 16:55	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	0.0104	U	0.0516	0.0516	1.24	0.212	pCi/g	01/31/15 10:48	02/02/15 16:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	92		30 - 110					01/31/15 10:48	02/02/15 16:55	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	1.02		0.138	0.173		0.110	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Americium 241	0.00743	U	0.0706	0.0706		0.120	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Bismuth 212	1.50		0.560	0.582		0.498	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Bismuth 214	0.744		0.118	0.141		0.0922	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Lead 212	0.965		0.0888	0.153		0.0878	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Lead 214	0.809		0.115	0.143		0.0971	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Potassium 40	16.9		1.36	2.20		0.200	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Protactinium 234m	-0.315	U	4.52	4.52		8.05	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Protactinium 231	0.313	U	0.214	0.217		1.35	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Radium 226	0.744		0.118	0.141		0.0922	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Thorium 234	0.658	U	0.378	0.385		1.20	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Uranium 235	0.0997	U	0.166	0.166		0.248	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Thorium 232	1.02		0.138	0.173		0.110	pCi/g	02/03/15 10:44	02/03/15 14:47	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.379		0.0647	0.0757		0.0499	pCi/g	02/03/15 10:44	02/03/15 14:47	1

Client Sample ID: L10-01-08-B-E-S-00

Lab Sample ID: 160-10325-6

Date Collected: 01/28/15 11:35

Matrix: Solid

Date Received: 01/30/15 18:05

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		0.000064	0.000019	mg/Kg	☼	01/31/15 10:48	02/02/15 16:59	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	0.00110	U	0.0282	0.0282	1.29	0.220	pCi/g	01/31/15 10:48	02/02/15 16:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	93		30 - 110					01/31/15 10:48	02/02/15 16:59	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-08-B-E-S-00

Lab Sample ID: 160-10325-6

Date Collected: 01/28/15 11:35

Matrix: Solid

Date Received: 01/30/15 18:05

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	1.15		0.141	0.184		0.144	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Americium 241	0.0371	U	0.0615	0.0617		0.102	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Bismuth 212	1.56		0.576	0.598		0.491	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Bismuth 214	0.872		0.112	0.144		0.0771	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Lead 212	1.13		0.0823	0.167		0.0656	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Lead 214	0.896		0.0858	0.127		0.0766	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Potassium 40	19.2		1.33	2.37		0.274	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Protactinium 234m	1.91	U	3.21	3.21		5.42	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Protactinium 231	0.737	U	0.405	0.413		1.26	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Radium 226	0.872		0.112	0.144		0.0771	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Thorium 234	0.717	U	0.287	0.297		0.917	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Uranium 235	0.0591	U	0.137	0.137		0.254	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Thorium 232	1.15		0.141	0.184		0.144	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.399		0.0540	0.0681		0.0347	pCi/g	02/03/15 10:44	02/03/15 14:49	1

Client Sample ID: L10-01-09-B-R-S-00

Lab Sample ID: 160-10325-7

Date Collected: 01/28/15 15:00

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 82.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000064	0.000019	mg/Kg	☼	01/31/15 10:48	02/02/15 17:03	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	0.0472	U	0.0514	0.0515	1.28	0.219	pCi/g	01/31/15 10:48	02/02/15 17:03	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:03	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	1.35		0.155	0.207		0.0925	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Americium 241	0.000590	U	0.0640	0.0640		0.108	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Bismuth 212	1.46		0.411	0.438		0.364	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Bismuth 214	0.848		0.109	0.140		0.0809	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Lead 212	1.10		0.0774	0.161		0.0737	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Lead 214	0.977		0.100	0.143		0.0756	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Potassium 40	19.3		1.15	2.29		0.298	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Protactinium 234m	1.03	U	1.40	1.41		5.16	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Protactinium 231	0.252	U	0.173	0.176		1.22	pCi/g	02/03/15 10:44	02/03/15 14:49	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-09-B-R-S-00

Lab Sample ID: 160-10325-7

Date Collected: 01/28/15 15:00

Matrix: Solid

Date Received: 01/30/15 18:05

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	0.848		0.109	0.140		0.0809	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Thorium 234	1.47		0.581	0.601		0.776	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Uranium 235	0.117	U	0.136	0.136		0.256	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Thorium 232	1.35		0.155	0.207		0.0925	pCi/g	02/03/15 10:44	02/03/15 14:49	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.340		0.0481	0.0596		0.0370	pCi/g	02/03/15 10:44	02/03/15 14:49	1

Client Sample ID: L10-01-10-B-E-S-00

Lab Sample ID: 160-10325-8

Date Collected: 01/28/15 15:10

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 80.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000065	0.000020	mg/Kg	☼	01/31/15 10:48	02/02/15 17:07	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	0.0325	U	0.0754	0.0754	1.31	0.224	pCi/g	01/31/15 10:48	02/02/15 17:07	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	92		30 - 110					01/31/15 10:48	02/02/15 17:07	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	1.07		0.190	0.219		0.132	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Americium 241	0.000	U	0.0612	0.0612		0.144	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Bismuth 212	1.93		0.470	0.511		0.279	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Bismuth 214	0.787		0.136	0.159		0.101	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Lead 212	1.06		0.114	0.178		0.104	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Lead 214	0.908		0.123	0.155		0.0929	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Potassium 40	18.1		1.49	2.37		0.332	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Protactinium 234m	2.11	U	3.85	3.86		6.57	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Protactinium 231	0.388	U	0.282	0.285		1.39	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Radium 226	0.787		0.136	0.159		0.101	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Thorium 234	0.724	U	0.343	0.351		0.939	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Uranium 235	0.0927	U	0.138	0.139		0.292	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Thorium 232	1.07		0.190	0.219		0.132	pCi/g	02/03/15 10:44	02/03/15 14:51	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.388		0.0725	0.0829		0.0550	pCi/g	02/03/15 10:44	02/03/15 14:51	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-11-B-R-S-00

Lab Sample ID: 160-10325-9

Date Collected: 01/28/15 16:45

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 83.9

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	☼	01/31/15 10:48	02/02/15 17:11	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	0.132	U	0.0156	0.0197	1.25	0.215	pCi/g	01/31/15 10:48	02/02/15 17:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:11	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	1.03		0.137	0.173		0.111	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Americium 241	-0.00805	U	0.322	0.322		0.113	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Bismuth 212	1.39		0.360	0.388		0.216	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Bismuth 214	0.672		0.105	0.126		0.0783	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Lead 212	0.757		0.0794	0.126		0.0832	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Lead 214	0.811		0.0939	0.126		0.0789	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Potassium 40	16.4		1.31	2.12		0.193	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Protactinium 234m	0.893	U	3.61	3.61		6.38	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Protactinium 231	0.354	U	0.226	0.229		1.26	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Radium 226	0.672		0.105	0.126		0.0783	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Thorium 234	0.599	U	0.563	0.567		0.932	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Uranium 235	0.110	U	0.141	0.141		0.256	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Thorium 232	1.03		0.137	0.173		0.111	pCi/g	02/03/15 10:44	02/03/15 15:23	1
Other Detected Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.322		0.0486	0.0590		0.0304	pCi/g	02/03/15 10:44	02/03/15 15:23	1

Client Sample ID: L10-01-12-B-E-S-00

Lab Sample ID: 160-10325-10

Date Collected: 01/28/15 16:55

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 81.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000061	0.000018	mg/Kg	☼	01/31/15 10:48	02/02/15 17:15	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	-0.0151	U	0.0389	0.0389	1.23	0.210	pCi/g	01/31/15 10:48	02/02/15 17:15	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	94		30 - 110					01/31/15 10:48	02/02/15 17:15	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-12-B-E-S-00

Lab Sample ID: 160-10325-10

Date Collected: 01/28/15 16:55

Matrix: Solid

Date Received: 01/30/15 18:05

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	1.19		0.159	0.200		0.166	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Americium 241	-0.00762	U	0.0623	0.0623		0.106	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Bismuth 212	1.07		0.380	0.396		0.386	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Bismuth 214	0.904		0.108	0.143		0.0655	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Lead 212	1.13		0.0852	0.169		0.0668	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Lead 214	0.960		0.0943	0.137		0.0737	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Potassium 40	20.0		1.43	2.49		0.409	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Protactinium 234m	2.13	U	3.21	3.21		5.37	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Protactinium 231	0.501	U	0.246	0.252		1.25	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Radium 226	0.904		0.108	0.143		0.0655	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Thorium 234	0.850	U	0.312	0.324		0.948	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Uranium 235	0.0920	U	0.163	0.163		0.259	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Thorium 232	1.19		0.159	0.200		0.166	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.379		0.0575	0.0697		0.0411	pCi/g	02/03/15 10:44	02/03/15 15:25	1

Client Sample ID: L10-01-13-B-E-S-00

Lab Sample ID: 160-10325-11

Date Collected: 01/28/15 14:30

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 78.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000067	0.000020	mg/Kg	☼	01/31/15 10:48	02/02/15 17:18	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	-0.00436	U	0.0284	0.0284	1.34	0.230	pCi/g	01/31/15 10:48	02/02/15 17:18	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:18	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		0.124	0.175		0.121	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Americium 241	0.00308	U	0.0594	0.0594		0.100	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Bismuth 212	1.53		0.472	0.498		0.405	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Bismuth 214	0.787		0.102	0.130		0.0742	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Lead 212	1.20		0.0785	0.174		0.0726	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Lead 214	0.793		0.0986	0.128		0.0810	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Potassium 40	18.8		1.10	2.22		0.222	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Protactinium 234m	5.75		2.33	2.40		4.86	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Protactinium 231	0.546	U	0.438	0.442		0.695	pCi/g	02/03/15 10:44	02/03/15 15:25	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-13-B-E-S-00

Lab Sample ID: 160-10325-11

Date Collected: 01/28/15 14:30

Matrix: Solid

Date Received: 01/30/15 18:05

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	0.787		0.102	0.130		0.0742	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Thorium 234	1.70		0.714	0.736		0.872	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Uranium 235	0.0550	U	0.102	0.102		0.244	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Thorium 232	1.21		0.124	0.175		0.121	pCi/g	02/03/15 10:44	02/03/15 15:25	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.402		0.0487	0.0641		0.0350	pCi/g	02/03/15 10:44	02/03/15 15:25	1

Client Sample ID: L10-01-13-B-E-Q-00

Lab Sample ID: 160-10325-12

Date Collected: 01/28/15 14:30

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 75.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000069	0.000021	mg/Kg	☼	01/31/15 10:48	02/02/15 17:22	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	-0.0103	U	0.0106	0.0107	1.37	0.235	pCi/g	01/31/15 10:48	02/02/15 17:22	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	90		30 - 110					01/31/15 10:48	02/02/15 17:22	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	1.28		0.180	0.223		0.146	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Americium 241	0.0247	U	0.0721	0.0721		0.121	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Bismuth 212	1.11		0.487	0.500		0.676	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Bismuth 214	0.866		0.120	0.150		0.0695	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Lead 212	1.13		0.116	0.187		0.106	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Lead 214	1.01		0.111	0.152		0.0924	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Potassium 40	17.8		1.49	2.36		0.486	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Protactinium 234m	5.92	U	4.23	4.27		6.01	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Protactinium 231	0.402	U	0.272	0.275		1.56	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Radium 226	0.866		0.120	0.150		0.0695	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Thorium 234	0.944	U	0.742	0.748		1.04	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Uranium 235	0.117	U	0.194	0.194		0.308	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Thorium 232	1.28		0.180	0.223		0.146	pCi/g	02/03/15 10:44	02/03/15 15:28	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.398		0.0613	0.0739		0.0440	pCi/g	02/03/15 10:44	02/03/15 15:28	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-14-B-E-S-00

Lab Sample ID: 160-10325-13

Date Collected: 01/28/15 14:25

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 71.5

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	☼	01/31/15 10:48	02/02/15 17:34	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	0.0206	U	0.0300	0.0300	1.47	0.252	pCi/g	01/31/15 10:48	02/02/15 17:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:34	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		0.171	0.210		0.152	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Americium 241	0.0134	U	0.0767	0.0768		0.130	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Bismuth 212	2.00		0.603	0.638		0.477	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Bismuth 214	0.724		0.107	0.130		0.0844	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Lead 212	1.18		0.0982	0.182		0.0982	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Lead 214	0.950		0.101	0.141		0.0850	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Potassium 40	17.2		1.39	2.25		0.367	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Protactinium 234m	1.63	U	3.87	3.88		6.01	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Protactinium 231	-0.852	U	0.952	0.957		1.56	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Radium 226	0.724		0.107	0.130		0.0844	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Thorium 234	0.931	U	0.422	0.434		1.24	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Uranium 235	0.113	U	0.176	0.177		0.301	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Thorium 232	1.19		0.171	0.210		0.152	pCi/g	02/03/15 10:44	02/03/15 16:02	1
Other Detected			Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radionuclides	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.432		0.0616	0.0762		0.0403	pCi/g	02/03/15 10:44	02/03/15 16:02	1

Client Sample ID: L10-01-15-B-S-S-00

Lab Sample ID: 160-10325-14

Date Collected: 01/28/15 15:15

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 81.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000065	0.000020	mg/Kg	☼	01/31/15 10:48	02/02/15 17:38	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	0.0228	U	0.0261	0.0262	1.31	0.224	pCi/g	01/31/15 10:48	02/02/15 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:38	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-15-B-S-S-00

Lab Sample ID: 160-10325-14

Date Collected: 01/28/15 15:15

Matrix: Solid

Date Received: 01/30/15 18:05

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	1.29		0.170	0.215		0.146	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Americium 241	0.0120	U	0.0771	0.0771		0.131	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Bismuth 212	1.84		0.601	0.631		0.473	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Bismuth 214	1.14		0.130	0.176		0.0688	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Lead 212	0.973		0.124	0.177		0.117	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Lead 214	1.10		0.122	0.167		0.0866	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Potassium 40	19.8		1.58	2.57		0.416	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Protactinium 234m	2.98	U	4.24	4.25		7.06	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Protactinium 231	0.602	U	0.450	0.455		1.32	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Radium 226	1.14		0.130	0.176		0.0688	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Thorium 234	1.13		0.622	0.633		0.997	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Uranium 235	0.168	U	0.188	0.189		0.308	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Thorium 232	1.29		0.170	0.215		0.146	pCi/g	02/03/15 10:44	02/03/15 18:31	1
Other Detected										
Radionuclides	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Tl-208	0.361		0.0668	0.0766		0.0533	pCi/g	02/03/15 10:44	02/03/15 18:31	1

Client Sample ID: L10-01-16-B-R-S-00

Lab Sample ID: 160-10325-15

Date Collected: 01/28/15 16:05

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 81.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000067	0.000020	mg/Kg	☼	01/31/15 10:48	02/02/15 17:42	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	0.0167	U	0.0520	0.0520	1.33	0.228	pCi/g	01/31/15 10:48	02/02/15 17:42	1
Carrier										
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	91		30 - 110					01/31/15 10:48	02/02/15 17:42	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	1.19		0.119	0.170		0.123	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Americium 241	-0.0342	U	0.0686	0.0687		0.114	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Bismuth 212	1.21		0.322	0.346		0.387	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Bismuth 214	0.840		0.102	0.135		0.0750	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Lead 212	1.09		0.0758	0.160		0.0709	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Lead 214	0.980		0.0865	0.134		0.0755	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Potassium 40	21.6		1.19	2.51		0.225	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Protactinium 234m	2.19	U	2.98	2.99		4.95	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Protactinium 231	0.0153	U	9.22	9.22		0.824	pCi/g	02/03/15 10:44	02/03/15 16:05	1

TestAmerica St. Louis

Client Sample Results

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

TestAmerica Job ID: 160-10325-1

Client Sample ID: L10-01-16-B-R-S-00

Lab Sample ID: 160-10325-15

Date Collected: 01/28/15 16:05

Matrix: Solid

Date Received: 01/30/15 18:05

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	0.840		0.102	0.135		0.0750	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Thorium 234	1.18		0.667	0.678		0.868	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Uranium 235	0.0838	U	0.146	0.146		0.248	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Thorium 232	1.19		0.119	0.170		0.123	pCi/g	02/03/15 10:44	02/03/15 16:05	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.366		0.0447	0.0587		0.0322	pCi/g	02/03/15 10:44	02/03/15 16:05	1

Client Sample ID: L10-01-18-B-E-B-00

Lab Sample ID: 160-10325-16

Date Collected: 01/28/15 16:00

Matrix: Solid

Date Received: 01/30/15 18:05

Percent Solids: 80.7

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	☼	01/31/15 10:48	02/02/15 17:45	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	0.0376	U	0.0132	0.0137	1.31	0.225	pCi/g	01/31/15 10:48	02/02/15 17:45	1
Carrier										
Re	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Re	93		30 - 110					01/31/15 10:48	02/02/15 17:45	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	1.39		0.186	0.234		0.135	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Americium 241	0.0362	U	0.0704	0.0705		0.117	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Bismuth 212	1.60		0.642	0.663		0.561	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Bismuth 214	0.854		0.128	0.156		0.0808	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Lead 212	0.915		0.105	0.158		0.122	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Lead 214	0.893		0.132	0.161		0.101	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Potassium 40	18.3		1.62	2.47		0.564	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Protactinium 234m	13.6		4.01	4.24		2.18	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Protactinium 231	0.358	U	0.348	0.350		1.64	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Radium 226	0.854		0.128	0.156		0.0808	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Thorium 234	0.947	U	0.382	0.395		1.09	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Uranium 235	0.132	U	0.171	0.171		0.311	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Thorium 232	1.39		0.186	0.234		0.135	pCi/g	02/03/15 10:44	02/03/15 16:20	1
Other Detected										
Radionuclides	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Tl-208	0.414		0.0755	0.0868		0.0545	pCi/g	02/03/15 10:44	02/03/15 16:20	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10325-1

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

Lab Sample ID: MB 160-171322/1-A

Matrix: Solid

Analysis Batch: 171825

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 171322

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Technetium 99	ND		0.000052	0.000016	mg/Kg		01/31/15 10:48	02/02/15 16:05	1

Lab Sample ID: LCS 160-171322/2-A

Matrix: Solid

Analysis Batch: 171825

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 171322

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	0.00122	0.00122		mg/Kg		100	80 - 120

Lab Sample ID: 160-10325-1 MS

Matrix: Solid

Analysis Batch: 171825

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

Prep Type: Total/NA

Prep Batch: 171322

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Technetium 99	ND		0.00159	0.00159		mg/Kg	☼	100	75 - 125

Lab Sample ID: 160-10325-1 MSD

Matrix: Solid

Analysis Batch: 171825

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

Prep Type: Total/NA

Prep Batch: 171322

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Technetium 99	ND		0.00160	0.00161		mg/Kg	☼	101	75 - 125	1	30

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

Lab Sample ID: MB 160-171322/1-A

Matrix: Solid

Analysis Batch: 171826

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 171322

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Technetium 99	0.02121	U	0.00785	0.00809	1.04	0.178	pCi/g	01/31/15 10:48	02/02/15 16:05	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Re	94		30 - 110	01/31/15 10:48	02/02/15 16:05	1

Lab Sample ID: LCS 160-171322/2-A

Matrix: Solid

Analysis Batch: 171826

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 171322

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	20.9	20.89		1.98	1.06	0.182	pCi/g	100	80 - 120

Carrier	LCS %Yield	LCS Qualifier	Limits
Re	94		30 - 110

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10325-1

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

Lab Sample ID: 160-10325-1 MS

Matrix: Solid

Analysis Batch: 171826

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

Prep Type: Total/NA

Prep Batch: 171322

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Technetium 99	0.363		27.2	27.26		2.92	1.46	0.251	pCi/g	99	75 - 125
Carrier	MS %Yield	MS Qualifier	Limits								
Re	88		30 - 110								

Lab Sample ID: 160-10325-1 MSD

Matrix: Solid

Analysis Batch: 171826

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

Prep Type: Total/NA

Prep Batch: 171322

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	0.363		27.4	27.65		2.77	1.46	0.250	pCi/g	100	75 - 125	0.07	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 160-171821/1-A

Matrix: Solid

Analysis Batch: 171843

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 171821

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	0.0000	U	0.00642	0.00642		0.0723	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Americium 241	-0.0002118	U	0.0114	0.0114		0.0209	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Bismuth 212	-0.02777	U	2.29	2.29		0.172	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Bismuth 214	0.009874	U	0.0162	0.0163		0.0367	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Lead 212	-0.001040	U	0.0149	0.0149		0.0244	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Lead 214	0.0000228	U	0.0144	0.0144		0.0301	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Potassium 40	0.05237	U	0.110	0.110		0.195	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Protactinium 234m	-0.5237	U	1.53	1.53		2.71	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Protactinium 231	0.03233	U	0.123	0.123		0.282	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Radium 226	0.009874	U	0.0162	0.0163		0.0367	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Thorium 234	-0.004762	U	0.157	0.157		0.281	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Uranium 235	-0.01121	U	0.898	0.898		0.0522	pCi/g	02/03/15 10:44	02/03/15 13:25	1
Thorium 232	0.0000	U	0.00642	0.00642		0.0723	pCi/g	02/03/15 10:44	02/03/15 13:25	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	02/03/15 10:44	02/03/15 13:25	1

TestAmerica St. Louis

QC Sample Results

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

TestAmerica Job ID: 160-10325-1

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

Lab Sample ID: LCS 160-171821/2-A
Matrix: Solid
Analysis Batch: 171844

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 171821

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium 241	101	103.7		10.8		0.513	pCi/g	103	87 - 116
Cesium 137	35.0	35.75		3.75	0.200	0.184	pCi/g	102	87 - 120
Cobalt 60	36.9	37.11		3.74		0.123	pCi/g	100	87 - 115

Lab Sample ID: 160-10325-1 DU
Matrix: Solid
Analysis Batch: 171847

Client Sample ID: L10-01-01-B-S-S-00
Prep Type: Total/NA
Prep Batch: 171821

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium 228	0.797		0.8973		0.171		0.135	pCi/g	0.29	1
Americium 241	-0.0118	U	-0.03626	U	0.0654		0.109	pCi/g	0.01	1
Bismuth 212	1.28		0.9620		0.359		0.323	pCi/g	0.37	1
Bismuth 214	0.680		0.6835		0.119		0.0624	pCi/g	0.01	1
Lead 212	0.820		0.8078		0.129		0.0631	pCi/g	0.04	1
Lead 214	0.809		0.6864		0.119		0.0731	pCi/g	0.49	1
Potassium 40	16.2		16.09		2.07		0.325	pCi/g	0.03	1
Protactinium 234m	0.000	U	1.859	U	3.20		5.42	pCi/g	0.45	1
Protactinium 231	0.391	U	0.4593	U	0.332		0.950	pCi/g	0.09	1
Radium 226	0.680		0.6835		0.119		0.0624	pCi/g	0.01	1
Thorium 234	0.655	U	0.9805		0.331		0.893	pCi/g	0.40	1
Uranium 235	0.290		0.1805	U	0.147		0.246	pCi/g	0.28	1
Thorium 232	0.797		0.8973		0.171		0.135	pCi/g	0.29	1
Total										
Other Detected Radionuclides	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Tl-208	0.250		0.2843		0.0570		0.0379	pCi/g	0.29	1

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10325-1

Metals

Prep Batch: 171322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-1 MS	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-1 MSD	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	None	
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	None	
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	None	
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	None	
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	None	
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	None	
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	None	
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	None	
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	None	
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	None	
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	None	
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	None	
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	None	
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	None	
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	None	
LCS 160-171322/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-171322/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 171825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	6020A	171322
160-10325-1 MS	L10-01-01-B-S-S-00	Total/NA	Solid	6020A	171322
160-10325-1 MSD	L10-01-01-B-S-S-00	Total/NA	Solid	6020A	171322
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	6020A	171322
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	6020A	171322
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	6020A	171322
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	6020A	171322
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	6020A	171322
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	6020A	171322
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	6020A	171322
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	6020A	171322
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	6020A	171322
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	6020A	171322
LCS 160-171322/2-A	Lab Control Sample	Total/NA	Solid	6020A	171322
MB 160-171322/1-A	Method Blank	Total/NA	Solid	6020A	171322

General Chemistry

Analysis Batch: 171524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	Moisture	
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	Moisture	

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10325-1

General Chemistry (Continued)

Analysis Batch: 171524 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	Moisture	
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	Moisture	
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	Moisture	
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	Moisture	
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	Moisture	
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	Moisture	
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	Moisture	
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	Moisture	
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	Moisture	
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	Moisture	
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	Moisture	
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	Moisture	
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	Moisture	
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	Moisture	
160-10325-16 DU	L10-01-18-B-E-B-00	Total/NA	Solid	Moisture	

Rad

Prep Batch: 171322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-1 MS	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-1 MSD	L10-01-01-B-S-S-00	Total/NA	Solid	None	
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	None	
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	None	
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	None	
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	None	
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	None	
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	None	
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	None	
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	None	
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	None	
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	None	
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	None	
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	None	
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	None	
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	None	
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	None	
LCS 160-171322/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-171322/1-A	Method Blank	Total/NA	Solid	None	

Leach Batch: 171530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	Dry and Grind	
160-10325-1 DU	L10-01-01-B-S-S-00	Total/NA	Solid	Dry and Grind	
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	Dry and Grind	
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	Dry and Grind	

TestAmerica St. Louis

QC Association Summary

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

TestAmerica Job ID: 160-10325-1

Rad (Continued)

Leach Batch: 171530 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	Dry and Grind	
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	Dry and Grind	
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	Dry and Grind	
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	Dry and Grind	
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	Dry and Grind	

Prep Batch: 171821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-10325-1	L10-01-01-B-S-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-1 DU	L10-01-01-B-S-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-2	L10-01-02-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-3	L10-01-04-B-S-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-4	L10-01-05-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-5	L10-01-07-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-6	L10-01-08-B-E-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-7	L10-01-09-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-8	L10-01-10-B-E-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-9	L10-01-11-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-10	L10-01-12-B-E-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-11	L10-01-13-B-E-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-12	L10-01-13-B-E-Q-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-13	L10-01-14-B-E-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-14	L10-01-15-B-S-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-15	L10-01-16-B-R-S-00	Total/NA	Solid	Fill_Geo-0	171530
160-10325-16	L10-01-18-B-E-B-00	Total/NA	Solid	Fill_Geo-0	171530
LCS 160-171821/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-171821/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Tracer/Carrier Summary

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

TestAmerica Job ID: 160-10325-1

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)	
160-10325-1	L10-01-01-B-S-S-00	90	
160-10325-1 MS	L10-01-01-B-S-S-00	88	
160-10325-1 MSD	L10-01-01-B-S-S-00	89	
160-10325-2	L10-01-02-B-R-S-00	92	
160-10325-3	L10-01-04-B-S-S-00	91	
160-10325-4	L10-01-05-B-R-S-00	92	
160-10325-5	L10-01-07-B-R-S-00	92	
160-10325-6	L10-01-08-B-E-S-00	93	
160-10325-7	L10-01-09-B-R-S-00	91	
160-10325-8	L10-01-10-B-E-S-00	92	
160-10325-9	L10-01-11-B-R-S-00	91	
160-10325-10	L10-01-12-B-E-S-00	94	
160-10325-11	L10-01-13-B-E-S-00	91	
160-10325-12	L10-01-13-B-E-Q-00	90	
160-10325-13	L10-01-14-B-E-S-00	91	
160-10325-14	L10-01-15-B-S-S-00	91	
160-10325-15	L10-01-16-B-R-S-00	91	
160-10325-16	L10-01-18-B-E-B-00	93	
LCS 160-171322/2-A	Lab Control Sample	94	
MB 160-171322/1-A	Method Blank	94	

Tracer/Carrier Legend

Re = Re