APPENDIX D

Soils Data

Uranium in Soils

QC Soils

Provided on CD

Results of Gamma Spec Analysis for Depleted Uranium in APG Soils

Sample ID:	pCi/g U-238 (Th-234)	Total Curies U-238	grams U-238 per Sample	pCi/g U-235	Total Curies U-235	grams U-235 per sample	U-235/U-238 Ratio	
							6.4227E-02	This Sample
	0.60	5.9600E-13	1.7898E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-1-1							785.53	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-1-2							1326.43	% Diff from Natual
							5.4596E-03	This Sample
	0.93	9.3200E-13	2.7988E-06	0.033	3.2700E-14	1.5280E-08	7.2529E-03	Natural
SU-1-3							-24.73	% Diff from Natual
							5.3729E-03	This Sample
	2.65	2.6500E-12	7.9580E-06	0.092	9.1500E-14	4.2757E-08	7.2529E-03	Natural
SU-1-4							-25.92	% Diff from Natual
							6.5900E-03	This Sample
	0.90	9.0200E-13	2.7087E-06	0.038	3.8200E-14	1.7850E-08	7.2529E-03	Natural
SU-1-5							-9.14	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-1-6							1326.43	% Diff from Natual
							4.7790E-02	This Sample
	0.80	8.0100E-13	2.4054E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-1-7							558.90	% Diff from Natual
							6.9749E-03	This Sample
	1.70	1.7000E-12	5.1051E-06	0.076	7.6200E-14	3.5607E-08	7.2529E-03	Natural
SU-1-8							-3.83	% Diff from Natual
							2.6988E-03	This Sample
	12.80	1.2800E-11	3.8438E-05	0.222	2.2200E-13	1.0374E-07	7.2529E-03	Natural
SU-1-9							-62.79	% Diff from Natual
							3.2168E-03	This Sample
	5.95	5.9500E-12	1.7868E-05	0.123	1.2300E-13	5.7477E-08	7.2529E-03	Natural
SU-1-10							-55.65	% Diff from Natual
							2.2662E-03	This Sample
	2.52	2.5200E-12	7.5676E-06	0.037	3.6700E-14	1.7150E-08	7.2529E-03	Natural
SU-1-11							-68.75	% Diff from Natual
							3.1928E-03	This Sample
	1.93	1.9300E-12	5.7958E-06	0.040	3.9600E-14	1.8505E-08	7.2529E-03	Natural
SU-1-12							-55.98	% Diff from Natual
							3.8379E-03	This Sample
	0.89	8.9200E-13	2.6787E-06	0.022	2.2000E-14	1.0280E-08	7.2529E-03	Natural
SU-1-13							-47.09	% Diff from Natual
							2.3256E-03	This Sample
	2.75	2.7500E-12	8.2583E-06	0.041	4.1100E-14	1.9206E-08	7.2529E-03	Natural
SU-1-14							-67.94	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-1							1326.43	% Diff from Natual
							2.8087E-01	This Sample
	0.02	2.0000E-14	6.0060E-08	0.036	3.6100E-14	1.6869E-08	7.2529E-03	Natural
SU-2-2							3772.52	% Diff from Natual
							6.6689E-02	This Sample
	0.57	5.7400E-13	1.7237E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-3							819.47	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-4							1326.43	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-5							1326.43	% Diff from Natual

Results of Gamma Spec Analysis for Depleted Uranium in APG Soils

Sample ID:	pCi/g U-238 (Th-234)	Total Curies U-238	grams U-238 per Sample	pCi/g U-235	Total Curies U-235	grams U-235 per sample	U-235/U-238 Ratio	
							8.6801E-02	This Sample
	0.44	4.4100E-13	1.3243E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-6							1096.77	% Diff from Natual
							6.7751E-02	This Sample
	0.57	5.6500E-13	1.6967E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-7							834.12	% Diff from Natual
							2.6308E-03	This Sample
	13.90	1.3900E-11	4.1742E-05	0.235	2.3500E-13	1.0981E-07	7.2529E-03	Natural
SU-2-8							-63.73	% Diff from Natual
							2.8065E-03	This Sample
	3.92	3.9200E-12	1.1772E-05	0.071	7.0700E-14	3.3037E-08	7.2529E-03	Natural
SU-2-9							-61.31	% Diff from Natual
							4.8578E-02	This Sample
	0.79	7.8800E-13	2.3664E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-10							569.77	% Diff from Natual
							4.2080E-03	This Sample
	0.87	8.6900E-13	2.6096E-06	0.024	2.3500E-14	1.0981E-08	7.2529E-03	Natural
SU-2-11							-41.98	% Diff from Natual
							3.2717E+00	This Sample
	0.01	1.1700E-14	3.5135E-08	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-12							45009.21	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-13							1326.43	% Diff from Natual
							4.2914E-02	This Sample
	0.89	8.9200E-13	2.6787E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-2-14							491.68	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-4-1							1326.43	% Diff from Natual
							3.1121E-01	This Sample
	0.05	5.3000E-14	1.5916E-07	0.106	1.0600E-13	4.9533E-08	7.2529E-03	Natural
SU-4-2							4190.88	% Diff from Natual
							4.6260E-03	This Sample
	2.21	2.2100E-12	6.6366E-06	0.066	6.5700E-14	3.0701E-08	7.2529E-03	Natural
SU-4-3							-36.22	% Diff from Natual
							3.0677E-01	This Sample
	0.02	2.1000E-14	6.3063E-08	0.041	4.1400E-14	1.9346E-08	7.2529E-03	Natural
SU-4-4							4129.58	% Diff from Natual
							2.5656E-03	This Sample
	20.50	2.0500E-11	6.1562E-05	0.338	3.3800E-13	1.5794E-07	7.2529E-03	Natural
SU-4-5							-64.63	% Diff from Natual
							2.0774E-01	This Sample
	0.04	4.0000E-14	1.2012E-07	0.053	5.3400E-14	2.4953E-08	7.2529E-03	Natural
SU-4-6							2764.16	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-4-7							1326.43	% Diff from Natual
							3.6872E-01	This Sample
	0.05	4.6000E-14	1.3814E-07	0.109	1.0900E-13	5.0935E-08	7.2529E-03	Natural
SU-4-8							4983.76	% Diff from Natual
							1.7466E-02	This Sample
	0.98	9.8000E-13	2.9429E-06	0.110	1.1000E-13	5.1402E-08	7.2529E-03	Natural
SU-4-9							140.81	% Diff from Natual
							1.6235E-01	This Sample
	0.06	6.0000E-14	1.8018E-07	0.063	6.2600E-14	2.9252E-08	7.2529E-03	Natural
SU-4-10							2138.41	% Diff from Natual

Results of Gamma Spec Analysis for Depleted Uranium in APG Soils

Sample ID:	pCi/g U-238 (Th-234)	Total Curies U-238	grams U-238 per Sample	pCi/g U-235	Total Curies U-235	grams U-235 per sample	U-235/U-238 Ratio	
							7.8119E-03	This Sample
	2.47	2.4700E-12	7.4174E-06	0.124	1.2400E-13	5.7944E-08	7.2529E-03	Natural
SU-4-11							7.71	% Diff from Natual
							3.0468E-01	This Sample
	0.05	5.0000E-14	1.5015E-07	0.098	9.7900E-14	4.5748E-08	7.2529E-03	Natural
SU-4-12							4100.77	% Diff from Natual
							2.6648E-01	This Sample
	0.08	8.0000E-14	2.4024E-07	0.137	1.3700E-13	6.4019E-08	7.2529E-03	Natural
SU-4-13							3574.06	% Diff from Natual
							5.2301E-01	This Sample
	0.04	3.6000E-14	1.0811E-07	0.121	1.2100E-13	5.6542E-08	7.2529E-03	Natural
SU-4-14							7111.06	% Diff from Natual
							3.2949E-03	This Sample
	2.98	2.9800E-12	8.9489E-06	0.063	6.3100E-14	2.9486E-08	7.2529E-03	Natural
SU-14-1							-54.57	% Diff from Natual
							4.2056E-03	This Sample
	2.22	2.2200E-12	6.6667E-06	0.060	6.0000E-14	2.8037E-08	7.2529E-03	Natural
SU-14-2							-42.02	% Diff from Natual
							2.3806E-03	This Sample
	0.72	7.1900E-13	2.1592E-06	0.011	1.1000E-14	5.1402E-09	7.2529E-03	Natural
SU-14-3							-67.18	% Diff from Natual
							4.8736E-03	This Sample
	3.03	3.0300E-12	9.0991E-06	0.095	9.4900E-14	4.4346E-08	7.2529E-03	Natural
SU-14-4							-32.80	% Diff from Natual
							5.3915E-02	This Sample
	0.71	7.1000E-13	2.1321E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-5							643.35	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-6							1326.43	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-7							1326.43	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-8							1326.43	% Diff from Natual
							3.2430E-03	This Sample
	3.33	3.3300E-12	1.0000E-05	0.069	6.9400E-14	3.2430E-08	7.2529E-03	Natural
SU-14-9							-55.29	% Diff from Natual
							1.5065E-03	This Sample
	3.45	3.4500E-12	1.0360E-05	0.033	3.3400E-14	1.5607E-08	7.2529E-03	Natural
SU-14-10							-79.23	% Diff from Natual
							8.1101E-02	This Sample
	0.47	4.7200E-13	1.4174E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-11							1018.17	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-12							1326.43	% Diff from Natual
							1.0346E-01	This Sample
	0.37	3.7000E-13	1.1111E-06	0.246	2.4600E-13	1.1495E-07	7.2529E-03	Natural
SU-14-13							1326.43	% Diff from Natual
							2.1653E-03	This Sample
	0.96	9.6300E-13	2.8919E-06	0.013	1.3400E-14	6.2617E-09	7.2529E-03	Natural
SU-14-14							-70.15	% Diff from Natual

Sample ID: Example

pCi/g U-238	Grams of Sample	Total Curies	grams U-238 per Sample
14.40	1600	2.3040E-08	6.9189E-02

pCi/g U-235		Total Curies	grams U-235
0.24		3.8880E-10	1.8168E-04

	U-235/U-238 Ratio	
Depleted	2.6259E-03	This Sample
0	7.2529E-03	Natural
	-63.80	% Diff from Natual

Enter pCi/g and grams of sample from analysis report.

Natural Abundance
0.7200% U-235
99.2745% U-238

Specific Activity		
Ci/g = **U-238**	3.33E-07	t 1/2 = 4.47E+09 yr
Ci/g = **U-235**	2.14E-06	t 1/2 = 7.1E+08 yr
Ci/g = **Th-234**	2.30E+04	t1/2 = 24.2 days

Specific Activity Calculation	Conversions
Ci/g = 1.30E+08 / t1/2 (days) x atomic wt	1dps = 1bq 1bq = 27 pCi 1Ci = 3.7E9dps

Bob's Ratio by Activity			
Isotope	**U238**		
Half-life	1.41E+17 sec		
A.W.	238.050788 g	N. Abd.	Activity
SpA	3.36E-07 Ci/g	99.2745	3.33E-05
Isotope	**U235**		
Half-life	2.22E+16 sec		
A.W.	235.043928 g	0.72	1.55E-06
SpA	2.16E-06 Ci/g		

Sample	pCi/g
U235	0.239
U238	7.78

Less than 1 indicates depletion
Greater than 1 indicates enrichment
Look at counting statistics
to see if uncertainties overlap natural.

Ratio Natural	
U235/238	0.0466
Ratio Sample	
U235/238	0.0307
Ratio	
Samp/Nat	0.6588
-34.12	% Diff from Natual

Sample ID

U-235/U-238 Ratio	
4.6600E-02	Natural
4.7120E-02	This Sample

pCi/g U-238	Grams of Sample	Total Curies
19.10	1600	3.0560E-08

	0
	0
Natural	

pCi/g U-235	Grams of Sample	Total Curies
0.90	1600	1.4400E-09

**Enter pCi/g from analysis report in Column A

Ratio U235/238	0.0466

Isotope	U238			
Half-life	1.41E+17	sec		
A.W.	238.050788	g	N. Abd.	Activity Ci
SpA	3.36E-07	Ci/g	99.2745	3.33E-05

Isotope	U235			
Half-life	2.22E+16	sec		
A.W.	235.043928	g	N. Abd.	Activity Ci
SpA	2.16E-06	Ci/g	0.7200	1.55E-06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

ANALYTICAL REPORT

APG

Lot #: F9L100438

PIKA International, Inc.

PIKA International, Inc.
12723 Capricorn Drive
Suite 500
Stafford, TX 77477

TESTAMERICA LABORATORIES, INC.

Kay Clay
Project Manager

December 23, 2009

Case Narrative
LOT NUMBER: F9L100438

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on December 9, 2009. These samples are associated with your APG project.

The analytical results included in this report meet all applicable quality control procedure requirements.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. **TestAmerica St. Louis' Florida certification number is E87689.** The case narrative is an integral part of this report.

This report shall not be reproduced, except in full, without the written approval of the laboratory.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances
Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

There are no observations or nonconformances associated with the analysis in this lot.

METHODS SUMMARY

F9L100438

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Gamma Spectroscopy - Cesium-137 & Hits	EML GA-01-R MOD	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL" HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

SAMPLE SUMMARY

F9L100438

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
LQVD2	001	SU1 1-11	11/23/09	11:00
LQVD3	002	SU1 1-4	11/23/09	13:05
LQVD6	003	SU2 2-5	11/23/09	08:50
LQVD7	004	SU2 2-12	11/23/09	08:30
LQVEA	005	SU4 4-7	11/23/09	13:49
LQVEC	006	SU4 4-11	11/23/09	13:40
LQVEE	007	SU14A 14A-10	11/23/09	09:15
LQVEF	008	SU14A 14A-03	11/23/09	09:57
LQVEJ	009	APG11-APG20	10/13/09	14:30
LQVEL	010	APG81-APG90	10/20/09	13:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

PIKA International, Inc.

Client Sample ID: SU1 1-11

Radiochemistry

Lab Sample ID: F9L100438-001
Work Order: LQVD2
Matrix: SOLID

Date Collected: 11/23/09 1100
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**		**Batch # 9351249**		**Yld %**
Cesium 137	0.020	U	0.022	0.200	0.035	12/17/09	12/18/09
Uranium 235	-0.03	U	1.4		0.3	12/17/09	12/18/09
Uranium 238	**2.02**		**0.48**		**1.1**	**12/17/09**	**12/18/09**
--- Other Detected Radionuclides ---							
Thorium 234	**2.02**		**0.48**		**1.1**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU1 1-4

Radiochemistry

Lab Sample ID: F9L100438-002
Work Order: LQVD3
Matrix: SOLID

Date Collected: 11/23/09 1305
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**	**Batch # 9351249**		**Yld %**
Cesium 137	**0.177**	**J**	**0.074**	0.200	**0.059**	12/17/09	12/18/09
Uranium 235	0.04	U	0.23		0.40	12/17/09	12/18/09
Uranium 238	**3.4**		**1.5**		**1.9**	**12/17/09**	**12/18/09**
--- Other Detected Radionuclides ---							
Actinium 228	**0.77**		**0.30**		**0.30**	**12/17/09**	**12/18/09**
Bismuth 214	**0.61**		**0.18**		**0.20**	**12/17/09**	**12/18/09**
Lead 212	**0.76**		**0.14**		**0.13**	**12/17/09**	**12/18/09**
Lead 214	**0.69**		**0.14**		**0.12**	**12/17/09**	**12/18/09**
Potassium 40	**5.5**		**1.4**		**1**	**12/17/09**	**12/18/09**
Thallium 208	**0.249**		**0.074**		**0.066**	**12/17/09**	**12/18/09**
Thorium 234	**3.4**		**1.5**		**1.9**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

J **Result is greater than sample detection limit but less than stated reporting limit.**
U **Result is less than the sample detection limit.**

PIKA International, Inc.

Client Sample ID: SU2 2-5

Radiochemistry

Lab Sample ID: F9L100438-003
Work Order: LQVD6
Matrix: SOLID

Date Collected: 11/23/09 0850
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**	**Batch # 9351249**		**Yld %**
Cesium 137	0.007	U	0.025	0.200	0.045	12/17/09	12/18/09
Uranium 235	-0.06	U	0.43		0.20	12/17/09	12/18/09
Uranium 238	0.02	U	0.50		0.95	12/17/09	12/18/09
--- Other Detected Radionuclides ---							
Actinium 228	**0.18**		**0.11**		**0.14**	**12/17/09**	**12/18/09**
Bismuth 214	**0.141**		**0.060**		**0.090**	**12/17/09**	**12/18/09**
Lead 212	**0.160**		**0.059**		**0.071**	**12/17/09**	**12/18/09**
Potassium 40	**1.44**		**0.61**		**0.82**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU2 2-12

Radiochemistry

Lab Sample ID: F9L100438-004
Work Order: LQVD7
Matrix: SOLID

Date Collected: 11/23/09 0830
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**		**Batch # 9351249**		**Yld %**
Cesium 137	-0.002	U	0.026	0.200	0.053	12/17/09	12/18/09
Uranium 235	-0.04	U	0.49		0.21	12/17/09	12/18/09
Uranium 238	0.56	U	0.29		0.78	12/17/09	12/18/09
--- Other Detected Radionuclides ---							
Lead 212	**0.102**		**0.044**		**0.055**	**12/17/09**	**12/18/09**
Potassium 40	**0.84**		**0.56**		**0.81**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU4 4-7

Radiochemistry

Lab Sample ID: F9L100438-005
Work Order: LOVEA
Matrix: SOLID

Date Collected: 11/23/09 1349
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**		**Batch # 9351249**		**Yld %**
Cesium 137	0.0	U	0.031	0.200	0.058	12/17/09	12/18/09
Uranium 235	0.04	U	0.12		0.21	12/17/09	12/18/09
Uranium 238	-0.4	U	1.6		1.3	12/17/09	12/18/09
--- Other Detected Radionuclides ---							
Potassium 40	**0.69**		**0.42**		**0.66**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU4 4-11

Radiochemistry

Lab Sample ID: F9L100438-006
Work Order: LOVEC
Matrix: SOLID

Date Collected: 11/23/09 1340
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**		**Batch # 9351249**	**Yld %**
Cesium 137	**0.42**		**0.11**	0.20	**0.08**	**12/17/09**	**12/18/09**
Uranium 235	0.20	U	0.35		0.59	12/17/09	12/18/09
Uranium 238	**4.6**		**2.3**		**2.8**	**12/17/09**	**12/18/09**
--- Other Detected Radionuclides ---							
Actinium 228	**1.17**		**0.34**		**0.32**	**12/17/09**	**12/18/09**
Bismuth 214	**1.08**		**0.23**		**0.20**	**12/17/09**	**12/18/09**
Lead 212	**1.10**		**0.18**		**0.17**	**12/17/09**	**12/18/09**
Lead 214	**1.08**		**0.25**		**0.24**	**12/17/09**	**12/18/09**
Potassium 40	**9.1**		**1.7**		**1.3**	**12/17/09**	**12/18/09**
Thallium 208	**0.371**		**0.099**		**0.096**	**12/17/09**	**12/18/09**
Thorium 234	**4.6**		**2.3**		**2.8**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU14A 14A-10

Radiochemistry

Lab Sample ID: F9L100438-007
Work Order: LOVEE
Matrix: SOLID

Date Collected: 11/23/09 0915
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**	**Batch # 9351249**		**Yld %**
Cesium 137	0.011	U	0.031	0.200	0.055	12/17/09	12/21/09
Uranium 235	-0.03	U	0.56		0.28	12/17/09	12/21/09
Uranium 238	0.86	U	0.81		1.2	12/17/09	12/21/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: SU14A 14A-03

Radiochemistry

Lab Sample ID: F9L100438-008
Work Order: LOVEF
Matrix: SOLID

Date Collected: 11/23/09 0957
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**	**Batch # 9351249**		**Yld %**
Cesium 137	-0.0001	U	0.028	0.200	0.054	12/17/09	12/18/09
Uranium 235	0.03	U	0.14		0.27	12/17/09	12/18/09
Uranium 238	0.34	U	0.81		1.3	12/17/09	12/18/09
--- Other Detected Radionuclides ---							
Bismuth 214	**0.144**		**0.074**		**0.12**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: APG11-APG20

Radiochemistry

Lab Sample ID: F9L100438-009
Work Order: LOVEJ
Matrix: SOLID

Date Collected: 10/13/09 1430
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD				**pCi/g**	**Batch # 9351249**		**Yld %**
Cesium 137	-0.0003	U	0.024	0.200	0.048	12/17/09	12/18/09
Uranium 235	0.06	U	0.12		0.21	12/17/09	12/18/09
Uranium 238	**1.74**		**0.46**		**1.0**	**12/17/09**	**12/18/09**
--- Other Detected Radionuclides ---							
Bismuth 214	**0.190**		**0.083**		**0.085**	**12/17/09**	**12/18/09**
Lead 212	**0.129**		**0.052**		**0.067**	**12/17/09**	**12/18/09**
Potassium 40	**1.60**		**0.65**		**0.69**	**12/17/09**	**12/18/09**
Thallium 208	**0.051**		**0.029**		**0.042**	**12/17/09**	**12/18/09**
Thorium 234	**1.74**		**0.46**		**1.0**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

PIKA International, Inc.

Client Sample ID: APG81-APG90

Radiochemistry

Lab Sample ID: F9L100438-010
Work Order: LOVEL
Matrix: SOLID

Date Collected: 10/20/09 1340
Date Received: 12/09/09 0910

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	mdc	Prep Date	Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**		**Batch # 9351249**		**Yld %**
Cesium 137	0.019	U	0.031	0.200	0.052	12/17/09	12/18/09
Uranium 235	**0.38**		**0.23**		**0.28**	**12/17/09**	**12/18/09**
Uranium 238	**16.3**		**1.7**		**1.9**	**12/17/09**	**12/18/09**
--- Other Detected Radionuclides ---							
Actinium 228	**0.247**		**0.095**		**0.065**	**12/17/09**	**12/18/09**
Lead 212	**0.143**		**0.061**		**0.077**	**12/17/09**	**12/18/09**
Lead 214	**0.091**		**0.051**		**0.076**	**12/17/09**	**12/18/09**
Thorium 234	**16.3**		**1.7**		**1.9**	**12/17/09**	**12/18/09**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F9L100438
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**	**Batch # 9351249**	**Yld %**		**F9L170000-249B**
Cesium 137	-0.002	U	0.030	0.200	0.058	12/17/09	12/18/09
Uranium 235	0.11	U	0.14		0.24	12/17/09	12/18/09
Uranium 238	-0.06	U	0.75		1.2	12/17/09	12/18/09

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC.

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Radiochemistry

Client Lot ID: F9L100438
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ+/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
Gamma Cs-137 & Hits by DOE GA-01-R MOD		**pCi/g**		**GA-01-R MOD**			**F9L170000-249C**
Americium 241	98.8	97.1	8.3	2.9		98	(90 - 110)
Cesium 137	37.1	38.9	2.4	0.3		105	(90 - 110)
Cobalt 60	61.4	60.0	3.5	0.2		98	(90 - 110)
	Batch #:	9351249		**Analysis Date:**	12/18/09		

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

DUPLICATE EVALUATION REPORT

Radiochemistry

Client Lot ID: F9L100438
Matrix: SOLID

Date Sampled: 11/23/09
Date Received: 12/09/09

Parameter	SAMPLE Result		Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result		Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision	
Gamma Cs-137 & Hits by DOE GA-01-R MOD			**pCi/g**		**GA-01-R MOD**				**F9L100438-001**	
Cesium 137	0.020	U	0.022		0.012	U	0.024		45	%RPD
Uranium 235	-0.03	U	1.4		0.037	U	0.097		6140	%RPD
Uranium 238	**2.02**		**0.48**		**2.30**		**0.48**		13	%RPD
---Other Dedected Radionuclides---										
Thorium 234	**2.02**		**0.48**		**2.30**		**0.48**		13	%RPD
	Batch #:		9351249 (Sample)		9351249 (Duplicate)					

NOTE(S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results

U Result is less than the sample detection limit.

Lot F9L100438

PIKA

PIKA International, Inc.

Clerk 3/29 AB 12-9-09

Chain of Custody Record

Fedex Airbill # F9L100438

Document No. 12-1
Page 1 of 2

Project Number	08-07-172	Project Fax	916-920-9163
Project Name	APG	Req'd Report Date	
Project Contact	Jeanne Haslett	Lab Contact	
Project Phone	916-920-9840	Lab Phone	

BILLING ADDRESS:	SEND REPORT TO:	LAB ADDRESS:
PIKA International, Inc. 12723Capricorn Dr., Ste 500 Stafford, TX 77477 Phone: 281-340-5525 Fax: 281-340-5533	PIKA International 5025 Arnold Ave., Ste 100 McClellan, CA 95652 Attention: Jeanne jhaslett@pikainc.com	

	#	Sample ID# and Description	Matrix TYPE: AIR	AQUEOUS	SOIL	FILTER	CONTAINER TYPE (G, P)	VOLUME	NUMBER OF CONTAINERS	PRESER -VATIVE	ANALYSIS REQUESTED: SW6020 Metals	HASL 300 Gamma Spec	DATE & TIME COLLECTED	SPECIAL INSTRUCTIONS / NOTES
														soar
X	1	APG11-APG20			X			1.5L	1	none	X	X	10/13/09 1430	1650 marin
X	2	APG81-APG90			X			1.5L	1	none	X	X	10/20/09 1340	
	3									none				
	4									none				
	5									none				
	6									none				
	7									none				
	8									none				

Sample TAT Req'd: Standard	Sample Disposal:	☐ Archive for _____ Months.	☒ Disposal by Lab	☐ Return to origin
QC Requirements:				
Notes/Comments:				
REPORT U238				

CUSTODY TRACKING

1)	Relinquished By:	Date: 12-07-09	Time: 11:37	Received By:	Date: 07DEC09	Time: 1137
2)	Relinquished By: Cheng Yue	Date: 12/8/09	Time: 1600	Received By:	Date: 12-9-09	Time: 9:10
3)	Relinquished By:	Date:	Time:	Received By:	Date:	Time:
4)	Relinquished By:	Date:	Time:	Received By:	Date:	Time:

x Metals performed @ TAL - W. Sacramento

TestAmerica St. Louis

Lot F9L100438

PIKA

PIKA International, Inc.

CWA 330

Chain of Custody Record

F9L100438

Fedex Airbill #

Document No. 12-1
Page 2 of 2

Project Number	08-07-172	Project Fax	916-920-9163
Project Name	APG	Req'd Report Date	
Project Contact	Jeanne Haslett	Lab Contact	
Project Phone	916-920-9840	Lab Phone	

BILLING ADDRESS:	SEND REPORT TO:	LAB ADDRESS:
PIKA International, Inc. 12723Capricorn Dr., Ste 500 Stafford, TX 77477 Phone: 281-340-5525 Fax: 281-340-5533	PIKA International 5025 Arnold Ave., Ste 100 McClellan, CA 95652 Attention: Jeanne jhaslett@pikainc.com	

#	Sample ID# and Description	Matrix TYPE: AIR	AQUEOUS	SOIL	FILTER	CONTAINER TYPE (G, P)	VOLUME	NUMBER OF CONTAINERS	PRESER -VATIVE	ANALYSIS REQUESTED: SW6020 Metals	HASL 300 Gamma Spec	DATE & TIME COLLECTED	SPECIAL INSTRUCTIONS / NOTES
													over
1	SU1- 1-11			X			1.5L	1	none		X	11/23/09 1100	Lab Marin
2	SU1 1-4			X			1.5L	1	none		X	1305	
3	SU2 2-5			X			1.5L	1	none		X	0850	
4	SU2 2-12			X			1.5L	1	none		X	0830	
5	SU4 4-7			X			1.5L	1	none		X	1349	
6	SU4 4-11			X			1.5L	1	none		X	1340	
7	SU14A 14A-10			X			1.5L	1	none		X	0915	
8	SU14A 14A-03			X			1.5L	1	none		X	0957	

Sample TAT Req'd: Standard	Sample Disposal:	☐ Archive for _____ Months.	☒ Disposal by Lab	☐ Return to origin
QC Requirements:				
Notes/Comments:				
REPORT U238				

CUSTODY TRACKING

1)	Relinquished By:	Date: 12-07-09	Time: 1137	Received By:	Date: 07DEC09	Time: 1137
2)	Relinquished By: Chang the	Date: 12/8/09	Time: 1600	Received By:	Date: 12-9-09	Time: 9:10
3)	Relinquished By:	Date:	Time:	Received By:	Date:	Time:
4)	Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TestAmerica St. Louis

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Lot #(s): F9L100438

CONDITION UPON RECEIPT FORM q-09

Client: TA Westlake Sac

Quote No: 84792

COC/RFA No: N/A

330

Initiated By: AB Date: 12-9-09 Time: 910

Shipping Information

Shipper: FedEx UPS DHL Courier Client Other: _____ Multiple Packages: (Y) N

Shipping # (s):*

1. 7982 0438 5176 - master
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Sample Temperature (s):**

1. ambient w/ ice 12/10/09
2. ↓
3. _____
4. _____
5. _____
6. #6
7. _____
8. _____
9. _____
10. _____

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1.	(Y) N	Are there custody seals present on the cooler?	8.	Y (N)	Are there custody seals present on bottles?
2.	Y (N) N/A	Do custody seals on cooler appear to be tampered with?	9.	Y N (N/A)	Do custody seals on bottles appear to be tampered with?
3.	(Y) N	Were contents of cooler frisked after opening, but before unpacking?	10.	Y N (N/A)	Was sample received with proper pH[1]? (If not, make note below)
4.	(Y) N	Sample received with Chain of Custody?	11.	(Y) N	Sample received in proper containers?
5.	(Y) N N/A	Does the Chain of Custody match sample ID's on the container(s)?	12.	Y N (N/A)	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)
6.	Y (N)	Was sample received broken?	13.	Y N (N/A)	Was Internal COC/Workshare received?
7.	(Y) N	Is sample volume sufficient for analysis?	14.	Y N (N/A)	Was pH taken by original TestAmerica lab?

[1] For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

* Following sample with lid partially off - Sample still in container - put lid back on
Sh 2 - 2 - 12
Sh 1 12-14: 1-4
Sh 4 4-7
Sh 1 1-11

* Sample Sh 14A 14A-03 received with lid completely off - cannot get lid back on or too full - sample mostly still in container per attached e-mail proceed with all samples 12-10-09

Corrective Action:

☑ Client Contact Name: Jeanne Haslett Informed by: K. CHA / 12-09-09

☐ Sample(s) processed "as is"

☐ Sample(s) on hold until: If released, notify: _____

Project Management Review: Jaymah Pahl Date: 12-13-09

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 10/21/08 \\Slsvr01\QA\FORMS\ST-LOUIS\ADMIN\Admin004 rev11.doc