

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : MJW Technical Services
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.1.2
 Sample ID: 392045021
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 25.4%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	-0.182	+/-0.295	0.529	0.248	+/-0.307		pCi/g		MXR1	03/07/16	1037	1547792	1
Antimony-125	U	-0.0674	+/-0.132	0.229	0.107	+/-0.135		pCi/g						
Bismuth-212	UI	0.00	+/-0.869	1.45	0.672	+/-1.07		pCi/g						
Bismuth-214		0.932	+/-0.173	0.134	0.0607	+/-0.190		pCi/g						
Cesium-137		2.88	+/-0.195	0.0842	0.0384	+/-0.306	0.100	pCi/g						
Cobalt-60	U	0.00427	+/-0.0405	0.0823	0.0352	+/-0.0405		pCi/g						
Europium-154	U	0.0959	+/-0.151	0.313	0.141	+/-0.158		pCi/g						
Lead-212		1.26	+/-0.139	0.133	0.063	+/-0.178		pCi/g						
Lead-214		1.14	+/-0.215	0.170	0.0797	+/-0.236		pCi/g						
Potassium-40		16.4	+/-1.72	0.691	0.286	+/-2.24		pCi/g						
Protactinium-231	UI	0.00	+/-0.823	1.12	0.528	+/-0.865		pCi/g						
Radium-226		0.932	+/-0.173	0.134	0.0607	+/-0.190		pCi/g						
Radium-228		1.22	+/-0.330	0.312	0.140	+/-0.378		pCi/g						
Thallium-208		0.357	+/-0.0975	0.0791	0.0362	+/-0.102		pCi/g						
Tin-126	UI	0.00	+/-0.156	0.181	0.0868	+/-0.158		pCi/g						

Rad Gas Flow Proportional Counting

GFPC, Gross A-B, solid "Dry Weight Corrected"

Alpha	12.3	+/-3.92	3.84	1.57	+/-4.65	4.00	pCi/g	JXB7	03/03/16	1557	1547853	2
Beta	23.8	+/-3.56	3.78	1.76	+/-4.88	10.0	pCi/g					

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1513	1547785

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4 5.2 3/Ga-01-R
2	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery Test

Batch ID Recovery% Acceptable Limits

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Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.1.2
Sample ID: 392045021

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Report Date: January 15, 2016

Client Sample ID: 4.1D.R.2.1
 Sample ID: 387763001
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 30.9%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		30.9						percent		LYT1	12/18/15	0843	1532296	1
Rad Gamma Spec Analysis														
<i>Gammasp. Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0461	+/-0.313	0.554	0.258	+/-0.313		pCi/g		RXF2	01/12/16	0739	1532303	2
Antimony-125	U	-0.0221	+/-0.104	0.193	0.0872	+/-0.105		pCi/g						
Bismuth-212	UI	0.00	+/-0.865	1.49	0.683	+/-0.934		pCi/g						
Bismuth-214		0.694	+/-0.189	0.161	0.0729	+/-0.197		pCi/g						
Cesium-137		1.40	+/-0.141	0.0856	0.0385	+/-0.183	0.100	pCi/g						
Cobalt-60	U	-0.0111	+/-0.0373	0.0725	0.0294	+/-0.0377		pCi/g						
Europium-154	U	0.0526	+/-0.144	0.272	0.117	+/-0.146		pCi/g						
Lead-212		1.14	+/-0.166	0.143	0.0672	+/-0.193		pCi/g						
Lead-214		1.10	+/-0.202	0.384	0.186	+/-0.222		pCi/g						
Potassium-40		16.0	+/-1.74	0.942	0.403	+/-2.21		pCi/g						
Protactinium-231	UI	0.00	+/-0.864	1.05	0.487	+/-0.897		pCi/g						
Radium-226		0.694	+/-0.189	0.161	0.0729	+/-0.197		pCi/g						
Radium-228		1.20	+/-0.307	0.221	0.0918	+/-0.355		pCi/g						
Thallium-208		0.302	+/-0.0988	0.0777	0.0349	+/-0.102		pCi/g						
Tin-126	UI	0.00	+/-0.133	0.155	0.073	+/-0.135		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		13.2	+/-3.26	3.06	1.28	+/-4.14	4.00	pCi/g		JXB7	01/11/16	1021	1534686	3
Beta		21.4	+/-3.04	3.52	1.66	+/-4.27	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300, 4.5 2 3/Ga-01-R
3	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.2.1
Sample ID: 387763001

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.2.2
 Sample ID: 387763002
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 22.3%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		22.3						percent		LYT1	12/18/15	0843	1532296	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238		0.0447	+/-0.071	0.0982	0.0225	+/-0.0713	1.00	pCi/g		HAKB	01/07/16	1208	1532467	2
Plutonium-239/240	U	0.00992	+/-0.0641	0.131	0.039	+/-0.0641	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.00502	+/-0.0571	0.121	0.0372	+/-0.0572	1.00	pCi/g		HAKB	01/07/16	1205	1532463	3
Uranium-233/234		0.857	+/-0.271	0.130	0.0331	+/-0.313	1.00	pCi/g						
Uranium-235/236		0.0853	+/-0.094	0.064	0.00	+/-0.0953	1.00	pCi/g						
Uranium-238		0.931	+/-0.280	0.102	0.0191	+/-0.327	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	0.0642	+/-0.219	0.407	0.111	+/-0.219	1.00	pCi/g		HAKB	01/07/16	1409	1532466	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.31	+/-0.752	0.794	0.267	+/-0.790	1.00	pCi/g		HAKB	01/07/16	1207	1532462	5
Thorium-229		0.362	+/-0.413	0.516	0.131	+/-0.418	1.00	pCi/g						
Thorium-230		0.742	+/-0.557	0.591	0.169	+/-0.572	1.00	pCi/g						
Thorium-232		1.07	+/-0.619	0.403	0.0754	+/-0.648	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	0.00653	+/-0.0363	0.0696	0.0159	+/-0.0363	1.00	pCi/g		HAKB	01/08/16	0856	1532464	6
Curium-242		0.00	+/-0.0283	0.0421	0.00	+/-0.0283	1.00	pCi/g						
Curium-243/244	U	-0.00298	+/-0.0257	0.0595	0.0111	+/-0.0257	1.00	pCi/g						
Curium-245/246	X	0.0863	+/-0.0749	0.0431	0.00	+/-0.0756	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.72	+/-5.90	10.3	5.04	+/-5.90	15.0	pCi/g		HAKB	01/13/16	1845	1532468	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	0.00737	+/-0.337	0.677	0.280	+/-0.337	1.00	pCi/g		MJH1	01/12/16	0725	1533088	8
<i>Gammaspec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0289	+/-0.376	0.692	0.326	+/-0.376		pCi/g		RXF2	01/12/16	0913	1532303	9
Antimony-125	U	0.0598	+/-0.158	0.305	0.143	+/-0.160		pCi/g						
Bismuth-212	U	0.630	+/-0.993	1.49	0.684	+/-1.04		pCi/g						
Bismuth-214		1.08	+/-0.223	0.158	0.0712	+/-0.243		pCi/g						
Cesium-137		2.73	+/-0.200	0.0907	0.0411	+/-0.317	0.100	pCi/g						
Cobalt-60	U	0.0192	+/-0.0833	0.109	0.0478	+/-0.0837		pCi/g						
Europium-154	U	-0.157	+/-0.157	0.246	0.105	+/-0.173		pCi/g						
Lead-212		1.23	+/-0.162	0.151	0.0716	+/-0.197		pCi/g						
Lead-214		1.19	+/-0.275	0.187	0.0869	+/-0.294		pCi/g						

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 Project: Soil Radioisotopes
 Client Sample ID: 4.1D.R.2.2
 Sample ID: 387763002

Report Date: January 15, 2016

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>GammaSpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		15.7	+/-1.78	0.695	0.280	+/-2.23		pCi/g						
Protactinium-231	U	0.00	+/-0.738	1.35	0.638	+/-0.879		pCi/g						
Radium-226		1.08	+/-0.223	0.158	0.0712	+/-0.243		pCi/g						
Radium-228		1.10	+/-0.317	0.323	0.143	+/-0.359		pCi/g						
Thallium-208		0.354	+/-0.107	0.0849	0.0385	+/-0.112		pCi/g						
Tm-126	U	0.0325	+/-0.166	0.149	0.0702	+/-0.168		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A, B, solid "Dry Weight Corrected"</i>														
Alpha		11.4	+/-3.89	3.88	1.54	+/-4.50	4.00	pCi/g		JXB7	01/11/16	1015	1534686	10
Beta		27.0	+/-3.40	2.75	1.25	+/-5.24	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.479	+/-0.659	1.39	0.613	+/-0.659	2.00	pCi/g		KSD1	01/07/16	1704	1534449	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist. Solid "Dry Weight Corrected"</i>														
Tritium	U	1.74	+/-2.45	4.14	1.99	+/-2.45	6.00	pCi/g		TXJ1	01/06/16	1532	1533793	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.597	+/-0.792	1.39	0.678	+/-0.792	2.00	pCi/g		TXJ1	01/13/16	1551	1533786	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	1.90	+/-2.51	4.25	2.03	+/-2.52	5.00	pCi/g		MYM	01/12/16	0936	1534428	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1476-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300, I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Contact: Ms. Laurie Losey
Project: Soil Radioisotopes
Client Sample ID: 4.1D.R.2.2
Sample ID: 387763002

Report Date: January 15, 2016

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EML HASL-300, Te-02-RC Modified													
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"							1532467	83.3	(15%-125%)				
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"							1532463	68.3	(15%-125%)				
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"							1532463	93.2	(15%-125%)				
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"							1532466	78.9	(15%-125%)				
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"							1532462	71.2	(15%-125%)				
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"							1532464	87.5	(15%-125%)				
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"							1532468	83.3	(15%-125%)				
Strontium Carrier	GFPc, Sr90, solid "Dry Weight Corrected"							1534449	69.6	(25%-125%)				
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"							1534428	93.4	(15%-125%)				

Notes:

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

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Report Date: January 20, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.2.3
 Sample ID: 388092018
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 23-DEC-15
 Collector: Client
 Moisture: 22.1%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gammaspac, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.294	+/-0.310	0.455	0.216	+/-0.340		pCi/g		MJH	01/18/16	0723	1534020	1
Antimony-125	U	0.0819	+/-0.0993	0.183	0.0863	+/-0.106		pCi/g						
Bismuth-212	UI	0.00	+/-0.567	1.18	0.557	+/-0.769		pCi/g						
Bismuth-214		0.772	+/-0.143	0.142	0.0672	+/-0.158		pCi/g						
Cesium-137		1.17	+/-0.126	0.0641	0.0298	+/-0.162	0.100	pCi/g						
Cobalt-60	U	0.0156	+/-0.0378	0.0749	0.034	+/-0.0385		pCi/g						
Europium-154	U	-0.0119	+/-0.115	0.210	0.0953	+/-0.116		pCi/g						
Lead-212		1.17	+/-0.130	0.108	0.0517	+/-0.159		pCi/g						
Lead-214		0.885	+/-0.189	0.137	0.0649	+/-0.201		pCi/g						
Potassium-40		11.0	+/-1.57	0.572	0.252	+/-1.83		pCi/g						
Protactinium-231	UI	0.00	+/-0.568	1.04	0.497	+/-0.804		pCi/g						
Radium-226		0.772	+/-0.143	0.142	0.0672	+/-0.158		pCi/g						
Radium-228		1.35	+/-0.367	0.248	0.114	+/-0.393		pCi/g						
Thallium-208		0.318	+/-0.0854	0.0671	0.0315	+/-0.0896		pCi/g						
Tin-126	U	0.0497	+/-0.110	0.185	0.0897	+/-0.112		pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYTI	12/24/15	0703	1533924

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2 3/Ga-01-R

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Report Date: January 20, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.2.3
Sample ID: 388092018

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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Report Date: January 20, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.2.3
 Sample ID: 388092008
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 23-DEC-15
 Collector: Client
 Moisture: 22.1%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		22.1						percent		LYTI	12/24/15	0703	1533555	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238		0.0549	+/-0.0695	0.0864	0.0198	+/-0.0699	1.00	pCi/g		MXS2	01/12/16	1021	1534070	2
Plutonium-239/240	U	0.0118	+/-0.0444	0.0747	0.014	+/-0.0445	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.00516	+/-0.054	0.113	0.0287	+/-0.0541	1.00	pCi/g		MXS2	01/12/16	1015	1534063	3
Uranium-233/234		0.845	+/-0.218	0.0927	0.0253	+/-0.260	1.00	pCi/g						
Uranium-235/236	U	0.0107	+/-0.0402	0.0677	0.0127	+/-0.0403	1.00	pCi/g						
Uranium-238		0.996	+/-0.234	0.0675	0.0126	+/-0.288	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237		0.140	+/-0.275	0.381	0.0713	+/-0.275	1.00	pCi/g		MXS2	01/12/16	1032	1534069	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		0.664	+/-0.699	0.973	0.313	+/-0.719	1.00	pCi/g		MXS2	01/12/16	1031	1534062	5
Thorium-229		0.287	+/-0.511	0.830	0.247	+/-0.516	1.00	pCi/g						
Thorium-230		1.10	+/-0.771	0.786	0.225	+/-0.816	1.00	pCi/g						
Thorium-232		0.978	+/-0.696	0.535	0.100	+/-0.736	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	0.0166	+/-0.0458	0.0794	0.0202	+/-0.0458	1.00	pCi/g		MXS2	01/14/16	1638	1534067	6
Curium-242	U	-0.00716	+/-0.0316	0.0826	0.0189	+/-0.0317	1.00	pCi/g						
Curium-243/244	U	-0.00617	+/-0.0273	0.0712	0.0163	+/-0.0273	1.00	pCi/g						
Curium-245/246		0.041	+/-0.0591	0.0713	0.0133	+/-0.0594	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-5.9	+/-7.92	14.0	6.81	+/-7.92	15.0	pCi/g		MXS2	01/14/16	1840	1534073	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.162	+/-0.399	0.716	0.288	+/-0.406	1.00	pCi/g		MJHI	01/15/16	1022	1535059	8
<i>Gammasp. Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	UI	0.00	+/-0.198	0.311	0.149	+/-0.214		pCi/g		MJHI	12/29/15	1156	1533562	9
Antimony-125	U	0.0281	+/-0.0628	0.117	0.056	+/-0.0641		pCi/g						
Bismuth-212		0.782	+/-0.684	0.534	0.251	+/-0.689		pCi/g						
Bismuth-214		0.757	+/-0.0992	0.0821	0.039	+/-0.117		pCi/g						
Cesium-137		1.10	+/-0.0724	0.0457	0.0217	+/-0.115	0.100	pCi/g						
Cobalt-60	U	0.015	+/-0.0279	0.0456	0.0211	+/-0.0288		pCi/g						
Europium-154	U	-0.0429	+/-0.0753	0.131	0.0611	+/-0.0778		pCi/g						
Lead-212		0.925	+/-0.098	0.0801	0.0388	+/-0.123		pCi/g						
Lead-214		0.976	+/-0.100	0.188	0.0923	+/-0.128		pCi/g						

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Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 4.1.D.R.2.3
 Sample ID: 388092008

Report Date: January 20, 2016

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gammaspac, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		15.1	+/-0.906	0.359	0.163	+/-1.59		pCi/g						
Protactinium-231	U	0.00	+/-0.398	0.684	0.331	+/-0.526		pCi/g						
Radium-226		0.757	+/-0.0992	0.0821	0.039	+/-0.117		pCi/g						
Radium-228		0.904	+/-0.171	0.145	0.0677	+/-0.224		pCi/g						
Thallium-208		0.283	+/-0.0414	0.0394	0.0187	+/-0.0476		pCi/g						
Tin-126	U	0.00	+/-0.0941	0.110	0.0533	+/-0.0954		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		14.5	+/-2.34	2.41	1.11	+/-3.64	4.00	pCi/g		JXB7	01/11/16	1900	1534760	10
Beta		21.8	+/-1.69	1.77	0.856	+/-3.61	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	0.213	+/-0.897	1.70	0.718	+/-0.897	2.00	pCi/g		KSD1	01/06/16	1656	1534788	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	0.125	+/-2.43	4.21	2.03	+/-2.43	6.00	pCi/g		TXJ1	01/10/16	2238	1534918	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.648	+/-0.797	1.38	0.678	+/-0.797	2.00	pCi/g		TXJ1	01/16/16	1406	1534935	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	0.290	+/-1.90	3.29	1.58	+/-1.90	5.00	pCi/g		MYM	01/19/16	0659	1534638	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/24/15	0703	1533555

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1476-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300, I-01 Modified
9	DOE HASL 300, 4 5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Project: Soil Radioisotopes
Client Sample ID: 4.1.D.R.2.3
Sample ID: 388092008

Report Date: January 20, 2016

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EML HASL-300, Tc-02-RC Modified													
Surrogate/Tracer Recovery	Test							Batch ID	Recovery%	Acceptable Limits				
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"							1534070	67	(15%-125%)				
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"							1534063	81.2	(15%-125%)				
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"							1534063	78.2	(15%-125%)				
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"							1534069	79.5	(15%-125%)				
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"							1534062	61.5	(15%-125%)				
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"							1534067	78.2	(15%-125%)				
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"							1534073	67	(15%-125%)				
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"							1534788	64.2	(25%-125%)				
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"							1534638	96	(15%-125%)				

Notes:

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

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Company : MJW Corporation
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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.2.5
 Sample ID: 387763003
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 22.5%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		22.5						percent		LYT1	12/18/15	0843	1532296	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.0144	+/-0.0434	0.122	0.031	+/-0.0435	1.00	pCi/g		HAKB	01/07/16	1208	1532467	2
Plutonium-239/240	U	0.0104	+/-0.0576	0.110	0.0253	+/-0.0577	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.0212	+/-0.0584	0.101	0.0258	+/-0.0585	1.00	pCi/g		HAKB	01/07/16	1205	1532463	3
Uranium-233/234		0.772	+/-0.262	0.134	0.034	+/-0.298	1.00	pCi/g						
Uranium-235/236		0.143	+/-0.123	0.122	0.0279	+/-0.126	1.00	pCi/g						
Uranium-238		1.07	+/-0.304	0.105	0.0196	+/-0.362	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	0.0418	+/-0.157	0.264	0.0493	+/-0.157	1.00	pCi/g		HAKB	01/07/16	1409	1532466	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.13	+/-0.734	0.581	0.129	+/-0.767	1.00	pCi/g		HAKB	01/07/16	1207	1532462	5
Thorium-229	U	0.118	+/-0.494	0.968	0.327	+/-0.494	1.00	pCi/g						
Thorium-230		1.12	+/-0.849	1.11	0.399	+/-0.876	1.00	pCi/g						
Thorium-232		0.656	+/-0.588	0.638	0.162	+/-0.601	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241		0.0255	+/-0.045	0.0682	0.0174	+/-0.0451	1.00	pCi/g		HAKB	01/08/16	0856	1532464	6
Curium-242		0.00	+/-0.0251	0.0374	0.00	+/-0.0252	1.00	pCi/g						
Curium-243/244	U	0.00574	+/-0.0319	0.0611	0.014	+/-0.0319	1.00	pCi/g						
Curium-245/246	X	0.0383	+/-0.0505	0.0383	0.00	+/-0.0507	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	2.37	+/-7.02	12.0	5.83	+/-7.04	15.0	pCi/g		HAKB	01/13/16	1932	1532468	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	0.210	+/-0.313	1.07	0.372	+/-0.328	1.00	pCi/g		MJH1	01/12/16	0733	1533088	8
<i>Gammaspect, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.178	+/-0.381	0.691	0.328	+/-0.390		pCi/g		RXF2	01/12/16	0914	1532303	9
Antimony-125	U	-0.0299	+/-0.157	0.285	0.134	+/-0.158		pCi/g						
Bismuth-212	UI	0.00	+/-1.27	1.61	0.746	+/-1.45		pCi/g						
Bismuth-214		0.965	+/-0.195	0.166	0.0759	+/-0.211		pCi/g						
Cesium-137		3.02	+/-0.211	0.0942	0.043	+/-0.325	0.100	pCi/g						
Cobalt-60	U	-0.00804	+/-0.0446	0.085	0.0362	+/-0.0447		pCi/g						
Europium-154	U	-0.0563	+/-0.162	0.295	0.130	+/-0.164		pCi/g						
Lead-212		1.22	+/-0.159	0.142	0.0671	+/-0.186		pCi/g						
Lead-214		0.999	+/-0.222	0.382	0.185	+/-0.235		pCi/g						

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Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 4.1D.R.2.5
 Sample ID: 387763003

Report Date: January 15, 2016

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		15.6	+/-1.73	0.742	0.309	+/-2.21		pCi/g						
Protactinium-231	U	-0.283	+/-1.08	1.32	0.625	+/-1.09		pCi/g						
Radium-226		0.965	+/-0.195	0.166	0.0759	+/-0.211		pCi/g						
Radium-228		1.04	+/-0.328	0.309	0.137	+/-0.354		pCi/g						
Thallium-208		0.301	+/-0.108	0.0992	0.0458	+/-0.111		pCi/g						
Tin-126	U	0.0232	+/-0.198	0.270	0.130	+/-0.198		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		12.0	+/-3.32	3.67	1.60	+/-4.04	4.00	pCi/g		JXB7	01/11/16	1021	1534686	10
Beta		26.4	+/-3.10	3.39	1.61	+/-4.79	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.373	+/-0.567	1.19	0.525	+/-0.567	2.00	pCi/g		KSD1	01/07/16	1704	1534449	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium		2.23	+/-2.57	4.31	2.07	+/-2.57	6.00	pCi/g		TXJ1	01/06/16	1644	1533793	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.891	+/-0.807	1.43	0.697	+/-0.807	2.00	pCi/g		TXJ1	01/13/16	1652	1533786	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	-0.524	+/-1.80	3.20	1.53	+/-1.80	5.00	pCi/g		MYM	01/12/16	0952	1534428	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1476-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300, I-01 Modified
9	DOE HASL 300, 4 5 2 3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.2.5
Sample ID: 387763003

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EMI HASL-300, Tc-02-RC Modified													

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1532467	71.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	65.6	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	87.2	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1532466	80.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1532462	68.4	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1532464	93	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1532468	71.4	(15%-125%)
Strontium Carrier	GFPc, Sr90, solid "Dry Weight Corrected"	1534449	73.9	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1534428	94	(15%-125%)

Notes:

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

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Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.3.1
 Sample ID: 387763004
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 24.1%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		24.1						percent		LYT1	12/18/15	0843	1532296	1
Rad Gamma Spec Analysis														
<i>Gammaspcc, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.00	+/-0.313	0.645	0.303	+/-0.354		pCi/g		RXF2	01/12/16	1057	1532303	2
Antimony-125	U	0.0251	+/-0.113	0.218	0.0998	+/-0.114		pCi/g						
Bismuth-212	U	0.00	+/-1.26	1.60	0.739	+/-1.47		pCi/g						
Bismuth-214		0.644	+/-0.220	0.155	0.0699	+/-0.226		pCi/g						
Cesium-137		0.203	+/-0.107	0.0724	0.0319	+/-0.108	0.100	pCi/g						
Cobalt-60	U	-0.0646	+/-0.0418	0.0546	0.0205	+/-0.0512		pCi/g						
Europium-154	U	-0.0422	+/-0.125	0.238	0.101	+/-0.127		pCi/g						
Lead-212		1.01	+/-0.139	0.124	0.0583	+/-0.164		pCi/g						
Lead-214		1.09	+/-0.214	0.131	0.059	+/-0.233		pCi/g						
Potassium-40		13.7	+/-1.64	0.899	0.382	+/-2.01		pCi/g						
Protactinium-231	U	0.00	+/-0.533	0.991	0.458	+/-0.550		pCi/g						
Radium-226		0.644	+/-0.220	0.155	0.0699	+/-0.226		pCi/g						
Radium-228		1.19	+/-0.291	0.346	0.155	+/-0.330		pCi/g						
Thallium-208		0.305	+/-0.0886	0.0802	0.0362	+/-0.0922		pCi/g						
Tin-126	U	0.0546	+/-0.129	0.196	0.0933	+/-0.130		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		17.1	+/-3.89	3.44	1.44	+/-5.11	4.00	pCi/g		JXB7	01/11/16	1026	1534686	3
Beta		25.4	+/-3.02	3.23	1.53	+/-4.64	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300, 4 S 2 3/Ga-01-R
3	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.3.1
Sample ID: 387763004

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.4.1
 Sample ID: 387763005
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 25.4%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		25.4						percent		LYT1	12/18/15	0843	1532296	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.00934	+/-0.0282	0.0792	0.0202	+/-0.0283	1.00	pCi/g		HAKB	01/07/16	1349	1532467	2
Plutonium-239/240	U	0.00674	+/-0.0375	0.0718	0.0165	+/-0.0375	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.000682	+/-0.0505	0.112	0.0306	+/-0.0506	1.00	pCi/g		HAKB	01/07/16	1205	1532463	3
Uranium-233/234		0.861	+/-0.259	0.135	0.0386	+/-0.302	1.00	pCi/g						
Uranium-235/236		0.0964	+/-0.093	0.0579	0.00	+/-0.0946	1.00	pCi/g						
Uranium-238		0.952	+/-0.270	0.106	0.0244	+/-0.319	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	0.00209	+/-0.155	0.345	0.0938	+/-0.155	1.00	pCi/g		HAKB	01/07/16	1409	1532466	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.80	+/-0.715	0.420	0.107	+/-0.777	1.00	pCi/g		HAKB	01/07/16	1207	1532462	5
Thorium-229	U	0.0349	+/-0.194	0.371	0.0851	+/-0.194	1.00	pCi/g						
Thorium-230		0.372	+/-0.380	0.495	0.147	+/-0.385	1.00	pCi/g						
Thorium-232		1.27	+/-0.586	0.200	0.00	+/-0.622	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241		0.0235	+/-0.054	0.0856	0.0196	+/-0.054	1.00	pCi/g		HAKB	01/08/16	0856	1532464	6
Curium-242	U	-0.00416	+/-0.0359	0.0831	0.0156	+/-0.0359	1.00	pCi/g						
Curium-243/244		0.00	+/-0.0308	0.0458	0.00	+/-0.0309	1.00	pCi/g						
Curium-245/246	X	0.0531	+/-0.0698	0.0531	0.00	+/-0.0702	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	0.517	+/-6.22	10.7	5.21	+/-6.22	15.0	pCi/g		HAKB	01/13/16	2019	1532468	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.242	+/-0.556	1.01	0.407	+/-0.567	1.00	pCi/g		MJH1	01/12/16	0747	1533088	8
<i>Gamma spec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0658	+/-0.247	0.479	0.224	+/-0.249		pCi/g		RXF2	01/12/16	1058	1532303	9
Antimony-125	U	-0.00243	+/-0.103	0.190	0.0877	+/-0.103		pCi/g						
Bismuth-212	U1	0.00	+/-1.02	1.46	0.682	+/-1.23		pCi/g						
Bismuth-214		0.886	+/-0.167	0.139	0.0632	+/-0.182		pCi/g						
Cesium-137		0.443	+/-0.109	0.0785	0.0356	+/-0.114	0.100	pCi/g						
Cobalt-60	U	0.0203	+/-0.0401	0.085	0.037	+/-0.0411		pCi/g						
Europium-154	U	-0.0033	+/-0.136	0.260	0.115	+/-0.136		pCi/g						
Lead-212		1.07	+/-0.121	0.102	0.0478	+/-0.189		pCi/g						
Lead-214		1.02	+/-0.187	0.322	0.156	+/-0.211		pCi/g						

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Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 4.1D.R.4.1
 Sample ID: 387763005

Report Date: January 15, 2016

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		13.9	+/-1.54	0.729	0.309	+/-1.97		pCi/g						
Protactinium-231	U	0.00	+/-0.706	0.787	0.363	+/-0.727		pCi/g						
Radium-226		0.886	+/-0.167	0.139	0.0632	+/-0.182		pCi/g						
Radium-228		1.16	+/-0.250	0.216	0.0927	+/-0.308		pCi/g						
Thallium-208		0.305	+/-0.105	0.0731	0.0333	+/-0.108		pCi/g						
Tin-126	U	0.00	+/-0.106	0.0924	0.0439	+/-0.108		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		8.86	+/-3.51	3.90	1.56	+/-3.91	4.00	pCi/g		JXB7	01/11/16	1015	1534686	10
Beta		19.4	+/-3.31	3.37	1.54	+/-4.37	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.129	+/-0.871	1.74	0.750	+/-0.871	2.00	pCi/g		KSD1	01/06/16	1541	1534449	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	0.935	+/-2.57	4.42	2.13	+/-2.57	6.00	pCi/g		TXJ1	01/06/16	1757	1533793	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.436	+/-0.837	1.46	0.712	+/-0.837	2.00	pCi/g		TXJ1	01/13/16	1754	1533786	13
<i>Liquid Scint Te99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	-0.176	+/-1.88	3.31	1.58	+/-1.88	5.00	pCi/g		MYM	01/12/16	1008	1534428	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1476-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300, I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.4.1
Sample ID: 387763005

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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14 DOE EML HASL-300, Te-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1532467	79.6	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	75	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	85.3	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1532466	86.2	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1532462	84.2	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1532464	77.7	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1532468	79.6	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1534449	78.2	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1534428	93.4	(15%-125%)

Notes:

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

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Certificate of Analysis

Company : MJW Technical Services
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.4.2
 Sample ID: 392045022
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 24.1%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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Rad Gamma Spec Analysis

Gamma with Ingrowth "Dry Weight Corrected"

Actinium-227	U	-0.228	+/-0.330	0.591	0.275	+/-0.347		pCi/g		MXR1	03/07/16	1040	1547792	1
Antimony-125	U	0.044	+/-0.131	0.250	0.115	+/-0.132		pCi/g						
Bismuth-212	UI	0.00	+/-1.78	1.56	0.718	+/-1.89		pCi/g						
Bismuth-214		0.931	+/-0.234	0.172	0.0782	+/-0.248		pCi/g						
Cesium-137		0.972	+/-0.139	0.104	0.0476	+/-0.164	0.100	pCi/g						
Cobalt-60	U	-0.00578	+/-0.050	0.0976	0.0416	+/-0.0501		pCi/g						
Europium-154	U	0.0381	+/-0.180	0.357	0.159	+/-0.181		pCi/g						
Lead-212		1.35	+/-0.157	0.132	0.0619	+/-0.198		pCi/g						
Lead-214		1.20	+/-0.208	0.408	0.198	+/-0.233		pCi/g						
Potassium-40		15.1	+/-1.71	0.457	0.158	+/-2.14		pCi/g						
Protactinium-231	UI	0.00	+/-1.13	1.17	0.544	+/-1.14		pCi/g						
Radium-226		0.931	+/-0.234	0.172	0.0782	+/-0.248		pCi/g						
Radium-228		0.816	+/-0.324	0.310	0.136	+/-0.344		pCi/g						
Thallium-208		0.373	+/-0.107	0.0908	0.0414	+/-0.112		pCi/g						
Tin-126	UI	0.00	+/-0.166	0.216	0.103	+/-0.167		pCi/g						

Rad Gas Flow Proportional Counting

GFPC, Gross A/B, solid "Dry Weight Corrected"

Alpha		16.6	+/-4.48	3.80	1.51	+/-5.54	4.00	pCi/g		JXB7	03/03/16	1602	1547853	2
Beta		23.1	+/-3.84	4.13	1.91	+/-5.15	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1513	1547785

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R
2	EPA 900.0/SW846.9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Report Date: March 8, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.I.D.R.4.2
Sample ID: 392045022

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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Certificate of Analysis

Company : MJW Corporation
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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.4.5
 Sample ID: 387763006
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 26%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		26.0						percent		LYT1	12/18/15	0843	1532296	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.00635	+/-0.0281	0.0733	0.0168	+/-0.0281	1.00	pCi/g		HAKB	01/07/16	1349	1532467	2
Plutonium-239/240		0.0598	+/-0.0644	0.0733	0.0168	+/-0.0649	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	-0.0429	+/-0.0603	0.176	0.061	+/-0.0604	1.00	pCi/g		HAKB	01/07/16	1205	1532463	3
Uranium-233/234		0.831	+/-0.268	0.140	0.0382	+/-0.309	1.00	pCi/g						
Uranium-235/236	U	0.000854	+/-0.0633	0.141	0.0383	+/-0.0634	1.00	pCi/g						
Uranium-238		0.825	+/-0.264	0.102	0.0191	+/-0.305	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.0658	+/-0.125	0.385	0.110	+/-0.125	1.00	pCi/g		HAKB	01/07/16	1409	1532466	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		0.448	+/-0.391	0.397	0.0934	+/-0.398	1.00	pCi/g		HAKB	01/07/16	1207	1532462	5
Thorium-229	U	0.0519	+/-0.195	0.327	0.0613	+/-0.195	1.00	pCi/g						
Thorium-230		0.665	+/-0.445	0.327	0.0612	+/-0.457	1.00	pCi/g						
Thorium-232		1.15	+/-0.566	0.204	0.00	+/-0.593	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241		0.0597	+/-0.0608	0.0601	0.0113	+/-0.0612	1.00	pCi/g		HAKB	01/08/16	0856	1532464	6
Curium-242		0.0141	+/-0.0395	0.0422	0.00	+/-0.0396	1.00	pCi/g						
Curium-243/244		0.0377	+/-0.0559	0.0817	0.0222	+/-0.0561	1.00	pCi/g						
Curium-245/246		0.0287	+/-0.0492	0.043	0.00	+/-0.0493	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-2.31	+/-5.51	9.61	4.68	+/-5.51	15.0	pCi/g		HAKB	01/13/16	2106	1532468	7
Rad Gamma Spec Analysis														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.308	+/-0.354	0.557	0.219	+/-0.382	1.00	pCi/g		MJ111	01/12/16	0805	1533088	8
<i>Gammaspac, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.132	+/-0.262	0.477	0.222	+/-0.269		pCi/g		RXF2	01/12/16	1058	1532303	9
Antimony-125	U	0.0327	+/-0.109	0.206	0.0952	+/-0.110		pCi/g						
Bismuth-212		1.02	+/-0.672	0.899	0.401	+/-0.680		pCi/g						
Bismuth-214		0.838	+/-0.152	0.136	0.0616	+/-0.166		pCi/g						
Cesium-137		0.412	+/-0.0846	0.0799	0.0364	+/-0.0907	0.100	pCi/g						
Cobalt-60	U	0.0153	+/-0.0366	0.0783	0.0336	+/-0.0373		pCi/g						
Europtium-154	U	-0.0347	+/-0.117	0.219	0.0946	+/-0.118		pCi/g						
Lead-212		1.10	+/-0.132	0.118	0.0556	+/-0.161		pCi/g						
Lead-214		0.993	+/-0.179	0.318	0.154	+/-0.197		pCi/g						

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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 4.1D.R.4.5
 Sample ID: 387763006

Report Date: January 15, 2016

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>GammaSpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		14.7	+/-1.56	0.609	0.249	+/-2.01		pCi/g						
Protactinium-231	U	0.00	+/-0.638	0.842	0.389	+/-0.655		pCi/g						
Radium-226		0.838	+/-0.152	0.136	0.0616	+/-0.166		pCi/g						
Radium-228		0.926	+/-0.278	0.280	0.125	+/-0.309		pCi/g						
Thallium-208		0.241	+/-0.0807	0.0756	0.0346	+/-0.083		pCi/g						
Tin-126	UI	0.00	+/-0.124	0.129	0.0612	+/-0.125		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A.B, solid "Dry Weight Corrected"</i>														
Alpha		16.4	+/-3.81	3.96	1.74	+/-4.92	4.00	pCi/g		JXB7	01/11/16	1021	1534686	10
Beta		24.3	+/-2.73	2.69	1.26	+/-4.28	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.00273	+/-0.568	1.13	0.477	+/-0.568	2.00	pCi/g		KSD1	01/07/16	1704	1534449	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	1.24	+/-2.63	4.50	2.16	+/-2.63	6.00	pCi/g		TXJ1	01/06/16	1909	1533793	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.324	+/-0.868	1.51	0.736	+/-0.868	2.00	pCi/g		TXJ1	01/13/16	1855	1533786	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	0.499	+/-1.57	2.72	1.30	+/-1.58	5.00	pCi/g		MYM	01/11/16	0232	1534429	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE EML HASL-300, Pu-11-RC Modified
3	DOE EML HASL-300, U-02-RC Modified
4	ASTM C 1476-00 Modified
5	DOE EML HASL-300, Th-01-RC Modified
6	DOE EML HASL-300, Am-05-RC Modified
7	DOE EML HASL-300, Pu-11-RC Modified
8	DOE EML HASL-300, I-01 Modified
9	DOE HASL 300, 4.5.2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.4.5
Sample ID: 387763006

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EML HASL-300, Tc-02-RC Modified													

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1532467	89.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	74.8	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1532463	83.8	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1532466	88.6	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1532462	104	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1532464	87.5	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1532468	89.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1534449	77.1	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1534429	91.3	(15%-125%)

Notes:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.5.1
 Sample ID: 387763007
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 21.1%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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Gravimetric Solids

ASTM D 2216 % Moisture "As Received"

Moisture		21.1						percent		LYT1	12/18/15	0843	1532296	1
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Rad Gamma Spec Analysis

Gammascpec, Gamma, Solid "Dry Weight Corrected"

Actinium-227	U	0.0954	+/-0.281	0.546	0.257	+/-0.285		pCi/g		RXF2	01/12/16	1059	1532303	2
Antimony-125	U	-0.00266	+/-0.109	0.201	0.0931	+/-0.109		pCi/g						
Bismuth-212	UI	0.00	+/-0.838	1.34	0.623	+/-1.10		pCi/g						
Bismuth-214		0.806	+/-0.164	0.132	0.0599	+/-0.177		pCi/g						
Cesium-137		0.869	+/-0.101	0.0667	0.0299	+/-0.123	0.100	pCi/g						
Cobalt-60	U	-0.0323	+/-0.0408	0.0696	0.0293	+/-0.0434		pCi/g						
Europium-154	U	0.0972	+/-0.131	0.274	0.122	+/-0.138		pCi/g						
Lead-212		1.02	+/-0.122	0.118	0.0556	+/-0.152		pCi/g						
Lead-214		1.12	+/-0.185	0.330	0.160	+/-0.209		pCi/g						
Potassium-40		15.9	+/-1.58	0.609	0.249	+/-2.11		pCi/g						
Protactinium-231	UI	0.00	+/-0.724	0.937	0.438	+/-0.756		pCi/g						
Radium-226		0.806	+/-0.164	0.132	0.0599	+/-0.177		pCi/g						
Radium-228		0.871	+/-0.368	0.241	0.106	+/-0.391		pCi/g						
Thallium-208		0.325	+/-0.0737	0.0735	0.0336	+/-0.0785		pCi/g						
Tin-126	UI	0.00	+/-0.124	0.139	0.0661	+/-0.126		pCi/g						

Rad Gas Flow Proportional Counting

GFPC, Gross A/B, solid "Dry Weight Corrected"

Alpha		13.6	+/-3.43	3.92	1.75	+/-4.36	4.00	pCi/g		JXB7	01/11/16	1019	1534686	3
Beta		23.2	+/-2.65	2.88	1.37	+/-4.13	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300, 4.5 2 3/Ga-01-R
3	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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GEL LABORATORIES LLC

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Certificate of Analysis

Company : MJW Corporation
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: January 15, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.ID.R.5.1
Sample ID: 387763007

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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

Certificate of Analysis

Company : MJW Technical Services
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.I.D.R.5.2
 Sample ID: 392045023
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 17.2%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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Rad Gamma Spec Analysis

Gamma with Ingrowth "Dry Weight Corrected"

Actinium-227	U	0.0334	+/-0.275	0.528	0.249	+/-0.275		pCi/g		MXR1	03/07/16	1038	1547792	1
Antimony-125	U	-0.0365	+/-0.102	0.183	0.0842	+/-0.104		pCi/g						
Bismuth-212	UI	0.00	+/-0.697	1.36	0.631	+/-1.14		pCi/g						
Bismuth-214		0.958	+/-0.159	0.134	0.0613	+/-0.178		pCi/g						
Cesium-137		0.940	+/-0.120	0.0769	0.035	+/-0.143	0.100	pCi/g						
Cobalt-60	U	0.00511	+/-0.0283	0.061	0.0251	+/-0.0284		pCi/g						
Europium-154	U	-0.0472	+/-0.131	0.239	0.105	+/-0.133		pCi/g						
Lead-212		1.17	+/-0.134	0.105	0.0492	+/-0.166		pCi/g						
Lead-214		1.14	+/-0.177	0.334	0.162	+/-0.201		pCi/g						
Potassium-40		14.3	+/-1.50	0.662	0.278	+/-1.97		pCi/g						
Protactinium-231	UI	0.00	+/-0.877	0.928	0.433	+/-0.890		pCi/g						
Radium-226		0.958	+/-0.159	0.134	0.0613	+/-0.178		pCi/g						
Radium-228		0.976	+/-0.272	0.248	0.109	+/-0.308		pCi/g						
Thallium-208		0.257	+/-0.0742	0.064	0.0289	+/-0.0773		pCi/g						
Tin-126	UI	0.00	+/-0.108	0.158	0.0755	+/-0.110		pCi/g						

Rad Gas Flow Proportional Counting

GFPC, Grass A/B, solid "Dry Weight Corrected"

Alpha		14.2	+/-4.14	3.96	1.61	+/-4.99	4.00	pCi/g		JXB7	03/03/16	1557	1547853	2
Beta		21.0	+/-3.30	3.34	1.54	+/-4.46	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1513	1547785

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2.3/Ga-01-R
2	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: March 8, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1.D.R.5.2
Sample ID: 392045023

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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Certificate of Analysis

Company : MJW Corporation
 Address : 15 Hazelwood Drive
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Report Date: January 15, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.ID.R.6.1
 Sample ID: 387763008
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-15
 Collector: Client
 Moisture: 28%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Gravimetric Solids														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		28.0						percent		LYT1	12/18/15	0843	1532296	1
Rad Gamma Spec Analysis														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.026	+/-0.265	0.507	0.237	+/-0.265		pCi/g		RXF2	01/12/16	1100	1532303	2
Antimony-125	U	0.0459	+/-0.108	0.207	0.0957	+/-0.110		pCi/g						
Bismuth-212		1.42	+/-0.870	1.02	0.461	+/-0.882		pCi/g						
Bismuth-214		0.712	+/-0.159	0.147	0.067	+/-0.170		pCi/g						
Cesium-137		0.884	+/-0.110	0.0777	0.0353	+/-0.132	0.100	pCi/g						
Cobalt-60	U	0.00592	+/-0.0438	0.0868	0.0378	+/-0.0439		pCi/g						
Europium-154	UI	0.00	+/-0.123	0.264	0.117	+/-0.140		pCi/g						
Lead-212		1.03	+/-0.131	0.107	0.0501	+/-0.156		pCi/g						
Lead-214		0.976	+/-0.187	0.161	0.0749	+/-0.204		pCi/g						
Potassium-40		15.8	+/-1.70	0.791	0.340	+/-2.20		pCi/g						
Protactinium-231	UI	0.00	+/-0.673	0.965	0.451	+/-0.697		pCi/g						
Radium-226		0.712	+/-0.159	0.147	0.067	+/-0.170		pCi/g						
Radium-228		0.946	+/-0.268	0.255	0.112	+/-0.303		pCi/g						
Thallium-208		0.256	+/-0.0731	0.0604	0.0269	+/-0.0763		pCi/g						
Tin-126	UI	0.00	+/-0.149	0.143	0.0677	+/-0.150		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		18.2	+/-4.04	3.89	1.68	+/-5.32	4.00	pCi/g		JXB7	01/11/16	1015	1534686	3
Beta		23.7	+/-2.87	2.68	1.25	+/-4.41	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	0843	1532296

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300.4.5.2.3/Ga-01-R
3	EPA 900.0/SW846.9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

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Certificate of Analysis

Company : MJW Corporation
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: January 15, 2016

Contact: Ms. Laurie Loscy
Project: Soil Radioisotopes

Client Sample ID: 4.1D.R.6.1
Sample ID: 387763008

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : MJW Technical Services
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Report Date: March 9, 2016

Client Sample ID: 4.1.D.R.6.2
 Sample ID: 392057001
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 21.5%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RI	Units	DF	Analyst	Date	Time	Batch	Mtd.
Rad Gamma Spec Analysis														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0797	+/-0.348	0.559	0.266	+/-0.351		pCi/g		MXRI	03/07/16	1042	1547922	1
Antimony-125	U	0.0381	+/-0.137	0.251	0.119	+/-0.138		pCi/g						
Bismuth-212	UJ	0.00	+/-0.754	1.17	0.545	+/-0.813		pCi/g						
Bismuth-214		0.877	+/-0.160	0.133	0.0609	+/-0.175		pCi/g						
Cesium-137		4.72	+/-0.218	0.075	0.0344	+/-0.433	0.100	pCi/g						
Cobalt-60	U	-0.00558	+/-0.033	0.0647	0.0276	+/-0.0331		pCi/g						
Europium-154	U	0.0872	+/-0.124	0.257	0.116	+/-0.131		pCi/g						
Lead-212		1.16	+/-0.134	0.129	0.0616	+/-0.172		pCi/g						
Lead-214		1.13	+/-0.194	0.328	0.159	+/-0.215		pCi/g						
Potassium-40		16.9	+/-1.52	0.608	0.258	+/-2.11		pCi/g						
Protactinium-231	U	0.364	+/-0.615	1.14	0.541	+/-0.642		pCi/g						
Radium-226		0.877	+/-0.160	0.133	0.0609	+/-0.175		pCi/g						
Radium-228		0.890	+/-0.336	0.206	0.0898	+/-0.359		pCi/g						
Thallium-208		0.282	+/-0.0966	0.0703	0.0324	+/-0.0994		pCi/g						
Tin-126	UJ	0.00	+/-0.123	0.157	0.0762	+/-0.125		pCi/g						

Rad Gas Flow Proportional Counting

GFPC, Gross A/B, solid "Dry Weight Corrected"

Alpha		19.5	+/-4.38	3.93	1.69	+/-5.95	4.00	pCi/g		BXFI	03/05/16	1448	1549866	2
Beta		34.2	+/-3.64	3.69	1.74	+/-5.91	10.0	pCi/g						

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/26/16	1436	1547873

The following Analytical Methods were performed

Method	Description
1	DOE HASL 300.4 5 2 3/Ga-01-R
2	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

GEL LABORATORIES LLC

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

Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228

Report Date: March 9, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.I.D.R.6.2
Sample ID: 392057001

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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