

Appendix G-
Sub-Area 3.1.16- 3.1.18- COA

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: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.16.R.1
 Sample ID: 385070007
 Matrix: Soil
 Collect Date: 21-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 18.1%

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		18.1						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammascpec. Gamma. Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0964	+/-0.260	0.494	0.230	+/-0.264		pCi/g		RXF2	12/03/15	1303	1522383	2
Antimony-125	U	-0.0282	+/-0.112	0.206	0.0948	+/-0.112		pCi/g						
Bismuth-212	UI	0.00	+/-0.914	1.23	0.564	+/-1.00		pCi/g						
Bismuth-214		0.682	+/-0.167	0.139	0.0628	+/-0.177		pCi/g						
Cesium-137		1.75	+/-0.161	0.0756	0.0339	+/-0.215	0.100	pCi/g						
Cobalt-60	UI	0.00	+/-0.0414	0.0968	0.0423	+/-0.0459		pCi/g						
Europium-154	U	-0.0232	+/-0.114	0.191	0.0791	+/-0.114		pCi/g						
Lead-212		0.930	+/-0.129	0.163	0.0778	+/-0.152		pCi/g						
Lead-214		0.944	+/-0.220	0.149	0.0685	+/-0.234		pCi/g						
Potassium-40		11.7	+/-1.55	0.702	0.291	+/-1.84		pCi/g						
Protactinium-231	U	0.306	+/-0.558	1.12	0.525	+/-0.579		pCi/g						
Radium-226		0.682	+/-0.167	0.139	0.0628	+/-0.177		pCi/g						
Radium-228		0.716	+/-0.295	0.279	0.123	+/-0.309		pCi/g						
Thallium-208		0.278	+/-0.0785	0.0696	0.0313	+/-0.0818		pCi/g						
Tin-126	U	0.0837	+/-0.143	0.193	0.0922	+/-0.144		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC. Gross A/B. solid "Dry Weight Corrected"</i>														
Alpha		14.7	+/-3.55	3.98	1.77	+/-4.64	4.00	pCi/g		KXB2	12/02/15	1116	1525757	3
Beta		21.7	+/-2.59	2.91	1.38	+/-4.02	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	11/10/15	1319	1521842

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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Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 3.1.16.R.1
Sample ID: 385070007

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 3.1.16.R.1
 Sample ID: 385070007
 Matrix: Soil
 Collect Date: 21-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 18.1%

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		18.1						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0964	+/-0.260	0.494	0.230	+/-0.264		pCi/g		RXF2	12/03/15	1303	1522383	2
Antimony-125	U	-0.0282	+/-0.112	0.206	0.0948	+/-0.112		pCi/g						
Bismuth-212	UI	0.00	+/-0.914	1.23	0.564	+/-1.00		pCi/g						
Bismuth-214		0.682	+/-0.167	0.139	0.0628	+/-0.177		pCi/g						
Cesium-137		1.75	+/-0.161	0.0756	0.0339	+/-0.215	0.100	pCi/g						
Cobalt-60	UI	0.00	+/-0.0414	0.0968	0.0423	+/-0.0459		pCi/g						
Europium-154	U	-0.0232	+/-0.114	0.191	0.0791	+/-0.114		pCi/g						
Lead-212		0.930	+/-0.129	0.163	0.0778	+/-0.152		pCi/g						
Lead-214		0.944	+/-0.220	0.149	0.0685	+/-0.234		pCi/g						
Potassium-40		11.7	+/-1.55	0.702	0.291	+/-1.84		pCi/g						
Protactinium-231	U	0.306	+/-0.558	1.12	0.525	+/-0.579		pCi/g						
Radium-226		0.682	+/-0.167	0.139	0.0628	+/-0.177		pCi/g						
Radium-228		0.716	+/-0.295	0.279	0.123	+/-0.309		pCi/g						
Thallium-208		0.278	+/-0.0785	0.0696	0.0313	+/-0.0818		pCi/g						
Tin-126	U	0.0837	+/-0.143	0.193	0.0922	+/-0.144		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		14.7	+/-3.55	3.98	1.77	+/-4.64	4.00	pCi/g		KXB2	12/02/15	1116	1525757	3
Beta		21.7	+/-2.59	2.91	1.38	+/-4.02	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	11/10/15	1319	1521842

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 Q/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

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Certificate of Analysis

Company : MJW Corporation
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Buffalo, New York 14228

Report Date: December 17, 2015

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Project: MJWC00115
Client ID: MJWC001

Client Sample ID: 3.1.16.R.1
Sample ID: 385070007

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).

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: February 10, 2016

Client Sample ID: 3.1.16.R.2
 Sample ID: 389296012
 Matrix: Soil
 Collect Date: 21-OCT-15
 Receive Date: 14-JAN-16
 Collector: Client
 Moisture: 16.6%

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		16.6						percent		CXC1	01/14/16	1208	1537312	1
Rad Gamma Spec Analysis														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	0.186	+/-0.317	0.567	0.266	+/-0.329		pCi/g		RXF2	02/05/16	0843	1537546	2
Antimony-125	UI	0.00	+/-0.128	0.256	0.120	+/-0.139		pCi/g						
Bismuth-212	UI	0.00	+/-0.641	1.11	0.501	+/-0.717		pCi/g						
Bismuth-214		0.635	+/-0.180	0.146	0.0663	+/-0.188		pCi/g						
Cesium-137		2.48	+/-0.176	0.074	0.0331	+/-0.278	0.100	pCi/g						
Cobalt-60	U	-0.0267	+/-0.0439	0.0788	0.0331	+/-0.0456		pCi/g						
Europium-154	U	-0.0256	+/-0.136	0.226	0.096	+/-0.137		pCi/g						
Lead-212		0.704	+/-0.128	0.132	0.0626	+/-0.140		pCi/g						
Lead-214		1.07	+/-0.214	0.340	0.164	+/-0.232		pCi/g						
Potassium-40		12.1	+/-1.57	0.510	0.193	+/-1.88		pCi/g						
Protactinium-231	U	0.349	+/-0.571	1.13	0.530	+/-0.597		pCi/g						
Radium-226		0.635	+/-0.180	0.146	0.0663	+/-0.188		pCi/g						
Radium-228		0.663	+/-0.302	0.242	0.104	+/-0.317		pCi/g						
Thallium-208		0.248	+/-0.0756	0.0777	0.0353	+/-0.0787		pCi/g						
Tin-126	U	0.0248	+/-0.173	0.170	0.0809	+/-0.174		pCi/g						
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0361	+/-0.247	0.449	0.213	+/-0.247		pCi/g		RXF2	01/18/16	1123	1537545	3
Antimony-125	U	-0.081	+/-0.107	0.186	0.0877	+/-0.113		pCi/g						
Bismuth-212	UI	0.00	+/-0.503	0.988	0.463	+/-0.947		pCi/g						
Bismuth-214		0.475	+/-0.125	0.117	0.0546	+/-0.131		pCi/g						
Cesium-137		2.41	+/-0.138	0.063	0.0292	+/-0.239	0.100	pCi/g						
Cobalt-60	U	0.0219	+/-0.0352	0.0715	0.0323	+/-0.0366		pCi/g						
Europium-154	U	-0.0751	+/-0.105	0.181	0.0812	+/-0.110		pCi/g						
Lead-212		0.829	+/-0.108	0.0995	0.0472	+/-0.127		pCi/g						
Lead-214		0.684	+/-0.134	0.122	0.057	+/-0.145		pCi/g						
Potassium-40		12.5	+/-1.26	0.452	0.192	+/-1.66		pCi/g						
Protactinium-231	U	-0.189	+/-0.462	0.816	0.385	+/-0.472		pCi/g						
Radium-226		0.475	+/-0.125	0.117	0.0546	+/-0.131		pCi/g						
Radium-228		0.842	+/-0.214	0.215	0.0977	+/-0.253		pCi/g						
Thallium-208		0.220	+/-0.0636	0.0533	0.0245	+/-0.0662		pCi/g						
Tin-126	UI	0.00	+/-0.145	0.140	0.0667	+/-0.145		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		8.99	+/-3.55	3.91	1.56	+/-3.95	4.00	pCi/g		KXB2	01/26/16	1152	1539462	4
Beta		17.0	+/-2.71	2.56	1.17	+/-3.73	10.0	pCi/g						

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Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228
Contact: Ms. Laurie Losey
Project: Soil Radioisotopes
Client Sample ID: 3.1.16.R.2
Sample ID: 389296012

Report Date: February 10, 2016

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	01/14/16	1208	1537312

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	DOE HASL 300, 4.5.2.3/Ga-01-R
4	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Notes:

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

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: December 4, 2015

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

Client Sample ID: 3.1.16.R.6	Project: MJWC00115
Sample ID: 385070008	Client ID: MJWC001
Matrix: Water	
Collect Date: 21-OCT-15 14:15	
Receive Date: 05-NOV-15	
Collector: Client	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time Batch	Method
Rad Gamma Spec Analysis											
Gammasec, Gamma, Liquid (Standard List) "As Received"											
Actinium-227	U	23.6	+/-29.6	55.3		pCi/L		MJH1	11/17/15	0657 1521915	1
Antimony-125	U	-8.67	+/-11.0	18.0		pCi/L					
Cesium-137	U	0.378	+/-4.01	7.52	10.0	pCi/L					
Cobalt-60	U	0.318	+/-4.94	9.52		pCi/L					
Europium-154	U	1.81	+/-12.7	25.0		pCi/L					
Protactinium-231	U	24.2	+/-51.3	94.5		pCi/L					
Radium-228	U	-22.7	+/-22.3	28.6		pCi/L					
Tin-126	U	-6.8	+/-14.4	16.0		pCi/L					

Rad Gas Flow Proportional Counting

GFPC, Gross A/B, liquid "As Received"

Alpha	U	-0.489	+/-1.76	3.75	5.00	pCi/L		JXB7	12/02/15	1303 1525771	2
Beta	U	-2.58	+/-2.47	4.94	5.00	pCi/L					

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 901.1	
2	EPA 900.0/SW846 9310	

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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

Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.16.R.6
 Sample ID: 385070008
 Matrix: Water
 Collect Date: 21-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client

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

Gammascpec, Gamma, Liquid (Standard List) "As Received"

Actinium-227	U	23.6	+/-29.6	55.3	26.2	+/-31.7		pCi/L		MJH1	11/17/15	0657	1521915	1
Antimony-125	U	-8.67	+/-11.0	18.0	8.36	+/-11.7		pCi/L						
Bismuth-212	U	31.4	+/-54.8	108	49.3	+/-56.7		pCi/L						
Bismuth-214	U	-12.8	+/-10.9	16.5	7.68	+/-12.4		pCi/L						
Cesium-137	U	0.378	+/-4.01	7.52	3.44	+/-4.01	10.0	pCi/L						
Cobalt-60	U	0.318	+/-4.94	9.52	4.26	+/-4.94		pCi/L						
Europium-154	U	1.81	+/-12.7	25.0	11.1	+/-12.7		pCi/L						
Lead-212	UI	0.00	+/-10.9	12.5	5.95	+/-11.0		pCi/L						
Lead-214	U	-1.37	+/-11.5	16.9	7.96	+/-11.5		pCi/L						
Potassium-40	U	-27.9	+/-56.9	101	45.7	+/-58.3		pCi/L						
Protactinium-231	U	24.2	+/-51.3	94.5	44.5	+/-52.7		pCi/L						
Radium-228	U	-22.7	+/-22.3	28.6	12.9	+/-24.7		pCi/L						
Thallium-208	UI	0.00	+/-5.92	6.62	3.02	+/-6.01		pCi/L						
Tin-126	U	-6.8	+/-14.4	16.0	7.66	+/-14.8		pCi/L						

Rad Gas Flow Proportional Counting

GFPC, Gross A/B, Liquid "As Received"

Alpha	U	-0.489	+/-1.76	3.75	1.56	+/-1.76	5.00	pCi/L		JXB7	12/02/15	1303	1525771	2
Beta	U	-2.58	+/-2.47	4.94	2.27	+/-2.47	5.00	pCi/L						

The following Analytical Methods were performed

Method	Description
1	EPA 901.1
2	EPA 900 0/SW846 9310

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Notes:

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

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Certificate of Analysis

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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.16.R.6
 Sample ID: 385070008
 Matrix: Water
 Collect Date: 21-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client

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>Gammaspcc, Gamma, Liquid (Standard List) "As Received"</i>														
Actinium-227	U	23.6	+/-29.6	55.3	26.2	+/-31.7		pCi/L		MJH1	11/17/15	0657	1521915	1
Antimony-125	U	-8.67	+/-11.0	18.0	8.36	+/-11.7		pCi/L						
Bismuth-212	U	31.4	+/-54.8	108	49.3	+/-56.7		pCi/L						
Bismuth-214	U	-12.8	+/-10.9	16.5	7.68	+/-12.4		pCi/L						
Cesium-137	U	0.378	+/-4.01	7.52	3.44	+/-4.01	10.0	pCi/L						
Cobalt-60	U	0.318	+/-4.94	9.52	4.26	+/-4.94		pCi/L						
Europium-154	U	1.81	+/-12.7	25.0	11.1	+/-12.7		pCi/L						
Lead-212	UL	0.00	+/-10.9	12.5	5.95	+/-11.0		pCi/L						
Lead-214	U	-1.37	+/-11.5	16.9	7.96	+/-11.5		pCi/L						
Potassium-40	U	-27.9	+/-56.9	101	45.7	+/-58.3		pCi/L						
Protactinium-231	U	24.2	+/-51.3	94.5	44.5	+/-52.7		pCi/L						
Radium-228	U	-22.7	+/-22.3	28.6	12.9	+/-24.7		pCi/L						
Thallium-208	UL	0.00	+/-5.92	6.62	3.02	+/-6.01		pCi/L						
Tin-126	U	-6.8	+/-14.4	16.0	7.66	+/-14.8		pCi/L						

Rad Gas Flow Proportional Counting

GFPC, Gross A-B, liquid "As Received"

Alpha	U	-0.489	+/-1.76	3.75	1.56	+/-1.76	5.00	pCi/L		JXB7	12/02/15	1303	1525771	2
Beta	U	-2.58	+/-2.47	4.94	2.27	+/-2.47	5.00	pCi/L						

The following Analytical Methods were performed

Method	Description
1	EPA 901 I
2	EPA 900 (I)/SW846 9310

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

Report Date: December 4, 2015

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

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.1
 Sample ID: 385070009
 Matrix: Soil
 Collect Date: 20-OCT-15 10:40
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 21%

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Gravimetric Solids												
ASTM D 2216 % Moisture "As Received"												
Moisture		21.0				percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis												
Gammascpec, Gamma, Solid "Dry Weight Corrected"												
Actinium-227	U	-0.0672	+/-0.346	0.631		pCi/g		RXF2	12/03/15	1303	1522383	2
Antimony-125	U	0.0605	+/-0.157	0.272		pCi/g						
Cesium-137		0.935	+/-0.133	0.0906	0.100	pCi/g						
Cobalt-60	U	-2.82E-05	+/-0.0516	0.103		pCi/g						
Europium-154	U	-0.112	+/-0.235	0.336		pCi/g						
Protactinium-231	U	0.403	+/-0.712	1.23		pCi/g						
Radium-226		1.05	+/-0.197	0.163		pCi/g						
Radium-228		1.04	+/-0.329	0.324		pCi/g						
Tin-126	U	0.0481	+/-0.154	0.220		pCi/g						
Rad Gas Flow Proportional Counting												
GFPC, Gross A/B, solid "Dry Weight Corrected"												
Alpha		11.8	+/-2.94	3.46	4.00	pCi/g		KXB2	12/02/15	1128	1525757	3
Beta		24.4	+/-2.64	3.11	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	11/10/15	1319	1521842

The following Analytical Methods were performed:

Method	Description	Analyst Comments
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	

Notes:

Counting Uncertainty is 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 Corporation
 Address : 15 Hazelwood Drive
 Suite 112
 Buffalo, New York 14228

Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 3.1.17.R.1
 Sample ID: 385070009
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 21%

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		21.0						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammasec. Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0672	+/-0.346	0.631	0.295	+/-0.348		pCi/g		RXF2	12/03/15	1303	1522383	2
Antimony-125	U	0.0605	+/-0.157	0.272	0.126	+/-0.160		pCi/g						
Bismuth-212	UI	0.00	+/-0.727	1.58	0.729	+/-0.921		pCi/g						
Bismuth-214		1.05	+/-0.197	0.163	0.0738	+/-0.218		pCi/g						
Cesium-137		0.935	+/-0.133	0.0906	0.0408	+/-0.157	0.100	pCi/g						
Cobalt-60	U	-2.82E-05	+/-0.0516	0.103	0.0443	+/-0.0516		pCi/g						
Europium-154	U	-0.112	+/-0.235	0.336	0.149	+/-0.240		pCi/g						
Lead-212		1.04	+/-0.154	0.142	0.0666	+/-0.181		pCi/g						
Lead-214		1.19	+/-0.231	0.406	0.196	+/-0.254		pCi/g						
Potassium-40		13.0	+/-1.65	0.902	0.380	+/-1.98		pCi/g						
Protactinium-231	U	0.403	+/-0.712	1.23	0.571	+/-0.741		pCi/g						
Radium-226		1.05	+/-0.197	0.163	0.0738	+/-0.218		pCi/g						
Radium-228		1.04	+/-0.329	0.324	0.143	+/-0.366		pCi/g						
Thallium-208		0.426	+/-0.0914	0.0781	0.035	+/-0.099		pCi/g						
Tin-126	U	0.0481	+/-0.154	0.220	0.106	+/-0.155		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha	11.8	+/-2.94	3.46	1.56	+/-3.80	4.00	pCi/g	KXB2	12/02/15	1128	1525757	3
Beta	24.4	+/-2.64	3.11	1.50	+/-4.35	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	11/10/15	1319	1521842

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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Report Date: December 17, 2015

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.1

Sample ID: 385070009

Project: MJWC00115

Client ID: MJWC001

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

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

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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.1
 Sample ID: 385070009
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 21%

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		21.0						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammascpec. Gamma. Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0672	+/-0.346	0.631	0.295	+/-0.348		pCi/g		RXF2	12/03/15	1303	1522383	2
Antimony-125	U	0.0605	+/-0.157	0.272	0.126	+/-0.160		pCi/g						
Bismuth-212	UI	0.00	+/-0.727	1.58	0.729	+/-0.921		pCi/g						
Bismuth-214		1.05	+/-0.197	0.163	0.0738	+/-0.218		pCi/g						
Cesium-137		0.935	+/-0.133	0.0906	0.0408	+/-0.157	0.100	pCi/g						
Cobalt-60	U	-2.82E-05	+/-0.0516	0.103	0.0443	+/-0.0516		pCi/g						
Europium-154	U	-0.112	+/-0.235	0.336	0.149	+/-0.240		pCi/g						
Lead-212		1.04	+/-0.154	0.142	0.0666	+/-0.181		pCi/g						
Lead-214		1.19	+/-0.231	0.406	0.196	+/-0.254		pCi/g						
Potassium-40		13.0	+/-1.65	0.902	0.380	+/-1.98		pCi/g						
Protactinium-231	U	0.403	+/-0.712	1.23	0.571	+/-0.741		pCi/g						
Radium-226		1.05	+/-0.197	0.163	0.0738	+/-0.218		pCi/g						
Radium-228		1.04	+/-0.329	0.324	0.143	+/-0.366		pCi/g						
Thallium-208		0.426	+/-0.0914	0.0781	0.035	+/-0.099		pCi/g						
Tm-126	U	0.0481	+/-0.154	0.220	0.106	+/-0.155		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC. Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		11.8	+/-2.94	3.46	1.56	+/-3.80	4.00	pCi/g		KXB2	12/02/15	1128	1525757	3
Beta		24.4	+/-2.64	3.11	1.50	+/-4.35	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	11/10/15	1319	1521842

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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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.1
Sample ID: 385070009

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

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 3.1.17.R.2
 Sample ID: 388092017
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 23-DEC-15
 Collector: Client
 Moisture: 20.6%

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>														
Actinium-227	U	0.0259	+/-0.347	0.613	0.290	+/-0.348		pCi/g		MJH1	01/18/16	0723	1534020	1
Antimony-125	U	0.0466	+/-0.127	0.246	0.115	+/-0.129		pCi/g						
Bismuth-212	UI	0.00	+/-1.12	1.27	0.583	+/-1.18		pCi/g						
Bismuth-214		0.814	+/-0.200	0.162	0.0742	+/-0.211		pCi/g						
Cesium-137		0.742	+/-0.107	0.0879	0.0402	+/-0.122	0.100	pCi/g						
Cobalt-60	U	-0.00171	+/-0.0366	0.072	0.0302	+/-0.0366		pCi/g						
Europium-154	U	0.122	+/-0.136	0.293	0.131	+/-0.148		pCi/g						
Lead-212		1.04	+/-0.132	0.130	0.0616	+/-0.157		pCi/g						
Lead-214		1.05	+/-0.215	0.176	0.0823	+/-0.232		pCi/g						
Potassium-40		14.0	+/-1.68	0.570	0.228	+/-2.06		pCi/g						
Protactinium-231	UI	0.00	+/-1.66	1.08	0.507	+/-1.70		pCi/g						
Radium-226		0.814	+/-0.200	0.162	0.0742	+/-0.211		pCi/g						
Radium-228		1.12	+/-0.309	0.293	0.131	+/-0.344		pCi/g						
Thallium-208		0.293	+/-0.095	0.0779	0.0356	+/-0.098		pCi/g						
Tin-126	UI	0.00	+/-0.139	0.165	0.079	+/-0.140		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	12/24/15	0703	1533924

The following Analytical Methods were performed

Method	Description
I	DOE HASL 300, 4.5 2 3/Ga-01-R

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

Company : MJW Corporation
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Buffalo, New York 14228

Report Date: January 20, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.2
Sample ID: 388092017

Project: MJWC00115
Client ID: MJWC001

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

Notes:

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

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 Address : 15 Hazelwood Drive
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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Report Date: January 20, 2016

Client Sample ID: 3.1.17.R.2
 Sample ID: 388092007
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 23-DEC-15
 Collector: Client
 Moisture: 20.6%

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		20.6						percent		LYT1	12/24/15	0703	1533555	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238		0.0518	+/-0.0673	0.0957	0.0274	+/-0.0677	1.00	pCi/g		MXS2	01/12/16	1021	1534070	2
Plutonium-239/240		0.031	+/-0.0549	0.0832	0.0212	+/-0.055	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	-0.0392	+/-0.0409	0.142	0.0464	+/-0.041	1.00	pCi/g		MXS2	01/12/16	1015	1534063	3
Uranium-233/234		0.759	+/-0.245	0.128	0.0349	+/-0.280	1.00	pCi/g						
Uranium-235/236		0.0296	+/-0.0681	0.108	0.0247	+/-0.0683	1.00	pCi/g						
Uranium-238		0.841	+/-0.256	0.119	0.0302	+/-0.297	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	0.0424	+/-0.274	0.560	0.167	+/-0.274	1.00	pCi/g		MXS2	01/12/16	1032	1534069	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.26	+/-0.642	0.449	0.109	+/-0.698	1.00	pCi/g		MXS2	01/12/16	1031	1534062	5
Thorium-229	U	-0.0682	+/-0.158	0.468	0.128	+/-0.159	1.00	pCi/g						
Thorium-230		1.03	+/-0.559	0.393	0.090	+/-0.600	1.00	pCi/g						
Thorium-232		0.848	+/-0.501	0.212	0.00	+/-0.532	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	0.0173	+/-0.0477	0.0827	0.0211	+/-0.0478	1.00	pCi/g		MXS2	01/12/16	1103	1534067	6
Curium-242		0.00	+/-0.0385	0.0573	0.00	+/-0.0386	1.00	pCi/g						
Curium-243/244		0.0205	+/-0.047	0.0745	0.0171	+/-0.0471	1.00	pCi/g						
Curium-245/246		0.0155	+/-0.0436	0.0465	0.00	+/-0.0436	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-6.03	+/-7.26	12.9	6.26	+/-7.26	15.0	pCi/g		MXS2	01/14/16	1749	1534073	7
Rad Gamma Spec Analysis														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	0.0568	+/-0.400	1.06	0.360	+/-0.401	1.00	pCi/g		MJH1	01/15/16	0849	1535059	8
<i>Gammastat, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0339	+/-0.182	0.336	0.160	+/-0.182		pCi/g		MJH1	12/29/15	1156	1533562	9
Antimony-125	U	0.0422	+/-0.0675	0.129	0.0606	+/-0.0702		pCi/g						
Bismuth-212	U	0.00	+/-0.624	0.832	0.392	+/-0.972		pCi/g						
Bismuth-214		0.746	+/-0.123	0.0981	0.046	+/-0.138		pCi/g						
Cesium-137		0.773	+/-0.0773	0.045	0.0207	+/-0.0999	0.100	pCi/g						
Cobalt-60	U	-0.000218	+/-0.0238	0.0461	0.0202	+/-0.0238		pCi/g						
Europium-154	U	-0.0157	+/-0.0955	0.172	0.0782	+/-0.0957		pCi/g						
Lead-212		1.05	+/-0.0862	0.0739	0.0353	+/-0.127		pCi/g						
Lead-214		0.841	+/-0.122	0.0942	0.0445	+/-0.142		pCi/g						

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Certificate of Analysis

Company : MJW Corporation
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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 3.1.17.R.2
 Sample ID: 388092007

Report Date: January 20, 2016

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>GammaSpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		12.5	+/-1.09	0.475	0.209	+/-1.55		pCi/g						
Protactinium-231	U	0.00	+/-0.411	0.710	0.340	+/-0.449		pCi/g						
Radium-226		0.746	+/-0.123	0.0981	0.046	+/-0.138		pCi/g						
Radium-228		0.965	+/-0.179	0.182	0.0832	+/-0.232		pCi/g						
Thallium-208		0.330	+/-0.0473	0.0465	0.0217	+/-0.0547		pCi/g						
Tin-126	U	0.00	+/-0.0766	0.086	0.0413	+/-0.0791		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		10.2	+/-3.81	3.82	1.48	+/-4.30	4.00	pCi/g		JXB7	01/12/16	0819	1534760	10
Beta		17.9	+/-3.27	2.92	1.28	+/-4.08	10.0	pCi/g						
<i>GFPC, Sr-90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.298	+/-0.841	1.70	0.745	+/-0.841	2.00	pCi/g		KSD1	01/06/16	1654	1534788	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	1.27	+/-2.46	4.19	2.02	+/-2.46	6.00	pCi/g		TXJ1	01/10/16	2115	1534918	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.182	+/-0.783	1.34	0.660	+/-0.783	2.00	pCi/g		TXJ1	01/16/16	1233	1534935	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	0.241	+/-1.64	2.84	1.36	+/-1.64	5.00	pCi/g		MYM	01/19/16	0642	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 EERFC-01 Modified

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Company : MJW Corporation
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Report Date: January 20, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.2
Sample ID: 388092007

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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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	75.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1534063	65.4	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1534063	86.1	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1534069	93	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1534062	85.1	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1534067	91.4	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1534073	75.4	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1534788	60	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1534638	95.9	(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

Report Date: December 4, 2015

Company : MJW Corporation
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 Suite 112
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Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.5	Project: MJWC00115
Sample ID: 385070010	Client ID: MJWC001
Matrix: Soil	
Collect Date: 20-OCT-15 10:45	
Receive Date: 05-NOV-15	
Collector: Client	
Moisture: 21%	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Gravimetric Solids												
ASTM D 2216 % Moisture "As Received"												
Moisture		21.0				percent		CXCI	11/10/15	1319	1521842	1
Rad Alpha Spec Analysis												
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"												
Plutonium-238	U	0.0726	+/-0.0919	0.114	1.00	pCi/g		HAKB	11/23/15	1501	1522577	2
Plutonium-239/240	U	0.0437	+/-0.105	0.190	1.00	pCi/g						
ASP Uranium Isotopic, Solid "Dry Weight Corrected"												
Uranium-232	U	0.0135	+/-0.0953	0.196	1.00	pci/g		HAKB	11/24/15	0851	1522580	3
Uranium-233/234		1.05	+/-0.329	0.143	1.00	pci/g						
Uranium-235/236	U	0.0456	+/-0.0897	0.124	1.00	pci/g						
Uranium-238		0.956	+/-0.312	0.0775	1.00	pci/g						
Alphaspec Np237, Solid "Dry Weight Corrected"												
Neptunium-237	U	-0.0887	+/-0.206	0.609	1.00	pCi/g		HAKB	11/23/15	1706	1522576	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"												
Thorium-228		1.05	+/-0.517	0.501	1.00	pCi/g		HAKB	11/24/15	1014	1522579	5
Thorium-229	U	0.0144	+/-0.151	0.314	1.00	pCi/g						
Thorium-230		0.924	+/-0.439	0.154	1.00	pCi/g						
Thorium-232		1.33	+/-0.522	0.154	1.00	pCi/g						
Am241, Cm Solid "Dry Weight Corrected"												
Americium-241	U	-0.0175	+/-0.0406	0.120	1.00	pCi/g		HAKB	11/24/15	1042	1522571	6
Curium-242	U	0.00	+/-0.0421	0.0627	1.00	pCi/g						
Curium-243/244	U	0.0144	+/-0.0647	0.126	1.00	pCi/g						
Curium-245/246	U	0.0417	+/-0.0715	0.0626	1.00	pCi/g						
Liquid Scint Pu241, Solid "Dry Weight Corrected"												
Plutonium-241	U	-3.38	+/-6.49	11.4	15.0	pCi/g		HAKB	11/25/15	0930	1522578	7
Rad Gamma Spec Analysis												
Gamma I129, Solid "Dry Weight Corrected"												
Iodine-129	U	-0.067	+/-0.270	0.491	1.00	pCi/g		MJH1	12/02/15	1342	1522374	8
Gammaspec, Gamma, Solid "Dry Weight Corrected"												
Actinium-227	U	-0.0434	+/-0.269	0.489		pCi/g		RXF2	12/03/15	1304	1522383	9
Antimony-125	U	-0.0629	+/-0.110	0.199		pCi/g						
Cesium-137		1.00	+/-0.114	0.0654	0.100	pCi/g						
Cobalt-60	U	0.00885	+/-0.0356	0.0739		pCi/g						
Europium-154	U	-0.0489	+/-0.137	0.255		pCi/g						
Protactinium-231	UI	0.00	+/-0.773	0.968		pCi/g						

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Certificate of Analysis

Report Date: December 4, 2015

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

Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010

Project: MJWC00115
 Client ID: MJWC001

Rad Gamma Spec Analysis

Gammaspec, Gamma, Solid "Dry Weight Corrected"

Radium-226		0.800	+/-0.174	0.126	pCi/g
Radium-228		0.968	+/-0.302	0.294	pCi/g
Tin-126	UI	0.00	+/-0.134	0.137	pCi/g

Rad Gas Flow Proportional Counting

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

Alpha		15.2	+/-2.84	2.57	4.00	pCi/g	KXB2	12/02/15	1128	1525757	10
Beta		25.2	+/-2.55	2.84	10.0	pCi/g					

GFPC, Sr90, solid "Dry Weight Corrected"

Strontium-90	U	-0.358	+/-0.742	1.53	2.00	pCi/g	KSDI	12/02/15	1641	1525755	11
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Rad Liquid Scintillation Analysis

LSC, Tritium Dist. Solid "Dry Weight Corrected"

Tritium	U	1.90	+/-1.91	3.14	6.00	pCi/g	TXJ1	12/02/15	1324	1522724	12
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Liquid Scint C14, Solid "Dry Weight Corrected"

Carbon-14	U	0.232	+/-0.868	1.48	2.00	pCi/g	TXJ1	12/03/15	1940	1522716	13
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Liquid Scint Tc99, Solid "Dry Weight Corrected"

Technetium-99	U	1.12	+/-1.58	2.67	5.00	pCi/g	MYM1	11/29/15	1017	1522715	14
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010

Project: MJWC00115
 Client ID: MJWC001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
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, F-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	
14	DOE EML HASL-300, Te-02-RC Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"			72.9	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"			57.5	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"			63.8	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"			70.5	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"			88.9	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"			68.8	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"			72.9	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"			86.7	(25%-125%)
Techetium-99m Tracer	Liquid Scint Te99, Solid "Dry Weight Corrected"			94.2	(15%-125%)

Notes:
 Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

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Certificate of Analysis

Company : MJW Corporation
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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Report Date: December 17, 2015

Client Sample ID: 3.I.17.R.5
 Sample ID: 385070010
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 21%

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		21.0						percent		CXC1	11/10/15	1319	1521842	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238		0.0726	+/-0.0919	0.114	0.0262	+/-0.0926	1.00	pCi/g		HAKB	11/23/15	1501	1522577	2
Plutonium-239/240	U	0.0437	+/-0.105	0.190	0.0641	+/-0.105	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.0135	+/-0.0953	0.196	0.0641	+/-0.0954	1.00	pci/g		HAKB	11/24/15	0851	1522580	3
Uranium-233/234		1.05	+/-0.329	0.143	0.0328	+/-0.400	1.00	pci/g						
Uranium-235/236		0.0456	+/-0.0897	0.124	0.0233	+/-0.0902	1.00	pci/g						
Uranium-238		0.956	+/-0.312	0.0775	0.00	+/-0.375	1.00	pci/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.0887	+/-0.206	0.609	0.166	+/-0.206	1.00	pCi/g		HAKB	11/23/15	1706	1522576	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.05	+/-0.517	0.501	0.171	+/-0.542	1.00	pCi/g		HAKB	11/24/15	1014	1522579	5
Thorium-229	U	0.0144	+/-0.151	0.314	0.080	+/-0.151	1.00	pCi/g						
Thorium-230		0.924	+/-0.439	0.154	0.00	+/-0.461	1.00	pCi/g						
Thorium-232		1.33	+/-0.522	0.154	0.00	+/-0.560	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	-0.0175	+/-0.0406	0.120	0.0327	+/-0.0407	1.00	pCi/g		HAKB	11/24/15	1042	1522571	6
Curium-242		0.00	+/-0.0421	0.0627	0.00	+/-0.0422	1.00	pCi/g						
Curium-243/244	U	0.0144	+/-0.0647	0.126	0.0362	+/-0.0647	1.00	pCi/g						
Curium-245/246		0.0417	+/-0.0715	0.0626	0.00	+/-0.0718	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.38	+/-6.49	11.4	5.53	+/-6.49	15.0	pCi/g		HAKB	11/25/15	0930	1522578	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.067	+/-0.270	0.491	0.210	+/-0.272	1.00	pCi/g		MJH1	12/02/15	1342	1522374	8
<i>Gammaspac, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0434	+/-0.269	0.489	0.228	+/-0.270		pCi/g		RXF2	12/03/15	1304	1522383	9
Antimony-125	U	-0.0629	+/-0.110	0.199	0.0916	+/-0.114		pCi/g						
Bismuth-212	UI	0.00	+/-1.09	0.860	0.379	+/-1.09		pCi/g						
Bismuth-214		0.800	+/-0.174	0.126	0.0564	+/-0.186		pCi/g						
Cesium-137		1.00	+/-0.114	0.0654	0.029	+/-0.141	0.100	pCi/g						
Cobalt-60	U	0.00885	+/-0.0356	0.0759	0.0322	+/-0.0358		pCi/g						
Europium-154	U	-0.0489	+/-0.137	0.255	0.112	+/-0.139		pCi/g						
Lead-212		1.10	+/-0.133	0.105	0.049	+/-0.164		pCi/g						
Lead-214		1.04	+/-0.183	0.341	0.165	+/-0.204		pCi/g						

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Certificate of Analysis

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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010

Report Date: December 17, 2015

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	+/-1.52	0.732	0.308	+/-1.93		pCi/g						
Protactinium-231	U1	0.00	+/-0.773	0.968	0.451	+/-0.806		pCi/g						
Radium-226		0.800	+/-0.174	0.126	0.0564	+/-0.186		pCi/g						
Radium-228		0.968	+/-0.302	0.294	0.131	+/-0.334		pCi/g						
Thallium-208		0.352	+/-0.073	0.0627	0.028	+/-0.0787		pCi/g						
Tin-126	U1	0.00	+/-0.134	0.137	0.0645	+/-0.136		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		15.2	+/-2.84	2.57	1.13	+/-4.12	4.00	pCi/g		KXB2	12/02/15	1128	1525757	10
Beta		25.2	+/-2.55	2.84	1.36	+/-4.38	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.358	+/-0.742	1.53	0.670	+/-0.742	2.00	pCi/g		KSD1	12/02/15	1641	1525755	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium		1.90	+/-1.91	3.14	1.37	+/-1.91	6.00	pCi/g		TXJ1	12/02/15	1324	1522724	12
<i>Liquid Scim C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	0.232	+/-0.868	1.48	0.725	+/-0.868	2.00	pCi/g		TXJ1	12/03/15	1940	1522716	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	1.12	+/-1.58	2.67	1.28	+/-1.58	5.00	pCi/g		MYM	11/29/15	1017	1522715	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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 EERFC-01 Modified

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Certificate of Analysis

Company : MJW Corporation
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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010

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"	1522577	72.9	(15%-125%)
Uranium-232 Tracer		ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	57.5	(15%-125%)
Uranium-235/236 Tracer		ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	63.8	(15%-125%)
Americium-243 Tracer		Alphaspec Np237, Solid "Dry Weight Corrected"	1522576	70.5	(15%-125%)
Actinium-227 Tracer		Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1522579	88.9	(15%-125%)
Americium-243 Tracer		Am241, Cm Solid "Dry Weight Corrected"	1522571	68.8	(15%-125%)
Plutonium-242 Tracer		Liquid Scint Pu241, Solid "Dry Weight Corrected"	1522578	72.9	(15%-125%)
Strontium Carrier		GFPC, Sr90, solid "Dry Weight Corrected"	1525755	86.7	(25%-125%)
Technetium-99m Tracer		Liquid Scint Tc99, Solid "Dry Weight Corrected"	1522715	94.2	(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
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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 21%

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		21.0						percent		CXC1	11/10/15	1319	1521842	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238		0.0726	+/-0.0919	0.114	0.0262	+/-0.0926	1.00	pCi/g		HAKB	11/23/15	1501	1522577	2
Plutonium-239/240	U	0.0437	+/-0.105	0.190	0.0641	+/-0.105	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.0135	+/-0.0953	0.196	0.0641	+/-0.0954	1.00	pci/g		HAKB	11/24/15	0851	1522580	3
Uranium-233/234		1.05	+/-0.329	0.143	0.0328	+/-0.400	1.00	pci/g						
Uranium-235/236		0.0456	+/-0.0897	0.124	0.0233	+/-0.0902	1.00	pci/g						
Uranium-238		0.956	+/-0.312	0.0775	0.00	+/-0.375	1.00	pci/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.0887	+/-0.206	0.609	0.166	+/-0.206	1.00	pCi/g		HAKB	11/23/15	1706	1522576	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.05	+/-0.517	0.501	0.171	+/-0.542	1.00	pCi/g		HAKB	11/24/15	1014	1522579	5
Thorium-229	U	0.0144	+/-0.151	0.314	0.080	+/-0.151	1.00	pCi/g						
Thorium-230		0.924	+/-0.439	0.154	0.00	+/-0.461	1.00	pCi/g						
Thorium-232		1.33	+/-0.522	0.154	0.00	+/-0.560	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	-0.0175	+/-0.0406	0.120	0.0327	+/-0.0407	1.00	pCi/g		HAKB	11/24/15	1042	1522571	6
Curium-242		0.00	+/-0.0421	0.0627	0.00	+/-0.0422	1.00	pCi/g						
Curium-243/244	U	0.0144	+/-0.0647	0.126	0.0362	+/-0.0647	1.00	pCi/g						
Curium-245/246		0.0417	+/-0.0715	0.0626	0.00	+/-0.0718	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.38	+/-6.49	11.4	5.53	+/-6.49	15.0	pCi/g		HAKB	11/25/15	0930	1522578	7
Rad Gamma Spec Analysis														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.067	+/-0.270	0.491	0.210	+/-0.272	1.00	pCi/g		MJH1	12/02/15	1342	1522374	8
<i>Gamma spec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0434	+/-0.269	0.489	0.228	+/-0.270		pCi/g		RXF2	12/03/15	1304	1522383	9
Antimony-125	U	-0.0629	+/-0.110	0.199	0.0916	+/-0.114		pCi/g						
Bismuth-212	UI	0.00	+/-1.09	0.860	0.379	+/-1.09		pCi/g						
Bismuth-214		0.800	+/-0.174	0.126	0.0564	+/-0.186		pCi/g						
Cesium-137		1.00	+/-0.114	0.0654	0.029	+/-0.141	0.100	pCi/g						
Cobalt-60	U	0.00885	+/-0.0356	0.0759	0.0322	+/-0.0358		pCi/g						
Europium-154	U	-0.0489	+/-0.137	0.255	0.112	+/-0.139		pCi/g						
Lead-212		1.10	+/-0.133	0.105	0.049	+/-0.164		pCi/g						
Lead-214		1.04	+/-0.183	0.341	0.165	+/-0.204		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: 3.1.17.R.5
 Sample ID: 385070010

Report Date: December 17, 2015

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		13.9	+/-1.52	0.732	0.308	+/-1.93		pCi/g						
Protactinium-231	U1	0.00	+/-0.773	0.968	0.451	+/-0.806		pCi/g						
Radium-226		0.800	+/-0.174	0.126	0.0564	+/-0.186		pCi/g						
Radium-228		0.968	+/-0.302	0.294	0.131	+/-0.334		pCi/g						
Thallium-208		0.352	+/-0.073	0.0627	0.028	+/-0.0787		pCi/g						
Tin-126	U1	0.00	+/-0.134	0.137	0.0645	+/-0.136		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		15.2	+/-2.84	2.57	1.13	+/-4.12	4.00	pCi/g		KXB2	12/02/15	1128	1525757	10
Beta		25.2	+/-2.55	2.84	1.36	+/-4.38	10.0	pCi/g						
<i>GFPC, Sr-90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.358	+/-0.742	1.53	0.670	+/-0.742	2.00	pCi/g		RSD1	12/02/15	1641	1525755	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium		1.90	+/-1.91	3.14	1.37	+/-1.91	6.00	pCi/g		TXJ1	12/02/15	1324	1522724	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	0.232	+/-0.868	1.48	0.725	+/-0.868	2.00	pCi/g		TXJ1	12/03/15	1940	1522716	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	1.12	+/-1.58	2.67	1.28	+/-1.58	5.00	pCi/g		MYM	11/29/15	1017	1522715	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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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Certificate of Analysis

Company : MJW Corporation
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Report Date: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.5
 Sample ID: 385070010

Project: MJWC00115
 Client ID: MJWC001

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1522577	72.9	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	57.5	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	63.8	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1522576	70.5	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1522579	88.9	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1522571	68.8	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1522578	72.9	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1525755	86.7	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1522715	94.2	(15%-125%)

Notes:

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

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Certificate of Analysis

Report Date: December 4, 2015

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

Client Sample ID: 3.1.17.R.6	Project: MJWC00115
Sample ID: 385070011	Client ID: MJWC001
Matrix: Soil	
Collect Date: 20-OCT-15 10:55	
Receive Date: 05-NOV-15	
Collector: Client	
Moisture: 20.5%	

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Gravimetric Solids												
ASTM D 2216 % Moisture "As Received"												
Moisture		20.5				percent	CXC1		11/10/15	1319	1521842	1
Rad Alpha Spec Analysis												
ASP Plutonium Isotopic, Solid "Dry Weight Corrected"												
Plutonium-238	U	-0.00502	+/-0.0433	0.100	1.00	pCi/g	HAKB		11/23/15	1501	1522577	2
Plutonium-239/240	U	-0.0301	+/-0.0486	0.155	1.00	pCi/g						
ASP Uranium Isotopic, Solid "Dry Weight Corrected"												
Uranium-232	U	0.0643	+/-0.0953	0.139	1.00	pci/g	HAKB		11/24/15	0851	1522580	3
Uranium-233/234		1.20	+/-0.361	0.131	1.00	pci/g						
Uranium-235/236		0.110	+/-0.121	0.0824	1.00	pci/g						
Uranium-238		0.767	+/-0.289	0.0822	1.00	pci/g						
Alphaspec Np237, Solid "Dry Weight Corrected"												
Neptunium-237	U	-0.181	+/-0.189	0.656	1.00	pCi/g	HAKB		11/23/15	1707	1522576	4
Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"												
Thorium-228		1.41	+/-0.530	0.336	1.00	pCi/g	HAKB		11/24/15	1014	1522579	5
Thorium-229	U	-0.0111	+/-0.0957	0.222	1.00	pCi/g						
Thorium-230		0.773	+/-0.385	0.221	1.00	pCi/g						
Thorium-232		1.08	+/-0.452	0.255	1.00	pCi/g						
Am241, Cm Solid "Dry Weight Corrected"												
Americium-241	U	-0.00355	+/-0.0306	0.0708	1.00	pCi/g	HAKB		11/24/15	1042	1522571	6
Curium-242	U	0.00	+/-0.0341	0.0508	1.00	pCi/g						
Curium-243/244	U	0.000584	+/-0.0433	0.0963	1.00	pCi/g						
Curium-245/246	X	0.186	+/-0.115	0.0507	1.00	pCi/g						
Liquid Scint Pu241, Solid "Dry Weight Corrected"												
Plutonium-241	U	-3.4	+/-7.08	12.4	15.0	pCi/g	HAKB		11/25/15	1031	1522578	7
Rad Gamma Spec Analysis												
Gamma 1129, Solid "Dry Weight Corrected"												
Iodine-129	U	-0.0593	+/-0.280	0.554	1.00	pCi/g	MJH1		12/02/15	1343	1522374	8
Gammaspec, Gamma, Solid "Dry Weight Corrected"												
Actinium-227	U	0.0212	+/-0.279	0.529		pCi/g	RXF2		12/03/15	1304	1522383	9
Antimony-125	U	-0.00335	+/-0.116	0.187		pCi/g						
Cesium-137		0.661	+/-0.111	0.0858	0.100	pCi/g						
Cobalt-60	U	-0.015	+/-0.0369	0.0681		pCi/g						
Europium-154	U	-0.0303	+/-0.122	0.229		pCi/g						
Protactinium-231	U	0.806	+/-0.524	1.09		pCi/g						

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Company : MfW Corporation
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 Suite 112
 Buffalo, New York 14228
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.I.17.R.6
 Sample ID: 385070011

Project: MJWC00115
 Client ID: MJWC001

Rad Gamma Spec Analysis

Gammascpec, Gamma, Solid "Dry Weight Corrected"

Radium-226		0.634	+/-0.133	0.118	pCi/g
Radium-228	UI	0.00	+/-0.275	0.550	pCi/g
Tin-126	U	0.114	+/-0.130	0.159	pCi/g

Rad Gas Flow Proportional Counting

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

Alpha	12.0	+/-3.12	3.98	4.00	pCi/g	KXB2	12/02/15	1128	1525757	10
Beta	22.6	+/-2.41	2.84	10.0	pCi/g					

GFPC, Sr90, solid "Dry Weight Corrected"

Strontium-90	U	-0.244	+/-0.623	1.31	2.00	pCi/g	KSD1	12/02/15	1655	1525755	11
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Rad Liquid Scintillation Analysis

LSC, Tritium Dist, Solid "Dry Weight Corrected"

Tritium	U	-0.0268	+/-1.165	3.19	6.00	pCi/g	TXJ1	12/02/15	1411	1522724	12
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Liquid Scint C14, Solid "Dry Weight Corrected"

Carbon-14	U	-0.435	+/-0.836	1.45	2.00	pCi/g	TXJ1	12/03/15	2053	1522716	13
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Liquid Scint Tc99, Solid "Dry Weight Corrected"

Technetium-99	U	1.73	+/-1.69	2.82	5.00	pCi/g	MYM1	11/29/15	1044	1522715	14
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The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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Report Date: December 4, 2015

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

Client Sample ID: 3.1.17.R.6
 Sample ID: 385070011

Project: MJWC00115
 Client ID: MJWC001

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	ASTM D 2216 (Modified)	
2	DOE EMI, 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	
14	DOE EML HASL-300, Tc-02-RC Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"			67.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"			52.9	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"			67.3	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"			91.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"			98.9	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"			76.9	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"			67.4	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"			88.9	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"			95.6	(15%-125%)

Notes:
 Counting Uncertainty is 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: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.6
 Sample ID: 385070011
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 20.5%

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		20.5						percent		CXC1	11/10/15	1319	1521842	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.00502	+/-0.0433	0.100	0.0188	+/-0.0435	1.00	pCi/g		HAKB	11/23/15	1501	1522577	2
Plutonium-239/240	U	-0.0301	+/-0.0486	0.155	0.096	+/-0.0487	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232		0.0643	+/-0.0953	0.139	0.038	+/-0.0964	1.00	pci/g		HAKB	11/24/15	0851	1522580	3
Uranium-233/234		1.20	+/-0.361	0.131	0.0246	+/-0.446	1.00	pci/g						
Uranium-235/236		0.110	+/-0.121	0.0824	0.00	+/-0.123	1.00	pci/g						
Uranium-238		0.767	+/-0.289	0.0822	0.00	+/-0.335	1.00	pci/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.181	+/-0.189	0.656	0.215	+/-0.190	1.00	pCi/g		HAKB	11/23/15	1707	1522576	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.41	+/-0.530	0.336	0.0964	+/-0.569	1.00	pCi/g		HAKB	11/24/15	1014	1522579	5
Thorium-229	U	-0.0111	+/-0.0957	0.222	0.0415	+/-0.0959	1.00	pCi/g						
Thorium-230		0.773	+/-0.385	0.221	0.0414	+/-0.400	1.00	pCi/g						
Thorium-232		1.08	+/-0.452	0.255	0.0584	+/-0.478	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	-0.00355	+/-0.0306	0.0708	0.0133	+/-0.0306	1.00	pCi/g		HAKB	11/24/15	1042	1522571	6
Curium-242		0.00	+/-0.0341	0.0508	0.00	+/-0.0342	1.00	pCi/g						
Curium-243/244	U	0.000584	+/-0.0433	0.0963	0.0262	+/-0.0434	1.00	pCi/g						
Curium-245/246	X	0.186	+/-0.115	0.0507	0.00	+/-0.118	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.4	+/-7.08	12.4	6.03	+/-7.08	15.0	pCi/g		HAKB	11/25/15	1031	1522578	7
Rad Gamma Spec Analysis														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.0593	+/-0.280	0.554	0.215	+/-0.281	1.00	pCi/g		MJH1	12/02/15	1343	1522374	8
<i>Gammaspect, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0212	+/-0.279	0.529	0.248	+/-0.279		pCi/g		RXF2	12/03/15	1304	1522383	9
Antimony-125	U	-0.00335	+/-0.116	0.187	0.0861	+/-0.116		pCi/g						
Bismuth-212	UI	0.00	+/-0.669	1.30	0.601	+/-0.908		pCi/g						
Bismuth-214		0.634	+/-0.133	0.118	0.053	+/-0.143		pCi/g						
Cesium-137		0.661	+/-0.111	0.0858	0.0394	+/-0.123	0.100	pCi/g						
Cobalt-60	U	-0.015	+/-0.0369	0.0681	0.0285	+/-0.0375		pCi/g						
Europium-154	U	-0.0303	+/-0.122	0.229	0.0993	+/-0.123		pCi/g						
Lead-212		1.13	+/-0.130	0.112	0.0526	+/-0.161		pCi/g						
Lead-214		1.05	+/-0.194	0.342	0.166	+/-0.212		pCi/g						

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 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 3.1.17.R.6
 Sample ID: 385070011

Report Date: December 17, 2015

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		13.6	+/-1.48	0.719	0.305	+/-1.89		pCi/g						
Protactinium-231	UI	0.00	+/-0.524	1.09	0.513	+/-0.663		pCi/g						
Radium-226		0.634	+/-0.133	0.118	0.053	+/-0.143		pCi/g						
Radium-228	UI	0.00	+/-0.275	0.550	0.260	+/-0.451		pCi/g						
Thallium-208		0.258	+/-0.0808	0.0782	0.0359	+/-0.0835		pCi/g						
Tin-126	UI	0.00	+/-0.130	0.159	0.076	+/-0.131		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		12.0	+/-3.12	3.98	1.83	+/-3.91	4.00	pCi/g		KXB2	12/02/15	1128	1525757	10
Beta		22.6	+/-2.41	2.84	1.37	+/-3.97	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.244	+/-0.623	1.31	0.562	+/-0.623	2.00	pCi/g		KSD1	12/02/15	1655	1525755	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	-0.0268	+/-1.65	3.19	1.39	+/-1.65	6.00	pCi/g		TXJ1	12/02/15	1411	1522724	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.435	+/-0.836	1.45	0.710	+/-0.836	2.00	pCi/g		TXJ1	12/03/15	2053	1522716	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99		1.73	+/-1.69	2.82	1.36	+/-1.70	5.00	pCi/g		MYM	11/29/15	1044	1522715	14

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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: 3.1.17.R.6
 Sample ID: 385070011

Report Date: December 17, 2015

Project: MJWC00115
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	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"	1522577	67.4	(15%-125%)
Uranium-232 Tracer		ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	52.9	(15%-125%)
Uranium-235/236 Tracer		ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	67.3	(15%-125%)
Americium-243 Tracer		Alphaspec Np237, Solid "Dry Weight Corrected"	1522576	91.8	(15%-125%)
Actinium-227 Tracer		Alphaspec Th229 + 228.230,232 Solid "Dry Weight Corrected"	1522579	98.9	(15%-125%)
Americium-243 Tracer		Am241, Cm Solid "Dry Weight Corrected"	1522571	76.9	(15%-125%)
Plutonium-242 Tracer		Liquid Scint Pu241, Solid "Dry Weight Corrected"	1522578	67.4	(15%-125%)
Strontium Carrier		GFPC, Sr90, solid "Dry Weight Corrected"	1525755	88.9	(25%-125%)
Technetium-99m Tracer		Liquid Scint Tc99, Solid "Dry Weight Corrected"	1522715	95.6	(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: December 17, 2015

Contact: Ms. Laurie Loscy
 Project: Soil Radioisotopes

Client Sample ID: 3.1.17.R.6
 Sample ID: 385070011
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 20.5%

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		20.5						percent		CXCI	11/10/15	1319	1521842	1
Rad Alpha Spec Analysis														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.00502	+/-0.0433	0.100	0.0188	+/-0.0435	1.00	pCi/g		HAKB	11/23/15	1501	1522577	2
Plutonium-239/240	U	-0.0301	+/-0.0486	0.155	0.046	+/-0.0487	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232		0.0643	+/-0.0953	0.139	0.038	+/-0.0964	1.00	pci/g		HAKB	11/24/15	0851	1522580	3
Uranium-233/234		1.20	+/-0.361	0.131	0.0246	+/-0.446	1.00	pci/g						
Uranium-235/236		0.110	+/-0.121	0.0824	0.00	+/-0.123	1.00	pci/g						
Uranium-238		0.767	+/-0.289	0.0822	0.00	+/-0.335	1.00	pci/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.181	+/-0.189	0.656	0.215	+/-0.190	1.00	pCi/g		HAKB	11/23/15	1707	1522576	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.41	+/-0.530	0.336	0.0964	+/-0.569	1.00	pCi/g		HAKB	11/24/15	1014	1522579	5
Thorium-229	U	-0.0111	+/-0.0957	0.222	0.0415	+/-0.0959	1.00	pCi/g						
Thorium-230		0.773	+/-0.385	0.221	0.0414	+/-0.400	1.00	pCi/g						
Thorium-232		1.08	+/-0.452	0.255	0.0584	+/-0.478	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	-0.00355	+/-0.0306	0.0708	0.0133	+/-0.0306	1.00	pCi/g		HAKB	11/24/15	1042	1522571	6
Curium-242		0.00	+/-0.0341	0.0508	0.00	+/-0.0342	1.00	pCi/g						
Curium-243/244	U	0.000584	+/-0.0433	0.0963	0.0262	+/-0.0434	1.00	pCi/g						
Curium-245/246	X	0.186	+/-0.115	0.0507	0.00	+/-0.118	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.4	+/-7.08	12.4	6.03	+/-7.08	15.0	pCi/g		HAKB	11/25/15	1031	1522578	7
Rad Gamma Spec Analysis														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.0593	+/-0.280	0.554	0.215	+/-0.281	1.00	pCi/g		MJHI	12/02/15	1343	1522374	8
<i>Gammasespec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0212	+/-0.279	0.529	0.248	+/-0.279		pCi/g		RXF2	12/03/15	1304	1522383	9
Antimony-125	U	-0.00335	+/-0.116	0.187	0.0861	+/-0.116		pCi/g						
Bismuth-212	UI	0.00	+/-0.669	1.30	0.601	+/-0.908		pCi/g						
Bismuth-214		0.634	+/-0.133	0.118	0.053	+/-0.143		pCi/g						
Cesium-137		0.661	+/-0.111	0.0858	0.0394	+/-0.123	0.100	pCi/g						
Cobalt-60	U	-0.015	+/-0.0369	0.0681	0.0285	+/-0.0375		pCi/g						
Europium-154	U	-0.0303	+/-0.122	0.229	0.0993	+/-0.123		pCi/g						
Lead-212		1.13	+/-0.130	0.112	0.0526	+/-0.161		pCi/g						
Lead-214		1.05	+/-0.194	0.342	0.166	+/-0.212		pCi/g						

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
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 3.1.17.R.6
 Sample ID: 385070011

Report Date: December 17, 2015

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 spec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		13.6	+/- 1.48	0.719	0.305	+/- 1.89		pCi/g						
Protactinium-231	UI	0.00	+/- 0.524	1.09	0.513	+/- 0.663		pCi/g						
Radium-226		0.634	+/- 0.133	0.118	0.053	+/- 0.143		pCi/g						
Radium-228	UI	0.00	+/- 0.275	0.550	0.260	+/- 0.451		pCi/g						
Thallium-208		0.258	+/- 0.0808	0.0782	0.0359	+/- 0.0835		pCi/g						
Tin-126	UI	0.00	+/- 0.130	0.159	0.076	+/- 0.131		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A-B, solid "Dry Weight Corrected"</i>														
Alpha		12.0	+/- 3.12	3.98	1.83	+/- 3.91	4.00	pCi/g		KXB2	12/02/15	1128	1525757	10
Beta		22.6	+/- 2.41	2.84	1.37	+/- 3.97	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.244	+/- 0.623	1.31	0.562	+/- 0.623	2.00	pCi/g		KSD1	12/02/15	1655	1525755	11
Rad Liquid Scintillation Analysis														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	-0.0268	+/- 1.65	3.19	1.39	+/- 1.65	6.00	pCi/g		TXJ1	12/02/15	1411	1522724	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.435	+/- 0.836	1.45	0.710	+/- 0.836	2.00	pCi/g		TXJ1	12/03/15	2053	1522716	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99		1.73	+/- 1.69	2.82	1.36	+/- 1.70	5.00	pCi/g		MYM	11/29/15	1044	1522715	14

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	11/10/15	1319	1521842

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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Certificate of Analysis

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

Report Date: December 17, 2015

Client Sample ID: 3.1.17.R.6
Sample ID: 385070011

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
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Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
14 DOE EML HASL-300, Tc-02-RC Modified				
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1522577	67.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	52.9	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1522580	67.3	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1522576	91.8	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228.230.232 Solid "Dry Weight Corrected"	1522579	98.9	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1522571	76.9	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1522578	67.4	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1525755	88.9	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1522715	95.6	(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

Report Date: December 4, 2015

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

Client Sample ID: 3.1.18.R.1 Project: MJWC00115
 Sample ID: 385070012 Client ID: MJWC001
 Matrix: Soil
 Collect Date: 20-OCT-15 11:20
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 19.8%

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	DF	Analyst	Date	Time	Batch	Method
Gravimetric Solids												
ASTM D 2216 % Moisture "As Received"												
Moisture		19.8				percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis												
Gammascpec, Gamma, Solid "Dry Weight Corrected"												
Actinium-227	U	0.103	+/-0.301	0.588		pCi/g		RXF2	12/03/15	1305	1522383	2
Antimony-125	U	0.00129	+/-0.121	0.227		pCi/g						
Cesium-137		1.12	+/-0.127	0.0633	0.100	pCi/g						
Cobalt-60	U	0.0364	+/-0.0372	0.0807		pCi/g						
Europium-154	U	0.00261	+/-0.116	0.229		pCi/g						
Protactinium-231	U	0.367	+/-0.587	1.11		pCi/g						
Radium-226		0.866	+/-0.181	0.167		pCi/g						
Radium-228		1.04	+/-0.279	0.306		pCi/g						
Tin-126	U	0.224	+/-0.244	0.251		pCi/g						
Rad Gas Flow Proportional Counting												
GFPC, Gross A/B, solid "Dry Weight Corrected"												
Alpha		7.56	+/-2.42	3.21	4.00	pCi/g		KXB2	12/02/15	1128	1525757	3
Beta		23.5	+/-2.39	2.63	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	11/10/15	1319	1521842

The following Analytical Methods were performed:

Method	Description	Analyst Comments
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	

Notes:

Counting Uncertainty is 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: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.18.R.1
 Sample ID: 385070012
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 19.8%

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		19.8						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammascpec. Gamma. Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.103	+/-0.301	0.588	0.277	+/-0.305		pCi/g		RXF2	12/03/15	1305	1522383	2
Antimony-125	U	0.00129	+/-0.121	0.227	0.105	+/-0.121		pCi/g						
Bismuth-212	UI	0.00	+/-0.661	1.33	0.615	+/-0.852		pCi/g						
Bismuth-214		0.866	+/-0.181	0.167	0.0765	+/-0.195		pCi/g						
Cesium-137		1.12	+/-0.127	0.0633	0.0278	+/-0.157	0.100	pCi/g						
Cobalt-60	UI	0.00	+/-0.0372	0.0807	0.0346	+/-0.0408		pCi/g						
Europium-154	U	0.00261	+/-0.116	0.229	0.0989	+/-0.116		pCi/g						
Lead-212		0.773	+/-0.156	0.173	0.0832	+/-0.168		pCi/g						
Lead-214		0.978	+/-0.184	0.332	0.160	+/-0.199		pCi/g						
Potassium-40		11.8	+/-1.49	0.717	0.301	+/-1.82		pCi/g						
Protactinium-231	U	0.367	+/-0.587	1.11	0.521	+/-0.615		pCi/g						
Radium-226		0.866	+/-0.181	0.167	0.0765	+/-0.195		pCi/g						
Radium-228		1.04	+/-0.279	0.306	0.137	+/-0.309		pCi/g						
Thallium-208		0.291	+/-0.107	0.065	0.029	+/-0.110		pCi/g						
Tin-126	UI	0.00	+/-0.244	0.251	0.121	+/-0.245		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A-B, solid "Dry Weight Corrected"</i>														
Alpha		7.56	+/-2.42	3.21	1.46	+/-2.84	4.00	pCi/g		KXB2	12/02/15	1128	1525757	3
Beta		23.5	+/-2.39	2.63	1.26	+/-4.04	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	11/10/15	1319	1521842

The following Analytical Methods were performed

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300, 4.5.2.3/Ca-01-R
3	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits

GEL LABORATORIES LLC

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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: 3.1.18.R.1
Sample ID: 385070012

Report Date: December 17, 2015

Project: MJWC00115
Client ID: MJWC001

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

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: December 17, 2015

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 3.1.18.R.1
 Sample ID: 385070012
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 05-NOV-15
 Collector: Client
 Moisture: 19.8%

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		19.8						percent		CXC1	11/10/15	1319	1521842	1
Rad Gamma Spec Analysis														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.103	+/-0.301	0.588	0.277	+/-0.305		pCi/g		RX12	12/03/15	1305	1522383	2
Antimony-125	U	0.00129	+/-0.121	0.227	0.105	+/-0.121		pCi/g						
Bismuth-212	UI	0.00	+/-0.661	1.33	0.615	+/-0.852		pCi/g						
Bismuth-214		0.866	+/-0.181	0.167	0.0765	+/-0.195		pCi/g						
Cesium-137		1.12	+/-0.127	0.0633	0.0278	+/-0.157	0.100	pCi/g						
Cobalt-60	UI	0.00	+/-0.0372	0.0807	0.0346	+/-0.0408		pCi/g						
Europium-154	U	0.00261	+/-0.116	0.229	0.0989	+/-0.116		pCi/g						
Lead-212		0.773	+/-0.156	0.173	0.0832	+/-0.168		pCi/g						
Lead-214		0.978	+/-0.184	0.332	0.160	+/-0.199		pCi/g						
Potassium-40		11.8	+/-1.49	0.717	0.301	+/-1.82		pCi/g						
Protactinium-231	U	0.367	+/-0.587	1.11	0.521	+/-0.615		pCi/g						
Radium-226		0.866	+/-0.181	0.167	0.0765	+/-0.195		pCi/g						
Radium-228		1.04	+/-0.279	0.306	0.137	+/-0.309		pCi/g						
Thallium-208		0.291	+/-0.107	0.065	0.029	+/-0.110		pCi/g						
Tin-126	UI	0.00	+/-0.244	0.251	0.121	+/-0.245		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		7.56	+/-2.42	3.21	1.46	+/-2.84	4.00	pCi/g		KXB2	12/02/15	1128	1525757	3
Beta		23.5	+/-2.39	2.63	1.26	+/-4.04	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	11/10/15	1319	1521842

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

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: December 17, 2015

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 3.1.18.R.1
Sample ID: 385070012

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).

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: February 10, 2016

Client Sample ID: 3.1.18.R.2
 Sample ID: 389296013
 Matrix: Soil
 Collect Date: 20-OCT-15
 Receive Date: 14-JAN-16
 Collector: Client
 Moisture: 13.6%

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		13.6						percent		CXC1	01/14/16	1208	1537312	1
Rad Gamma Spec Analysis														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	UI	0.00	+/-0.314	0.634	0.298	+/-0.346		pCi/g		RXF2	02/05/16	0843	1537546	2
Antimony-125	U	-0.0409	+/-0.135	0.240	0.110	+/-0.136		pCi/g						
Bismuth-212	UI	0.00	+/-0.807	1.43	0.659	+/-0.987		pCi/g						
Bismuth-214		0.799	+/-0.183	0.165	0.0752	+/-0.196		pCi/g						
Cesium-137		1.83	+/-0.160	0.0837	0.0376	+/-0.228	0.100	pCi/g						
Cobalt-60	U	0.019	+/-0.0421	0.0844	0.0354	+/-0.043		pCi/g						
Europium-154	U	-0.0126	+/-0.129	0.250	0.106	+/-0.129		pCi/g						
Lead-212		0.985	+/-0.135	0.123	0.0577	+/-0.160		pCi/g						
Lead-214		0.923	+/-0.230	0.187	0.0871	+/-0.244		pCi/g						
Potassium-40		11.1	+/-1.54	0.661	0.264	+/-1.81		pCi/g						
Protactinium-231	UI	0.00	+/-0.924	1.23	0.577	+/-0.934		pCi/g						
Radium-226		0.799	+/-0.183	0.165	0.0752	+/-0.196		pCi/g						
Radium-228		1.05	+/-0.301	0.340	0.152	+/-0.341		pCi/g						
Thallium-208		0.333	+/-0.0799	0.0783	0.0353	+/-0.0853		pCi/g						
Tin-126	U	0.0199	+/-0.195	0.193	0.0923	+/-0.195		pCi/g						
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.253	+/-0.334	0.569	0.267	+/-0.355		pCi/g		RXF2	01/18/16	1123	1537545	3
Antimony-125	U	0.0375	+/-0.134	0.257	0.120	+/-0.136		pCi/g						
Bismuth-212	UI	0.00	+/-0.710	1.09	0.492	+/-0.712		pCi/g						
Bismuth-214		0.704	+/-0.181	0.163	0.0746	+/-0.190		pCi/g						
Cesium-137		1.89	+/-0.172	0.0808	0.0365	+/-0.230	0.100	pCi/g						
Cobalt-60	U	-0.0257	+/-0.0502	0.0877	0.0378	+/-0.0516		pCi/g						
Europium-154	U	0.0103	+/-0.140	0.270	0.118	+/-0.140		pCi/g						
Lead-212		0.948	+/-0.133	0.133	0.0628	+/-0.154		pCi/g						
Lead-214		0.685	+/-0.205	0.186	0.0869	+/-0.212		pCi/g						
Potassium-40		12.1	+/-1.42	0.593	0.237	+/-1.75		pCi/g						
Protactinium-231	U	0.385	+/-0.787	1.29	0.609	+/-0.811		pCi/g						
Radium-226		0.704	+/-0.181	0.163	0.0746	+/-0.190		pCi/g						
Radium-228		1.16	+/-0.349	0.304	0.136	+/-0.383		pCi/g						
Thallium-208		0.248	+/-0.0833	0.088	0.0405	+/-0.0857		pCi/g						
Tin-126	UI	0.00	+/-0.139	0.192	0.0922	+/-0.159		pCi/g						
Rad Gas Flow Proportional Counting														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		11.5	+/-3.28	3.91	1.73	+/-3.95	4.00	pCi/g		KXB2	01/26/16	1153	1539462	4
Beta		17.3	+/-2.52	2.77	1.30	+/-3.54	10.0	pCi/g						

GEL LABORATORIES LLC

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Certificate of Analysis

Company : MJW Technical Services
Address : 15 Hazelwood Drive
Suite 112
Buffalo, New York 14228
Contact: Ms. Laurie Losey
Project: Soil Radioisotopes
Client Sample ID: 3.1.18.R.2
Sample ID: 389296013

Report Date: February 10, 2016

Project: MJWC00115
Client ID: MJWC001

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

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	01/14/16	1208	1537312

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	DOE HASL 300, 4.5 2 3/Ga-01-R
4	EPA 900.0/SW846 9310/SM 7110B Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Notes:

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