

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

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 4.1.C.R.1.2
 Sample ID: 392045013
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 21.9%

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	0.108	+/-0.312	0.600	0.282	+/-0.316		pCi/g		MXR1	03/08/16	0730	1547793	1
Antimony-125	U	-0.0139	+/-0.137	0.249	0.115	+/-0.137		pCi/g						
Bismuth-212	UI	0.00	+/-0.848	1.19	0.536	+/-0.894		pCi/g						
Bismuth-214		0.850	+/-0.181	0.161	0.0731	+/-0.194		pCi/g						
Cesium-137		0.874	+/-0.117	0.0847	0.0381	+/-0.137	0.100	pCi/g						
Cobalt-60	U	-0.025	+/-0.0475	0.0893	0.038	+/-0.0489		pCi/g						
Europium-154	U	-0.0122	+/-0.122	0.243	0.103	+/-0.122		pCi/g						
Lead-212		1.05	+/-0.163	0.153	0.0726	+/-0.182		pCi/g						
Lead-214		0.985	+/-0.214	0.187	0.0875	+/-0.227		pCi/g						
Potassium-40		14.1	+/-1.60	0.859	0.364	+/-2.14		pCi/g						
Protactinium-231	U	-0.158	+/-0.713	1.14	0.532	+/-0.718		pCi/g						
Radium-226		0.850	+/-0.181	0.161	0.0731	+/-0.194		pCi/g						
Radium-228		0.952	+/-0.318	0.296	0.130	+/-0.339		pCi/g						
Thallium-208		0.295	+/-0.090	0.0818	0.0371	+/-0.0933		pCi/g						
Tin-126	UI	0.00	+/-0.127	0.181	0.0863	+/-0.128		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		14.5	+/-3.90	3.86	1.63	+/-4.87	4.00	pCi/g		JXB7	03/03/16	1052	1547854	2
Beta		23.7	+/-3.21	3.25	1.51	+/-4.78	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	1456	1547784

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.C.R.1.2
Sample ID: 392045013

Project: MJWC00115
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	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) 558-8171 - 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.C.R.2.2
 Sample ID: 392045014
 Matrix: Soil
 Collect Date: 10-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 20.7%

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"

Acunium-227	U	-0.123	+/-0.309	0.559	0.262	+/-0.314		pCi/g		MXR1	03/08/16	0730	1547793	1
Antimony-125	U	-0.0312	+/-0.114	0.216	0.0992	+/-0.115		pCi/g						
Bismuth-212	UI	0.00	+/-0.913	1.46	0.678	+/-1.27		pCi/g						
Bismuth-214		0.722	+/-0.179	0.147	0.0666	+/-0.189		pCi/g						
Cesium-137		0.842	+/-0.139	0.0807	0.0365	+/-0.156	0.100	pCi/g						
Cobalt-60	U	-0.034	+/-0.0547	0.0775	0.0326	+/-0.0569		pCi/g						
Europium-154	U	-0.0566	+/-0.132	0.241	0.104	+/-0.134		pCi/g						
Lead-212		1.00	+/-0.139	0.122	0.0575	+/-0.164		pCi/g						
Lead-214		1.07	+/-0.198	0.350	0.169	+/-0.218		pCi/g						
Potassium-40		15.1	+/-1.62	0.795	0.337	+/-2.07		pCi/g						
Protactinium-231	U	0.233	+/-0.836	1.08	0.503	+/-0.837		pCi/g						
Radium-226		0.722	+/-0.179	0.147	0.0666	+/-0.189		pCi/g						
Radium-228		0.834	+/-0.348	0.310	0.138	+/-0.369		pCi/g						
Thallium-208		0.414	+/-0.0869	0.0665	0.0297	+/-0.0939		pCi/g						
Tin-126	UI	0.00	+/-0.192	0.190	0.091	+/-0.193		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		27.4	+/-5.24	3.87	1.60	+/-7.46	4.00	pCi/g		JXB7	03/03/16	1054	1547854	2
Beta		27.3	+/-3.04	2.19	0.989	+/-5.08	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	1456	1547784

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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Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.2.2
Sample ID: 392045014

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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Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Report Date: January 14, 2016

Client Sample ID: 4.1.C.R.2.5
 Sample ID: 387694001
 Matrix: Water
 Collect Date: 10-DEC-15
 Receive Date: 17-DEC-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

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

Actinium-227	U1	0.00	+/-31.2	58.3	27.7	+/-34.0		pCi/L		MJH1	01/08/16	1546	1532831	1
Antimony-125	U	6.56	+/-10.7	19.9	9.31	+/-11.1		pCi/L						
Bismuth-212	U	22.2	+/-53.1	103	47.1	+/-54.1		pCi/L						
Bismuth-214	U	1.43	+/-10.2	17.1	7.98	+/-10.3		pCi/L						
Cesium-137	U	0.855	+/-4.11	7.41	3.39	+/-4.13	10.0	pCi/L						
Cobalt-60	U	-1.4	+/-4.95	7.81	3.40	+/-4.99		pCi/L						
Europium-154	U	8.75	+/-11.5	22.9	10.1	+/-12.1		pCi/L						
Lead-212	U	6.48	+/-12.3	14.3	6.83	+/-12.7		pCi/L						
Lead-214	U	-5.94	+/-11.1	16.1	7.57	+/-11.4		pCi/L						
Potassium-40	U	15.6	+/-65.2	113	51.3	+/-65.5		pCi/L						
Protactinium-231	U	-12	+/-55.9	97.6	46.0	+/-56.2		pCi/L						
Radium-228	U	8.78	+/-29.1	24.1	10.7	+/-29.1		pCi/L						
Thallium-208	U	-2.35	+/-5.09	7.84	3.63	+/-5.20		pCi/L						
Tin-126	U	-4.87	+/-11.8	17.2	8.23	+/-12.0		pCi/L						

Rad Gas Flow Proportional Counting

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

Alpha		2.01	+/-2.47	4.18	1.69	+/-2.50	5.00	pCi/L		JXB7	01/05/16	1143	1533798	2
Beta	U	1.29	+/-2.51	4.42	1.95	+/-2.52	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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Report Date: January 14, 2016

Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.2.5
Sample ID: 387694001

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: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.4.2
 Sample ID: 392045015
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 23.5%

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	0.150	+/-0.339	0.574	0.269	+/-0.347		pCi/g		MXR1	03/08/16	0738	1547793	1
Antimony-125	U	-0.0499	+/-0.120	0.218	0.100	+/-0.122		pCi/g						
Bismuth-212	UI	0.00	+/-1.22	0.928	0.410	+/-1.22		pCi/g						
Bismuth-214		0.918	+/-0.188	0.119	0.0527	+/-0.204		pCi/g						
Cesium-137		1.80	+/-0.160	0.0868	0.0395	+/-0.219	0.100	pCi/g						
Cobalt-60	U	0.0139	+/-0.0439	0.0923	0.0398	+/-0.0444		pCi/g						
Europium-154	U	0.0575	+/-0.143	0.295	0.130	+/-0.145		pCi/g						
Lead-212		1.20	+/-0.148	0.123	0.058	+/-0.181		pCi/g						
Lead-214		1.05	+/-0.178	0.355	0.171	+/-0.199		pCi/g						
Potassium-40		16.2	+/-1.74	0.684	0.280	+/-2.22		pCi/g						
Protactinium-231	U	0.413	+/-0.665	1.12	0.522	+/-0.671		pCi/g						
Radium-226		0.918	+/-0.188	0.119	0.0527	+/-0.204		pCi/g						
Radium-228		1.20	+/-0.314	0.314	0.140	+/-0.361		pCi/g						
Thallium-208		0.358	+/-0.087	0.0771	0.035	+/-0.092		pCi/g						
Tin-126	UI	0.00	+/-0.232	0.170	0.0809	+/-0.233		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		17.3	+/-4.31	3.89	1.62	+/-5.48	4.00	pCi/g		JXB7	03/03/16	1046	1547854	2
Beta		21.5	+/-3.01	2.93	1.35	+/-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	CXC1	02/26/16	1456	1547784

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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Contact: Ms. Laurie Losey
Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.4.2
Sample ID: 392045015

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: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.5.2
 Sample ID: 392045016
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 34.1%

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	0.0618	+/-0.329	0.621	0.289	+/-0.330		pCi/g		MXR1	03/08/16	0738	1547793	1
Antimony-125	UI	0.00	+/-0.276	0.279	0.128	+/-0.306		pCi/g						
Bismuth-212	U	0.654	+/-1.29	2.01	0.918	+/-1.33		pCi/g						
Bismuth-214		1.21	+/-0.252	0.205	0.092	+/-0.272		pCi/g						
Cesium-137		0.320	+/-0.133	0.138	0.0626	+/-0.135	0.100	pCi/g						
Cobalt-60	U	-0.0449	+/-0.0618	0.110	0.0444	+/-0.0651		pCi/g						
Europium-154	U	-0.096	+/-0.242	0.437	0.190	+/-0.246		pCi/g						
Lead-212		1.44	+/-0.153	0.135	0.0629	+/-0.221		pCi/g						
Lead-214		1.38	+/-0.199	0.163	0.0739	+/-0.233		pCi/g						
Potassium-40		21.7	+/-2.58	1.31	0.550	+/-3.23		pCi/g						
Protactinium-231	UI	0.00	+/-0.698	1.39	0.649	+/-0.797		pCi/g						
Radium-226		1.21	+/-0.252	0.205	0.092	+/-0.272		pCi/g						
Radium-228		0.950	+/-0.627	0.466	0.206	+/-0.638		pCi/g						
Thallium-208		0.375	+/-0.136	0.122	0.0553	+/-0.140		pCi/g						
Tin-126	UI	0.00	+/-0.111	0.105	0.0495	+/-0.115		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		22.2	+/-5.41	3.98	1.55	+/-6.97	4.00	pCi/g		JXB7	03/03/16	1046	1547854	2
Beta		27.8	+/-3.61	2.77	1.24	+/-5.29	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	1456	1547784

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: 4.1.C.R.5.2
Sample ID: 392045016

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: March 8, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Project: MJWC00115
 Client ID: MJWC001

Client Sample ID: 4.1.C.R.6.2
 Sample ID: 392045017
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 24.2%

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	0.0561	+/-0.289	0.559	0.262	+/-0.290		pCi/g		MXR1	03/08/16	0756	1547793	1
Antimony-125	U	-0.0761	+/-0.111	0.189	0.0861	+/-0.116		pCi/g						
Bismuth-212	UI	0.00	+/-1.11	1.50	0.697	+/-1.23		pCi/g						
Bismuth-214		0.851	+/-0.216	0.156	0.0715	+/-0.229		pCi/g						
Cesium-137		0.922	+/-0.119	0.0752	0.0338	+/-0.145	0.100	pCi/g						
Cobalt-60	U	0.0185	+/-0.0485	0.101	0.0443	+/-0.0492		pCi/g						
Europium-154	U	-0.0125	+/-0.147	0.285	0.125	+/-0.147		pCi/g						
Lead-212		1.16	+/-0.139	0.120	0.0563	+/-0.175		pCi/g						
Lead-214		1.05	+/-0.188	0.164	0.0763	+/-0.210		pCi/g						
Potassium-40		16.2	+/-1.73	0.650	0.262	+/-2.22		pCi/g						
Protactinium-231	UI	0.00	+/-0.982	1.01	0.470	+/-0.993		pCi/g						
Radium-226		0.851	+/-0.216	0.156	0.0715	+/-0.229		pCi/g						
Radium-228		0.914	+/-0.362	0.293	0.130	+/-0.389		pCi/g						
Thallium-208		0.328	+/-0.0791	0.0822	0.0377	+/-0.0843		pCi/g						
Tin-126	U	0.0287	+/-0.123	0.178	0.0846	+/-0.124		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		13.4	+/-4.10	3.92	1.58	+/-4.87	4.00	pCi/g		JXB7	03/03/16	1052	1547854	2
Beta		24.4	+/-3.45	3.19	1.46	+/-4.87	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	1456	1547784

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.C.R.6.2
Sample ID: 392045017

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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 Buffalo, New York 14228

Report Date: January 14, 2016

Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.6.5
 Sample ID: 387686004
 Matrix: Water
 Collect Date: 09-DEC-15
 Receive Date: 17-DEC-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

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

Actinium-227	U	-2.26	+/-22.3	40.1	19.0	+/-22.3		pCi/L		MJH1	01/08/16	1529	1532831	1
Antimony-125	U	0.592	+/-8.18	14.8	6.88	+/-8.18		pCi/L						
Bismuth-212	U	-5.69	+/-44.4	81.7	37.5	+/-44.5		pCi/L						
Bismuth-214	UI	0.00	+/-10.5	9.89	4.53	+/-10.5		pCi/L						
Cesium-137	U	-1.82	+/-4.19	6.49	3.01	+/-4.27	10.0	pCi/L						
Cobalt-60	U	-1.2	+/-3.64	6.37	2.83	+/-3.68		pCi/L						
Europium-154	U	6.28	+/-10.4	19.8	8.92	+/-10.8		pCi/L						
Lead-212	U	3.59	+/-8.28	11.5	5.51	+/-8.44		pCi/L						
Lead-214	U	-2.83	+/-8.40	12.6	5.93	+/-8.50		pCi/L						
Potassium-40	U	-2.21	+/-52.6	86.6	39.7	+/-52.6		pCi/L						
Protactinium-231	UI	0.00	+/-40.7	80.2	38.0	+/-50.2		pCi/L						
Radium-228	U	-14.5	+/-16.4	22.7	10.3	+/-17.8		pCi/L						
Thallium-208	UI	0.00	+/-5.27	5.70	2.63	+/-5.29		pCi/L						
Tin-126	U	0.234	+/-8.52	10.6	5.04	+/-8.52		pCi/L						

Rad Gas Flow Proportional Counting

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

Alpha		1.61	+/-1.98	3.34	1.28	+/-2.00	5.00	pCi/L		JXB7	01/05/16	1139	1533798	2
Beta	U	-1.35	+/-2.34	4.61	2.09	+/-2.34	5.00	pCi/L						

The following Analytical Methods were performed

Method	Description
1	EPA 901 I
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).

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.C.R.7.2
 Sample ID: 392045018
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 25.3%

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	0.146	+/-0.370	0.706	0.334	+/-0.376		pCi/g		MXR1	03/08/16	0757	1547793	1
Antimony-125	U	0.0531	+/-0.136	0.258	0.119	+/-0.138		pCi/g						
Bismuth-212	UI	0.00	+/-0.790	1.55	0.717	+/-0.954		pCi/g						
Bismuth-214		1.09	+/-0.191	0.188	0.0865	+/-0.215		pCi/g						
Cesium-137		1.34	+/-0.157	0.0997	0.0455	+/-0.197	0.100	pCi/g						
Cobalt-60	U	-0.0216	+/-0.0543	0.098	0.042	+/-0.0552		pCi/g						
Europium-154	U	-0.0687	+/-0.168	0.301	0.132	+/-0.171		pCi/g						
Lead-212		1.37	+/-0.155	0.131	0.0613	+/-0.195		pCi/g						
Lead-214		1.18	+/-0.243	0.394	0.190	+/-0.264		pCi/g						
Potassium-40		17.6	+/-1.86	0.681	0.272	+/-2.40		pCi/g						
Protactinium-231	UI	0.00	+/-0.653	1.31	0.613	+/-0.741		pCi/g						
Radium-226		1.09	+/-0.191	0.188	0.0865	+/-0.215		pCi/g						
Radium-228		1.15	+/-0.324	0.337	0.150	+/-0.368		pCi/g						
Thallium-208		0.378	+/-0.0836	0.0743	0.0332	+/-0.0902		pCi/g						
Tin-126	UI	0.00	+/-0.165	0.189	0.0898	+/-0.166		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		16.3	+/-4.33	3.85	1.56	+/-5.35	4.00	pCi/g		JXB7	03/03/16	1052	1547854	2
Beta		27.4	+/-3.37	3.01	1.39	+/-5.17	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	1456	1547784

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.C.R.7.2
Sample ID: 392045018

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 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.C.R.8.2
 Sample ID: 392045019
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 22.2%

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	-0.0293	+/-0.262	0.492	0.230	+/-0.262		pCi/g		MXR1	03/08/16	0800	1547793	1
Antimony-125	U	-0.00754	+/-0.104	0.192	0.0883	+/-0.104		pCi/g						
Bismuth-212	UI	0.00	+/-0.761	1.40	0.653	+/-0.973		pCi/g						
Bismuth-214		0.890	+/-0.168	0.145	0.0666	+/-0.184		pCi/g						
Cesium-137		0.969	+/-0.121	0.0705	0.0317	+/-0.145	0.100	pCi/g						
Cobalt-60	U	-0.00959	+/-0.0386	0.0737	0.0312	+/-0.0388		pCi/g						
Europium-154	U	-0.0735	+/-0.136	0.244	0.107	+/-0.140		pCi/g						
Lead-212		1.33	+/-0.132	0.105	0.0491	+/-0.177		pCi/g						
Lead-214		1.07	+/-0.203	0.152	0.0705	+/-0.223		pCi/g						
Potassium-40		15.4	+/-1.54	0.538	0.213	+/-2.05		pCi/g						
Protactinium-231	UI	0.00	+/-0.980	0.898	0.418	+/-1.01		pCi/g						
Radium-226		0.890	+/-0.168	0.145	0.0666	+/-0.184		pCi/g						
Radium-228		0.998	+/-0.300	0.325	0.147	+/-0.336		pCi/g						
Thallium-208		0.230	+/-0.0797	0.0789	0.0363	+/-0.082		pCi/g						
Tin-126	U	0.0628	+/-0.103	0.181	0.0873	+/-0.105		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		13.8	+/-3.97	3.95	1.64	+/-4.80	4.00	pCi/g		JXB7	03/03/16	1046	1547854	2
Beta		21.2	+/-3.18	3.03	1.38	+/-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	02/26/16	1456	1547784

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
Contact: Ms. Laurie Losey
Project: Soil Radioisotopes
Client Sample ID: 4.1.C.R.8.2
Sample ID: 392045019

Report Date: March 8, 2016

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
 Contact: Ms. Laurie Losey
 Project: Soil Radioisotopes
 Client Sample ID: 4.1.C.R.9.2
 Sample ID: 392045020
 Matrix: Soil
 Collect Date: 09-DEC-15
 Receive Date: 25-FEB-16
 Collector: Client
 Moisture: 21.7%

Report Date: March 8, 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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Rad Gamma Spec Analysis

Gamma with Ingrowth "Dry Weight Corrected"

Actinium-227	U	-0.126	+/-0.306	0.546	0.256	+/-0.312		pCi/g		MXR1	03/08/16	0801	1547793	1
Antimony-125	U	-0.00519	+/-0.114	0.218	0.100	+/-0.114		pCi/g						
Bismuth-212		1.17	+/-0.972	1.15	0.514	+/-0.978		pCi/g						
Bismuth-214		0.842	+/-0.177	0.155	0.070	+/-0.191		pCi/g						
Cesium-137		0.700	+/-0.131	0.0823	0.0368	+/-0.143	0.100	pCi/g						
Cobalt-60	U	-0.00124	+/-0.0489	0.0954	0.0407	+/-0.0489		pCi/g						
Europium-154	U	0.00122	+/-0.138	0.271	0.116	+/-0.138		pCi/g						
Lead-212		1.05	+/-0.131	0.120	0.0562	+/-0.164		pCi/g						
Lead-214		1.01	+/-0.209	0.164	0.0759	+/-0.226		pCi/g						
Potassium-40		14.6	+/-1.73	0.564	0.213	+/-2.13		pCi/g						
Protactinium-231	UI	0.00	+/-0.554	1.07	0.499	+/-0.645		pCi/g						
Radium-226		0.842	+/-0.177	0.155	0.070	+/-0.191		pCi/g						
Radium-228		0.999	+/-0.358	0.322	0.142	+/-0.377		pCi/g						
Thallium-208		0.406	+/-0.091	0.0854	0.0389	+/-0.0974		pCi/g						
Tin-126	UI	0.00	+/-0.112	0.121	0.0581	+/-0.116		pCi/g						

Rad Gas Flow Proportional Counting

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

Alpha		15.2	+/-3.64	3.92	1.73	+/-4.66	4.00	pCi/g		JXB7	03/03/16	1052	1547854	2
Beta		19.8	+/-2.50	2.55	1.20	+/-3.79	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	1456	1547784

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

Contact: Ms. Laurie Losey

Project: Soil Radioisotopes

Client Sample ID: 4.1.C.R.9.2

Sample ID: 392045020

Report Date: March 8, 2016

Project: MJWC00115

Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	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).