

# GEL LABORATORIES LLC

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

## Certificate of Analysis

Report Date: January 5, 2016

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

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.1.1	Project: MJWC00115
Sample ID: 386983021	Client ID: MJWC001
Matrix: Soil	
Collect Date: 30-NOV-15 10:32	
Receive Date: 08-DEC-15	
Collector: Client	
Moisture: 26.9%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Gravimetric Solids</b>											
ASTM D 2216 % Moisture "As Received"											
Moisture		26.9			percent		DRS1	12/09/15	1255	1529378	1
<b>Rad Gamma Spec Analysis</b>											
Gammascpec, Gamma, Solid "Dry Weight Corrected"											
Actinium-227	U	-0.0504	0.590		pCi/g		RXF2	01/04/16	0858	1529716	2
Antimony-125	U	-0.0247	0.186		pCi/g						
Bismuth-212	U	0.605	1.43		pCi/g						
Bismuth-214		0.925	0.162		pCi/g						
Cesium-137		0.676	0.0725	0.100	pCi/g						
Cobalt-60	U	-0.0211	0.0993		pCi/g						
Europium-154	U	-0.0124	0.306		pCi/g						
Lead-212		1.09	0.135		pCi/g						
Lead-214		1.20	0.383		pCi/g						
Potassium-40		16.2	0.591		pCi/g						
Protactinium-231	UI	0.00	1.05		pCi/g						
Radium-226		0.925	0.162		pCi/g						
Radium-228		0.909	0.340		pCi/g						
Thallium-208		0.288	0.087		pCi/g						
Tin-126	U	0.0605	0.221		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>											
GFPC, Gross A/B, solid "Dry Weight Corrected"											
Alpha		12.5	3.93	4.00	pCi/g		KXB2	01/04/16	1241	1532749	3
Beta		23.5	2.80	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	DRS1	12/09/15	1255	1529378

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:**

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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

Report Date: March 8, 2016

Client Sample ID: 4.4.C.R.1.2  
 Sample ID: 392045001  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 20.3%

Project: MJWC00115  
 Client ID: MJWC001

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

*Gamma with Ingrowth "Dry Weight Corrected"*

Actinium-227	U	-0.0492	+/-0.257	0.467	0.216	+/-0.258		pCi/g		MXR1	03/08/16	0632	1547793	1
Antimony-125	U	-0.0261	+/-0.104	0.194	0.0889	+/-0.105		pCi/g						
Bismuth-212	UI	0.00	+/-0.810	1.38	0.640	+/-1.01		pCi/g						
Bismuth-214		0.614	+/-0.178	0.139	0.0631	+/-0.185		pCi/g						
Cesium-137		0.496	+/-0.0952	0.0641	0.0284	+/-0.104	0.100	pCi/g						
Cobalt-60	U	0.00816	+/-0.0341	0.0713	0.0298	+/-0.0343		pCi/g						
Europium-154	U	0.0493	+/-0.124	0.259	0.114	+/-0.126		pCi/g						
Lead-212		1.12	+/-0.134	0.115	0.054	+/-0.166		pCi/g						
Lead-214		1.03	+/-0.178	0.165	0.0768	+/-0.198		pCi/g						
Potassium-40		15.2	+/-1.59	0.552	0.218	+/-2.05		pCi/g						
Protactinium-231	U	0.172	+/-0.519	0.971	0.452	+/-0.526		pCi/g						
Radium-226		0.614	+/-0.178	0.139	0.0631	+/-0.185		pCi/g						
Radium-228		1.31	+/-0.322	0.239	0.104	+/-0.375		pCi/g						
Thallium-208		0.351	+/-0.083	0.0705	0.0319	+/-0.0881		pCi/g						
Tin-126	UI	0.00	+/-0.130	0.145	0.0686	+/-0.132		pCi/g						

**Rad Gas Flow Proportional Counting**

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

Alpha		11.8	+/-3.94	3.98	1.60	+/-4.57	4.00	pCi/g		JXB7	03/03/16	1051	1547854	2
Beta		24.3	+/-3.49	3.00	1.35	+/-4.89	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: 4.4.C.R.1.2  
Sample ID: 392045001

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

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

Client Sample ID: 4.4C.R.2.1	Project: MJWC00115
Sample ID: 386983022	Client ID: MJWC001
Matrix: Soil	
Collect Date: 30-NOV-15 11:01	
Receive Date: 08-DEC-15	
Collector: Client	
Moisture: 23.4%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Gravimetric Solids</b>											
ASTM D 2216 % Moisture "As Received"											
Moisture		23.4			percent		DRS1	12/09/15	1255	1529378	1
<b>Rad Gamma Spec Analysis</b>											
Gammascpec, Gamma. Solid "Dry Weight Corrected"											
Actinium-227	UI	0.00	0.488		pCi/g		RXF2	01/04/16	0858	1529716	2
Antimony-125	UI	0.00	0.179		pCi/g						
Bismuth-212	UI	0.00	1.21		pCi/g						
Bismuth-214		0.857	0.122		pCi/g						
Cesium-137		0.504	0.0816	0.100	pCi/g						
Cobalt-60	U	-0.0391	0.0573		pCi/g						
Europium-154	U	0.0127	0.225		pCi/g						
Lead-212		1.10	0.0882		pCi/g						
Lead-214		0.956	0.136		pCi/g						
Potassium-40		15.9	0.642		pCi/g						
Protactinium-231	UI	0.00	0.867		pCi/g						
Radium-226		0.857	0.122		pCi/g						
Radium-228		0.884	0.285		pCi/g						
Thallium-208		0.338	0.0665		pCi/g						
Tin-126	UI	0.00	0.106		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>											
GFPC, Gross A/B. solid "Dry Weight Corrected"											
Alpha		13.7	3.91	4.00	pCi/g		KXB2	01/04/16	1240	1532749	3
Beta		24.1	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	DRS1	12/09/15	1255	1529378

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:

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Report Date: March 8, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.2.2  
 Sample ID: 392045002  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 19.6%

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	-0.0418	+/-0.293	0.552	0.258	+/-0.294		pCi/g		MXR1	03/08/16	0632	1547793	1
Antimony-125	U	0.0162	+/-0.125	0.245	0.113	+/-0.125		pCi/g						
Bismuth-212	UI	0.00	+/-0.868	1.78	0.818	+/-1.09		pCi/g						
Bismuth-214		1.00	+/-0.237	0.183	0.0829	+/-0.252		pCi/g						
Cesium-137		1.16	+/-0.140	0.0922	0.041	+/-0.169	0.100	pCi/g						
Cobalt-60	U	0.00166	+/-0.0584	0.120	0.0513	+/-0.0584		pCi/g						
Europium-154	U	-0.329	+/-0.192	0.260	0.107	+/-0.244		pCi/g						
Lead-212		1.18	+/-0.138	0.112	0.0523	+/-0.190		pCi/g						
Lead-214		1.10	+/-0.217	0.175	0.0811	+/-0.237		pCi/g						
Potassium-40		15.4	+/-1.89	1.01	0.421	+/-2.34		pCi/g						
Protactinium-231	UI	0.00	+/-0.548	1.01	0.466	+/-0.566		pCi/g						
Radium-226		1.00	+/-0.237	0.183	0.0829	+/-0.252		pCi/g						
Radium-228		1.32	+/-0.389	0.400	0.177	+/-0.424		pCi/g						
Thallium-208		0.344	+/-0.105	0.0794	0.0353	+/-0.109		pCi/g						
Tin-126	UI	0.00	+/-0.0941	0.0935	0.0444	+/-0.097		pCi/g						

**Rad Gas Flow Proportional Counting**

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

Alpha		84.9	+/-8.15	3.86	1.64	+/-18.2	4.00	pCi/g		JXB7	03/03/16	1051	1547854	2
Beta		30.1	+/-3.43	3.05	1.42	+/-5.71	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: 4.4.C.R.2.2  
Sample ID: 392045002

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 5, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4C.R.2.3  
 Sample ID: 387022005  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 16.6%

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		16.6						percent		DRS1	12/09/15	1328	1529597	1
<b>Rad Alpha Spec Analysis</b>														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.0106	+/-0.032	0.0899	0.0229	+/-0.032	1.00	pCi/g		MXS2	12/28/15	1656	1529806	2
Plutonium-239/240	U	0.0118	+/-0.0527	0.103	0.0295	+/-0.0527	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	-0.00058	+/-0.0767	0.163	0.0597	+/-0.0767	1.00	pCi/g		MXS2	12/28/15	1551	1529801	3
Uranium-233/234		0.566	+/-0.199	0.0964	0.0221	+/-0.221	1.00	pCi/g						
Uranium-235/236		0.0307	+/-0.0604	0.0837	0.0157	+/-0.0606	1.00	pCi/g						
Uranium-238		0.592	+/-0.202	0.0522	0.00	+/-0.226	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.161	+/-0.226	0.661	0.228	+/-0.226	1.00	pCi/g		MXS2	12/28/15	1605	1529805	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		0.989	+/-0.520	0.542	0.189	+/-0.544	1.00	pCi/g		MXS2	12/28/15	1606	1529799	5
Thorium-229		0.282	+/-0.282	0.327	0.0831	+/-0.285	1.00	pCi/g						
Thorium-230		0.934	+/-0.458	0.295	0.0677	+/-0.477	1.00	pCi/g						
Thorium-232		0.931	+/-0.456	0.294	0.0675	+/-0.476	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241		0.011	+/-0.0309	0.033	0.00	+/-0.0309	1.00	pCi/g		MXS2	12/28/15	1656	1529802	6
Curium-242		0.00	+/-0.0247	0.0367	0.00	+/-0.0247	1.00	pCi/g						
Curium-243/244		0.0165	+/-0.0379	0.0601	0.0138	+/-0.0379	1.00	pCi/g						
Curium-245/246	X	0.0503	+/-0.0554	0.0377	0.00	+/-0.0557	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-5.4	+/-6.28	11.2	5.42	+/-6.28	15.0	pCi/g		MXS2	12/30/15	1802	1529807	7
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	0.0808	+/-0.251	0.447	0.209	+/-0.254	1.00	pCi/g		MJH1	12/30/15	1638	1533084	8
<i>Gammiaspec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0375	+/-0.184	0.357	0.169	+/-0.185		pCi/g		RXF2	01/04/16	0921	1529718	9
Antimony-125	U	-0.00716	+/-0.0675	0.128	0.0597	+/-0.0676		pCi/g						
Bismuth-212	UI	0.00	+/-0.620	0.868	0.408	+/-0.781		pCi/g						
Bismuth-214		0.707	+/-0.123	0.100	0.0466	+/-0.136		pCi/g						
Cesium-137		0.072	+/-0.0826	0.0521	0.0241	+/-0.0828	0.100	pCi/g						
Cobalt-60	U	0.00909	+/-0.0275	0.0548	0.0246	+/-0.0278		pCi/g						
Europium-154	U	0.0193	+/-0.0876	0.171	0.0776	+/-0.0881		pCi/g						
Lead-212		0.951	+/-0.109	0.0814	0.0386	+/-0.133		pCi/g						
Lead-214		0.883	+/-0.159	0.101	0.0473	+/-0.174		pCi/g						

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 Address : 15 Hazelwood Drive  
 Suite 112  
 Buffalo, New York 14228  
 Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes  
 Client Sample ID: 4.4C.R.2.3  
 Sample ID: 387022005

Report Date: January 5, 2016

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspex, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		12.5	+/-1.11	0.279	0.112	+/-1.55		pCi/g						
Protactinium-231	UI	0.00	+/-0.612	0.728	0.345	+/-0.631		pCi/g						
Radium-226		0.707	+/-0.123	0.100	0.0466	+/-0.136		pCi/g						
Radium-228		0.729	+/-0.280	0.196	0.090	+/-0.303		pCi/g						
Thallium-208		0.215	+/-0.0676	0.0493	0.0229	+/-0.0699		pCi/g						
Tin-126	UI	0.00	+/-0.101	0.106	0.0503	+/-0.102		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		8.82	+/-3.14	3.94	1.73	+/-3.61	4.00	pCi/g		JXB7	01/04/16	1347	1532750	10
Beta		20.3	+/-3.23	3.99	1.89	+/-4.42	10.0	pCi/g						
<i>GFPC, Sr-90, solid "Dry Weight Corrected"</i>														
Strontium-90	UI	-1.34	+/-0.924	1.99	0.903	+/-0.924	2.00	pCi/g		KSD1	12/29/15	1420	1532743	11
<b>Rad Liquid Scintillation Analysis</b>														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	UI	-1.04	+/-2.12	3.79	1.82	+/-2.12	6.00	pCi/g		TXJ1	12/27/15	2130	1531105	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	UI	-0.597	+/-0.757	1.31	0.645	+/-0.757	2.00	pCi/g		TXJ1	12/24/15	0001	1531115	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	UI	-0.13	+/-1.20	2.11	1.01	+/-1.20	5.00	pCi/g		MYM	01/02/16	1159	1532556	14

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	12/09/15	1328	1529597

**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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Suite 112  
Buffalo, New York 14228

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.2.3  
Sample ID: 387022005

Project: MJWC00115  
Client ID: MJWC001

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1529806	81.4	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	84.1	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	101	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1529805	104	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1529799	90.4	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1529802	95.6	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1529807	81.4	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1532743	79.2	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1532556	92.9	(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

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

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.2.5  
 Sample ID: 387022006  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 15.5%

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		15.5						percent		DRS1	12/09/15	1328	1529597	1
<b>Rad Alpha Spec Analysis</b>														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.0105	+/-0.0244	0.0723	0.0197	+/-0.0244	1.00	pCi/g		MXS2	12/28/15	1656	1529806	2
Plutonium-239/240	U	-0.0105	+/-0.0244	0.0722	0.0197	+/-0.0244	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	-0.0216	+/-0.0616	0.150	0.0542	+/-0.0617	1.00	pCi/g		MXS2	12/28/15	1552	1529801	3
Uranium-233/234		0.721	+/-0.238	0.118	0.0301	+/-0.269	1.00	pCi/g						
Uranium-235/236	U	0.0101	+/-0.0561	0.107	0.0246	+/-0.0562	1.00	pCi/g						
Uranium-238		0.832	+/-0.252	0.058	0.00	+/-0.291	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.0146	+/-0.219	0.512	0.147	+/-0.219	1.00	pCi/g		MXS2	12/28/15	1605	1529805	4
<i>Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.03	+/-0.560	0.548	0.179	+/-0.586	1.00	pCi/g		MXS2	12/28/15	1606	1529799	5
Thorium-229		0.206	+/-0.309	0.480	0.147	+/-0.310	1.00	pCi/g						
Thorium-230		0.683	+/-0.442	0.407	0.111	+/-0.454	1.00	pCi/g						
Thorium-232		0.912	+/-0.503	0.432	0.124	+/-0.522	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	-0.00328	+/-0.0282	0.0654	0.0122	+/-0.0283	1.00	pCi/g		MXS2	12/28/15	1656	1529802	6
Curium-242		0.00	+/-0.0306	0.0456	0.00	+/-0.0307	1.00	pCi/g						
Curium-243/244	U	-0.00647	+/-0.0286	0.0747	0.0171	+/-0.0287	1.00	pCi/g						
Curium-245/246		0.00	+/-0.0315	0.0468	0.00	+/-0.0315	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-3.47	+/-5.40	9.53	4.63	+/-5.40	15.0	pCi/g		MXS2	12/30/15	1853	1529807	7
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	UI	0.00	+/-0.131	0.295	0.134	+/-0.166	1.00	pCi/g		MJH1	12/30/15	1638	1533084	8
<i>Gammaspect, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0415	+/-0.214	0.419	0.198	+/-0.215		pCi/g		RXF2	01/04/16	0922	1529718	9
Antimony-125	U	-0.00416	+/-0.0769	0.144	0.0667	+/-0.0769		pCi/g						
Bismuth-212	UI	0.00	+/-0.769	0.994	0.462	+/-0.805		pCi/g						
Bismuth-214		0.601	+/-0.149	0.109	0.050	+/-0.157		pCi/g						
Cesium-137		0.0546	+/-0.0633	0.0508	0.0228	+/-0.0635	0.100	pCi/g						
Cobalt-60	U	-0.0229	+/-0.0245	0.0404	0.0162	+/-0.0266		pCi/g						
Europium-154	U	0.037	+/-0.0933	0.193	0.0858	+/-0.0948		pCi/g						
Lead-212		0.897	+/-0.108	0.0904	0.0427	+/-0.139		pCi/g						
Lead-214		0.909	+/-0.138	0.246	0.119	+/-0.160		pCi/g						

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## Certificate of Analysis

Company : MJW Corporation  
 Address : 15 Hazelwood Drive  
 Suite 112  
 Buffalo, New York 14228  
 Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes  
 Client Sample ID: 4.4C.R.2.5  
 Sample ID: 387022006

Report Date: January 5, 2016

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Le	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gammaspex, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		12.3	+/-1.28	0.584	0.252	+/-1.69		pCi/g						
Protactinium-231	U	0.0823	+/-0.426	0.824	0.388	+/-0.428		pCi/g						
Radium-226		0.601	+/-0.149	0.109	0.050	+/-0.157		pCi/g						
Radium-228		0.933	+/-0.203	0.200	0.0888	+/-0.245		pCi/g						
Thallium-208		0.188	+/-0.0652	0.0544	0.0249	+/-0.0671		pCi/g						
Tin-126	UI	0.00	+/-0.115	0.0976	0.0466	+/-0.115		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A-B, solid "Dry Weight Corrected"</i>														
Alpha		10.8	+/-3.84	3.89	1.54	+/-4.37	4.00	pCi/g		JXB7	01/02/16	1420	1532750	10
Beta		15.8	+/-2.95	2.88	1.29	+/-3.75	10.0	pCi/g						
<i>GFPC, Sr-90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	0.544	+/-0.941	1.65	0.722	+/-0.947	2.00	pCi/g		KSD1	12/29/15	1703	1532743	11
<b>Rad Liquid Scintillation Analysis</b>														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	0.0557	+/-2.18	3.82	1.83	+/-2.18	6.00	pCi/g		TXJ1	12/27/15	2301	1531105	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	0.219	+/-0.775	1.32	0.647	+/-0.775	2.00	pCi/g		TXJ1	12/24/15	0124	1531115	13
<i>Liquid Scint Tc99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	0.827	+/-1.26	2.14	1.03	+/-1.27	5.00	pCi/g		MYM	01/02/16	1216	1532556	14

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRS1	12/09/15	1328	1529597

**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

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.2.5  
Sample ID: 387022006

Project: MJWC00115  
Client ID: MJWC001

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1529806	94.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	71.8	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	80.8	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1529805	101	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1529799	84.5	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1529802	86.6	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1529807	94.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1532743	76	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1532556	92.8	(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: January 5, 2016

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

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.3.1	Project: MJWC00115
Sample ID: 386983023	Client ID: MJWC001
Matrix: Soil	
Collect Date: 25-NOV-15 12:03	
Receive Date: 08-DEC-15	
Collector: Client	
Moisture: 27%	

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Gravimetric Solids</b>											
ASTM D 2216 % Moisture "As Received"											
Moisture		27.0			percent		DRS1	12/09/15	1255	1529378	1
<b>Rad Gamma Spec Analysis</b>											
Gammascpec, Gamma, Solid "Dry Weight Corrected"											
Actinium-227	U	0.0781	0.513		pCi/g		RXF2	01/04/16	0859	1529716	2
Antimony-125	U	0.0314	0.197		pCi/g						
Bismuth-212	UI	0.00	1.33		pCi/g						
Bismuth-214		0.546	0.141		pCi/g						
Cesium-137		0.613	0.0898	0.100	pCi/g						
Cobalt-60	U	-0.0182	0.0755		pCi/g						
Europium-154	U	-0.0371	0.205		pCi/g						
Lead-212		1.01	0.120		pCi/g						
Lead-214		1.07	0.163		pCi/g						
Potassium-40		14.5	0.728		pCi/g						
Protactinium-231	UI	0.00	1.11		pCi/g						
Radium-226		0.546	0.141		pCi/g						
Radium-228		0.763	0.287		pCi/g						
Thallium-208		0.353	0.0761		pCi/g						
Tin-126	UI	0.00	0.161		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>											
GFPC, Gross A/B, solid "Dry Weight Corrected"											
Alpha		10.1	3.91	4.00	pCi/g		KXB2	01/04/16	1241	1532749	3
Beta		23.6	4.25	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	DRS1	12/09/15	1255	1529378

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:

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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

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.3.2  
 Sample ID: 392045003  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 18.8%

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	0.163	+/-0.230	0.470	0.222	+/-0.243		pCi/g		MXR1	03/08/16	0632	1547793	1
Antimony-125	U	-0.00248	+/-0.0958	0.161	0.074	+/-0.0958		pCi/g						
Bismuth-212		0.870	+/-0.516	0.721	0.321	+/-0.524		pCi/g						
Bismuth-214		0.698	+/-0.141	0.124	0.0571	+/-0.153		pCi/g						
Cesium-137		0.337	+/-0.0762	0.0619	0.0281	+/-0.0815	0.100	pCi/g						
Cobalt-60	U	-0.0309	+/-0.0359	0.0643	0.0276	+/-0.0386		pCi/g						
Europium-154	U	-0.0791	+/-0.108	0.183	0.079	+/-0.114		pCi/g						
Lead-212		1.03	+/-0.118	0.105	0.0496	+/-0.154		pCi/g						
Lead-214		0.981	+/-0.174	0.123	0.0573	+/-0.195		pCi/g						
Potassium-40		12.6	+/-1.33	0.610	0.261	+/-1.72		pCi/g						
Protactinium-231	U	0.173	+/-0.435	0.867	0.407	+/-0.444		pCi/g						
Radium-226		0.698	+/-0.141	0.124	0.0571	+/-0.153		pCi/g						
Radium-228		1.06	+/-0.286	0.233	0.105	+/-0.329		pCi/g						
Thallium-208		0.270	+/-0.0731	0.0595	0.0272	+/-0.0768		pCi/g						
Tin-126	UI	0.00	+/-0.133	0.143	0.0685	+/-0.139		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha		13.7	+/-3.81	3.99	1.70	+/-4.66	4.00	pCi/g		JXB7	03/03/16	1051	1547854	2
Beta		18.1	+/-2.86	3.01	1.39	+/-3.88	10.0	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/26/16	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: 4.4.C.R.3.2  
Sample ID: 392045003

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

Report Date: January 5, 2016

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

Client Sample ID: 4.4C.R.3.5 Project: MJWC00115  
Sample ID: 386983001 Client ID: MJWC001  
Matrix: Water  
Collect Date: 25-NOV-15 12:34  
Receive Date: 08-DEC-15  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
<b>Rad Gamma Spec Analysis</b>											
<b>Gammaspec, Gamma, Liquid (Standard List) "As Received"</b>											
Actinium-227	U	1.68	44.7		pCi/L		MJH1	12/18/15	0711	1529228	1
Antimony-125	U	-6.2	14.8		pCi/L						
Bismuth-212	U	5.08	81.0		pCi/L						
Bismuth-214	U	-0.166	14.8		pCi/L						
Cesium-137	U	-0.523	7.14	10.0	pCi/L						
Cobalt-60	U	0.936	6.90		pCi/L						
Europium-154	U	-9.85	15.5		pCi/L						
Lead-212	U	3.80	11.7		pCi/L						
Lead-214	U	-9.36	13.6		pCi/L						
Potassium-40	U	8.79	93.6		pCi/L						
Protactinium-231	U	-14.7	81.1		pCi/L						
Radium-228	U	-9.89	26.5		pCi/L						
Thallium-208	U	0.822	7.08		pCi/L						
Tin-126	U	-3.09	11.7		pCi/L						
<b>Rad Gas Flow Proportional Counting</b>											
<b>GFPC, Gross A/B, liquid "As Received"</b>											
Alpha	U	-0.27	3.28	5.00	pCi/L		JXB7	12/21/15	1329	1531188	2
Beta	U	-0.67	4.82	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:





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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

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.4.2  
 Sample ID: 392045004  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 19.8%

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	-0.0356	+/-0.278	0.478	0.227	+/-0.278		pCi/g		MXR1	03/08/16	0646	1547793	1
Antimony-125	U	-0.0831	+/-0.0944	0.164	0.0768	+/-0.102		pCi/g						
Bismuth-212	UI	0.00	+/-0.730	1.12	0.529	+/-0.790		pCi/g						
Bismuth-214		0.993	+/-0.187	0.126	0.0591	+/-0.206		pCi/g						
Cesium-137		0.419	+/-0.0684	0.0649	0.0301	+/-0.0774	0.100	pCi/g						
Cobalt-60	U	0.00819	+/-0.0386	0.075	0.0339	+/-0.0388		pCi/g						
Europium-154	U	0.040	+/-0.133	0.249	0.114	+/-0.134		pCi/g						
Lead-212		1.26	+/-0.133	0.109	0.0521	+/-0.165		pCi/g						
Lead-214		1.19	+/-0.169	0.136	0.0641	+/-0.193		pCi/g						
Potassium-40		16.4	+/-1.25	0.597	0.264	+/-1.88		pCi/g						
Protactinium-231	UI	0.00	+/-0.512	0.992	0.474	+/-0.596		pCi/g						
Radium-226		0.993	+/-0.187	0.126	0.0591	+/-0.206		pCi/g						
Radium-228		1.22	+/-0.247	0.276	0.128	+/-0.278		pCi/g						
Thallium-208		0.293	+/-0.0861	0.0568	0.0263	+/-0.0897		pCi/g						
Tin-126	UI	0.00	+/-0.128	0.181	0.0876	+/-0.130		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha		14.0	+/-3.67	3.94	1.71	+/-4.55	4.00	pCi/g		JXB7	03/03/16	1051	1547854	2
Beta		19.6	+/-2.53	2.63	1.24	+/-3.92	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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# 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 Loscy  
Project: Soil Radioisotopes

Client Sample ID: 4.4.C.R.4.2  
Sample ID: 392045004

Project: MJWC00115  
Client ID: MJWC001

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

### Notes:

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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Report Date: January 5, 2016

Client Sample ID: 4.4.C.R.5.1  
 Sample ID: 387022001  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 28.3%

Project: MJWC00115  
 Client ID: MJWC001

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

*ASTM D 2216 % Moisture "As Received"*

Moisture		28.3						percent		DRS1	12/09/15	1328	1529597	1
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**Rad Gamma Spec Analysis**

*Gammascpec, Gamma, Solid "Dry Weight Corrected"*

Actinium-227	U	-0.235	+/-0.285	0.498	0.230	+/-0.306		pCi/g		RXF2	01/04/16	0746	1529718	2
Antimony-125	U	0.0523	+/-0.128	0.241	0.112	+/-0.130		pCi/g						
Bismuth-212	UI	0.00	+/-0.857	1.30	0.594	+/-0.942		pCi/g						
Bismuth-214		0.749	+/-0.154	0.183	0.0842	+/-0.167		pCi/g						
Cesium-137		0.878	+/-0.114	0.0824	0.0371	+/-0.135	0.100	pCi/g						
Cobalt-60	U	-0.0062	+/-0.0472	0.090	0.0385	+/-0.0473		pCi/g						
Europium-154	U	0.0139	+/-0.147	0.287	0.126	+/-0.148		pCi/g						
Lead-212		1.12	+/-0.152	0.118	0.0551	+/-0.178		pCi/g						
Lead-214		1.03	+/-0.198	0.356	0.172	+/-0.216		pCi/g						
Potassium-40		13.6	+/-1.70	0.986	0.428	+/-2.08		pCi/g						
Protactinium-231	U	0.200	+/-0.561	1.01	0.466	+/-0.570		pCi/g						
Radium-226		0.749	+/-0.154	0.183	0.0842	+/-0.167		pCi/g						
Radium-228		0.783	+/-0.321	0.338	0.151	+/-0.342		pCi/g						
Thallium-208		0.355	+/-0.0755	0.0757	0.0341	+/-0.0814		pCi/g						
Tin-126	UI	0.00	+/-0.132	0.150	0.0708	+/-0.133		pCi/g						

**Rad Gas Flow Proportional Counting**

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

Alpha		20.4	+/-4.18	4.00	1.75	+/-5.76	4.00	pCi/g		JXB7	01/02/16	1419	1532750	3
Beta		24.2	+/-2.96	3.19	1.52	+/-4.80	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	DRS1	12/09/15	1328	1529597

**The following Analytical Methods were performed**

Method	Description
1	ASTM D 2216 (Modified)
2	DOE HASL 300, 4 5 2.3/Ga-01-R
3	EPA 900.0/SW846 9310/SM 7110B Modified

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

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## Certificate of Analysis

Company : MJW Corporation  
Address : 15 Hazelwood Drive  
Suite 112  
Buffalo, New York 14228  
Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes  
Client Sample ID: 4.4.C.R.5.1  
Sample ID: 387022001

Report Date: January 5, 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).

# GEL LABORATORIES LLC

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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

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.5.2  
 Sample ID: 392031016  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 23.6%

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	-0.372	+/-0.296	0.492	0.231	+/-0.346		pCi/g		MXR1	03/07/16	0744	1547790	1
Antimony-125	U	-0.0366	+/-0.132	0.241	0.113	+/-0.133		pCi/g						
Bismuth-212		1.10	+/-0.884	0.956	0.426	+/-0.891		pCi/g						
Bismuth-214		1.11	+/-0.182	0.139	0.0628	+/-0.205		pCi/g						
Cesium-137		1.54	+/-0.161	0.0927	0.0426	+/-0.206	0.100	pCi/g						
Cobalt-60	U	0.00613	+/-0.0491	0.0972	0.0425	+/-0.0492		pCi/g						
Europium-154	U	-0.126	+/-0.143	0.239	0.103	+/-0.154		pCi/g						
Lead-212		1.16	+/-0.123	0.117	0.0552	+/-0.187		pCi/g						
Lead-214		1.26	+/-0.220	0.140	0.0649	+/-0.245		pCi/g						
Potassium-40		17.3	+/-1.83	0.847	0.363	+/-2.48		pCi/g						
Protactinium-231	U	0.379	+/-0.692	1.02	0.478	+/-0.697		pCi/g						
Radium-226		1.11	+/-0.182	0.139	0.0628	+/-0.205		pCi/g						
Radium-228		0.912	+/-0.321	0.333	0.150	+/-0.343		pCi/g						
Thallium-208		0.428	+/-0.0929	0.0684	0.0308	+/-0.0998		pCi/g						
Tin-126	UI	0.00	+/-0.0963	0.123	0.0593	+/-0.0984		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha		12.1	+/-3.85	3.91	1.60	+/-4.48	4.00	pCi/g		JXB7	03/03/16	1137	1547849	2
Beta		21.9	+/-3.06	3.07	1.42	+/-4.28	10.0	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1518	1547782

### The following Analytical Methods were performed

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

### Surrogate/Tracer Recovery Test

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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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: 4.4.C.R.5.2  
Sample ID: 392031016

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

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## Certificate of Analysis

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

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.4.C.R.6.1  
 Sample ID: 387022002  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 27%

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		27.0						percent		DRS1	12/09/15	1328	1529597	1
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec. Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	0.0151	+/-0.326	0.620	0.289	+/-0.326		pCi/g		RXF2	01/04/16	0901	1529718	2
Antimony-125	U	-0.0544	+/-0.135	0.237	0.108	+/-0.137		pCi/g						
Bismuth-212	UI	0.00	+/-1.02	1.69	0.779	+/-1.28		pCi/g						
Bismuth-214		0.843	+/-0.220	0.168	0.0753	+/-0.232		pCi/g						
Cesium-137		1.08	+/-0.157	0.0941	0.0422	+/-0.180	0.100	pCi/g						
Cobalt-60	U	-0.0153	+/-0.054	0.0994	0.042	+/-0.0544		pCi/g						
Europium-154	U	-0.0292	+/-0.187	0.297	0.127	+/-0.187		pCi/g						
Lead-212		1.09	+/-0.147	0.135	0.0634	+/-0.172		pCi/g						
Lead-214		0.961	+/-0.210	0.194	0.0897	+/-0.226		pCi/g						
Potassium-40		12.6	+/-1.85	0.918	0.381	+/-2.14		pCi/g						
Protactinium-231	UI	0.00	+/-1.02	1.16	0.536	+/-1.05		pCi/g						
Radium-226		0.843	+/-0.220	0.168	0.0753	+/-0.232		pCi/g						
Radium-228		1.25	+/-0.285	0.335	0.146	+/-0.331		pCi/g						
Thallium-208		0.390	+/-0.111	0.0847	0.0379	+/-0.116		pCi/g						
Tin-126	UI	0.00	+/-0.167	0.194	0.0921	+/-0.168		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A:B, solid "Dry Weight Corrected"</i>														
Alpha		14.9	+/-4.16	3.83	1.60	+/-5.33	4.00	pCi/g		JXB7	01/02/16	1419	1532750	3
Beta		25.7	+/-3.22	2.37	1.05	+/-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	DRS1	12/09/15	1328	1529597

**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  
Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes  
Client Sample ID: 44.C.R.6.1  
Sample ID: 387022002

Report Date: January 5, 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).

# GEL LABORATORIES LLC

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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

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.6.2  
 Sample ID: 392031017  
 Matrix: Soil  
 Collect Date: 25-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 22.2%

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	0.101	+/-0.271	0.518	0.245	+/-0.275		pCi/g		MXR1	03/07/16	0746	1547790	1
Antimony-125	U	-0.0344	+/-0.105	0.186	0.0859	+/-0.106		pCi/g						
Bismuth-212		1.26	+/-0.938	0.996	0.455	+/-0.946		pCi/g						
Bismuth-214		0.802	+/-0.181	0.141	0.065	+/-0.192		pCi/g						
Cesium-137		1.14	+/-0.125	0.0707	0.0322	+/-0.154	0.100	pCi/g						
Cobalt-60	U	-0.024	+/-0.043	0.0767	0.0334	+/-0.0444		pCi/g						
Europium-154	U	0.0648	+/-0.134	0.243	0.108	+/-0.137		pCi/g						
Lead-212		1.10	+/-0.121	0.110	0.0522	+/-0.159		pCi/g						
Lead-214		1.05	+/-0.171	0.315	0.153	+/-0.193		pCi/g						
Potassium-40		16.4	+/-1.51	0.510	0.207	+/-2.07		pCi/g						
Protactinium-231	U	0.253	+/-0.720	1.02	0.481	+/-0.723		pCi/g						
Radium-226		0.802	+/-0.181	0.141	0.065	+/-0.192		pCi/g						
Radium-228		1.15	+/-0.286	0.225	0.0989	+/-0.330		pCi/g						
Thallium-208		0.356	+/-0.0827	0.0569	0.0256	+/-0.0878		pCi/g						
Tin-126	UI	0.00	+/-0.113	0.117	0.056	+/-0.114		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha		13.5	+/-4.23	4.24	1.73	+/-4.90	4.00	pCi/g		JXB7	03/03/16	1137	1547849	2
Beta		24.3	+/-3.78	4.00	1.85	+/-4.89	10.0	pCi/g						

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1518	1547782

### The following Analytical Methods were performed

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

### Surrogate/Tracer Recovery Test

Batch ID Recovery% Acceptable Limits

# GEL LABORATORIES LLC

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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: 4.4.C.R.6.2  
Sample ID: 392031017

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).

# 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: 4.4C.R.7.1  
 Sample ID: 387022003  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 24%

Report Date: January 5, 2016

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		24.0						percent		DKS1	12/09/15	1328	1529597	1
<b>Rad Alpha Spec Analysis</b>														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.00371	+/-0.032	0.0741	0.0139	+/-0.0321	1.00	pCi/g		MXS2	12/28/15	1656	1529806	2
Plutonium-239/240		0.0272	+/-0.0534	0.0741	0.0139	+/-0.0536	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.0248	+/-0.0682	0.118	0.0301	+/-0.0684	1.00	pCi/g		MXS2	12/28/15	1551	1529801	3
Uranium-233/234		0.770	+/-0.243	0.117	0.0297	+/-0.280	1.00	pCi/g						
Uranium-235/236		0.0575	+/-0.0757	0.0575	0.00	+/-0.0764	1.00	pCi/g						
Uranium-238		0.937	+/-0.265	0.0573	0.00	+/-0.315	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	-0.0337	+/-0.149	0.389	0.0891	+/-0.149	1.00	pCi/g		MXS2	12/28/15	1605	1529805	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.42	+/-0.616	0.523	0.173	+/-0.654	1.00	pCi/g		MXS2	12/28/15	1606	1529799	5
Thorium-229		0.118	+/-0.234	0.380	0.103	+/-0.235	1.00	pCi/g						
Thorium-230		0.734	+/-0.424	0.276	0.0516	+/-0.437	1.00	pCi/g						
Thorium-232		0.833	+/-0.452	0.318	0.0728	+/-0.468	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	0.00693	+/-0.0385	0.0738	0.0169	+/-0.0385	1.00	pCi/g		MXS2	12/28/15	1656	1529802	6
Curium-242	U	-0.00356	+/-0.0307	0.0711	0.0133	+/-0.0308	1.00	pCi/g						
Curium-243/244	U	-0.00579	+/-0.040	0.0974	0.0289	+/-0.040	1.00	pCi/g						
Curium-245/246	X	0.0915	+/-0.0794	0.0457	0.00	+/-0.0802	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-4.49	+/-7.22	12.7	6.18	+/-7.22	15.0	pCi/g		MXS2	12/30/15	1620	1529807	7
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma 1129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.018	+/-0.181	0.375	0.144	+/-0.181	1.00	pCi/g		MJH1	12/30/15	1433	1533084	8
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	UI	0.00	+/-0.382	0.744	0.350	+/-0.421		pCi/g		RXF2	01/04/16	0920	1529718	9
Antimony-125	U	-0.000139	+/-0.125	0.228	0.103	+/-0.125		pCi/g						
Bismuth-212		1.37	+/-0.969	1.26	0.554	+/-0.977		pCi/g						
Bismuth-214		0.839	+/-0.219	0.188	0.0845	+/-0.229		pCi/g						
Cesium-137		0.404	+/-0.0993	0.103	0.0463	+/-0.105	0.100	pCi/g						
Cobalt-60	U	-0.00648	+/-0.0542	0.167	0.045	+/-0.0543		pCi/g						
Europium-154	U	0.0866	+/-0.179	0.375	0.165	+/-0.183		pCi/g						
Lead-212		1.17	+/-0.149	0.138	0.0642	+/-0.175		pCi/g						
Lead-214		1.01	+/-0.240	0.413	0.199	+/-0.253		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: 4.4C.R.7.1  
 Sample ID: 387022003

Report Date: January 5, 2016

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>GammaSpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		14.1	+/-1.85	0.892	0.363	+/-2.33		pCi/g						
Protactinium-231	U	0.00	+/-0.829	1.16	0.536	+/-0.859		pCi/g						
Radium-226		0.839	+/-0.219	0.188	0.0845	+/-0.229		pCi/g						
Radium-228		1.33	+/-0.352	0.308	0.131	+/-0.387		pCi/g						
Thallium-208		0.319	+/-0.106	0.101	0.0456	+/-0.109		pCi/g						
Tin-126	U	0.0756	+/-0.160	0.219	0.105	+/-0.160		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		11.7	+/-3.35	3.93	1.73	+/-4.05	4.00	pCi/g		JXB7	01/02/16	1420	1532750	10
Beta		15.9	+/-2.25	2.16	0.994	+/-3.29	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	0.288	+/-0.893	1.63	0.714	+/-0.894	2.00	pCi/g		KSDI	12/29/15	1420	1532743	11
<b>Rad Liquid Scintillation Analysis</b>														
<i>ISC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	0.287	+/-2.56	4.46	2.14	+/-2.56	6.00	pCi/g		TXJ1	12/27/15	1827	1531105	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	-0.656	+/-0.822	1.43	0.700	+/-0.822	2.00	pCi/g		TXJ1	12/23/15	2115	1531115	13
<i>Liquid Scint Te99, Solid "Dry Weight Corrected"</i>														
Technetium-99		1.67	+/-1.60	2.68	1.28	+/-1.62	5.00	pCi/g		MYM	01/02/16	1126	1532556	14

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-01	DRS1	12/09/15	1328	1529597

**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, J-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

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.7.1  
Sample ID: 387022003

Project: MJWC00115  
Client ID: MJWC001

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

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"	1529806	70.2	(15%-125%)
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	75.6	(15%-125%)
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"	1529801	74.7	(15%-125%)
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"	1529805	99.1	(15%-125%)
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"	1529799	90.1	(15%-125%)
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"	1529802	89.9	(15%-125%)
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"	1529807	70.2	(15%-125%)
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"	1532743	79.2	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"	1532556	90.3	(15%-125%)

### Notes:

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

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## Certificate of Analysis

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

Report Date: March 8, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Project: MJWC00115  
 Client ID: MJWC001

Client Sample ID: 4.4.C.R.7.2  
 Sample ID: 392031018  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 21.7%

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	0.301	+/-0.342	0.666	0.314	+/-0.371		pCi/g		MXR1	03/07/16	0745	1547790	1
Antimony-125	UI	0.00	+/-0.137	0.269	0.125	+/-0.151		pCi/g						
Bismuth-212	UI	0.00	+/-0.799	1.42	0.656	+/-0.939		pCi/g						
Bismuth-214		0.921	+/-0.204	0.173	0.0795	+/-0.221		pCi/g						
Cesium-137		1.25	+/-0.141	0.0826	0.0373	+/-0.182	0.100	pCi/g						
Cobalt-60	U	-0.0453	+/-0.0457	0.0737	0.0302	+/-0.0501		pCi/g						
Europium-154	U	-0.0867	+/-0.147	0.261	0.113	+/-0.153		pCi/g						
Lead-212		1.11	+/-0.150	0.147	0.0697	+/-0.182		pCi/g						
Lead-214		0.965	+/-0.198	0.189	0.0882	+/-0.216		pCi/g						
Potassium-40		14.4	+/-1.64	0.623	0.247	+/-2.05		pCi/g						
Protactinium-231	UI	0.00	+/-1.66	1.12	0.522	+/-1.68		pCi/g						
Radium-226		0.921	+/-0.204	0.173	0.0795	+/-0.221		pCi/g						
Radium-228		1.06	+/-0.309	0.296	0.131	+/-0.351		pCi/g						
Thallium-208		0.253	+/-0.0876	0.0845	0.0386	+/-0.0905		pCi/g						
Tin-126	UI	0.00	+/-0.166	0.174	0.0829	+/-0.167		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha	15.4	+/-4.16	3.87	1.61	+/-5.20	4.00	pCi/g	JXB7	03/03/16	1138	1547849	2
Beta	24.6	+/-3.37	3.57	1.67	+/-4.83	10.0	pCi/g					

### The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	CXC1	02/25/16	1518	1547782

### 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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Address : 15 Hazelwood Drive  
Suite 112  
Buffalo, New York 14228  
Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes  
Client Sample ID: 4.4.C.R.7.2  
Sample ID: 392031018

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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## Certificate of Analysis

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

Report Date: January 5, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.4C.R.7.5  
 Sample ID: 387022004  
 Matrix: Soil  
 Collect Date: 30-NOV-15  
 Receive Date: 08-DEC-15  
 Collector: Client  
 Moisture: 27.3%

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		27.3						percent		DRS1	12/09/15	1328	1529597	1
<b>Rad Alpha Spec Analysis</b>														
<i>ASP Plutonium Isotopic, Solid "Dry Weight Corrected"</i>														
Plutonium-238	U	-0.0121	+/-0.0366	0.103	0.0262	+/-0.0367	1.00	pCi/g		MXS2	12/28/15	1656	1529806	2
Plutonium-239/240	U	0.0135	+/-0.0603	0.118	0.0338	+/-0.0604	1.00	pCi/g						
<i>ASP Uranium Isotopic, Solid "Dry Weight Corrected"</i>														
Uranium-232	U	0.0139	+/-0.0783	0.157	0.0557	+/-0.0784	1.00	pCi/g		MXS2	12/28/15	1551	1529801	3
Uranium-233/234		0.493	+/-0.470	0.605	0.185	+/-0.493	1.00	pCi/g						
Uranium-235/236		0.00	+/-0.158	0.235	0.00	+/-0.159	1.00	pCi/g						
Uranium-238		1.31	+/-0.651	0.374	0.070	+/-0.760	1.00	pCi/g						
<i>Alphaspec Np237, Solid "Dry Weight Corrected"</i>														
Neptunium-237	U	0.00292	+/-0.216	0.481	0.131	+/-0.216	1.00	pCi/g		MXS2	12/28/15	1605	1529805	4
<i>Alphaspec Th229 - 228,230,232 Solid "Dry Weight Corrected"</i>														
Thorium-228		1.06	+/-0.536	0.472	0.147	+/-0.563	1.00	pCi/g		MXS2	12/28/15	1606	1529799	5
Thorium-229		0.235	+/-0.286	0.383	0.104	+/-0.288	1.00	pCi/g						
Thorium-230		1.09	+/-0.510	0.278	0.052	+/-0.534	1.00	pCi/g						
Thorium-232		0.925	+/-0.468	0.173	0.00	+/-0.487	1.00	pCi/g						
<i>Am241, Cm Solid "Dry Weight Corrected"</i>														
Americium-241	U	0.00337	+/-0.0352	0.0735	0.0187	+/-0.0353	1.00	pCi/g		MXS2	12/28/15	1656	1529802	6
Curium-242	U	0.0102	+/-0.0382	0.0643	0.012	+/-0.0382	1.00	pCi/g						
Curium-243/244	U	0.00952	+/-0.0426	0.0834	0.0239	+/-0.0427	1.00	pCi/g						
Curium-245/246	X	0.0413	+/-0.0544	0.0413	0.00	+/-0.0546	1.00	pCi/g						
<i>Liquid Scint Pu241, Solid "Dry Weight Corrected"</i>														
Plutonium-241	U	-1.6	+/-7.84	13.6	6.62	+/-7.84	15.0	pCi/g		MXS2	12/30/15	1711	1529807	7
<b>Rad Gamma Spec Analysis</b>														
<i>Gamma I129, Solid "Dry Weight Corrected"</i>														
Iodine-129	U	-0.00304	+/-0.326	0.629	0.270	+/-0.326	1.00	pCi/g		MJH1	12/30/15	1520	1533084	8
<i>Gammasespec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	UI	0.00	+/-0.318	0.639	0.301	+/-0.352		pCi/g		RXF2	01/04/16	0921	1529718	9
Antimony-125	U	-0.00286	+/-0.132	0.244	0.113	+/-0.132		pCi/g						
Bismuth-212	UI	0.00	+/-1.15	1.64	0.761	+/-1.48		pCi/g						
Bismuth-214		0.953	+/-0.205	0.165	0.075	+/-0.220		pCi/g						
Cesium-137		0.409	+/-0.0936	0.0946	0.0431	+/-0.0994	0.100	pCi/g						
Cobalt-60	U	-0.0112	+/-0.0388	0.0736	0.0304	+/-0.0391		pCi/g						
Europium-154	UI	0.00	+/-0.142	0.316	0.141	+/-0.159		pCi/g						
Lead-212		1.02	+/-0.140	0.145	0.0688	+/-0.162		pCi/g						
Lead-214		1.07	+/-0.209	0.376	0.182	+/-0.226		pCi/g						

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 Buffalo, New York 14228  
 Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes  
 Client Sample ID: 4.4C.R.7.5  
 Sample ID: 387022004

Report Date: January 5, 2016

Project: MJWC00115  
 Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>														
<i>GammaSpec, Gamma, Solid "Dry Weight Corrected"</i>														
Potassium-40		12.5	+/-1.64	0.929	0.401	+/-1.97		pCi/g						
Protactinium-231	U	0.00	+/-1.04	1.05	0.487	+/-1.05		pCi/g						
Radium-226		0.953	+/-0.205	0.165	0.075	+/-0.220		pCi/g						
Radium-228		1.13	+/-0.336	0.224	0.0941	+/-0.367		pCi/g						
Thallium-208		0.301	+/-0.0895	0.0814	0.0369	+/-0.0931		pCi/g						
Tin-126	U	0.00	+/-0.147	0.171	0.0807	+/-0.149		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		15.0	+/-4.46	3.92	1.55	+/-5.31	4.00	pCi/g		JXB7	01/02/16	1420	1532750	10
Beta		23.0	+/-3.79	4.08	1.89	+/-4.79	10.0	pCi/g						
<i>GFPC, Sr90, solid "Dry Weight Corrected"</i>														
Strontium-90	U	-0.492	+/-0.738	1.62	0.696	+/-0.738	2.00	pCi/g		KSD1	12/29/15	1420	1532743	11
<b>Rad Liquid Scintillation Analysis</b>														
<i>LSC, Tritium Dist, Solid "Dry Weight Corrected"</i>														
Tritium	U	0.748	+/-2.65	4.59	2.20	+/-2.65	6.00	pCi/g		TXJ1	12/27/15	1958	1531105	12
<i>Liquid Scint C14, Solid "Dry Weight Corrected"</i>														
Carbon-14	U	0.0444	+/-0.895	1.53	0.751	+/-0.895	2.00	pCi/g		TXJ1	12/23/15	2238	1531115	13
<i>Liquid Scint Te99, Solid "Dry Weight Corrected"</i>														
Technetium-99	U	0.192	+/-1.35	2.34	1.12	+/-1.35	5.00	pCi/g		MYM	01/02/16	1143	1532556	14

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	DRSI	12/09/15	1328	1529597

**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 S 2.3/Ga-01-R
10	EPA 900.0/SW846 9310/SM 7110B Modified
11	EPA 905.0 Modified/DOE RP501 Rev 1 Modified
12	EPA 906.0 Modified
13	EPA EERF C-01 Modified

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Project: Soil Radioisotopes  
Client Sample ID: 4.4C.R.7.5  
Sample ID: 387022004

Report Date: January 5, 2016

Project: MJWC00115  
Client ID: MJWC001

Parameter	Qualifier	Result	Uncertainty	MDC	Lc	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
14	DOE EML HASL-300, Tc-02-RC Modified													
Surrogate/Tracer Recovery	Test						Batch ID	Recovery%	Acceptable Limits					
Plutonium-242 Tracer	ASP Plutonium Isotopic, Solid "Dry Weight Corrected"						1529806	66.5	(15%-125%)					
Uranium-232 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"						1529801	18.5	(15%-125%)					
Uranium-235/236 Tracer	ASP Uranium Isotopic, Solid "Dry Weight Corrected"						1529801	78.6	(15%-125%)					
Americium-243 Tracer	Alphaspec Np237, Solid "Dry Weight Corrected"						1529805	96.5	(15%-125%)					
Actinium-227 Tracer	Alphaspec Th229 + 228,230,232 Solid "Dry Weight Corrected"						1529799	89.7	(15%-125%)					
Americium-243 Tracer	Am241, Cm Solid "Dry Weight Corrected"						1529802	89.5	(15%-125%)					
Plutonium-242 Tracer	Liquid Scint Pu241, Solid "Dry Weight Corrected"						1529807	66.5	(15%-125%)					
Strontium Carrier	GFPC, Sr90, solid "Dry Weight Corrected"						1532743	81.4	(25%-125%)					
Technetium-99m Tracer	Liquid Scint Tc99, Solid "Dry Weight Corrected"						1532556	91.4	(15%-125%)					

### Notes:

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