

# GEL LABORATORIES LLC

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

## Certificate of Analysis

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

Report Date: January 15, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.2C.R.1.1  
 Sample ID: 387769007  
 Matrix: Soil  
 Collect Date: 08-DEC-15  
 Receive Date: 17-DEC-15  
 Collector: Client  
 Moisture: 24.4%

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		24.4						percent		LYT1	12/18/15	1142	1532297	1
<b>Rad Gamma Spec Analysis</b>														
<i>Gammascpec, Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.128	+/-0.371	0.670	0.317	+/-0.376		pCi/g		RXF2	01/12/16	0843	1532304	2
Antimony-125	U	-0.151	+/-0.145	0.253	0.118	+/-0.160		pCi/g						
Bismuth-212	U	0.183	+/-0.669	1.28	0.585	+/-0.674		pCi/g						
Bismuth-214		0.684	+/-0.215	0.169	0.0773	+/-0.223		pCi/g						
Cesium-137		2.47	+/-0.189	0.0974	0.0447	+/-0.285	0.100	pCi/g						
Cobalt-60	U	0.0381	+/-0.0488	0.106	0.0465	+/-0.0518		pCi/g						
Europium-154	U	0.022	+/-0.181	0.303	0.134	+/-0.182		pCi/g						
Lead-212		1.28	+/-0.160	0.139	0.0658	+/-0.202		pCi/g						
Lead-214		1.16	+/-0.197	0.374	0.181	+/-0.224		pCi/g						
Potassium-40		14.8	+/-1.79	0.990	0.430	+/-2.19		pCi/g						
Protactinium-231	UI	0.00	+/-0.790	1.39	0.656	+/-0.885		pCi/g						
Radium-226		0.684	+/-0.215	0.169	0.0773	+/-0.223		pCi/g						
Radium-228		0.885	+/-0.420	0.290	0.128	+/-0.438		pCi/g						
Thallium-208		0.347	+/-0.0964	0.0917	0.0422	+/-0.101		pCi/g						
Tin-126	UI	0.00	+/-0.147	0.209	0.100	+/-0.149		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A-B, solid "Dry Weight Corrected"</i>														
Alpha		17.1	+/-3.98	3.60	1.51	+/-5.17	4.00	pCi/g		JXB7	01/07/16	1423	1534688	3
Beta		25.2	+/-2.84	2.81	1.32	+/-4.48	10.0	pCi/g						

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	1142	1532297

**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: 4.2C.R.1.1  
Sample ID: 387769007

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  
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 Buffalo, New York 14228

Report Date: March 9, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.2.C.R.1.2  
 Sample ID: 392057010  
 Matrix: Soil  
 Collect Date: 08-DEC-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 20.2%

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	0.118	+/-0.276	0.525	0.246	+/-0.282		pCi/g		MXR1	03/07/16	1205	1547922	1
Antimony-125	U	-0.0204	+/-0.122	0.201	0.0923	+/-0.123		pCi/g						
Bismuth-212	UI	0.00	+/-0.926	1.46	0.679	+/-1.11		pCi/g						
Bismuth-214		0.852	+/-0.147	0.128	0.0578	+/-0.163		pCi/g						
Cesium-137		1.56	+/-0.144	0.0748	0.0338	+/-0.194	0.100	pCi/g						
Cobalt-60	U	-0.00186	+/-0.0314	0.0648	0.0266	+/-0.0314		pCi/g						
Europium-154	U	-0.0243	+/-0.120	0.231	0.100	+/-0.120		pCi/g						
Lead-212		0.972	+/-0.162	0.133	0.0629	+/-0.182		pCi/g						
Lead-214		0.940	+/-0.178	0.328	0.158	+/-0.196		pCi/g						
Potassium-40		13.8	+/-1.51	0.588	0.237	+/-1.91		pCi/g						
Protactinium-231	UI	0.00	+/-0.759	1.02	0.476	+/-0.797		pCi/g						
Radium-226		0.852	+/-0.147	0.128	0.0578	+/-0.163		pCi/g						
Radium-228		0.853	+/-0.272	0.297	0.133	+/-0.300		pCi/g						
Thallium-208		0.294	+/-0.0837	0.073	0.0332	+/-0.0873		pCi/g						
Tm-126	UI	0.00	+/-0.128	0.152	0.0723	+/-0.129		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha		15.2	+/-4.01	3.87	1.62	+/-4.97	4.00	pCi/g		BXF1	03/05/16	1618	1549866	2
Beta		21.9	+/-2.72	2.14	0.965	+/-4.07	10.0	pCi/g						

### The following Prep Methods were performed

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

### The following Analytical Methods were performed

Method	Description
1	DOE HASL 300, 4.5.2 3/Ga-01-R
2	EPA 900 0/SW846 9310/SM 7110B Modified

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

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

Report Date: March 9, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.2.C.R.1.2  
Sample ID: 392057010

Project: MJWC00115  
Client ID: MJWC001

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

### Notes:

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

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Report Date: January 15, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.2C.R.2.1  
 Sample ID: 387769008  
 Matrix: Soil  
 Collect Date: 07-DEC-15  
 Receive Date: 17-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.
<b>Gravimetric Solids</b>														
<i>ASTM D 2216 % Moisture "As Received"</i>														
Moisture		28.3						percent		LYT1	12/18/15	1142	1532297	1
<b>Rad Gamma Spec Analysis</b>														
<i>Gammasp. Gamma, Solid "Dry Weight Corrected"</i>														
Actinium-227	U	-0.0428	+/-0.282	0.509	0.237	+/-0.283		pCi/g		RXF2	01/12/16	0843	1532304	2
Antimony-125	U	0.0482	+/-0.118	0.231	0.107	+/-0.121		pCi/g						
Bismuth-212		1.87	+/-0.946	1.04	0.465	+/-0.964		pCi/g						
Bismuth-214		0.959	+/-0.188	0.151	0.0689	+/-0.205		pCi/g						
Cesium-137		2.07	+/-0.156	0.081	0.0367	+/-0.232	0.100	pCi/g						
Cobalt-60	U	-0.00117	+/-0.0434	0.0861	0.0371	+/-0.0434		pCi/g						
Europium-154	UI	0.00	+/-0.133	0.316	0.142	+/-0.158		pCi/g						
Lead-212		1.16	+/-0.134	0.112	0.0522	+/-0.167		pCi/g						
Lead-214		1.19	+/-0.229	0.365	0.177	+/-0.250		pCi/g						
Potassium-40		14.3	+/-1.58	0.717	0.298	+/-2.00		pCi/g						
Protactinium-231	UI	0.00	+/-0.900	0.889	0.410	+/-0.970		pCi/g						
Radium-226		0.959	+/-0.188	0.151	0.0689	+/-0.205		pCi/g						
Radium-228		0.977	+/-0.323	0.210	0.0885	+/-0.354		pCi/g						
Thallium-208		0.329	+/-0.0966	0.0699	0.0315	+/-0.100		pCi/g						
Tin-126	UI	0.00	+/-0.133	0.183	0.0872	+/-0.134		pCi/g						
<b>Rad Gas Flow Proportional Counting</b>														
<i>GFPC, Gross A/B, solid "Dry Weight Corrected"</i>														
Alpha		18.0	+/-4.09	3.91	1.68	+/-5.36	4.00	pCi/g		JXB7	01/07/16	1423	1534688	3
Beta		27.8	+/-2.68	2.45	1.15	+/-4.57	10.0	pCi/g						

**The following Prep Methods were performed**

Method	Description	Analyst	Date	Time	Prep Batch
Dry Soil Prep	Dry Soil Prep GL-RAD-A-021	LYT1	12/18/15	1142	1532297

**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: January 15, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.2C.R.2.1  
Sample ID: 387769008

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 9, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4.2.C.R.2.2  
 Sample ID: 392057011  
 Matrix: Soil  
 Collect Date: 07-DEC-15  
 Receive Date: 25-FEB-16  
 Collector: Client  
 Moisture: 21.9%

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>Gamma with Ingrowth "Dry Weight Corrected"</i>														
Actinium-227	U	0.0105	+/-0.279	0.526	0.248	+/-0.279		pCi/g		MXR1	03/07/16	1205	1547922	1
Antimony-125	U	0.0524	+/-0.116	0.221	0.103	+/-0.118		pCi/g						
Bismuth-212	UI	0.00	+/-0.698	1.30	0.605	+/-0.924		pCi/g						
Bismuth-214		0.982	+/-0.165	0.135	0.0615	+/-0.184		pCi/g						
Cesium-137		1.47	+/-0.140	0.081	0.037	+/-0.182	0.100	pCi/g						
Cobalt-60	U	0.00801	+/-0.0394	0.0804	0.0348	+/-0.0396		pCi/g						
Europium-154	U	-0.072	+/-0.123	0.218	0.0941	+/-0.127		pCi/g						
Lead-212		1.09	+/-0.125	0.113	0.0535	+/-0.155		pCi/g						
Lead-214		1.08	+/-0.206	0.346	0.168	+/-0.225		pCi/g						
Potassium-40		14.2	+/-1.51	0.628	0.261	+/-1.95		pCi/g						
Protactinium-231	UI	0.00	+/-0.747	0.948	0.443	+/-0.766		pCi/g						
Radium-226		0.982	+/-0.165	0.135	0.0615	+/-0.184		pCi/g						
Radium-228		1.05	+/-0.341	0.256	0.113	+/-0.374		pCi/g						
Thallium-208		0.284	+/-0.0694	0.066	0.0299	+/-0.0731		pCi/g						
Tin-126	UI	0.00	+/-0.124	0.137	0.0653	+/-0.125		pCi/g						

### Rad Gas Flow Proportional Counting

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

Alpha	15.4	+/-4.38	3.77	1.48	+/-5.30	4.00	pCi/g	BXF1	03/03/16	1623	1549866	2
Beta	24.9	+/-3.43	2.42	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	CXC1	02/26/16	1436	1547873

### The following Analytical Methods were performed

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

### Surrogate/Tracer Recovery Test

Surrogate/Tracer	Recovery	Test	Batch ID	Recovery%	Acceptable Limits
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Report Date: March 9, 2016

Contact: Ms. Laurie Losey  
Project: Soil Radioisotopes

Client Sample ID: 4.2.C.R.2.2  
Sample ID: 392057011

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 19, 2016

Contact: Ms. Laurie Losey  
 Project: Soil Radioisotopes

Client Sample ID: 4,2C,R,2,5  
 Sample ID: 387899005  
 Matrix: Water  
 Collect Date: 07-DEC-15  
 Receive Date: 21-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	8.46	+/-27.9	51.5	24.3	+/-28.1		pCi/L		MJH1	01/08/16	1806	1532831	1
Antimony-125	U	-1.35	+/-9.08	16.2	7.43	+/-9.10		pCi/L						
Bismuth-212	U	4.76	+/-46.5	89.0	40.1	+/-46.6		pCi/L						
Bismuth-214	UI	0.00	+/-11.0	12.1	5.49	+/-11.0		pCi/L						
Cesium-137	U	-0.352	+/-3.82	7.09	3.23	+/-3.82	10.0	pCi/L						
Cobalt-60	U	2.80	+/-3.59	7.43	3.22	+/-3.81		pCi/L						
Europium-154	U	-0.386	+/-10.9	21.2	9.22	+/-10.9		pCi/L						
Lead-212	UI	0.00	+/-12.2	9.52	4.46	+/-12.2		pCi/L						
Lead-214	U	3.82	+/-15.8	15.8	7.42	+/-15.8		pCi/L						
Potassium-40	U	21.2	+/-58.0	104	47.1	+/-58.8		pCi/L						
Protactinium-231	U	-10.6	+/-47.1	84.0	39.2	+/-47.4		pCi/L						
Radium-228	U	0.923	+/-19.4	28.6	13.0	+/-19.4		pCi/L						
Thallium-208	U	-1.34	+/-5.31	8.38	3.90	+/-5.34		pCi/L						
Tin-126	U	-1.38	+/-8.16	14.3	6.76	+/-8.19		pCi/L						

### Rad Gas Flow Proportional Counting

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

Alpha	U	-0.489	+/-0.960	2.82	1.00	+/-0.961	5.00	pCi/L		JXB7	01/05/16	1148	1533798	2
Beta	U	1.06	+/-1.81	3.17	1.34	+/-1.82	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

### Notes:

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