



Nicholson GeoSolutions LLC

3433 East Lake Drive
Centennial, CO 80121

June 24, 2018

Mr. Derek Johnson
Berry Petroleum Company
235 Callahan Avenue
Parachute, Colorado 81635

Subject: O-29 Final Landfarm Sampling Results

Dear Derek:

Nicholson GeoSolutions LLC was retained by Berry Petroleum Company (Berry) to conduct soil sampling of the landfarm near the O-29 well pad in the Garden Gulch area, Garfield County, Colorado. GPS mapping showed that the landfarm contains an estimated 11,000 yards of material. The landfarm material has been recently spread out and averages about 15 inches deep.

Sampling was conducted on May 24th, 2018. A total of 13 composite soil samples were collected. Each composite sample was combined from six subsamples. All subsamples were collected from a depth of about 8-12 inches. The locations of the samples are shown on Figure 1.

All samples were analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), BTEX (benzene, toluene, ethylbenzene, and xylenes), sodium adsorption ratio (SAR), pH, conductivity, metals, and PAHs to evaluate compliance with the COGCC Table 910-1 standards and further treatment needs.

Table 1 provides a summary of the analytical results for the 13 samples. The laboratory report is contained in Appendix A. Benzo(a)pyrene ranged from <0.006 mg/kg to 0.0727 mg/kg and exceeded the standard of 0.022 mg/kg for eight of the 13 samples. All other results were below the COGCC standards except for arsenic. Arsenic ranged from 6.57 mg/kg to 13.5 mg/kg, within the range of natural background concentrations for the Garden Gulch area.

Based on the sample results, remediation of the O-29 landfarm should continue. Figure 1 shows the areas of the landfarm that need further treatment based on the sample results. Since all SAR, pH, and conductivity values are below the standards for all samples, the material in the areas of the landfarm that passed the benzo(a)pyrene standard does not need to be buried and can be used for general site purposes pending COGCC approval.

Nicholson GeoSolutions LLC



David K. Nicholson, P.G.
Principal Geologist

Table 1 O-29 Landfarm Sample Results – May 24, 2018

Parameter	Table 910-1 Standards	O29-1	O29-2	O29-3	O29-4	O29-5
sp. conductance (mmhos/cm)	<4	0.131	0.215	0.234	0.236	0.204
pH (standard units)	6-9	7.84	8.01	8.05	7.75	8.19
SAR (ratio)	<12	1.55	2.35	1.91	1.74	1.80
TVPH – gasoline range	500 ¹	<0.1	0.21	<0.1	0.121	0.113
TEPH – diesel/motor oil range		<8.0	140.9	129.9	131	124.3
benzene	0.17	0.000894	0.00155	0.00128	0.00113	0.00113
toluene	85	<0.005	<0.005	0.00516	<0.005	<0.005
ethylbenzene	100	0.000766	0.00135	0.00111	0.000923	0.000961
xylenes	175	<0.0015	0.00266	0.00187	<0.0015	<0.0015
benzo(a)pyrene	0.022	<0.006	0.0727	0.0275	0.0219	0.0149
arsenic	0.39	7.72	6.81	8.60	7.97	9.02

Parameter	Table 910-1 Standards	O29-6	O29-7	O29-8	O29-9
sp. conductance (mmhos/cm)	<4	0.220	0.119	0.150	0.142
pH (standard units)	6-9	8.11	8.23	8.23	8.16
SAR (ratio)	<12	1.81	1.57	1.80	1.70
TVPH – gasoline range	500 ¹	0.165	0.126	0.127	0.117
TEPH – diesel/motor oil range		16.31	73.9	108.9	78.4
benzene	0.17	0.00135	0.00131	0.00141	0.00123
toluene	85	<0.005	<0.005	<0.005	<0.005
ethylbenzene	100	0.00113	0.00114	0.00124	0.00102
xylenes	175	0.00197	0.00172	0.00194	<0.0015
benzo(a)pyrene	0.022	0.0284	<0.006	0.0245	0.0189
arsenic	0.39	8.19	6.57	7.81	13.5

Parameter	Table 910-1 Standards	O29-10	O29-11	O29-12	O29-13
sp. conductance (mmhos/cm)	<4	0.155	0.150	0.216	0.215
pH (standard units)	6-9	8.23	8.12	8.23	8.17
SAR (ratio)	<12	1.27	1.58	1.92	1.98
TVPH – gasoline range	500 ¹	<0.1	0.116	0.135	0.125
TEPH – diesel/motor oil range		161	88.3	185.2	232
benzene	0.17	0.00104	0.00114	0.0014	0.00156
toluene	85	<0.005	<0.005	<0.005	<0.005
ethylbenzene	100	0.000923	0.000898	0.00125	0.00123
xylenes	175	<0.0015	<0.0015	0.00178	0.00181
benzo(a)pyrene	0.022	0.0408	0.0273	0.0525	0.0599
arsenic	0.39	11.0	7.95	8.92	10.5

¹The standard is 500 for the combined total of TVPH and TEPH

Values in bold type exceed standards

All units in mg/kg except where indicated

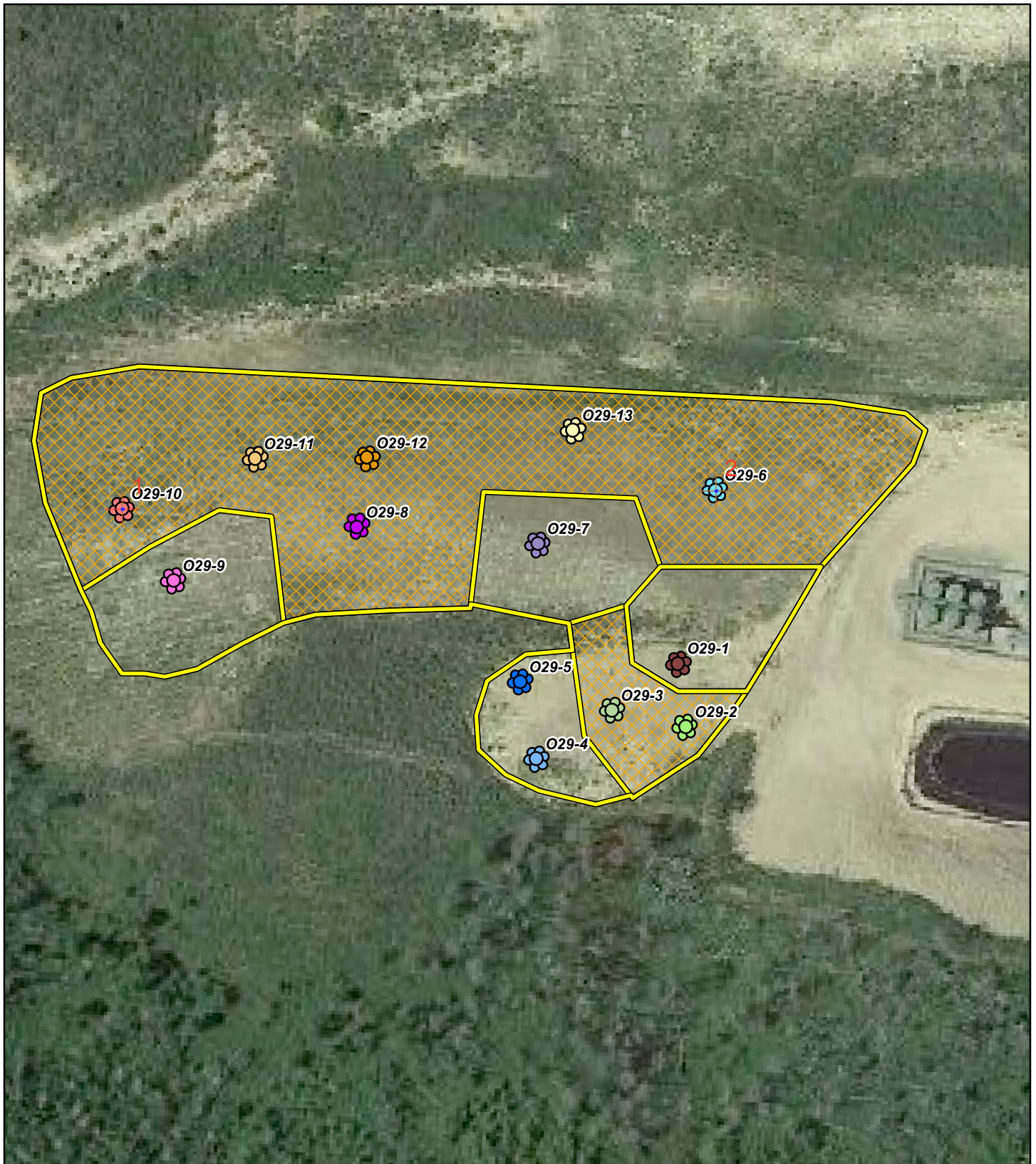


Figure 1

June
2018

GeoSolutions
NICHOLSON

Legend

- Sub Sample
- Area Needing Further Treatment

0 50 100 200 Feet 1" = 100'

Berry Petroleum Company

O-29
Landfarm Final
Composite Soil Samples

APPENDIX A
Laboratory Report

June 08, 2018

Berry Petroleum - Denver, CO

Sample Delivery Group: L997751

Samples Received: 05/30/2018

Project Number:

Description: Berry Landfarms

Report To:

Dave Nicholson

1999 Broadway, Suite 3700

Denver, CO 93309

Entire Report Reviewed By:



Mark W. Beasley

Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



029-1 L997751-01 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 09:10

Received date/time
05/30/18 08:45

¹ Cp

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:44	CCE
Wet Chemistry by Method 3060A/7196A	WG1117835	1	05/31/18 08:23	05/31/18 15:58	MLW
Wet Chemistry by Method 9045D	WG1118057	1	05/31/18 15:30	05/31/18 17:10	ITB
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:28	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:02	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 00:17	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 18:42	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 00:17	LEA

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

029-2 L997751-02 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 09:20

Received date/time
05/30/18 08:45

⁷ Gl

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:47	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:04	EEM
Wet Chemistry by Method 9045D	WG1118057	1	05/31/18 15:30	05/31/18 17:10	ITB
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:37	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:29	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 00:38	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	5	06/05/18 08:23	06/05/18 20:41	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 00:39	LEA

⁸ Al

⁹ Sc

029-3 L997751-03 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 09:30

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:49	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:06	EEM
Wet Chemistry by Method 9045D	WG1118057	1	05/31/18 15:30	05/31/18 17:10	ITB
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:39	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:31	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 00:59	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 19:54	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 01:00	LEA

029-4 L997751-04 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 09:40

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:52	CCE
Wet Chemistry by Method 3060A/7196A	WG1118734	1	06/01/18 13:00	06/02/18 11:59	EEM
Wet Chemistry by Method 9045D	WG1118057	1	05/31/18 15:30	05/31/18 17:10	ITB
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:41	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:34	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 01:20	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 20:17	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 01:22	KM

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



029-5 L997751-05 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 09:50

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:55	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:12	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:44	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:36	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 01:41	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 20:05	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 01:44	KM

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

029-6 L997751-06 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:00

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 11:57	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:12	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:46	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:39	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 02:02	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 18:54	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 02:06	KM

⁷ Gl

⁸ Al

⁹ Sc

029-7 L997751-07 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:10

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:00	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:12	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:48	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:41	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 02:23	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 19:30	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 02:28	KM

029-8 L997751-08 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:20

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:08	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:13	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:50	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:44	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 02:44	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 19:06	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 02:50	KM

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L997751

DATE/TIME:

06/08/18 11:25

PAGE:

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



029-9 L997751-09 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:30

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:10	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:14	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:52	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 14:46	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 03:05	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 19:18	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 03:11	KM

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

029-10 L997751-10 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:40

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:13	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:15	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:55	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 15:05	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 03:26	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	5	06/05/18 08:23	06/05/18 20:29	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 03:34	KM

⁷ Gl

⁸ Al

⁹ Sc

029-11 L997751-11 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 10:50

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:16	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:16	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1118010	1	05/31/18 13:31	05/31/18 17:09	TH
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 00:57	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 15:07	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 03:47	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	1	06/05/18 08:23	06/05/18 19:42	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 03:55	KM

029-12 L997751-12 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 11:00

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:18	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:16	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118292	1	05/31/18 14:41	06/01/18 01:03	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 15:10	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 04:08	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	5	06/05/18 08:23	06/05/18 20:53	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 04:17	KM

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L997751

DATE/TIME:

06/08/18 11:25

PAGE:

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



029-13 L997751-13 Solid

Collected by
DK Nicholson

Collected date/time
05/24/18 11:10

Received date/time
05/30/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1117908	1	06/02/18 11:11	06/04/18 12:21	CCE
Wet Chemistry by Method 3060A/7196A	WG1118371	1	06/01/18 06:45	06/01/18 12:16	EEM
Wet Chemistry by Method 9045D	WG1118058	1	05/31/18 08:57	05/31/18 11:50	EEM
Wet Chemistry by Method 9050AMod	WG1117990	1	05/30/18 23:54	05/31/18 01:38	MZ
Mercury by Method 7471A	WG1118485	1	05/31/18 23:17	06/03/18 08:50	EL
Metals (ICP) by Method 6010B	WG1118402	1	05/31/18 17:22	06/01/18 15:12	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1118425	1	05/31/18 10:54	06/01/18 04:29	RAS
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1118332	5	06/05/18 08:23	06/05/18 21:05	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1118352	1	06/04/18 11:52	06/05/18 04:39	KM

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L997751

DATE/TIME:

06/08/18 11:25

PAGE:

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All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.55		1	06/04/2018 11:44	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	05/31/2018 15:58	WG1117835

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.84	T8	1	05/31/2018 17:10	WG1118057

Sample Narrative:

L997751-01 WG1118057: 7.84 at 20.2C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	131		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

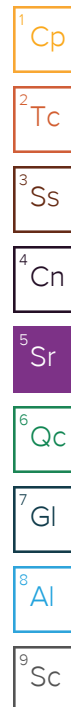
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0259		0.0200	1	06/01/2018 00:28	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.72		2.00	1	06/01/2018 14:02	WG1118402
Barium	213		0.500	1	06/01/2018 14:02	WG1118402
Boron	ND		10.0	1	06/01/2018 14:02	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:02	WG1118402
Chromium	24.8		1.00	1	06/01/2018 14:02	WG1118402
Copper	17.5		2.00	1	06/01/2018 14:02	WG1118402
Lead	13.9		0.500	1	06/01/2018 14:02	WG1118402
Nickel	16.1		2.00	1	06/01/2018 14:02	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:02	WG1118402
Silver	ND	J6	1.00	1	06/01/2018 14:02	WG1118402
Zinc	49.1	J6	5.00	1	06/01/2018 14:02	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000894		0.000500	1	06/01/2018 00:17	WG1118425
Toluene	ND		0.00500	1	06/01/2018 00:17	WG1118425
Ethylbenzene	0.000766	B	0.000500	1	06/01/2018 00:17	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 00:17	WG1118425
TPH (GC/FID) Low Fraction	ND		0.100	1	06/01/2018 00:17	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	97.9		77.0-120		06/01/2018 00:17	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 00:17	WG1118425





Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	06/05/2018 18:42	WG1118332
C28-C40 Oil Range	ND		4.00	1	06/05/2018 18:42	WG1118332
(S) o-Terphenyl	90.7		18.0-148		06/05/2018 18:42	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Benzo(a)anthracene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Benzo(a)pyrene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Benzo(b)fluoranthene	0.00663		0.00600	1	06/05/2018 00:17	WG1118352
Benzo(g,h,i)perylene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Benzo(k)fluoranthene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Chrysene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Dibenz(a,h)anthracene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Fluoranthene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Naphthalene	ND		0.0200	1	06/05/2018 00:17	WG1118352
Phenanthrene	ND		0.00600	1	06/05/2018 00:17	WG1118352
Pyrene	ND		0.00600	1	06/05/2018 00:17	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 00:17	WG1118352
2-Methylnaphthalene	ND		0.0200	1	06/05/2018 00:17	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 00:17	WG1118352
(S) p-Terphenyl-d14	61.3		23.0-120		06/05/2018 00:17	WG1118352
(S) Nitrobenzene-d5	52.5		14.0-149		06/05/2018 00:17	WG1118352
(S) 2-Fluorobiphenyl	68.6		34.0-125		06/05/2018 00:17	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.35		1	06/04/2018 11:47	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	06/01/2018 12:04	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.01	T8	1	05/31/2018 17:10	WG1118057

Sample Narrative:

L997751-02 WG1118057: 8.01 at 20.3C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	215		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

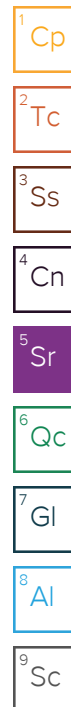
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0275		0.0200	1	06/01/2018 00:37	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.81		2.00	1	06/01/2018 14:29	WG1118402
Barium	228		0.500	1	06/01/2018 14:29	WG1118402
Boron	ND		10.0	1	06/01/2018 14:29	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:29	WG1118402
Chromium	24.1		1.00	1	06/01/2018 14:29	WG1118402
Copper	16.2		2.00	1	06/01/2018 14:29	WG1118402
Lead	16.1		0.500	1	06/01/2018 14:29	WG1118402
Nickel	17.6		2.00	1	06/01/2018 14:29	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:29	WG1118402
Silver	ND		1.00	1	06/01/2018 14:29	WG1118402
Zinc	51.8		5.00	1	06/01/2018 14:29	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00155		0.000500	1	06/01/2018 00:38	WG1118425
Toluene	ND		0.00500	1	06/01/2018 00:38	WG1118425
Ethylbenzene	0.00135		0.000500	1	06/01/2018 00:38	WG1118425
Total Xylene	0.00266	B	0.00150	1	06/01/2018 00:38	WG1118425
TPH (GC/FID) Low Fraction	0.210		0.100	1	06/01/2018 00:38	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	99.2		77.0-120		06/01/2018 00:38	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 00:38	WG1118425





Collected date/time: 05/24/18 09:20

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	66.2		20.0	5	06/05/2018 20:41	WG1118332
C28-C40 Oil Range	74.7		20.0	5	06/05/2018 20:41	WG1118332
(S) o-Terphenyl	107		18.0-148		06/05/2018 20:41	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0264		0.00600	1	06/05/2018 00:39	WG1118352
Acenaphthene	0.00826		0.00600	1	06/05/2018 00:39	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 00:39	WG1118352
Benzo(a)anthracene	0.0947		0.00600	1	06/05/2018 00:39	WG1118352
Benzo(a)pyrene	0.0727		0.00600	1	06/05/2018 00:39	WG1118352
Benzo(b)fluoranthene	0.165		0.00600	1	06/05/2018 00:39	WG1118352
Benzo(g,h,i)perylene	0.0748		0.00600	1	06/05/2018 00:39	WG1118352
Benzo(k)fluoranthene	0.0316		0.00600	1	06/05/2018 00:39	WG1118352
Chrysene	0.112		0.00600	1	06/05/2018 00:39	WG1118352
Dibenz(a,h)anthracene	0.0247		0.00600	1	06/05/2018 00:39	WG1118352
Fluoranthene	0.163		0.00600	1	06/05/2018 00:39	WG1118352
Fluorene	0.0147		0.00600	1	06/05/2018 00:39	WG1118352
Indeno(1,2,3-cd)pyrene	0.0594		0.00600	1	06/05/2018 00:39	WG1118352
Naphthalene	0.0728		0.0200	1	06/05/2018 00:39	WG1118352
Phenanthrene	0.0936		0.00600	1	06/05/2018 00:39	WG1118352
Pyrene	0.104		0.00600	1	06/05/2018 00:39	WG1118352
1-Methylnaphthalene	0.0803		0.0200	1	06/05/2018 00:39	WG1118352
2-Methylnaphthalene	0.126		0.0200	1	06/05/2018 00:39	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 00:39	WG1118352
(S) p-Terphenyl-d14	56.1		23.0-120		06/05/2018 00:39	WG1118352
(S) Nitrobenzene-d5	50.6		14.0-149		06/05/2018 00:39	WG1118352
(S) 2-Fluorobiphenyl	55.9		34.0-125		06/05/2018 00:39	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.91		1	06/04/2018 11:49	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	06/01/2018 12:06	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.05	<u>T8</u>	1	05/31/2018 17:10	WG1118057

Sample Narrative:

L997751-03 WG1118057: 8.05 at 20.3C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	234		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

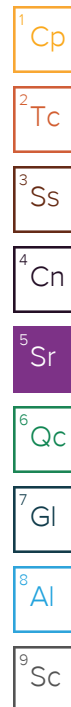
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0251		0.0200	1	06/01/2018 00:39	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	8.60		2.00	1	06/01/2018 14:31	WG1118402
Barium	259		0.500	1	06/01/2018 14:31	WG1118402
Boron	ND		10.0	1	06/01/2018 14:31	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:31	WG1118402
Chromium	26.4		1.00	1	06/01/2018 14:31	WG1118402
Copper	22.3		2.00	1	06/01/2018 14:31	WG1118402
Lead	15.3		0.500	1	06/01/2018 14:31	WG1118402
Nickel	19.9		2.00	1	06/01/2018 14:31	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:31	WG1118402
Silver	ND		1.00	1	06/01/2018 14:31	WG1118402
Zinc	56.6		5.00	1	06/01/2018 14:31	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00128		0.000500	1	06/01/2018 00:59	WG1118425
Toluene	ND		0.00500	1	06/01/2018 00:59	WG1118425
Ethylbenzene	0.00111	<u>B</u>	0.000500	1	06/01/2018 00:59	WG1118425
Total Xylene	0.00187	<u>B</u>	0.00150	1	06/01/2018 00:59	WG1118425
TPH (GC/FID) Low Fraction	0.143		0.100	1	06/01/2018 00:59	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.8		77.0-120		06/01/2018 00:59	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 00:59	WG1118425





Collected date/time: 05/24/18 09:30

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	64.7		4.00	1	06/05/2018 19:54	WG1118332
C28-C40 Oil Range	65.2		4.00	1	06/05/2018 19:54	WG1118332
(S) o-Terphenyl	77.2		18.0-148		06/05/2018 19:54	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00949		0.00600	1	06/05/2018 01:00	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 01:00	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 01:00	WG1118352
Benzo(a)anthracene	0.0354		0.00600	1	06/05/2018 01:00	WG1118352
Benzo(a)pyrene	0.0275		0.00600	1	06/05/2018 01:00	WG1118352
Benzo(b)fluoranthene	0.0647		0.00600	1	06/05/2018 01:00	WG1118352
Benzo(g,h,i)perylene	0.0309		0.00600	1	06/05/2018 01:00	WG1118352
Benzo(k)fluoranthene	0.0163		0.00600	1	06/05/2018 01:00	WG1118352
Chrysene	0.0460		0.00600	1	06/05/2018 01:00	WG1118352
Dibenz(a,h)anthracene	ND		0.00600	1	06/05/2018 01:00	WG1118352
Fluoranthene	0.0660		0.00600	1	06/05/2018 01:00	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 01:00	WG1118352
Indeno(1,2,3-cd)pyrene	0.0251		0.00600	1	06/05/2018 01:00	WG1118352
Naphthalene	0.0228		0.0200	1	06/05/2018 01:00	WG1118352
Phenanthrene	0.0334		0.00600	1	06/05/2018 01:00	WG1118352
Pyrene	0.0416		0.00600	1	06/05/2018 01:00	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 01:00	WG1118352
2-Methylnaphthalene	0.0363		0.0200	1	06/05/2018 01:00	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 01:00	WG1118352
(S) p-Terphenyl-d14	53.8		23.0-120		06/05/2018 01:00	WG1118352
(S) Nitrobenzene-d5	47.1		14.0-149		06/05/2018 01:00	WG1118352
(S) 2-Fluorobiphenyl	54.7		34.0-125		06/05/2018 01:00	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.74		1	06/04/2018 11:52	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND	J6 Q1	2.00	1	06/02/2018 11:59	WG1118734

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.75	T8	1	05/31/2018 17:10	WG1118057

Sample Narrative:

L997751-04 WG1118057: 7.75 at 20.3C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	236		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0376		0.0200	1	06/01/2018 00:41	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.97		2.00	1	06/01/2018 14:34	WG1118402
Barium	246		0.500	1	06/01/2018 14:34	WG1118402
Boron	ND		10.0	1	06/01/2018 14:34	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:34	WG1118402
Chromium	28.0		1.00	1	06/01/2018 14:34	WG1118402
Copper	20.3		2.00	1	06/01/2018 14:34	WG1118402
Lead	15.4		0.500	1	06/01/2018 14:34	WG1118402
Nickel	19.5		2.00	1	06/01/2018 14:34	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:34	WG1118402
Silver	ND		1.00	1	06/01/2018 14:34	WG1118402
Zinc	56.2		5.00	1	06/01/2018 14:34	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00113		0.000500	1	06/01/2018 01:20	WG1118425
Toluene	ND		0.00500	1	06/01/2018 01:20	WG1118425
Ethylbenzene	0.000923	B	0.000500	1	06/01/2018 01:20	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 01:20	WG1118425
TPH (GC/FID) Low Fraction	0.121		0.100	1	06/01/2018 01:20	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	97.3		77.0-120		06/01/2018 01:20	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 01:20	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 09:40

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	59.7		4.00	1	06/05/2018 20:17	WG1118332
C28-C40 Oil Range	71.3		4.00	1	06/05/2018 20:17	WG1118332
(S) o-Terphenyl	85.1		18.0-148		06/05/2018 20:17	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00674		0.00600	1	06/05/2018 01:22	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 01:22	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 01:22	WG1118352
Benzo(a)anthracene	0.0290		0.00600	1	06/05/2018 01:22	WG1118352
Benzo(a)pyrene	0.0219		0.00600	1	06/05/2018 01:22	WG1118352
Benzo(b)fluoranthene	0.0543		0.00600	1	06/05/2018 01:22	WG1118352
Benzo(g,h,i)perylene	0.0247		0.00600	1	06/05/2018 01:22	WG1118352
Benzo(k)fluoranthene	0.0126		0.00600	1	06/05/2018 01:22	WG1118352
Chrysene	0.0372		0.00600	1	06/05/2018 01:22	WG1118352
Dibenz(a,h)anthracene	0.00899		0.00600	1	06/05/2018 01:22	WG1118352
Fluoranthene	0.0487		0.00600	1	06/05/2018 01:22	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 01:22	WG1118352
Indeno(1,2,3-cd)pyrene	0.0196		0.00600	1	06/05/2018 01:22	WG1118352
Naphthalene	0.0231		0.0200	1	06/05/2018 01:22	WG1118352
Phenanthrene	0.0251		0.00600	1	06/05/2018 01:22	WG1118352
Pyrene	0.0328		0.00600	1	06/05/2018 01:22	WG1118352
1-Methylnaphthalene	0.0200		0.0200	1	06/05/2018 01:22	WG1118352
2-Methylnaphthalene	0.0350		0.0200	1	06/05/2018 01:22	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 01:22	WG1118352
(S) p-Terphenyl-d14	47.4		23.0-120		06/05/2018 01:22	WG1118352
(S) Nitrobenzene-d5	41.7		14.0-149		06/05/2018 01:22	WG1118352
(S) 2-Fluorobiphenyl	49.8		34.0-125		06/05/2018 01:22	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.80		1	06/04/2018 11:55	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	06/01/2018 12:12	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.19	T8	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-05 WG1118058: 8.19 at 21.4C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	204		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0231		0.0200	1	06/01/2018 00:44	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	9.02		2.00	1	06/01/2018 14:36	WG1118402
Barium	325		0.500	1	06/01/2018 14:36	WG1118402
Boron	ND		10.0	1	06/01/2018 14:36	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:36	WG1118402
Chromium	25.8		1.00	1	06/01/2018 14:36	WG1118402
Copper	19.2		2.00	1	06/01/2018 14:36	WG1118402
Lead	12.2		0.500	1	06/01/2018 14:36	WG1118402
Nickel	19.4		2.00	1	06/01/2018 14:36	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:36	WG1118402
Silver	ND		1.00	1	06/01/2018 14:36	WG1118402
Zinc	54.1		5.00	1	06/01/2018 14:36	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00113		0.000500	1	06/01/2018 01:41	WG1118425
Toluene	ND		0.00500	1	06/01/2018 01:41	WG1118425
Ethylbenzene	0.000961	B	0.000500	1	06/01/2018 01:41	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 01:41	WG1118425
TPH (GC/FID) Low Fraction	0.113		0.100	1	06/01/2018 01:41	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	97.9		77.0-120		06/01/2018 01:41	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 01:41	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	57.3		4.00	1	06/05/2018 20:05	WG1118332
C28-C40 Oil Range	67.0		4.00	1	06/05/2018 20:05	WG1118332
(S) o-Terphenyl	82.7		18.0-148		06/05/2018 20:05	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	06/05/2018 01:44	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 01:44	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 01:44	WG1118352
Benzo(a)anthracene	0.0200		0.00600	1	06/05/2018 01:44	WG1118352
Benzo(a)pyrene	0.0149		0.00600	1	06/05/2018 01:44	WG1118352
Benzo(b)fluoranthene	0.0360		0.00600	1	06/05/2018 01:44	WG1118352
Benzo(g,h,i)perylene	0.0167		0.00600	1	06/05/2018 01:44	WG1118352
Benzo(k)fluoranthene	0.00952		0.00600	1	06/05/2018 01:44	WG1118352
Chrysene	0.0263		0.00600	1	06/05/2018 01:44	WG1118352
Dibenz(a,h)anthracene	ND		0.00600	1	06/05/2018 01:44	WG1118352
Fluoranthene	0.0358		0.00600	1	06/05/2018 01:44	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 01:44	WG1118352
Indeno(1,2,3-cd)pyrene	0.0135		0.00600	1	06/05/2018 01:44	WG1118352
Naphthalene	ND		0.0200	1	06/05/2018 01:44	WG1118352
Phenanthrene	0.0175		0.00600	1	06/05/2018 01:44	WG1118352
Pyrene	0.0238		0.00600	1	06/05/2018 01:44	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 01:44	WG1118352
2-Methylnaphthalene	0.0283		0.0200	1	06/05/2018 01:44	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 01:44	WG1118352
(S) p-Terphenyl-d14	53.4		23.0-120		06/05/2018 01:44	WG1118352
(S) Nitrobenzene-d5	46.3		14.0-149		06/05/2018 01:44	WG1118352
(S) 2-Fluorobiphenyl	55.9		34.0-125		06/05/2018 01:44	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.81		1	06/04/2018 11:57	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:12	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.11	<u>T8</u>	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-06 WG1118058: 8.11 at 21.2C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	220		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0277		0.0200	1	06/01/2018 00:46	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	8.19		2.00	1	06/01/2018 14:39	WG1118402
Barium	272		0.500	1	06/01/2018 14:39	WG1118402
Boron	ND		10.0	1	06/01/2018 14:39	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:39	WG1118402
Chromium	28.0		1.00	1	06/01/2018 14:39	WG1118402
Copper	20.7		2.00	1	06/01/2018 14:39	WG1118402
Lead	15.8		0.500	1	06/01/2018 14:39	WG1118402
Nickel	21.0		2.00	1	06/01/2018 14:39	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:39	WG1118402
Silver	ND		1.00	1	06/01/2018 14:39	WG1118402
Zinc	59.2		5.00	1	06/01/2018 14:39	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00135		0.000500	1	06/01/2018 02:02	WG1118425
Toluene	ND		0.00500	1	06/01/2018 02:02	WG1118425
Ethylbenzene	0.00113	<u>B</u>	0.000500	1	06/01/2018 02:02	WG1118425
Total Xylene	0.00197	<u>B</u>	0.00150	1	06/01/2018 02:02	WG1118425
TPH (GC/FID) Low Fraction	0.165		0.100	1	06/01/2018 02:02	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.1		77.0-120		06/01/2018 02:02	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 02:02	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 10:00

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	5.71		4.00	1	06/05/2018 18:54	WG1118332
C28-C40 Oil Range	10.6		4.00	1	06/05/2018 18:54	WG1118332
(S) o-Terphenyl	84.9		18.0-148		06/05/2018 18:54	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00761		0.00600	1	06/05/2018 02:06	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 02:06	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 02:06	WG1118352
Benzo(a)anthracene	0.0354		0.00600	1	06/05/2018 02:06	WG1118352
Benzo(a)pyrene	0.0284		0.00600	1	06/05/2018 02:06	WG1118352
Benzo(b)fluoranthene	0.0672		0.00600	1	06/05/2018 02:06	WG1118352
Benzo(g,h,i)perylene	0.0319		0.00600	1	06/05/2018 02:06	WG1118352
Benzo(k)fluoranthene	0.0173		0.00600	1	06/05/2018 02:06	WG1118352
Chrysene	0.0457		0.00600	1	06/05/2018 02:06	WG1118352
Dibenz(a,h)anthracene	0.0109		0.00600	1	06/05/2018 02:06	WG1118352
Fluoranthene	0.0607		0.00600	1	06/05/2018 02:06	WG1118352
Fluorene	0.00635		0.00600	1	06/05/2018 02:06	WG1118352
Indeno(1,2,3-cd)pyrene	0.0258		0.00600	1	06/05/2018 02:06	WG1118352
Naphthalene	0.0500		0.0200	1	06/05/2018 02:06	WG1118352
Phenanthrene	0.0373		0.00600	1	06/05/2018 02:06	WG1118352
Pyrene	0.0408		0.00600	1	06/05/2018 02:06	WG1118352
1-Methylnaphthalene	0.0542		0.0200	1	06/05/2018 02:06	WG1118352
2-Methylnaphthalene	0.0828		0.0200	1	06/05/2018 02:06	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 02:06	WG1118352
(S) p-Terphenyl-d14	55.3		23.0-120		06/05/2018 02:06	WG1118352
(S) Nitrobenzene-d5	46.0		14.0-149		06/05/2018 02:06	WG1118352
(S) 2-Fluorobiphenyl	56.4		34.0-125		06/05/2018 02:06	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.57		1	06/04/2018 12:00	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:12	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.23	<u>T8</u>	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-07 WG1118058: 8.23 at 21.4C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	119		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

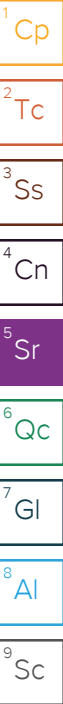
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0212		0.0200	1	06/01/2018 00:48	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.57		2.00	1	06/01/2018 14:41	WG1118402
Barium	234		0.500	1	06/01/2018 14:41	WG1118402
Boron	ND		10.0	1	06/01/2018 14:41	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:41	WG1118402
Chromium	24.8		1.00	1	06/01/2018 14:41	WG1118402
Copper	17.8		2.00	1	06/01/2018 14:41	WG1118402
Lead	12.2		0.500	1	06/01/2018 14:41	WG1118402
Nickel	18.6		2.00	1	06/01/2018 14:41	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:41	WG1118402
Silver	ND		1.00	1	06/01/2018 14:41	WG1118402
Zinc	49.8		5.00	1	06/01/2018 14:41	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00131		0.000500	1	06/01/2018 02:23	WG1118425
Toluene	ND		0.00500	1	06/01/2018 02:23	WG1118425
Ethylbenzene	0.00114	<u>B</u>	0.000500	1	06/01/2018 02:23	WG1118425
Total Xylene	0.00172	<u>B</u>	0.00150	1	06/01/2018 02:23	WG1118425
TPH (GC/FID) Low Fraction	0.126		0.100	1	06/01/2018 02:23	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.5		77.0-120		06/01/2018 02:23	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 02:23	WG1118425





Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	30.2		4.00	1	06/05/2018 19:30	WG1118332
C28-C40 Oil Range	43.7		4.00	1	06/05/2018 19:30	WG1118332
(S) o-Terphenyl	82.1		18.0-148		06/05/2018 19:30	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Benzo(a)anthracene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Benzo(a)pyrene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Benzo(b)fluoranthene	0.0103		0.00600	1	06/05/2018 02:28	WG1118352
Benzo(g,h,i)perylene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Benzo(k)fluoranthene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Chrysene	0.00645		0.00600	1	06/05/2018 02:28	WG1118352
Dibenz(a,h)anthracene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Fluoranthene	0.00796		0.00600	1	06/05/2018 02:28	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Naphthalene	ND		0.0200	1	06/05/2018 02:28	WG1118352
Phenanthrene	ND		0.00600	1	06/05/2018 02:28	WG1118352
Pyrene	ND		0.00600	1	06/05/2018 02:28	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 02:28	WG1118352
2-Methylnaphthalene	ND		0.0200	1	06/05/2018 02:28	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 02:28	WG1118352
(S) p-Terphenyl-d14	63.2		23.0-120		06/05/2018 02:28	WG1118352
(S) Nitrobenzene-d5	51.7		14.0-149		06/05/2018 02:28	WG1118352
(S) 2-Fluorobiphenyl	67.8		34.0-125		06/05/2018 02:28	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.80		1	06/04/2018 12:08	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	06/01/2018 12:13	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.23	<u>T8</u>	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-08 WG1118058: 8.23 at 21.3C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	150		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0256		0.0200	1	06/01/2018 00:50	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.81		2.00	1	06/01/2018 14:44	WG1118402
Barium	268		0.500	1	06/01/2018 14:44	WG1118402
Boron	ND		10.0	1	06/01/2018 14:44	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:44	WG1118402
Chromium	26.4		1.00	1	06/01/2018 14:44	WG1118402
Copper	20.0		2.00	1	06/01/2018 14:44	WG1118402
Lead	14.5		0.500	1	06/01/2018 14:44	WG1118402
Nickel	20.5		2.00	1	06/01/2018 14:44	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:44	WG1118402
Silver	ND		1.00	1	06/01/2018 14:44	WG1118402
Zinc	60.1		5.00	1	06/01/2018 14:44	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00141		0.000500	1	06/01/2018 02:44	WG1118425
Toluene	ND		0.00500	1	06/01/2018 02:44	WG1118425
Ethylbenzene	0.00124	<u>B</u>	0.000500	1	06/01/2018 02:44	WG1118425
Total Xylene	0.00194	<u>B</u>	0.00150	1	06/01/2018 02:44	WG1118425
TPH (GC/FID) Low Fraction	0.127		0.100	1	06/01/2018 02:44	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	96.6		77.0-120		06/01/2018 02:44	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 02:44	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 10:20

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	57.6		4.00	1	06/05/2018 19:06	WG1118332
C28-C40 Oil Range	51.3		4.00	1	06/05/2018 19:06	WG1118332
(S) o-Terphenyl	70.4		18.0-148		06/05/2018 19:06	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00961		0.00600	1	06/05/2018 02:50	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 02:50	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 02:50	WG1118352
Benzo(a)anthracene	0.0343		0.00600	1	06/05/2018 02:50	WG1118352
Benzo(a)pyrene	0.0245		0.00600	1	06/05/2018 02:50	WG1118352
Benzo(b)fluoranthene	0.0628		0.00600	1	06/05/2018 02:50	WG1118352
Benzo(g,h,i)perylene	0.0274		0.00600	1	06/05/2018 02:50	WG1118352
Benzo(k)fluoranthene	0.0117		0.00600	1	06/05/2018 02:50	WG1118352
Chrysene	0.0441		0.00600	1	06/05/2018 02:50	WG1118352
Dibenz(a,h)anthracene	0.0100		0.00600	1	06/05/2018 02:50	WG1118352
Fluoranthene	0.0593		0.00600	1	06/05/2018 02:50	WG1118352
Fluorene	0.0143		0.00600	1	06/05/2018 02:50	WG1118352
Indeno(1,2,3-cd)pyrene	0.0220		0.00600	1	06/05/2018 02:50	WG1118352
Naphthalene	0.127		0.0200	1	06/05/2018 02:50	WG1118352
Phenanthrene	0.0534		0.00600	1	06/05/2018 02:50	WG1118352
Pyrene	0.0397		0.00600	1	06/05/2018 02:50	WG1118352
1-Methylnaphthalene	0.139		0.0200	1	06/05/2018 02:50	WG1118352
2-Methylnaphthalene	0.200		0.0200	1	06/05/2018 02:50	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 02:50	WG1118352
(S) p-Terphenyl-d14	52.8		23.0-120		06/05/2018 02:50	WG1118352
(S) Nitrobenzene-d5	45.8		14.0-149		06/05/2018 02:50	WG1118352
(S) 2-Fluorobiphenyl	52.7		34.0-125		06/05/2018 02:50	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.70		1	06/04/2018 12:10	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	06/01/2018 12:14	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.16	T8	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-09 WG1118058: 8.16 at 21.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	142		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0270		0.0200	1	06/01/2018 00:52	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	13.5		2.00	1	06/01/2018 14:46	WG1118402
Barium	281		0.500	1	06/01/2018 14:46	WG1118402
Boron	ND		10.0	1	06/01/2018 14:46	WG1118402
Cadmium	ND		0.500	1	06/01/2018 14:46	WG1118402
Chromium	25.7		1.00	1	06/01/2018 14:46	WG1118402
Copper	19.7		2.00	1	06/01/2018 14:46	WG1118402
Lead	17.8		0.500	1	06/01/2018 14:46	WG1118402
Nickel	20.5		2.00	1	06/01/2018 14:46	WG1118402
Selenium	ND		2.00	1	06/01/2018 14:46	WG1118402
Silver	ND		1.00	1	06/01/2018 14:46	WG1118402
Zinc	60.8		5.00	1	06/01/2018 14:46	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00123		0.000500	1	06/01/2018 03:05	WG1118425
Toluene	ND		0.00500	1	06/01/2018 03:05	WG1118425
Ethylbenzene	0.00102	B	0.000500	1	06/01/2018 03:05	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 03:05	WG1118425
TPH (GC/FID) Low Fraction	0.117		0.100	1	06/01/2018 03:05	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.4		77.0-120		06/01/2018 03:05	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 03:05	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 10:30

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	35.7		4.00	1	06/05/2018 19:18	WG1118332
C28-C40 Oil Range	42.7		4.00	1	06/05/2018 19:18	WG1118332
(S) o-Terphenyl	75.9		18.0-148		06/05/2018 19:18	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	06/05/2018 03:11	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 03:11	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 03:11	WG1118352
Benzo(a)anthracene	0.0256		0.00600	1	06/05/2018 03:11	WG1118352
Benzo(a)pyrene	0.0189		0.00600	1	06/05/2018 03:11	WG1118352
Benzo(b)fluoranthene	0.0468		0.00600	1	06/05/2018 03:11	WG1118352
Benzo(g,h,i)perylene	0.0217		0.00600	1	06/05/2018 03:11	WG1118352
Benzo(k)fluoranthene	0.0103		0.00600	1	06/05/2018 03:11	WG1118352
Chrysene	0.0319		0.00600	1	06/05/2018 03:11	WG1118352
Dibenz(a,h)anthracene	0.00759		0.00600	1	06/05/2018 03:11	WG1118352
Fluoranthene	0.0423		0.00600	1	06/05/2018 03:11	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 03:11	WG1118352
Indeno(1,2,3-cd)pyrene	0.0168		0.00600	1	06/05/2018 03:11	WG1118352
Naphthalene	ND		0.0200	1	06/05/2018 03:11	WG1118352
Phenanthrene	0.0189		0.00600	1	06/05/2018 03:11	WG1118352
Pyrene	0.0284		0.00600	1	06/05/2018 03:11	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 03:11	WG1118352
2-Methylnaphthalene	0.0266		0.0200	1	06/05/2018 03:11	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 03:11	WG1118352
(S) p-Terphenyl-d14	109		23.0-120		06/05/2018 03:11	WG1118352
(S) Nitrobenzene-d5	86.4		14.0-149		06/05/2018 03:11	WG1118352
(S) 2-Fluorobiphenyl	109		34.0-125		06/05/2018 03:11	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.27		1	06/04/2018 12:13	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:15	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.23	T8	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-10 WG1118058: 8.23 at 21.3C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	155		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0260		0.0200	1	06/01/2018 00:55	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	11.0		2.00	1	06/01/2018 15:05	WG1118402
Barium	279		0.500	1	06/01/2018 15:05	WG1118402
Boron	ND		10.0	1	06/01/2018 15:05	WG1118402
Cadmium	ND		0.500	1	06/01/2018 15:05	WG1118402
Chromium	26.5		1.00	1	06/01/2018 15:05	WG1118402
Copper	22.7		2.00	1	06/01/2018 15:05	WG1118402
Lead	14.8		0.500	1	06/01/2018 15:05	WG1118402
Nickel	22.7		2.00	1	06/01/2018 15:05	WG1118402
Selenium	ND		2.00	1	06/01/2018 15:05	WG1118402
Silver	ND		1.00	1	06/01/2018 15:05	WG1118402
Zinc	65.0		5.00	1	06/01/2018 15:05	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00104		0.000500	1	06/01/2018 03:26	WG1118425
Toluene	ND		0.00500	1	06/01/2018 03:26	WG1118425
Ethylbenzene	0.000923	B	0.000500	1	06/01/2018 03:26	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 03:26	WG1118425
TPH (GC/FID) Low Fraction	ND		0.100	1	06/01/2018 03:26	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	97.0		77.0-120		06/01/2018 03:26	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 03:26	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 10:40

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	54.0		20.0	5	06/05/2018 20:29	WG1118332
C28-C40 Oil Range	107		20.0	5	06/05/2018 20:29	WG1118332
(S) o-Terphenyl	113		18.0-148		06/05/2018 20:29	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00754		0.00600	1	06/05/2018 03:34	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 03:34	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 03:34	WG1118352
Benzo(a)anthracene	0.0506		0.00600	1	06/05/2018 03:34	WG1118352
Benzo(a)pyrene	0.0408		0.00600	1	06/05/2018 03:34	WG1118352
Benzo(b)fluoranthene	0.106		0.00600	1	06/05/2018 03:34	WG1118352
Benzo(g,h,i)perylene	0.0495		0.00600	1	06/05/2018 03:34	WG1118352
Benzo(k)fluoranthene	0.0259		0.00600	1	06/05/2018 03:34	WG1118352
Chrysene	0.0675		0.00600	1	06/05/2018 03:34	WG1118352
Dibenz(a,h)anthracene	0.0178		0.00600	1	06/05/2018 03:34	WG1118352
Fluoranthene	0.0756		0.00600	1	06/05/2018 03:34	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 03:34	WG1118352
Indeno(1,2,3-cd)pyrene	0.0395		0.00600	1	06/05/2018 03:34	WG1118352
Naphthalene	0.0222		0.0200	1	06/05/2018 03:34	WG1118352
Phenanthrene	0.0285		0.00600	1	06/05/2018 03:34	WG1118352
Pyrene	0.0532		0.00600	1	06/05/2018 03:34	WG1118352
1-Methylnaphthalene	ND		0.0200	1	06/05/2018 03:34	WG1118352
2-Methylnaphthalene	0.0372		0.0200	1	06/05/2018 03:34	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 03:34	WG1118352
(S) p-Terphenyl-d14	59.8		23.0-120		06/05/2018 03:34	WG1118352
(S) Nitrobenzene-d5	47.8		14.0-149		06/05/2018 03:34	WG1118352
(S) 2-Fluorobiphenyl	60.6		34.0-125		06/05/2018 03:34	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.58		1	06/04/2018 12:16	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:16	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.12	T8	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-11 WG1118058: 8.12 at 21.4C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	150		10.0	1	05/31/2018 17:09	WG1118010

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0226		0.0200	1	06/01/2018 00:57	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.95		2.00	1	06/01/2018 15:07	WG1118402
Barium	270		0.500	1	06/01/2018 15:07	WG1118402
Boron	ND		10.0	1	06/01/2018 15:07	WG1118402
Cadmium	ND		0.500	1	06/01/2018 15:07	WG1118402
Chromium	27.0		1.00	1	06/01/2018 15:07	WG1118402
Copper	20.0		2.00	1	06/01/2018 15:07	WG1118402
Lead	14.3		0.500	1	06/01/2018 15:07	WG1118402
Nickel	20.2		2.00	1	06/01/2018 15:07	WG1118402
Selenium	ND		2.00	1	06/01/2018 15:07	WG1118402
Silver	ND		1.00	1	06/01/2018 15:07	WG1118402
Zinc	57.0		5.00	1	06/01/2018 15:07	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00114		0.000500	1	06/01/2018 03:47	WG1118425
Toluene	ND		0.00500	1	06/01/2018 03:47	WG1118425
Ethylbenzene	0.000898	B	0.000500	1	06/01/2018 03:47	WG1118425
Total Xylene	ND		0.00150	1	06/01/2018 03:47	WG1118425
TPH (GC/FID) Low Fraction	0.116		0.100	1	06/01/2018 03:47	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	97.3		77.0-120		06/01/2018 03:47	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 03:47	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 05/24/18 10:50

L997751

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	37.8		4.00	1	06/05/2018 19:42	WG1118332
C28-C40 Oil Range	50.5		4.00	1	06/05/2018 19:42	WG1118332
(S) o-Terphenyl	75.2		18.0-148		06/05/2018 19:42	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00646		0.00600	1	06/05/2018 03:55	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 03:55	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 03:55	WG1118352
Benzo(a)anthracene	0.0357		0.00600	1	06/05/2018 03:55	WG1118352
Benzo(a)pyrene	0.0273		0.00600	1	06/05/2018 03:55	WG1118352
Benzo(b)fluoranthene	0.0660		0.00600	1	06/05/2018 03:55	WG1118352
Benzo(g,h,i)perylene	0.0304		0.00600	1	06/05/2018 03:55	WG1118352
Benzo(k)fluoranthene	0.0172		0.00600	1	06/05/2018 03:55	WG1118352
Chrysene	0.0465		0.00600	1	06/05/2018 03:55	WG1118352
Dibenz(a,h)anthracene	0.0101		0.00600	1	06/05/2018 03:55	WG1118352
Fluoranthene	0.0568		0.00600	1	06/05/2018 03:55	WG1118352
Fluorene	ND		0.00600	1	06/05/2018 03:55	WG1118352
Indeno(1,2,3-cd)pyrene	0.0247		0.00600	1	06/05/2018 03:55	WG1118352
Naphthalene	0.0376		0.0200	1	06/05/2018 03:55	WG1118352
Phenanthrene	0.0297		0.00600	1	06/05/2018 03:55	WG1118352
Pyrene	0.0393		0.00600	1	06/05/2018 03:55	WG1118352
1-Methylnaphthalene	0.0306		0.0200	1	06/05/2018 03:55	WG1118352
2-Methylnaphthalene	0.0564		0.0200	1	06/05/2018 03:55	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 03:55	WG1118352
(S) p-Terphenyl-d14	50.5		23.0-120		06/05/2018 03:55	WG1118352
(S) Nitrobenzene-d5	41.9		14.0-149		06/05/2018 03:55	WG1118352
(S) 2-Fluorobiphenyl	51.7		34.0-125		06/05/2018 03:55	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.92		1	06/04/2018 12:18	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:16	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.23	<u>T8</u>	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-12 WG1118058: 8.23 at 21.4C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	216		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

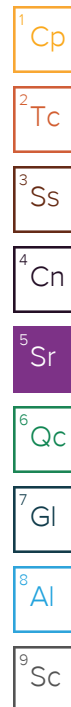
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0273		0.0200	1	06/01/2018 01:03	WG1118292

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	8.92		2.00	1	06/01/2018 15:10	WG1118402
Barium	349		0.500	1	06/01/2018 15:10	WG1118402
Boron	ND		10.0	1	06/01/2018 15:10	WG1118402
Cadmium	ND		0.500	1	06/01/2018 15:10	WG1118402
Chromium	29.8		1.00	1	06/01/2018 15:10	WG1118402
Copper	22.4		2.00	1	06/01/2018 15:10	WG1118402
Lead	18.4		0.500	1	06/01/2018 15:10	WG1118402
Nickel	22.0		2.00	1	06/01/2018 15:10	WG1118402
Selenium	ND		2.00	1	06/01/2018 15:10	WG1118402
Silver	ND		1.00	1	06/01/2018 15:10	WG1118402
Zinc	65.6		5.00	1	06/01/2018 15:10	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00140		0.000500	1	06/01/2018 04:08	WG1118425
Toluene	ND		0.00500	1	06/01/2018 04:08	WG1118425
Ethylbenzene	0.00125	<u>B</u>	0.000500	1	06/01/2018 04:08	WG1118425
Total Xylene	0.00178	<u>B</u>	0.00150	1	06/01/2018 04:08	WG1118425
TPH (GC/FID) Low Fraction	0.135		0.100	1	06/01/2018 04:08	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.2		77.0-120		06/01/2018 04:08	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	103		75.0-128		06/01/2018 04:08	WG1118425





Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	75.2		20.0	5	06/05/2018 20:53	WG1118332
C28-C40 Oil Range	110		20.0	5	06/05/2018 20:53	WG1118332
(S) o-Terphenyl	108		18.0-148		06/05/2018 20:53	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0118		0.00600	1	06/05/2018 04:17	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 04:17	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 04:17	WG1118352
Benzo(a)anthracene	0.0683		0.00600	1	06/05/2018 04:17	WG1118352
Benzo(a)pyrene	0.0525		0.00600	1	06/05/2018 04:17	WG1118352
Benzo(b)fluoranthene	0.130		0.00600	1	06/05/2018 04:17	WG1118352
Benzo(g,h,i)perylene	0.0594		0.00600	1	06/05/2018 04:17	WG1118352
Benzo(k)fluoranthene	0.0305		0.00600	1	06/05/2018 04:17	WG1118352
Chrysene	0.0875		0.00600	1	06/05/2018 04:17	WG1118352
Dibenz(a,h)anthracene	0.0216		0.00600	1	06/05/2018 04:17	WG1118352
Fluoranthene	0.112		0.00600	1	06/05/2018 04:17	WG1118352
Fluorene	0.00716		0.00600	1	06/05/2018 04:17	WG1118352
Indeno(1,2,3-cd)pyrene	0.0475		0.00600	1	06/05/2018 04:17	WG1118352
Naphthalene	0.0456		0.0200	1	06/05/2018 04:17	WG1118352
Phenanthrene	0.0516		0.00600	1	06/05/2018 04:17	WG1118352
Pyrene	0.0737		0.00600	1	06/05/2018 04:17	WG1118352
1-Methylnaphthalene	0.0448		0.0200	1	06/05/2018 04:17	WG1118352
2-Methylnaphthalene	0.0803		0.0200	1	06/05/2018 04:17	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 04:17	WG1118352
(S) p-Terphenyl-d14	59.7		23.0-120		06/05/2018 04:17	WG1118352
(S) Nitrobenzene-d5	48.3		14.0-149		06/05/2018 04:17	WG1118352
(S) 2-Fluorobiphenyl	59.1		34.0-125		06/05/2018 04:17	WG1118352

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.98		1	06/04/2018 12:21	WG1117908

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	06/01/2018 12:16	WG1118371

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.17	T8	1	05/31/2018 11:50	WG1118058

Sample Narrative:

L997751-13 WG1118058: 8.17 at 21.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	215		10.0	1	05/31/2018 01:38	WG1117990

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	06/03/2018 08:50	WG1118485

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	10.5		2.00	1	06/01/2018 15:12	WG1118402
Barium	367		0.500	1	06/01/2018 15:12	WG1118402
Boron	ND		10.0	1	06/01/2018 15:12	WG1118402
Cadmium	ND		0.500	1	06/01/2018 15:12	WG1118402
Chromium	33.6		1.00	1	06/01/2018 15:12	WG1118402
Copper	26.2		2.00	1	06/01/2018 15:12	WG1118402
Lead	15.8		0.500	1	06/01/2018 15:12	WG1118402
Nickel	26.5		2.00	1	06/01/2018 15:12	WG1118402
Selenium	ND		2.00	1	06/01/2018 15:12	WG1118402
Silver	ND		1.00	1	06/01/2018 15:12	WG1118402
Zinc	74.8		5.00	1	06/01/2018 15:12	WG1118402

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00156	J3	0.000500	1	06/01/2018 04:29	WG1118425
Toluene	ND		0.00500	1	06/01/2018 04:29	WG1118425
Ethylbenzene	0.00123	B J3	0.000500	1	06/01/2018 04:29	WG1118425
Total Xylene	0.00181	B J3 J6	0.00150	1	06/01/2018 04:29	WG1118425
TPH (GC/FID) Low Fraction	0.125		0.100	1	06/01/2018 04:29	WG1118425
(S) a,a,a-Trifluorotoluene(FID)	98.6		77.0-120		06/01/2018 04:29	WG1118425
(S) a,a,a-Trifluorotoluene(PID)	104		75.0-128		06/01/2018 04:29	WG1118425

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

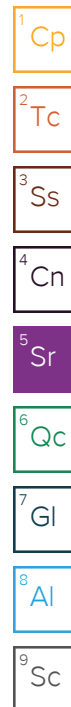


Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	106		20.0	5	06/05/2018 21:05	WG1118332
C28-C40 Oil Range	126		20.0	5	06/05/2018 21:05	WG1118332
(S) o-Terphenyl	83.0		18.0-148		06/05/2018 21:05	WG1118332

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0159		0.00600	1	06/05/2018 04:39	WG1118352
Acenaphthene	ND		0.00600	1	06/05/2018 04:39	WG1118352
Acenaphthylene	ND		0.00600	1	06/05/2018 04:39	WG1118352
Benzo(a)anthracene	0.0786		0.00600	1	06/05/2018 04:39	WG1118352
Benzo(a)pyrene	0.0599		0.00600	1	06/05/2018 04:39	WG1118352
Benzo(b)fluoranthene	0.142		0.00600	1	06/05/2018 04:39	WG1118352
Benzo(g,h,i)perylene	0.0631		0.00600	1	06/05/2018 04:39	WG1118352
Benzo(k)fluoranthene	0.0306		0.00600	1	06/05/2018 04:39	WG1118352
Chrysene	0.0953		0.00600	1	06/05/2018 04:39	WG1118352
Dibenz(a,h)anthracene	0.0227		0.00600	1	06/05/2018 04:39	WG1118352
Fluoranthene	0.138		0.00600	1	06/05/2018 04:39	WG1118352
Fluorene	0.00885		0.00600	1	06/05/2018 04:39	WG1118352
Indeno(1,2,3-cd)pyrene	0.0494		0.00600	1	06/05/2018 04:39	WG1118352
Naphthalene	0.0472		0.0200	1	06/05/2018 04:39	WG1118352
Phenanthrene	0.0659		0.00600	1	06/05/2018 04:39	WG1118352
Pyrene	0.0865		0.00600	1	06/05/2018 04:39	WG1118352
1-Methylnaphthalene	0.0475		0.0200	1	06/05/2018 04:39	WG1118352
2-Methylnaphthalene	0.0780		0.0200	1	06/05/2018 04:39	WG1118352
2-Chloronaphthalene	ND		0.0200	1	06/05/2018 04:39	WG1118352
(S) p-Terphenyl-d14	60.5		23.0-120		06/05/2018 04:39	WG1118352
(S) Nitrobenzene-d5	50.6		14.0-149		06/05/2018 04:39	WG1118352
(S) 2-Fluorobiphenyl	60.4		34.0-125		06/05/2018 04:39	WG1118352



Method Blank (MB)

(MB) R3314337-1 05/31/18 15:39

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.640	2.00

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L997619-22 Original Sample (OS) • Duplicate (DUP)

(OS) L997619-22 05/31/18 15:44 • (DUP) R3314337-4 05/31/18 15:44

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	U	0.000	1	0.000		20

L997729-09 Original Sample (OS) • Duplicate (DUP)

(OS) L997729-09 05/31/18 15:56 • (DUP) R3314337-9 05/31/18 15:57

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314337-2 05/31/18 15:42 • (LCSD) R3314337-3 05/31/18 15:42

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chromium,Hexavalent	24.0	23.3	23.2	97.2	96.8	80.0-120			0.344	20

L997619-25 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997619-25 05/31/18 15:47 • (MS) R3314337-5 05/31/18 15:47 • (MSD) R3314337-6 05/31/18 15:48

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chromium,Hexavalent	21.4	U	21.9	21.9	102	102	1	75.0-125			0.196	20



L997619-25 Original Sample (OS) • Matrix Spike (MS)

(OS) L997619-25 05/31/18 15:47 • (MS) R3314337-7 05/31/18 15:49

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MS Rec.	Dilution	Rec. Limits	<u>MS Qualifier</u>
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Chromium,Hexavalent	703	U	666	94.8	50	75.0-125	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3314573-1 06/01/18 12:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.640	2.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L997751-08 Original Sample (OS) • Duplicate (DUP)

(OS) L997751-08 06/01/18 12:13 • (DUP) R3314573-8 06/01/18 12:13

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0.000	1	0.000		20

L997751-11 Original Sample (OS) • Duplicate (DUP)

(OS) L997751-11 06/01/18 12:16 • (DUP) R3314573-9 06/01/18 12:16

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0.720	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314573-2 06/01/18 12:01 • (LCSD) R3314573-3 06/01/18 12:02

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chromium,Hexavalent	24.0	23.1	23.2	96.3	96.5	80.0-120			0.173	20

L997751-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-04 06/01/18 12:06 • (MS) R3314573-4 06/01/18 12:08 • (MSD) R3314573-5 06/01/18 12:09

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chromium,Hexavalent	20.0	ND	6.56	6.40	32.8	32.0	1	75.0-125	J6	J6	2.47	20

L997751-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L997751-04 06/01/18 12:06 • (MS) R3314573-7 06/01/18 12:10

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Chromium,Hexavalent	669	ND	481	71.9	50	75.0-125	J6



Method Blank (MB)

(MB) R3314825-1 06/02/18 11:57

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.640	2.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L998069-06 Original Sample (OS) • Duplicate (DUP)

(OS) L998069-06 06/02/18 12:14 • (DUP) R3314825-8 06/02/18 12:14

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314825-2 06/02/18 11:58 • (LCSD) R3314825-3 06/02/18 11:58

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Chromium,Hexavalent	24.0	23.3	23.5	97.2	98.0	80.0-120			0.854	20

L997751-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-04 06/02/18 11:59 • (MS) R3314825-4 06/02/18 12:03 • (MSD) R3314825-5 06/02/18 12:03

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chromium,Hexavalent	20.0	ND	5.00	4.92	25.0	24.6	1	75.0-125	J6	J6	1.61	20

L997751-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L997751-04 06/02/18 11:59 • (MS) R3314825-7 06/02/18 12:04

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Chromium,Hexavalent	688	ND	549	79.8	50	75.0-125	

L997567-01 Original Sample (OS) • Duplicate (DUP)

(OS) L997567-01 05/31/18 17:10 • (DUP) R3314371-3 05/31/18 17:10

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	su	su		%		%
pH	6.82	6.77	1	0.736		1

Sample Narrative:
OS: 6.82 at 20.2C
DUP: 6.77 at 20.4C

L997729-09 Original Sample (OS) • Duplicate (DUP)

(OS) L997729-09 05/31/18 17:10 • (DUP) R3314371-4 05/31/18 17:10

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	su	su		%		%
pH	8.35	8.29	1	0.721		1

Sample Narrative:
OS: 8.35 at 20.3C
DUP: 8.29 at 20.4C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314371-1 05/31/18 17:10 • (LCSD) R3314371-2 05/31/18 17:10

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
pH	10.0	9.98	9.98	99.8	99.8	99.0-101			0.000	1

Sample Narrative:
LCS: 9.98 at 20.4C
LCSD: 9.98 at 20.4C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



L997754-01 Original Sample (OS) • Duplicate (DUP)

(OS) L997754-01 05/31/18 11:50 • (DUP) R3314201-3 05/31/18 11:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.86	7.86	1	0.000		1

Sample Narrative:

OS: 7.86 at 21.2C

DUP: 7.86 at 21.1C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L997754-11 Original Sample (OS) • Duplicate (DUP)

(OS) L997754-11 05/31/18 11:50 • (DUP) R3314201-4 05/31/18 11:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	11.3	11.2	1	0.267		1

Sample Narrative:

OS: 11.25 at 20.7C

DUP: 11.22 at 20.8C

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314201-1 05/31/18 11:50 • (LCSD) R3314201-2 05/31/18 11:50

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	su	su	su	%	%	%			%	%
pH	10.0	9.99	9.98	99.9	99.8	99.0-101			0.100	1

Sample Narrative:

LCS: 9.99 at 20.8C

LCSD: 9.98 at 20.8C



Method Blank (MB)

(MB) R3314031-1 05/31/18 01:38

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L997751-02 Original Sample (OS) • Duplicate (DUP)

(OS) L997751-02 05/31/18 01:38 • (DUP) R3314031-4 05/31/18 01:38

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	215	214	1	0.000		20

L997766-03 Original Sample (OS) • Duplicate (DUP)

(OS) L997766-03 05/31/18 01:38 • (DUP) R3314031-5 05/31/18 01:38

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	622	620	1	0.322		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314031-2 05/31/18 01:38 • (LCSD) R3314031-3 05/31/18 01:38

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	877	875	872	99.8	99.4	85.0-115			0.343	20



Method Blank (MB)

(MB) R3314363-1 05/31/18 17:09

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L997729-01 Original Sample (OS) • Duplicate (DUP)

(OS) L997729-01 05/31/18 17:09 • (DUP) R3314363-4 05/31/18 17:09

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	396	394	1	0.506		20

L997751-09 Original Sample (OS) • Duplicate (DUP)

(OS) L997751-09 05/31/18 17:09 • (DUP) R3314363-5 05/31/18 17:09

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	142	144	1	1.40		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314363-2 05/31/18 17:09 • (LCSD) R3314363-3 05/31/18 17:09

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	877	865	866	98.6	98.7	85.0-115			0.116	20



Method Blank (MB)

(MB) R3314426-1 06/01/18 00:15

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.00280	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314426-2 06/01/18 00:17 • (LCSD) R3314426-3 06/01/18 00:19

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Mercury	0.300	0.242	0.270	80.7	90.1	80.0-120			11.1	20

L997768-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997768-02 06/01/18 00:22 • (MS) R3314426-4 06/01/18 00:24 • (MSD) R3314426-5 06/01/18 00:26

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Mercury	0.300	ND	0.244	0.249	76.0	77.5	1	75.0-125			1.91	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3314960-1 06/03/18 07:34

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.00280	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314960-2 06/03/18 07:48 • (LCSD) R3314960-3 06/03/18 07:55

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Mercury	0.300	0.275	0.285	91.7	95.0	80.0-120			3.60	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3314755-1 06/01/18 13:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.650	2.00
Barium	U		0.170	0.500
Boron	U		1.26	10.0
Cadmium	U		0.0700	0.500
Chromium	0.170	U	0.140	1.00
Copper	0.628	U	0.530	2.00
Lead	U		0.190	0.500
Nickel	U		0.490	2.00
Selenium	U		0.740	2.00
Silver	U		0.280	1.00
Zinc	U		0.590	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3314755-2 06/01/18 13:57 • (LCSD) R3314755-3 06/01/18 13:59

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	100	98.0	101	98.0	101	80.0-120			3.06	20
Barium	100	101	105	101	105	80.0-120			3.23	20
Boron	100	102	106	102	106	80.0-120			3.93	20
Cadmium	100	95.0	98.2	95.0	98.2	80.0-120			3.30	20
Chromium	100	94.5	97.4	94.5	97.4	80.0-120			3.06	20
Copper	100	101	104	101	104	80.0-120			3.03	20
Lead	100	94.5	97.6	94.5	97.6	80.0-120			3.26	20
Nickel	100	101	104	101	104	80.0-120			2.49	20
Selenium	100	97.9	99.7	97.9	99.7	80.0-120			1.86	20
Silver	20.0	17.2	17.6	86.1	87.9	80.0-120			2.05	20
Zinc	100	98.2	101	98.2	101	80.0-120			2.81	20

L997751-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-01 06/01/18 14:02 • (MS) R3314755-6 06/01/18 14:09 • (MSD) R3314755-7 06/01/18 14:11

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	100	7.72	97.2	94.1	89.5	86.4	1	75.0-125			3.31	20
Barium	100	213	333	291	120	77.8	1	75.0-125			13.4	20
Boron	100	ND	93.2	89.3	93.2	89.3	1	75.0-125			4.24	20
Cadmium	100	ND	88.9	85.3	88.7	85.1	1	75.0-125			4.12	20
Chromium	100	24.8	105	101	79.9	76.2	1	75.0-125			3.54	20



L997751-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-01 06/01/18 14:02 • (MS) R3314755-6 06/01/18 14:09 • (MSD) R3314755-7 06/01/18 14:11

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Copper	100	17.5	113	109	95.7	91.4	1	75.0-125			3.85	20
Lead	100	13.9	99.7	96.7	85.8	82.8	1	75.0-125			3.08	20
Nickel	100	16.1	120	108	103	91.8	1	75.0-125			10.2	20
Selenium	100	ND	90.7	87.3	90.7	87.3	1	75.0-125			3.87	20
Silver	20.0	ND	15.6	14.8	78.0	74.2	1	75.0-125		J6	5.02	20
Zinc	100	49.1	123	127	74.3	78.0	1	75.0-125	J6		2.91	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

[L997751-01,02,03,04,05,06,07,08,09,10,11,12,13](#)

Method Blank (MB)

(MB) R3315780-3 05/31/18 22:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000485	U	0.000150	0.00500
Ethylbenzene	0.000131	U	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	103			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	107			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3315780-1 05/31/18 20:42

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0500	0.0485	97.0	71.0-121	
Toluene	0.0500	0.0480	95.9	72.0-120	
Ethylbenzene	0.0500	0.0528	106	76.0-121	
Total Xylene	0.150	0.160	107	75.0-124	
(S) a,a,a-Trifluorotoluene(FID)			99.4	77.0-120	
(S) a,a,a-Trifluorotoluene(PID)			104	75.0-128	

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315780-4 05/31/18 19:59 • (LCSD) R3315780-5 05/31/18 20:42

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.0485	0.0485	96.9	97.0	71.0-121			0.0882	20
Toluene	0.0500	0.0478	0.0480	95.6	95.9	72.0-120			0.323	20
Ethylbenzene	0.0500	0.0527	0.0528	105	106	76.0-121			0.217	20
Total Xylene	0.150	0.160	0.160	107	107	75.0-124			0.0626	20
(S) a,a,a-Trifluorotoluene(FID)				103	99.4	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				103	104	75.0-128				



Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315780-2 05/31/18 21:03 • (LCSD) R3315780-6 05/31/18 21:24

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	5.76	5.70	105	104	70.0-136			1.02	20
(S) a,a,a-Trifluorotoluene(FID)				92.4	92.7	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				115	114	75.0-128				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

L997751-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-13 06/01/18 04:29 • (MS) R3315780-8 06/01/18 04:50 • (MSD) R3315780-9 06/01/18 05:11

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0500	0.00156	0.0112	0.0152	19.3	27.3	1	10.0-146		J3	30.5	29
Toluene	0.0500	ND	0.0109	0.0144	15.8	22.8	1	10.0-143			27.4	30
Ethylbenzene	0.0500	0.00123	0.00752	0.0111	12.6	19.8	1	10.0-147		J3	38.5	31
Total Xylene	0.150	0.00181	0.0182	0.0283	10.9	17.6	1	10.0-149	J6	J3 J6	43.2	30
(S) a,a,a-Trifluorotoluene(FID)					97.9	98.6		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					103	104		75.0-128				

L997751-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997751-13 06/01/18 04:29 • (MS) R3315780-10 06/01/18 05:32 • (MSD) R3315780-11 06/01/18 05:54

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	5.50	0.125	0.766	0.873	11.6	13.6	1	10.0-147			13.1	30
(S) a,a,a-Trifluorotoluene(FID)					98.5	98.6		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					105	106		75.0-128				



Method Blank (MB)

(MB) R3315622-1 06/05/18 17:55

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	84.3			18.0-148

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315622-2 06/05/18 18:07 • (LCSD) R3315622-3 06/05/18 18:18

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	50.0	32.6	33.5	65.2	67.0	50.0-150			2.81	20
(S) o-Terphenyl				113	114	18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3315306-3 06/04/18 20:38

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Anthracene	U		0.000600	0.00600
Acenaphthene	U		0.000600	0.00600
Acenaphthylene	U		0.000600	0.00600
Benzo(a)anthracene	U		0.000600	0.00600
Benzo(a)pyrene	U		0.000600	0.00600
Benzo(b)fluoranthene	U		0.000600	0.00600
Benzo(g,h,i)perylene	U		0.000600	0.00600
Benzo(k)fluoranthene	U		0.000600	0.00600
Chrysene	U		0.000600	0.00600
Dibenz(a,h)anthracene	U		0.000600	0.00600
Fluoranthene	U		0.000600	0.00600
Fluorene	U		0.000600	0.00600
Indeno(1,2,3-cd)pyrene	U		0.000600	0.00600
Naphthalene	U		0.00200	0.0200
Phenanthrene	U		0.000600	0.00600
Pyrene	U		0.000600	0.00600
1-Methylnaphthalene	U		0.00200	0.0200
2-Methylnaphthalene	U		0.00200	0.0200
2-Chloronaphthalene	U		0.00200	0.0200
(S) Nitrobenzene-d5	54.7			14.0-149
(S) 2-Fluorobiphenyl	78.8			34.0-125
(S) p-Terphenyl-d14	75.1			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315306-1 06/04/18 19:55 • (LCSD) R3315306-2 06/04/18 20:16

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	0.0800	0.0798	0.0735	99.7	91.8	50.0-125			8.23	20
Acenaphthene	0.0800	0.0631	0.0592	78.9	74.0	52.0-120			6.46	20
Acenaphthylene	0.0800	0.0658	0.0610	82.2	76.2	51.0-120			7.50	20
Benzo(a)anthracene	0.0800	0.0643	0.0584	80.4	73.0	46.0-121			9.57	20
Benzo(a)pyrene	0.0800	0.0640	0.0578	79.9	72.2	42.0-121			10.2	20
Benzo(b)fluoranthene	0.0800	0.0660	0.0654	82.6	81.8	42.0-123			0.961	20
Benzo(g,h,i)perylene	0.0800	0.0716	0.0669	89.6	83.7	43.0-128			6.81	20
Benzo(k)fluoranthene	0.0800	0.0722	0.0650	90.2	81.2	45.0-128			10.5	20
Chrysene	0.0800	0.0705	0.0650	88.1	81.3	48.0-127			8.06	20
Dibenz(a,h)anthracene	0.0800	0.0701	0.0664	87.6	83.0	43.0-132			5.38	20
Fluoranthene	0.0800	0.0781	0.0733	97.6	91.6	49.0-129			6.34	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3315306-1 06/04/18 19:55 • (LCSD) R3315306-2 06/04/18 20:16

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Fluorene	0.0800	0.0630	0.0589	78.7	73.6	50.0-120			6.72	20
Indeno(1,2,3-cd)pyrene	0.0800	0.0712	0.0664	89.0	83.0	44.0-131			6.97	20
Naphthalene	0.0800	0.0629	0.0587	78.7	73.4	50.0-120			7.00	20
Phenanthrene	0.0800	0.0642	0.0594	80.2	74.3	48.0-120			7.76	20
Pyrene	0.0800	0.0669	0.0609	83.6	76.2	48.0-135			9.29	20
1-Methylnaphthalene	0.0800	0.0665	0.0630	83.1	78.7	52.0-122			5.38	20
2-Methylnaphthalene	0.0800	0.0645	0.0610	80.6	76.3	52.0-120			5.46	20
2-Chloronaphthalene	0.0800	0.0655	0.0621	81.9	77.7	50.0-120			5.31	20
(S) Nitrobenzene-d5				64.0	54.0	14.0-149				
(S) 2-Fluorobiphenyl				80.2	75.0	34.0-125				
(S) p-Terphenyl-d14				75.3	69.1	23.0-120				

L997747-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L997747-01 06/04/18 21:00 • (MS) R3315306-4 06/04/18 21:22 • (MSD) R3315306-5 06/04/18 21:44

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Anthracene	0.113	U	0.0627	0.0631	55.4	55.7	1	20.0-136			0.578	24
Acenaphthene	0.113	U	0.0518	0.0516	45.7	45.5	1	29.0-124			0.460	20
Acenaphthylene	0.113	U	0.0542	0.0532	47.8	47.0	1	35.0-120			1.78	20
Benzo(a)anthracene	0.113	U	0.0506	0.0504	44.7	44.5	1	13.0-132			0.489	27
Benzo(a)pyrene	0.113	U	0.0529	0.0541	46.7	47.7	1	14.0-138			2.09	27
Benzo(b)fluoranthene	0.113	U	0.0521	0.0529	46.0	46.7	1	10.0-129			1.54	31
Benzo(g,h,i)perylene	0.113	U	0.0535	0.0547	47.2	48.3	1	10.0-133			2.21	30
Benzo(k)fluoranthene	0.113	U	0.0522	0.0531	46.1	46.9	1	15.0-131			1.74	27
Chrysene	0.113	U	0.0533	0.0543	47.0	47.9	1	15.0-137			1.92	25
Dibenz(a,h)anthracene	0.113	U	0.0534	0.0540	47.2	47.7	1	15.0-132			1.06	27
Fluoranthene	0.113	U	0.0625	0.0631	55.2	55.7	1	13.0-139			0.891	28
Fluorene	0.113	U	0.0506	0.0495	44.6	43.7	1	27.0-122			2.12	22
Indeno(1,2,3-cd)pyrene	0.113	U	0.0533	0.0538	47.1	47.5	1	11.0-133			0.956	29
Naphthalene	0.113	U	0.0547	0.0543	48.3	48.0	1	18.0-136			0.699	21
Phenanthrene	0.113	U	0.0511	0.0508	45.1	44.8	1	15.0-133			0.559	25
Pyrene	0.113	U	0.0520	0.0517	45.9	45.6	1	11.0-146			0.625	29
1-Methylnaphthalene	0.113	U	0.0568	0.0560	50.1	49.4	1	24.0-137			1.45	22
2-Methylnaphthalene	0.113	U	0.0551	0.0546	48.7	48.2	1	23.0-136			0.904	22
2-Chloronaphthalene	0.113	U	0.0557	0.0555	49.2	49.0	1	36.0-120			0.418	20
(S) Nitrobenzene-d5					35.9	34.6		14.0-149				
(S) 2-Fluorobiphenyl					50.1	47.7		34.0-125				
(S) p-Terphenyl-d14					45.1	41.0		23.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
T8	Sample(s) received past/too close to holding time expiration.

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Gl
8	Al
9	Sc

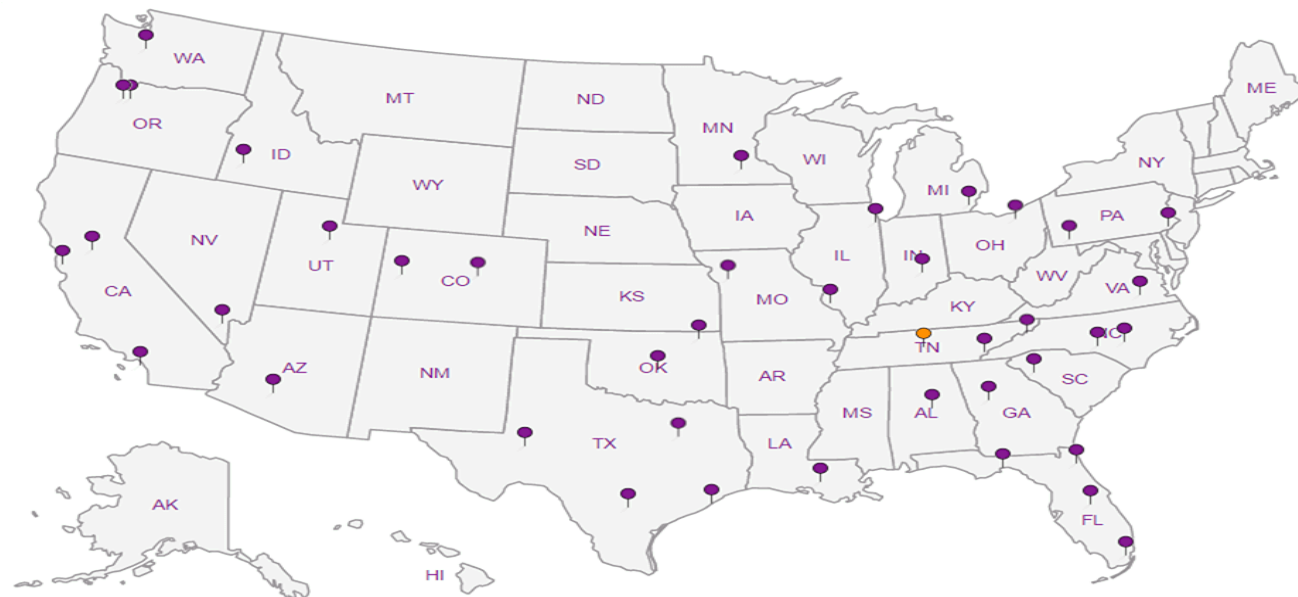
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.



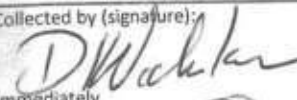
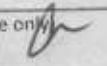
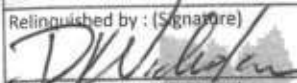

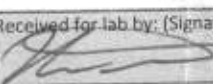
Alabama	40660	Nebraska	NE-05-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



Company Name/Address: Nicholson GeoSolutions. LLC. 3433 E. Lake Dr. Centennial, CO 80121				Billing Information: Don Wilbourn Berry Petroleum Company 235 Callahan Ave Parachute, CO 81635				Analysis / Container / Preservative										Chain of Custody Page <u>1</u> of <u>2</u>  L.A.B S.C.I.E.N.C.E.S. YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859 																																																																																																
Report to: Dave Nicholson				Email To: dknicholson@q.com				TEPH(8015)Diesel & Oil Range (1) 4oz Clear - No Pres BTEX/GRO/TPH (1) 4oz Clear - No Pres Metals, SAR, CR6 - 4oz Clear - No Pres SPCON, pH - 4oz Clear - No Pres SV8270PAHSIM - 4oz Clear - No Pres																																																																																																										
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