



Nicholson GeoSolutions LLC

3433 East Lake Drive
Centennial, CO 80121

October 21, 2017

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

Subject: Latham I-02 Final Landfarm Sampling Results

Dear Derek:

Nicholson GeoSolutions LLC was retained by Berry Petroleum Company (Berry) to conduct soil sampling of the landfarm on the Latham I-02 well pad in the Garden Gulch area, Garfield County, Colorado. GPS mapping showed that the landfarm covers about 1.30 acres and contains an estimated 3,648 yards of material. The landfarm material has been recently spread out and averages about 15 inches deep.

Sampling was conducted on September 26th, 2017. A total of seven 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 seven composite samples. The laboratory report is contained in Appendix A. All results were below the COGCC standards except for benzo(a)pyrene and arsenic for all samples and SAR for sample LI-02-LF-1. Benzo(a)pyrene was above the standard of 0.022 mg/kg for all samples and ranged from 0.0236 mg/kg to 0.0515 mg/kg. Arsenic ranged from 6.1 mg/kg to 9.06 mg/kg, within the range of natural background concentrations for the Garden Gulch area.

Based on the sample results, further treatment of the landfarm is necessary.

Nicholson GeoSolutions LLC



David K. Nicholson, P.G.
Principal Geologist

Table 1 Latham I-02 Landfarm Sample Results – September 26, 2017

	Table 910-1 Standards	LI-02 LF-1	LI-02 LF-2	LI-02 LF-3	LI-02 LF-4	LI-02 LF-5	LI-02 LF-6	LI-02 LF-7
sp. conductance (mmhos/cm)	<4	0.491	0.698	0.162	0.795	0.892	0.742	0.692
pH (standard units)	6-9	7.73	8.03	7.46	7.61	7.79	7.81	7.96
SAR (ratio)	<12	12.6	4.17	4.59	5.27	9.03	4.97	5.77
TVPH – gasoline range	500 ¹	<0.1	<0.1	<0.1	<0.1	0.363	0.21	0.166
TEPH – diesel/motor oil range		105	265.8	376.9	268	225.7	256.7	270.1
benzene	0.17	0.00169	0.00116	0.00168	0.00121	0.00273	0.00138	0.00113
toluene	85	<0.005	<0.005	<0.005	<0.005	0.00825	<0.005	<0.005
ethylbenzene	100	0.00134	0.00133	0.00139	0.00155	0.0028	0.00123	0.00117
xylene	175	0.00256	0.002	0.00229	0.00216	0.00551	0.00231	0.00222
benzo(a)pyrene	0.022	0.0236	0.0456	0.0515	0.034	0.0332	0.0374	0.0328
arsenic	0.39	7.73	6.1	6.37	9.06	7.09	8.29	7.91

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

October
2017

GeoSolutions
NICHOLSON

Legend

- Sub Sample
- Land Farm Perimeter

0 37.5 75 150 Feet 1" = 75'

Berry Petroleum Company

Latham I-02
Landfarm Final
Composite Soil Samples

APPENDIX A
Laboratory Report

October 09, 2017

Berry Petroleum - Denver, CO

Sample Delivery Group: L939743
Samples Received: 09/28/2017
Project Number:
Description: Latham I-02

Report To: Dave Nicholson
1999 Broadway, Suite 3700
Denver, CO 80202

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.



Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	5
Sr: Sample Results	6
LI02-LF-1 L939743-01	6
LI02-LF-2 L939743-02	8
LI02-LF-3 L939743-03	10
LI02-LF-4 L939743-04	12
LI02-LF-5 L939743-05	14
LI02-LF-6 L939743-06	16
LI02-LF-7 L939743-07	18
Qc: Quality Control Summary	20
Wet Chemistry by Method 3060A/7196A	20
Wet Chemistry by Method 9045D	21
Wet Chemistry by Method 9050AMod	24
Mercury by Method 7471A	25
Metals (ICP) by Method 6010B	26
Volatile Organic Compounds (GC) by Method 8015/8021	28
Semi-Volatile Organic Compounds (GC) by Method 8015	31
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	32
Gl: Glossary of Terms	34
Al: Accreditations & Locations	35
Sc: Sample Chain of Custody	36



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



LI02-LF-1 L939743-01 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:10

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:17	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:48	TH
Wet Chemistry by Method 9045D	WG1025724	1	09/29/17 18:04	09/30/17 14:39	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 13:18	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 18:56	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026225	1	09/29/17 08:43	10/04/17 09:10	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	20	10/04/17 14:04	10/06/17 00:15	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 09:21	KM

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

LI02-LF-2 L939743-02 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:15

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:21	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:49	TH
Wet Chemistry by Method 9045D	WG1025724	1	09/29/17 18:04	09/30/17 14:39	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:08	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 19:52	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026225	1	09/29/17 08:43	10/04/17 09:32	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 19:47	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 10:46	KM

LI02-LF-3 L939743-03 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:20

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:24	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:50	TH
Wet Chemistry by Method 9045D	WG1025724	1	09/29/17 18:04	09/30/17 14:39	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:10	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 19:55	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026225	1	09/29/17 08:43	10/04/17 09:55	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 20:02	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 11:08	KM

LI02-LF-4 L939743-04 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:25

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:27	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:50	TH
Wet Chemistry by Method 9045D	WG1025724	1	09/29/17 18:04	09/30/17 14:39	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:13	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 19:57	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026225	1	09/29/17 08:43	10/04/17 10:17	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 19:05	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 11:29	KM

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L939743

DATE/TIME:

10/09/17 09:27

PAGE:

3 of 37

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



LI02-LF-5 L939743-05 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:30

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:30	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:51	TH
Wet Chemistry by Method 9045D	WG1027374	1	10/04/17 10:05	10/04/17 10:44	TH
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:15	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 20:00	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026496	1	09/29/17 08:43	10/01/17 14:36	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 18:51	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 11:51	KM

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

LI02-LF-6 L939743-06 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:40

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:34	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:51	TH
Wet Chemistry by Method 9045D	WG1025967	1	09/29/17 18:06	09/30/17 14:21	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:17	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 20:02	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026496	1	09/29/17 08:43	10/01/17 14:58	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 19:33	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 09:42	KM

LI02-LF-7 L939743-07 Solid

Collected by
DK Nicholson

Collected date/time
09/26/17 15:50

Received date/time
09/28/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1027733	1	10/04/17 16:07	10/06/17 01:37	ST
Wet Chemistry by Method 3060A/7196A	WG1025950	1	10/03/17 09:08	10/03/17 14:53	TH
Wet Chemistry by Method 9045D	WG1025967	1	09/29/17 18:06	09/30/17 14:21	ER
Wet Chemistry by Method 9050AMod	WG1027503	1	10/05/17 14:25	10/05/17 14:25	MA
Mercury by Method 7471A	WG1026800	1	10/03/17 10:06	10/04/17 14:20	ABL
Metals (ICP) by Method 6010B	WG1027653	1	10/04/17 12:25	10/05/17 20:05	ST
Volatile Organic Compounds (GC) by Method 8015/8021	WG1026496	1	09/29/17 08:43	10/01/17 15:19	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1027431	5	10/04/17 14:04	10/05/17 19:19	DMG
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1026650	1	10/02/17 22:33	10/03/17 12:12	KM



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. 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	12.6		1	10/06/2017 01:17	WG1027733

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	2.60		2.00	1	10/03/2017 14:48	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.73	T8	1	09/30/2017 14:39	WG1025724

Sample Narrative:

L939743-01 WG1025724: 7.73 at 19.1c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	491		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 13:18	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.73		2.00	1	10/05/2017 18:56	WG1027653
Barium	459	V	0.500	1	10/05/2017 18:56	WG1027653
Boron	ND		10.0	1	10/05/2017 18:56	WG1027653
Cadmium	ND		0.500	1	10/05/2017 18:56	WG1027653
Chromium	48.5		1.00	1	10/05/2017 18:56	WG1027653
Copper	20.8		2.00	1	10/05/2017 18:56	WG1027653
Lead	12.9		0.500	1	10/05/2017 18:56	WG1027653
Nickel	29.5		2.00	1	10/05/2017 18:56	WG1027653
Selenium	ND		2.00	1	10/05/2017 18:56	WG1027653
Silver	ND		1.00	1	10/05/2017 18:56	WG1027653
Zinc	52.6	Q1	5.00	1	10/05/2017 18:56	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00169		0.000500	1	10/04/2017 09:10	WG1026225
Toluene	ND		0.00500	1	10/04/2017 09:10	WG1026225
Ethylbenzene	0.00134	B	0.000500	1	10/04/2017 09:10	WG1026225
Total Xylene	0.00256	B	0.00150	1	10/04/2017 09:10	WG1026225
TPH (GC/FID) Low Fraction	ND		0.100	1	10/04/2017 09:10	WG1026225
(S) a,a,a-Trifluorotoluene(FID)	93.4		77.0-120		10/04/2017 09:10	WG1026225
(S) a,a,a-Trifluorotoluene(PID)	102		75.0-128		10/04/2017 09:10	WG1026225

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



Collected date/time: 09/26/17 15:10

L939743

Semi-Volatile Organic Compounds (GC) by Method 8015

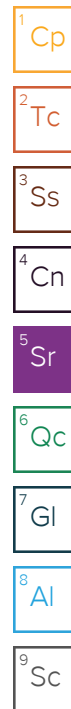
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	105		80.0	20	10/06/2017 00:15	WG1027431
C28-C40 Oil Range	ND		80.0	20	10/06/2017 00:15	WG1027431
(S) o-Terphenyl	77.2	J7	18.0-148		10/06/2017 00:15	WG1027431

Sample Narrative:

L939743-01 WG1027431: Cannot run at lower dilution due to viscosity of extract

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.00970		0.00600	1	10/03/2017 09:21	WG1026650
Acenaphthene	0.00961		0.00600	1	10/03/2017 09:21	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 09:21	WG1026650
Benzo(a)anthracene	0.0144		0.00600	1	10/03/2017 09:21	WG1026650
Benzo(a)pyrene	0.0236		0.00600	1	10/03/2017 09:21	WG1026650
Benzo(b)fluoranthene	0.0532		0.00600	1	10/03/2017 09:21	WG1026650
Benzo(g,h,i)perylene	0.0355		0.00600	1	10/03/2017 09:21	WG1026650
Benzo(k)fluoranthene	0.0126	J3	0.00600	1	10/03/2017 09:21	WG1026650
Chrysene	0.0167		0.00600	1	10/03/2017 09:21	WG1026650
Dibenz(a,h)anthracene	0.0108		0.00600	1	10/03/2017 09:21	WG1026650
Fluoranthene	0.0166		0.00600	1	10/03/2017 09:21	WG1026650
Fluorene	0.00945		0.00600	1	10/03/2017 09:21	WG1026650
Indeno(1,2,3-cd)pyrene	0.0258		0.00600	1	10/03/2017 09:21	WG1026650
Naphthalene	0.0632		0.0200	1	10/03/2017 09:21	WG1026650
Phenanthrene	0.0343		0.00600	1	10/03/2017 09:21	WG1026650
Pyrene	0.0440	J3	0.00600	1	10/03/2017 09:21	WG1026650
1-Methylnaphthalene	0.0739	J3	0.0200	1	10/03/2017 09:21	WG1026650
2-Methylnaphthalene	0.145	J3	0.0200	1	10/03/2017 09:21	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 09:21	WG1026650
(S) p-Terphenyl-d14	71.6		23.0-120		10/03/2017 09:21	WG1026650
(S) Nitrobenzene-d5	45.8		14.0-149		10/03/2017 09:21	WG1026650
(S) 2-Fluorobiphenyl	89.0		34.0-125		10/03/2017 09:21	WG1026650





Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.17		1	10/06/2017 01:21	WG1027733

Wet Chemistry by Method 3060A/7196A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	10/03/2017 14:49	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.03	T8	1	09/30/2017 14:39	WG1025724

Sample Narrative:

L939743-02 WG1025724: 8.03 at 19.3c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	698		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 14:08	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	6.10		2.00	1	10/05/2017 19:52	WG1027653
Barium	273		0.500	1	10/05/2017 19:52	WG1027653
Boron	ND		10.0	1	10/05/2017 19:52	WG1027653
Cadmium	ND		0.500	1	10/05/2017 19:52	WG1027653
Chromium	36.7		1.00	1	10/05/2017 19:52	WG1027653
Copper	20.8		2.00	1	10/05/2017 19:52	WG1027653
Lead	10.7		0.500	1	10/05/2017 19:52	WG1027653
Nickel	21.9		2.00	1	10/05/2017 19:52	WG1027653
Selenium	ND		2.00	1	10/05/2017 19:52	WG1027653
Silver	ND		1.00	1	10/05/2017 19:52	WG1027653
Zinc	47.3		5.00	1	10/05/2017 19:52	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00116		0.000500	1	10/04/2017 09:32	WG1026225
Toluene	ND		0.00500	1	10/04/2017 09:32	WG1026225
Ethylbenzene	0.00133	B	0.000500	1	10/04/2017 09:32	WG1026225
Total Xylene	0.00200	B	0.00150	1	10/04/2017 09:32	WG1026225
TPH (GC/FID) Low Fraction	ND		0.100	1	10/04/2017 09:32	WG1026225
(S) a,a,a-Trifluorotoluene(FID)	92.5		77.0-120		10/04/2017 09:32	WG1026225
(S) a,a,a-Trifluorotoluene(PID)	100		75.0-128		10/04/2017 09:32	WG1026225

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	212		20.0	5	10/05/2017 19:47	WG1027431
C28-C40 Oil Range	53.8		20.0	5	10/05/2017 19:47	WG1027431
(S) o-Terphenyl	61.0		18.0-148		10/05/2017 19:47	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0132		0.00600	1	10/03/2017 10:46	WG1026650
Acenaphthene	ND		0.00600	1	10/03/2017 10:46	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 10:46	WG1026650
Benzo(a)anthracene	0.0192		0.00600	1	10/03/2017 10:46	WG1026650
Benzo(a)pyrene	0.0456		0.00600	1	10/03/2017 10:46	WG1026650
Benzo(b)fluoranthene	0.0922		0.00600	1	10/03/2017 10:46	WG1026650
Benzo(g,h,i)perylene	0.0649		0.00600	1	10/03/2017 10:46	WG1026650
Benzo(k)fluoranthene	0.0216	<u>J3</u>	0.00600	1	10/03/2017 10:46	WG1026650
Chrysene	0.0194		0.00600	1	10/03/2017 10:46	WG1026650
Dibenz(a,h)anthracene	0.0200		0.00600	1	10/03/2017 10:46	WG1026650
Fluoranthene	0.0253		0.00600	1	10/03/2017 10:46	WG1026650
Fluorene	0.0160		0.00600	1	10/03/2017 10:46	WG1026650
Indeno(1,2,3-cd)pyrene	0.0489		0.00600	1	10/03/2017 10:46	WG1026650
Naphthalene	0.125		0.0200	1	10/03/2017 10:46	WG1026650
Phenanthrene	0.0645		0.00600	1	10/03/2017 10:46	WG1026650
Pyrene	0.0928	<u>J3</u>	0.00600	1	10/03/2017 10:46	WG1026650
1-Methylnaphthalene	0.132	<u>J3</u>	0.0200	1	10/03/2017 10:46	WG1026650
2-Methylnaphthalene	0.256	<u>J3</u>	0.0200	1	10/03/2017 10:46	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 10:46	WG1026650
(S) p-Terphenyl-d14	82.1		23.0-120		10/03/2017 10:46	WG1026650
(S) Nitrobenzene-d5	56.0		14.0-149		10/03/2017 10:46	WG1026650
(S) 2-Fluorobiphenyl	83.0		34.0-125		10/03/2017 10:46	WG1026650

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	4.59		1	10/06/2017 01:24	WG1027733

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	2.00		2.00	1	10/03/2017 14:50	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.46	<u>T8</u>	1	09/30/2017 14:39	WG1025724

Sample Narrative:

L939743-03 WG1025724: 7.46 at 19.2c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	162		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 14:10	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.37		2.00	1	10/05/2017 19:55	WG1027653
Barium	280		0.500	1	10/05/2017 19:55	WG1027653
Boron	ND		10.0	1	10/05/2017 19:55	WG1027653
Cadmium	ND		0.500	1	10/05/2017 19:55	WG1027653
Chromium	63.0		1.00	1	10/05/2017 19:55	WG1027653
Copper	21.2		2.00	1	10/05/2017 19:55	WG1027653
Lead	10.2		0.500	1	10/05/2017 19:55	WG1027653
Nickel	23.6		2.00	1	10/05/2017 19:55	WG1027653
Selenium	ND		2.00	1	10/05/2017 19:55	WG1027653
Silver	ND		1.00	1	10/05/2017 19:55	WG1027653
Zinc	47.5		5.00	1	10/05/2017 19:55	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00168		0.000500	1	10/04/2017 09:55	WG1026225
Toluene	ND		0.00500	1	10/04/2017 09:55	WG1026225
Ethylbenzene	0.00139	<u>B</u>	0.000500	1	10/04/2017 09:55	WG1026225
Total Xylene	0.00229	<u>B</u>	0.00150	1	10/04/2017 09:55	WG1026225
TPH (GC/FID) Low Fraction	0.100		0.100	1	10/04/2017 09:55	WG1026225
(S) a,a,a-Trifluorotoluene(FID)	89.6		77.0-120		10/04/2017 09:55	WG1026225
(S) a,a,a-Trifluorotoluene(PID)	98.0		75.0-128		10/04/2017 09:55	WG1026225

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Collected date/time: 09/26/17 15:20

L939743

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	305		20.0	5	10/05/2017 20:02	WG1027431
C28-C40 Oil Range	71.9		20.0	5	10/05/2017 20:02	WG1027431
(S) o-Terphenyl	68.5		18.0-148		10/05/2017 20:02	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0151		0.00600	1	10/03/2017 11:08	WG1026650
Acenaphthene	0.0171		0.00600	1	10/03/2017 11:08	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 11:08	WG1026650
Benzo(a)anthracene	0.0195		0.00600	1	10/03/2017 11:08	WG1026650
Benzo(a)pyrene	0.0515		0.00600	1	10/03/2017 11:08	WG1026650
Benzo(b)fluoranthene	0.110		0.00600	1	10/03/2017 11:08	WG1026650
Benzo(g,h,i)perylene	0.0726		0.00600	1	10/03/2017 11:08	WG1026650
Benzo(k)fluoranthene	0.0241	J3	0.00600	1	10/03/2017 11:08	WG1026650
Chrysene	0.0250		0.00600	1	10/03/2017 11:08	WG1026650
Dibenz(a,h)anthracene	0.0223		0.00600	1	10/03/2017 11:08	WG1026650
Fluoranthene	0.0239		0.00600	1	10/03/2017 11:08	WG1026650
Fluorene	0.0176		0.00600	1	10/03/2017 11:08	WG1026650
Indeno(1,2,3-cd)pyrene	0.0560		0.00600	1	10/03/2017 11:08	WG1026650
Naphthalene	0.132		0.0200	1	10/03/2017 11:08	WG1026650
Phenanthrene	0.0673		0.00600	1	10/03/2017 11:08	WG1026650
Pyrene	0.0920	J3	0.00600	1	10/03/2017 11:08	WG1026650
1-Methylnaphthalene	0.134	J3	0.0200	1	10/03/2017 11:08	WG1026650
2-Methylnaphthalene	0.265	J3	0.0200	1	10/03/2017 11:08	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 11:08	WG1026650
(S) p-Terphenyl-d14	76.2		23.0-120		10/03/2017 11:08	WG1026650
(S) Nitrobenzene-d5	58.5		14.0-149		10/03/2017 11:08	WG1026650
(S) 2-Fluorobiphenyl	76.9		34.0-125		10/03/2017 11:08	WG1026650

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	5.27		1	10/06/2017 01:27	WG1027733

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 3060A/7196A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		2.00	1	10/03/2017 14:50	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.61	T8	1	09/30/2017 14:39	WG1025724

Sample Narrative:

L939743-04 WG1025724: 7.61 at 19.4c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	795		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	0.0227		0.0200	1	10/04/2017 14:13	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	9.06		2.00	1	10/05/2017 19:57	WG1027653
Barium	276		0.500	1	10/05/2017 19:57	WG1027653
Boron	ND		10.0	1	10/05/2017 19:57	WG1027653
Cadmium	ND		0.500	1	10/05/2017 19:57	WG1027653
Chromium	35.2		1.00	1	10/05/2017 19:57	WG1027653
Copper	20.2		2.00	1	10/05/2017 19:57	WG1027653
Lead	12.7		0.500	1	10/05/2017 19:57	WG1027653
Nickel	28.0		2.00	1	10/05/2017 19:57	WG1027653
Selenium	ND		2.00	1	10/05/2017 19:57	WG1027653
Silver	ND		1.00	1	10/05/2017 19:57	WG1027653
Zinc	56.8		5.00	1	10/05/2017 19:57	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00121		0.000500	1	10/04/2017 10:17	WG1026225
Toluene	ND		0.00500	1	10/04/2017 10:17	WG1026225
Ethylbenzene	0.00155	B	0.000500	1	10/04/2017 10:17	WG1026225
Total Xylene	0.00216	B	0.00150	1	10/04/2017 10:17	WG1026225
TPH (GC/FID) Low Fraction	ND		0.100	1	10/04/2017 10:17	WG1026225
(S) a,a,a-Trifluorotoluene(FID)	93.1		77.0-120		10/04/2017 10:17	WG1026225
(S) a,a,a-Trifluorotoluene(PID)	101		75.0-128		10/04/2017 10:17	WG1026225



Collected date/time: 09/26/17 15:25

L939743

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	210		20.0	5	10/05/2017 19:05	WG1027431
C28-C40 Oil Range	58.0		20.0	5	10/05/2017 19:05	WG1027431
(S) o-Terphenyl	71.0		18.0-148		10/05/2017 19:05	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0123		0.00600	1	10/03/2017 11:29	WG1026650
Acenaphthene	0.0138		0.00600	1	10/03/2017 11:29	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 11:29	WG1026650
Benzo(a)anthracene	0.0151		0.00600	1	10/03/2017 11:29	WG1026650
Benzo(a)pyrene	0.0340		0.00600	1	10/03/2017 11:29	WG1026650
Benzo(b)fluoranthene	0.0749		0.00600	1	10/03/2017 11:29	WG1026650
Benzo(g,h,i)perylene	0.0464		0.00600	1	10/03/2017 11:29	WG1026650
Benzo(k)fluoranthene	0.0161	J3	0.00600	1	10/03/2017 11:29	WG1026650
Chrysene	0.0206		0.00600	1	10/03/2017 11:29	WG1026650
Dibenz(a,h)anthracene	0.0147		0.00600	1	10/03/2017 11:29	WG1026650
Fluoranthene	0.0201		0.00600	1	10/03/2017 11:29	WG1026650
Fluorene	0.0160		0.00600	1	10/03/2017 11:29	WG1026650
Indeno(1,2,3-cd)pyrene	0.0355		0.00600	1	10/03/2017 11:29	WG1026650
Naphthalene	0.147		0.0200	1	10/03/2017 11:29	WG1026650
Phenanthrene	0.0586		0.00600	1	10/03/2017 11:29	WG1026650
Pyrene	0.0602	J3	0.00600	1	10/03/2017 11:29	WG1026650
1-Methylnaphthalene	0.175	J3	0.0200	1	10/03/2017 11:29	WG1026650
2-Methylnaphthalene	0.313	J3	0.0200	1	10/03/2017 11:29	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 11:29	WG1026650
(S) p-Terphenyl-d14	84.7		23.0-120		10/03/2017 11:29	WG1026650
(S) Nitrobenzene-d5	67.6		14.0-149		10/03/2017 11:29	WG1026650
(S) 2-Fluorobiphenyl	99.3		34.0-125		10/03/2017 11:29	WG1026650

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	9.03		1	10/06/2017 01:30	WG1027733

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 3060A/7196A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	10/03/2017 14:51	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.79	T8	1	10/04/2017 10:44	WG1027374

Sample Narrative:

L939743-05 WG1027374: 7.79 at 19.8c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	892		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 14:15	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	7.09		2.00	1	10/05/2017 20:00	WG1027653
Barium	426		0.500	1	10/05/2017 20:00	WG1027653
Boron	ND		10.0	1	10/05/2017 20:00	WG1027653
Cadmium	ND		0.500	1	10/05/2017 20:00	WG1027653
Chromium	43.6		1.00	1	10/05/2017 20:00	WG1027653
Copper	21.6		2.00	1	10/05/2017 20:00	WG1027653
Lead	11.9		0.500	1	10/05/2017 20:00	WG1027653
Nickel	26.4		2.00	1	10/05/2017 20:00	WG1027653
Selenium	ND		2.00	1	10/05/2017 20:00	WG1027653
Silver	ND		1.00	1	10/05/2017 20:00	WG1027653
Zinc	52.6		5.00	1	10/05/2017 20:00	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00273		0.000500	1	10/01/2017 14:36	WG1026496
Toluene	0.00825		0.00500	1	10/01/2017 14:36	WG1026496
Ethylbenzene	0.00280		0.000500	1	10/01/2017 14:36	WG1026496
Total Xylene	0.00551	B	0.00150	1	10/01/2017 14:36	WG1026496
TPH (GC/FID) Low Fraction	0.363		0.100	1	10/01/2017 14:36	WG1026496
(S) a,a,a-Trifluorotoluene(FID)	83.7		77.0-120		10/01/2017 14:36	WG1026496
(S) a,a,a-Trifluorotoluene(PID)	78.9		75.0-128		10/01/2017 14:36	WG1026496



Collected date/time: 09/26/17 15:30

L939743

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	181		20.0	5	10/05/2017 18:51	WG1027431
C28-C40 Oil Range	44.7		20.0	5	10/05/2017 18:51	WG1027431
(S) o-Terphenyl	66.5		18.0-148		10/05/2017 18:51	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0114		0.00600	1	10/03/2017 11:51	WG1026650
Acenaphthene	0.0123		0.00600	1	10/03/2017 11:51	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 11:51	WG1026650
Benzo(a)anthracene	0.0145		0.00600	1	10/03/2017 11:51	WG1026650
Benzo(a)pyrene	0.0332		0.00600	1	10/03/2017 11:51	WG1026650
Benzo(b)fluoranthene	0.0721		0.00600	1	10/03/2017 11:51	WG1026650
Benzo(g,h,i)perylene	0.0466		0.00600	1	10/03/2017 11:51	WG1026650
Benzo(k)fluoranthene	0.0179	J3	0.00600	1	10/03/2017 11:51	WG1026650
Chrysene	0.0204		0.00600	1	10/03/2017 11:51	WG1026650
Dibenz(a,h)anthracene	0.0149		0.00600	1	10/03/2017 11:51	WG1026650
Fluoranthene	0.0200		0.00600	1	10/03/2017 11:51	WG1026650
Fluorene	0.0140		0.00600	1	10/03/2017 11:51	WG1026650
Indeno(1,2,3-cd)pyrene	0.0371		0.00600	1	10/03/2017 11:51	WG1026650
Naphthalene	0.0910		0.0200	1	10/03/2017 11:51	WG1026650
Phenanthrene	0.0497		0.00600	1	10/03/2017 11:51	WG1026650
Pyrene	0.0603	J3	0.00600	1	10/03/2017 11:51	WG1026650
1-Methylnaphthalene	0.102	J3	0.0200	1	10/03/2017 11:51	WG1026650
2-Methylnaphthalene	0.188	J3	0.0200	1	10/03/2017 11:51	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 11:51	WG1026650
(S) p-Terphenyl-d14	78.9		23.0-120		10/03/2017 11:51	WG1026650
(S) Nitrobenzene-d5	55.3		14.0-149		10/03/2017 11:51	WG1026650
(S) 2-Fluorobiphenyl	80.9		34.0-125		10/03/2017 11:51	WG1026650

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	4.97		1	10/06/2017 01:34	WG1027733

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 3060A/7196A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	10/03/2017 14:51	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.81	T8	1	09/30/2017 14:21	WG1025967

Sample Narrative:

L939743-06 WG1025967: 7.81 at 19.3c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	742		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 14:17	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	8.29		2.00	1	10/05/2017 20:02	WG1027653
Barium	286		0.500	1	10/05/2017 20:02	WG1027653
Boron	ND		10.0	1	10/05/2017 20:02	WG1027653
Cadmium	ND		0.500	1	10/05/2017 20:02	WG1027653
Chromium	36.9		1.00	1	10/05/2017 20:02	WG1027653
Copper	19.0		2.00	1	10/05/2017 20:02	WG1027653
Lead	14.0		0.500	1	10/05/2017 20:02	WG1027653
Nickel	22.4		2.00	1	10/05/2017 20:02	WG1027653
Selenium	ND		2.00	1	10/05/2017 20:02	WG1027653
Silver	ND		1.00	1	10/05/2017 20:02	WG1027653
Zinc	48.7		5.00	1	10/05/2017 20:02	WG1027653

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00138		0.000500	1	10/01/2017 14:58	WG1026496
Toluene	ND		0.00500	1	10/01/2017 14:58	WG1026496
Ethylbenzene	0.00123		0.000500	1	10/01/2017 14:58	WG1026496
Total Xylene	0.00231	B	0.00150	1	10/01/2017 14:58	WG1026496
TPH (GC/FID) Low Fraction	0.210		0.100	1	10/01/2017 14:58	WG1026496
(S) a,a,a-Trifluorotoluene(FID)	95.7		77.0-120		10/01/2017 14:58	WG1026496
(S) a,a,a-Trifluorotoluene(PID)	88.6		75.0-128		10/01/2017 14:58	WG1026496



Collected date/time: 09/26/17 15:40

L939743

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	199		20.0	5	10/05/2017 19:33	WG1027431
C28-C40 Oil Range	57.7		20.0	5	10/05/2017 19:33	WG1027431
(S) o-Terphenyl	71.0		18.0-148		10/05/2017 19:33	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0114		0.00600	1	10/03/2017 09:42	WG1026650
Acenaphthene	0.0138		0.00600	1	10/03/2017 09:42	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 09:42	WG1026650
Benzo(a)anthracene	0.0144		0.00600	1	10/03/2017 09:42	WG1026650
Benzo(a)pyrene	0.0374		0.00600	1	10/03/2017 09:42	WG1026650
Benzo(b)fluoranthene	0.0794		0.00600	1	10/03/2017 09:42	WG1026650
Benzo(g,h,i)perylene	0.0592		0.00600	1	10/03/2017 09:42	WG1026650
Benzo(k)fluoranthene	0.0212		0.00600	1	10/03/2017 09:42	WG1026650
Chrysene	0.0186		0.00600	1	10/03/2017 09:42	WG1026650
Dibenz(a,h)anthracene	0.0172		0.00600	1	10/03/2017 09:42	WG1026650
Fluoranthene	0.0201		0.00600	1	10/03/2017 09:42	WG1026650
Fluorene	0.0157		0.00600	1	10/03/2017 09:42	WG1026650
Indeno(1,2,3-cd)pyrene	0.0442		0.00600	1	10/03/2017 09:42	WG1026650
Naphthalene	0.118	<u>J3</u>	0.0200	1	10/03/2017 09:42	WG1026650
Phenanthrene	0.0605		0.00600	1	10/03/2017 09:42	WG1026650
Pyrene	0.0692		0.00600	1	10/03/2017 09:42	WG1026650
1-Methylnaphthalene	0.143	<u>J6</u>	0.0200	1	10/03/2017 09:42	WG1026650
2-Methylnaphthalene	0.264	<u>J3 J6</u>	0.0200	1	10/03/2017 09:42	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 09:42	WG1026650
(S) p-Terphenyl-d14	71.7		23.0-120		10/03/2017 09:42	WG1026650
(S) Nitrobenzene-d5	58.1		14.0-149		10/03/2017 09:42	WG1026650
(S) 2-Fluorobiphenyl	72.5		34.0-125		10/03/2017 09:42	WG1026650

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	5.77		1	10/06/2017 01:37	WG1027733

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	10/03/2017 14:53	WG1025950

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.96	T8	1	09/30/2017 14:21	WG1025967

Sample Narrative:

L939743-07 WG1025967: 7.96 at 19.0c

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	692		1	10/05/2017 14:25	WG1027503

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0200	1	10/04/2017 14:20	WG1026800

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.91		2.00	1	10/05/2017 20:05	WG1027653
Barium	343		0.500	1	10/05/2017 20:05	WG1027653
Boron	ND		10.0	1	10/05/2017 20:05	WG1027653
Cadmium	ND		0.500	1	10/05/2017 20:05	WG1027653
Chromium	37.9		1.00	1	10/05/2017 20:05	WG1027653
Copper	21.5		2.00	1	10/05/2017 20:05	WG1027653
Lead	12.1		0.500	1	10/05/2017 20:05	WG1027653
Nickel	24.2		2.00	1	10/05/2017 20:05	WG1027653
Selenium	ND		2.00	1	10/05/2017 20:05	WG1027653
Silver	ND		1.00	1	10/05/2017 20:05	WG1027653
Zinc	51.8		5.00	1	10/05/2017 20:05	WG1027653

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	10/01/2017 15:19	WG1026496
Toluene	ND		0.00500	1	10/01/2017 15:19	WG1026496
Ethylbenzene	0.00117		0.000500	1	10/01/2017 15:19	WG1026496
Total Xylene	0.00222	B	0.00150	1	10/01/2017 15:19	WG1026496
TPH (GC/FID) Low Fraction	0.166		0.100	1	10/01/2017 15:19	WG1026496
(S) a,a,a-Trifluorotoluene(FID)	97.0		77.0-120		10/01/2017 15:19	WG1026496
(S) a,a,a-Trifluorotoluene(PID)	90.5		75.0-128		10/01/2017 15:19	WG1026496

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



Collected date/time: 09/26/17 15:50

L939743

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	217		20.0	5	10/05/2017 19:19	WG1027431
C28-C40 Oil Range	53.1		20.0	5	10/05/2017 19:19	WG1027431
(S) o-Terphenyl	65.5		18.0-148		10/05/2017 19:19	WG1027431

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0106		0.00600	1	10/03/2017 12:12	WG1026650
Acenaphthene	0.0127		0.00600	1	10/03/2017 12:12	WG1026650
Acenaphthylene	ND		0.00600	1	10/03/2017 12:12	WG1026650
Benzo(a)anthracene	0.0127		0.00600	1	10/03/2017 12:12	WG1026650
Benzo(a)pyrene	0.0328		0.00600	1	10/03/2017 12:12	WG1026650
Benzo(b)fluoranthene	0.0737		0.00600	1	10/03/2017 12:12	WG1026650
Benzo(g,h,i)perylene	0.0441		0.00600	1	10/03/2017 12:12	WG1026650
Benzo(k)fluoranthene	0.0125	J3	0.00600	1	10/03/2017 12:12	WG1026650
Chrysene	0.0173		0.00600	1	10/03/2017 12:12	WG1026650
Dibenz(a,h)anthracene	0.0140		0.00600	1	10/03/2017 12:12	WG1026650
Fluoranthene	0.0185		0.00600	1	10/03/2017 12:12	WG1026650
Fluorene	0.0144		0.00600	1	10/03/2017 12:12	WG1026650
Indeno(1,2,3-cd)pyrene	0.0355		0.00600	1	10/03/2017 12:12	WG1026650
Naphthalene	0.112		0.0200	1	10/03/2017 12:12	WG1026650
Phenanthrene	0.0535		0.00600	1	10/03/2017 12:12	WG1026650
Pyrene	0.0610	J3	0.00600	1	10/03/2017 12:12	WG1026650
1-Methylnaphthalene	0.130	J3	0.0200	1	10/03/2017 12:12	WG1026650
2-Methylnaphthalene	0.248	J3	0.0200	1	10/03/2017 12:12	WG1026650
2-Chloronaphthalene	ND		0.0200	1	10/03/2017 12:12	WG1026650
(S) p-Terphenyl-d14	80.4		23.0-120		10/03/2017 12:12	WG1026650
(S) Nitrobenzene-d5	52.1		14.0-149		10/03/2017 12:12	WG1026650
(S) 2-Fluorobiphenyl	81.2		34.0-125		10/03/2017 12:12	WG1026650

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3254399-1 10/03/17 14:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.64	2.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L939669-01 Original Sample (OS) • Duplicate (DUP)

(OS) L939669-01 10/03/17 14:44 • (DUP) R3254399-4 10/03/17 14:44

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	1.18	1.43	1	19	J	20

L939743-07 Original Sample (OS) • Duplicate (DUP)

(OS) L939743-07 10/03/17 14:53 • (DUP) R3254399-5 10/03/17 14:53

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	1.28	1	0		20

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

(LCS) R3254399-2 10/03/17 14:40 • (LCSD) R3254399-3 10/03/17 14:40

	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	56.9	51.6	51.6	91	91	30-170			0	20

L939743-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939743-07 10/03/17 14:53 • (MS) R3254399-6 10/03/17 14:53 • (MSD) R3254399-7 10/03/17 14:54

	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	ND	ND	0	0	1	75-125	J6	J6	0	20



L939723-01 Original Sample (OS) • Duplicate (DUP)

(OS) L939723-01 09/30/17 14:39 • (DUP) WG1025724-3 09/30/17 14:39

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.35	7.35	1	0.000	T8	1

Sample Narrative:

OS: 7.35 at 19.2c

DUP: 7.35 at 19.2c

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L939743-04 Original Sample (OS) • Duplicate (DUP)

(OS) L939743-04 09/30/17 14:39 • (DUP) WG1025724-4 09/30/17 14:39

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.61	7.61	1	0.000	T8	1

Sample Narrative:

OS: 7.61 at 19.4c

DUP: 7.61 at 19.5c

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

(LCS) WG1025724-1 09/30/17 14:39 • (LCSD) WG1025724-2 09/30/17 14:39

	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	9.98	9.98	99.8	99.8	99.0-101			0.000	1

Sample Narrative:

LCS: 9.98 at 19.4c

LCSD: 9.98 at 19.4c



L939708-01 Original Sample (OS) • Duplicate (DUP)

(OS) L939708-01 09/30/17 14:21 • (DUP) WG1025967-7 09/30/17 14:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	4.18	4.18	1	0.000	T8	1

Sample Narrative:

OS: 4.18 at 19.4c

DUP: 4.18 at 19.5c

L939819-08 Original Sample (OS) • Duplicate (DUP)

(OS) L939819-08 09/30/17 14:21 • (DUP) WG1025967-8 09/30/17 14:21

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.65	7.65	1	0.000	T8	1

Sample Narrative:

OS: 7.65 at 19.1c

DUP: 7.65 at 19.3c

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

(LCS) WG1025967-5 09/30/17 14:21 • (LCSD) WG1025967-6 09/30/17 14:21

	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	9.94	9.94	99.4	99.4	98.4-102			0.000	1

Sample Narrative:

LCS: 9.94 at 19.2c

LCSD: 9.94 at 19.2c





L939738-01 Original Sample (OS) • Duplicate (DUP)

(OS) L939738-01 10/04/17 10:44 • (DUP) WG1027374-3 10/04/17 10:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.23	8.22	1	0.122	T8	1

Sample Narrative:

OS: 8.23 at 20.1c
DUP: 8.22 at 20.1c



L940515-01 Original Sample (OS) • Duplicate (DUP)

(OS) L940515-01 10/04/17 10:44 • (DUP) WG1027374-4 10/04/17 10:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	4.64	4.64	1	0.000	T8	1

Sample Narrative:

OS: 4.64 at 20.0c
DUP: 4.64 at 20.0c

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

(LCS) WG1027374-1 10/04/17 10:44 • (LCSD) WG1027374-2 10/04/17 10:44

	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	9.90	9.90	99.0	99.0	99.0-101			0.000	1

Sample Narrative:

LCS: 9.90 at 19.2c
LCSD: 9.90 at 19.2c



[L939743-01,02,03,04,05,06,07](#)

Method Blank (MB)

(MB) WG1027503-1 10/05/17 14:25

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	3.03			

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L939729-05 Original Sample (OS) • Duplicate (DUP)

(OS) L939729-05 10/05/17 14:25 • (DUP) WG1027503-4 10/05/17 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	2610	2610	1	0.0383		20

L939738-13 Original Sample (OS) • Duplicate (DUP)

(OS) L939738-13 10/05/17 14:25 • (DUP) WG1027503-5 10/05/17 14:25

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	1580	1580	1	0.0633		20

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

(LCS) WG1027503-2 10/05/17 14:25 • (LCSD) WG1027503-3 10/05/17 14:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	umhos/cm	umhos/cm	umhos/cm	%	%	%			%	%
Specific Conductance	559	562	560	101	100	90.0-110			0.357	20



Method Blank (MB)

(MB) R3254703-1 10/04/17 13:11

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.0028	0.0200

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3254703-2 10/04/17 13:14 • (LCSD) R3254703-3 10/04/17 13:16

	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	0.294	0.292	98	97	80-120			1	20

L939743-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939743-01 10/04/17 13:18 • (MS) R3254703-4 10/04/17 13:21 • (MSD) R3254703-5 10/04/17 13:30

	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	0.283	0.270	89	84	1	75-125			5	20



L939743-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3255211-1 10/05/17 18:49

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.65	2.00
Barium	U		0.17	0.500
Boron	U		1.26	10.0
Cadmium	U		0.07	0.500
Chromium	U		0.14	1.00
Copper	U		0.53	2.00
Lead	U		0.19	0.500
Nickel	U		0.49	2.00
Selenium	U		0.74	2.00
Silver	U		0.28	1.00
Zinc	1.84	⌵	0.59	5.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3255211-2 10/05/17 18:51 • (LCSD) R3255211-3 10/05/17 18:54

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	100	98.0	100	98	80-120			2	20
Barium	100	104	102	104	102	80-120			2	20
Boron	100	98.8	99.4	99	99	80-120			1	20
Cadmium	100	98.7	96.4	99	96	80-120			2	20
Chromium	100	101	98.3	101	98	80-120			3	20
Copper	100	102	99.7	102	100	80-120			3	20
Lead	100	105	102	105	102	80-120			3	20
Nickel	100	103	101	103	101	80-120			2	20
Selenium	100	102	100	102	100	80-120			2	20
Silver	20.0	18.8	18.3	94	92	80-120			3	20
Zinc	100	102	99.8	102	100	80-120			2	20

L939743-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939743-01 10/05/17 18:56 • (MS) R3255211-6 10/05/17 19:04 • (MSD) R3255211-7 10/05/17 19:06

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	7.73	109	107	102	99	1	75-125			3	20
Barium	100	459	512	506	53	48	1	75-125	⌵	⌵	1	20
Boron	100	ND	95.7	93.7	96	94	1	75-125			2	20
Cadmium	100	ND	99.0	99.2	99	99	1	75-125			0	20
Chromium	100	48.5	144	150	96	102	1	75-125			4	20



L939743-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939743-01 10/05/17 18:56 • (MS) R3255211-6 10/05/17 19:04 • (MSD) R3255211-7 10/05/17 19:06

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	20.8	126	124	105	103	1	75-125			1	20
Lead	100	12.9	120	119	107	106	1	75-125			1	20
Nickel	100	29.5	138	133	108	104	1	75-125			3	20
Selenium	100	ND	102	102	102	102	1	75-125			0	20
Silver	20.0	ND	18.1	18.2	90	91	1	75-125			1	20
Zinc	100	52.6	147	146	94	93	1	75-125			1	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3254672-3 10/03/17 21:45

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000409	U	0.000150	0.00500
Ethylbenzene	0.000244	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)	99.5			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	107			75.0-128

1
Cp

2
Tc

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Ss

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Cn

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Sr

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Qc

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Gl

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Al

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Sc

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

(LCS) R3254672-1 10/03/17 20:25 • (LCSD) R3254672-2 10/03/17 20:47

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	5.52	5.48	100	99.7	70.0-136			0.680	20
(S) a,a,a-Trifluorotoluene(FID)				106	106	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				118	117	75.0-128				

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

(LCS) R3254672-4 10/03/17 22:34 • (LCSD) R3254672-5 10/03/17 22:56

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	0.0498	0.0511	99.7	102	71.0-121			2.52	20
Toluene	0.0500	0.0513	0.0514	103	103	72.0-120			0.220	20
Ethylbenzene	0.0500	0.0524	0.0533	105	107	76.0-121			1.71	20
Total Xylene	0.150	0.158	0.160	105	107	75.0-124			1.51	20
(S) a,a,a-Trifluorotoluene(FID)				99.3	99.0	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				104	103	75.0-128				

Method Blank (MB)

(MB) R3255186-5 10/01/17 12:59

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000322	J	0.000150	0.00500
Ethylbenzene	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)	102			77.0-120
(S) a,a,a-Trifluorotoluene(PID)	94.6			75.0-128

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3255186-1 10/01/17 11:09 • (LCSD) R3255186-2 10/01/17 11:31

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	0.0466	0.0476	93.3	95.2	71.0-121			1.99	20
Toluene	0.0500	0.0473	0.0480	94.7	95.9	72.0-120			1.35	20
Ethylbenzene	0.0500	0.0504	0.0511	101	102	76.0-121			1.51	20
Total Xylene	0.150	0.157	0.159	105	106	75.0-124			0.950	20
(S) a,a,a-Trifluorotoluene(FID)				101	102	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				98.0	100	75.0-128				

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

(LCS) R3255186-3 10/01/17 11:53 • (LCSD) R3255186-4 10/01/17 12:15

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	5.36	105	97.4	70.0-136			7.15	20
(S) a,a,a-Trifluorotoluene(FID)				104	102	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				102	101	75.0-128				



L939744-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939744-07 10/01/17 18:35 • (MS) R3255186-6 10/01/17 21:53 • (MSD) R3255186-7 10/01/17 22:14

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 %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0602	ND	1.64	1.71	109	114	25	10.0-146			4.48	29
Toluene	0.0602	0.371	1.71	1.80	88.7	95.0	25	10.0-143			5.40	30
Ethylbenzene	0.0602	1.01	2.43	2.48	94.5	97.6	25	10.0-147			1.89	31
Total Xylene	0.181	4.39	8.05	8.18	81.1	84.0	25	10.0-149			1.63	30
(S) a,a,a-Trifluorotoluene(FID)					103	104		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					105	107		75.0-128				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3255070-1 10/05/17 12:18

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	88.6			18.0-148

1
Cp

2
Tc

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Ss

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Cn

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Sr

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Qc

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Gl

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Al

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Sc

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

(LCS) R3255070-2 10/05/17 12:33 • (LCSD) R3255070-3 10/05/17 12:47

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	60.0	39.4	40.3	65.7	67.1	50.0-150			2.04	20
(S) o-Terphenyl				81.3	81.5	18.0-148				

L939723-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939723-08 10/05/17 17:53 • (MS) R3255070-4 10/05/17 18:07 • (MSD) R3255070-5 10/05/17 18:23

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 %
C10-C28 Diesel Range	12.0	32.2	91.2	82.9	98.2	84.4	5	50.0-150			9.52	20
(S) o-Terphenyl					72.0	71.0		18.0-148				

Sample Narrative:

OS: Cannot run at lower dilution due to viscosity of extract



Method Blank (MB)

(MB) R3254579-3 10/03/17 05:48

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	75.4			14.0-149
(S) 2-Fluorobiphenyl	82.3			34.0-125
(S) p-Terphenyl-d14	73.5			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3254579-1 10/03/17 05:05 • (LCSD) R3254579-2 10/03/17 05:27

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	0.0638	0.0772	79.8	96.5	50.0-125			19.0	20
Acenaphthene	0.0800	0.0614	0.0732	76.8	91.5	52.0-120			17.5	20
Acenaphthylene	0.0800	0.0601	0.0730	75.1	91.2	51.0-120			19.4	20
Benzo(a)anthracene	0.0800	0.0548	0.0655	68.5	81.8	46.0-121			17.7	20
Benzo(a)pyrene	0.0800	0.0606	0.0719	75.7	89.9	42.0-121			17.1	20
Benzo(b)fluoranthene	0.0800	0.0609	0.0710	76.1	88.8	42.0-123			15.4	20
Benzo(g,h,i)perylene	0.0800	0.0609	0.0737	76.1	92.2	43.0-128			19.1	20
Benzo(k)fluoranthene	0.0800	0.0632	0.0795	78.9	99.4	45.0-128		J3	23.0	20
Chrysene	0.0800	0.0606	0.0739	75.8	92.3	48.0-127			19.7	20
Dibenz(a,h)anthracene	0.0800	0.0649	0.0787	81.2	98.3	43.0-132			19.1	20
Fluoranthene	0.0800	0.0648	0.0771	81.0	96.4	49.0-129			17.4	20

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

(LCS) R3254579-1 10/03/17 05:05 • (LCSD) R3254579-2 10/03/17 05:27

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	0.0596	0.0714	74.5	89.2	50.0-120			17.9	20
Indeno(1,2,3-cd)pyrene	0.0800	0.0625	0.0759	78.2	94.9	44.0-131			19.3	20
Naphthalene	0.0800	0.0576	0.0694	72.1	86.8	50.0-120			18.5	20
Phenanthrene	0.0800	0.0595	0.0721	74.4	90.1	48.0-120			19.1	20
Pyrene	0.0800	0.0526	0.0664	65.7	83.0	48.0-135		J3	23.2	20
1-Methylnaphthalene	0.0800	0.0627	0.0801	78.4	100	52.0-122		J3	24.4	20
2-Methylnaphthalene	0.0800	0.0603	0.0754	75.3	94.3	52.0-120		J3	22.4	20
2-Chloronaphthalene	0.0800	0.0615	0.0748	76.8	93.4	50.0-120			19.5	20
(S) Nitrobenzene-d5				71.4	82.6	14.0-149				
(S) 2-Fluorobiphenyl				80.6	92.2	34.0-125				
(S) p-Terphenyl-d14				67.9	81.8	23.0-120				

L939743-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L939743-06 10/03/17 09:42 • (MS) R3254579-4 10/03/17 10:03 • (MSD) R3254579-5 10/03/17 10:25

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Anthracene	0.0800	0.0114	0.0795	0.0701	85.1	73.4	1	20.0-136			12.6	24
Acenaphthene	0.0800	0.0138	0.0762	0.0681	77.9	67.8	1	29.0-124			11.2	20
Acenaphthylene	0.0800	ND	0.0711	0.0630	88.9	78.7	1	35.0-120			12.2	20
Benzo(a)anthracene	0.0800	0.0144	0.0785	0.0727	80.2	72.8	1	13.0-132			7.76	27
Benzo(a)pyrene	0.0800	0.0374	0.0946	0.0892	71.5	64.8	1	14.0-138			5.88	27
Benzo(b)fluoranthene	0.0800	0.0794	0.134	0.130	67.9	63.4	1	10.0-129			2.78	31
Benzo(g,h,i)perylene	0.0800	0.0592	0.104	0.0965	55.4	46.6	1	10.0-133			7.03	30
Benzo(k)fluoranthene	0.0800	0.0212	0.0863	0.0661	81.5	56.1	1	15.0-131			26.6	27
Chrysene	0.0800	0.0186	0.102	0.0862	104	84.6	1	15.0-137			16.5	25
Dibenz(a,h)anthracene	0.0800	0.0172	0.0756	0.0681	73.1	63.6	1	15.0-132			10.5	27
Fluoranthene	0.0800	0.0201	0.0920	0.0810	89.9	76.1	1	13.0-139			12.8	28
Fluorene	0.0800	0.0157	0.0805	0.0724	81.1	70.9	1	27.0-122			10.7	22
Indeno(1,2,3-cd)pyrene	0.0800	0.0442	0.0954	0.0865	63.9	52.9	1	11.0-133			9.75	29
Naphthalene	0.0800	0.118	0.168	0.133	62.5	18.6	1	18.0-136		J3	23.3	21
Phenanthrene	0.0800	0.0605	0.121	0.100	75.6	49.7	1	15.0-133			18.7	25
Pyrene	0.0800	0.0692	0.131	0.109	77.6	50.4	1	11.0-146			18.1	29
1-Methylnaphthalene	0.0800	0.143	0.176	0.146	41.4	3.32	1	24.0-137		J6	18.9	22
2-Methylnaphthalene	0.0800	0.264	0.285	0.220	26.7	0.000	1	23.0-136		J3 J6	25.7	22
2-Chloronaphthalene	0.0800	ND	0.0700	0.0628	87.5	78.5	1	36.0-120			10.9	20
(S) Nitrobenzene-d5					67.2	67.7		14.0-149				
(S) 2-Fluorobiphenyl					87.6	81.1		34.0-125				
(S) p-Terphenyl-d14					91.7	80.4		23.0-120				

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Cp

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Tc

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Cn

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Sr

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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, 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.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
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.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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

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

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina ¹	DW21704
Florida	E87487	North Carolina ²	41
Georgia	NELAP	North Dakota	R-140
Georgia ¹	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky ¹	90010	South Dakota	n/a
Kentucky ²	16	Tennessee ¹⁴	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	IN00003		

Our Locations

A map of the United States showing state abbreviations and purple pins indicating data points. The pin in Tennessee is highlighted in orange.

Company Name/Address: Nicholson GeoSolutions, LLC 3433 E. Lake Dr. Centennial, CO 80121						Billing Information: Tom Hogelin Berry Petroleum Company 235 Callahan Ave Parachute, CO 81623						Analysis / Container / Preservative																					
Report to: Dave Nicholson						Email To: dknicholson@q.com						<p style="font-weight: bold; margin-top: 10px;">YOUR LAB OF CHOICE</p> <p style="font-size: x-small; margin: 0;">12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Fax: 615-758-5859</p> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 5px auto;"></div> <p style="margin-top: 10px;">L# (93)743</p> <p style="background-color: #f0f0f0; padding: 5px; display: inline-block; font-weight: bold; font-size: large;">H158</p> <p style="margin-top: 10px;">Acctnum: BERPETCO</p> <p>Template:</p> <p>Prelogin:</p> <p>TSR:</p> <p>Cooler:</p> <p>Shipped Via:</p> <table border="1" style="width:100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th>Item./Contaminant</th> <th>Sample # (lab only)</th> </tr> </thead> <tbody> <tr><td></td><td>-01</td></tr> <tr><td></td><td>-02</td></tr> <tr><td></td><td>-03</td></tr> <tr><td></td><td>-04</td></tr> <tr><td></td><td>-05</td></tr> <tr><td></td><td>-06</td></tr> <tr><td></td><td>-07</td></tr> </tbody> </table>						Item./Contaminant	Sample # (lab only)		-01		-02		-03		-04		-05		-06		-07
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	-01																																
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Project Description: Latham I-02						City/State Collected:																											
Phone: 303-601-2023 Fax:			Client Project #			Lab Project #																											
Collected by (print):			Site/Facility ID #			P.O. #																											
Collected by (signature): <i>[Signature]</i>						Date Results Needed																											
Rush? (Lab MUST Be Notified) <input type="checkbox"/> Same Day 200% <input type="checkbox"/> Next Day 100% <input type="checkbox"/> Two Day 50% <input type="checkbox"/> Three Day 25%						Email? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes FAX? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes																											
Immediately Packed on Ice N <input checked="" type="checkbox"/>						No. of Cntrs																											
Sample ID	Comp/Grab	Matrix *	Depth	Date	Time																												
LI-02-LF-1		SS		9/26	1510	5	X	X	X	X	X																						
LI02-LF-2					1515	1	X	X	X	X	X																						
LI02-LF-3					1520	1	X	X	X	X	X																						
LI02-LF-4					1525	1	X	X	X	X	X																						
LI02-LF-5					1530	1	X	X	X	X	X																						
LI02-LF-6					1540	1	X	X	X	X	X																						
LI02-LF-7					1550	1	X	X	X	X	X																						
* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____																																	
Remarks: As, Ba, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn, C ^H																																	
Relinquished by : (Signature) <i>[Signature]</i>						Date: 9/27/17		Time: 1400		Received by: (Signature) <i>[Signature]</i>						Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____																	
Relinquished by : (Signature)						Date:		Time:		Received by: (Signature)						Temp: °C Bottles Received: 3.2 msc 35																	
Relinquished by : (Signature)						Date:		Time:		Received for lab by: (Signature) <i>[Signature]</i>						Date: 9-28-17 Time: 8:45																	
Condition: (lab use only) OK												COC Seal Intact: Y N NA																					
pH Checked:												NCF:																					

ESC LAB SCIENCES Cooler Receipt Form

Client: BERPETCO		SDG#	1939743
Cooler Received/Opened On: 9/28/17		Temperature:	3.2
Received by: Jennifer Royal			
Signature: <i>Jennifer Royal</i>			
Receipt Check List			
	NP	Yes	No
COC Seal Present / Intact?	<input checked="" type="checkbox"/>		
COC Signed / Accurate?	<input checked="" type="checkbox"/>		
Bottles arrive intact?	<input checked="" type="checkbox"/>		
Correct bottles used?	<input checked="" type="checkbox"/>		
Sufficient volume sent?	<input checked="" type="checkbox"/>		
If Applicable	<input checked="" type="checkbox"/>		
VOA Zero headspace?			
Preservation Correct / Checked?			