



**Nicholson GeoSolutions LLC**

3433 East Lake Drive  
Centennial, CO 80121

June 26, 2017

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

**Subject: I-31 Small Landfarm Sampling Results**

Dear Derek:

Nicholson GeoSolutions LLC was retained by Berry Petroleum Company (Berry) to conduct soil sampling of the small landfarm on the I-31 well pad in the Garden Gulch area, Garfield County, Colorado.

The sample was composited from 8 subsamples collected at depths of about 18 inches across the surface of the landfarm on May 6<sup>th</sup>, 2017. This sample was analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), PAHs, BTEX, SAR, pH, conductivity, and metals to evaluate compliance with the COGCC Table 910-1 standards and whether additional treatment is necessary. The laboratory report is attached.

TPH was reported at 568.2 mg/kg (standard = 500 mg/kg) and benzo(a)pyrene was reported at 0.0379 mg/kg (standard = 0.022 mg/kg) for this sample. All other parameters were below the standards except for arsenic at 7.58 mg/kg.

Further treatment of this landfarm cell should be conducted. The landfarm should be sampled again in the fall of 2017 to reassess the benzo(a)pyrene concentration and degradation rate.

Nicholson GeoSolutions LLC

A handwritten signature in blue ink that reads "DK Nicholson".

David K. Nicholson, P.G.  
Principal Geologist

**APPENDIX A**  
**Laboratory Report**

## Berry Petroleum - Denver, CO

Sample Delivery Group: L908344  
Samples Received: 05/10/2017  
Project Number:  
Description: Pit Reclamation

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.



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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## I-31 SMALL L908344-01 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 13:20

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 00:47	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:42	MHM
Wet Chemistry by Method 9045D	WG978925	1	05/16/17 11:08	05/16/17 11:59	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:21	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:23	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.99	05/15/17 12:17	05/16/17 15:16	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 18:08	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG979316	1	05/15/17 18:07	05/17/17 07:58	CLG

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

## F-06 L908344-02 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 15:20

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 00:50	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:42	MHM
Wet Chemistry by Method 9045D	WG978925	1	05/16/17 11:08	05/16/17 11:59	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:24	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:26	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.98	05/15/17 12:17	05/16/17 16:01	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 18:22	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG979316	1	05/15/17 18:07	05/17/17 08:40	CLG

## F-01 L908344-03 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 14:25

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 00:53	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:43	MHM
Wet Chemistry by Method 9045D	WG978925	1	05/16/17 11:08	05/16/17 11:59	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:27	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:34	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.94	05/15/17 12:17	05/16/17 16:23	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 19:04	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG979316	1	05/15/17 18:07	05/17/17 09:01	CLG

## I-02 L908344-04 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 15:00

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 00:56	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:43	MHM
Wet Chemistry by Method 9045D	WG978925	1	05/16/17 11:08	05/16/17 11:59	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:29	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:37	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.99	05/15/17 12:17	05/16/17 16:45	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 19:18	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG979316	1	05/15/17 18:07	05/17/17 08:19	CLG

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L908344

DATE/TIME:

05/18/17 09:57

PAGE:

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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## O-06 L908344-05 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 15:40

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 00:59	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:43	MHM
Wet Chemistry by Method 9045D	WG978925	1	05/16/17 11:08	05/16/17 11:59	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:32	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:40	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.98	05/15/17 12:17	05/16/17 17:07	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 18:36	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG979316	1	05/15/17 18:07	05/17/17 07:37	CLG

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

## J-13 L908344-06 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 16:00

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 01:07	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:44	MHM
Wet Chemistry by Method 9045D	WG980051	1	05/16/17 14:02	05/16/17 14:49	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 07:59	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:43	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.98	05/15/17 12:17	05/16/17 17:30	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 19:32	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG980179	2	05/16/17 20:50	05/17/17 16:52	CLG

## O-29 L908344-07 Solid

Collected by  
DK Nicholson

Collected date/time  
05/06/17 13:20

Received date/time  
05/10/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG978536	1	05/16/17 09:53	05/17/17 01:10	CCE
Wet Chemistry by Method 3060A/7196A	WG978168	1	05/12/17 12:56	05/16/17 11:44	MHM
Wet Chemistry by Method 9045D	WG980051	1	05/16/17 14:02	05/16/17 14:49	MA
Wet Chemistry by Method 9050AMod	WG978499	1	05/11/17 17:29	05/11/17 17:29	MAJ
Mercury by Method 7471A	WG978426	1	05/10/17 16:45	05/11/17 08:34	BRJ
Metals (ICP) by Method 6010B	WG978829	1	05/12/17 10:07	05/15/17 14:45	CCE
Volatile Organic Compounds (GC) by Method 8015/8021	WG979954	.99	05/15/17 12:17	05/16/17 17:52	ACG
Semi-Volatile Organic Compounds (GC) by Method 8015	WG979187	10	05/12/17 21:07	05/13/17 18:51	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG980179	1	05/16/17 20:50	05/17/17 16:31	CLG



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 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

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.09		1	05/17/2017 00:47	WG978536

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	05/16/2017 11:42	<a href="#">WG978168</a>

## Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.24	<a href="#">T8</a>	1	05/16/2017 11:59	<a href="#">WG978925</a>

## Sample Narrative:

9045D L908344-01 WG978925: 7.24 at 21.2c

## Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	1350		1	05/11/2017 17:29	<a href="#">WG978499</a>

## Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	0.0261		0.0200	1	05/11/2017 08:21	<a href="#">WG978426</a>

## Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	7.58		2.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Barium	426		0.500	1	05/15/2017 14:23	<a href="#">WG978829</a>
Boron	ND		10.0	1	05/15/2017 14:23	<a href="#">WG978829</a>
Cadmium	ND		0.500	1	05/15/2017 14:23	<a href="#">WG978829</a>
Chromium	38.7		1.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Copper	22.1		2.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Lead	14.1		0.500	1	05/15/2017 14:23	<a href="#">WG978829</a>
Nickel	24.3		2.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Selenium	ND		2.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Silver	ND		1.00	1	05/15/2017 14:23	<a href="#">WG978829</a>
Zinc	54.0		5.00	1	05/15/2017 14:23	<a href="#">WG978829</a>

## Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00234		0.000495	.99	05/16/2017 15:16	<a href="#">WG979954</a>
Toluene	0.00615		0.00495	.99	05/16/2017 15:16	<a href="#">WG979954</a>
Ethylbenzene	0.00441		0.000495	.99	05/16/2017 15:16	<a href="#">WG979954</a>
Total Xylene	0.0146		0.00148	.99	05/16/2017 15:16	<a href="#">WG979954</a>
TPH (GC/FID) Low Fraction	0.634		0.0990	.99	05/16/2017 15:16	<a href="#">WG979954</a>
(S) a,a,a-Trifluorotoluene(FID)	87.9		77.0-120		05/16/2017 15:16	<a href="#">WG979954</a>
(S) a,a,a-Trifluorotoluene(PID)	98.2		75.0-128		05/16/2017 15:16	<a href="#">WG979954</a>





## 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	499		40.0	10	05/13/2017 18:08	<a href="#">WG979187</a>
C28-C40 Oil Range	68.6		40.0	10	05/13/2017 18:08	<a href="#">WG979187</a>
(S) o-terphenyl	58.5		18.0-148		05/13/2017 18:08	<a href="#">WG979187</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0186		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Acenaphthene	0.0223		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Acenaphthylene	0.00709		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Benzo(a)anthracene	0.0205		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Benzo(a)pyrene	0.0379		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Benzo(b)fluoranthene	0.0900		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Benzo(g,h,i)perylene	0.0530		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Benzo(k)fluoranthene	0.0167		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Chrysene	0.0526		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Dibenz(a,h)anthracene	0.0164		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Fluoranthene	0.0265		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Fluorene	0.0242		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Indeno(1,2,3-cd)pyrene	0.0385		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Naphthalene	0.180		0.0200	1	05/17/2017 07:58	<a href="#">WG979316</a>
Phenanthrene	0.0803		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
Pyrene	0.135		0.00600	1	05/17/2017 07:58	<a href="#">WG979316</a>
1-Methylnaphthalene	0.208		0.0200	1	05/17/2017 07:58	<a href="#">WG979316</a>
2-Methylnaphthalene	0.396		0.0200	1	05/17/2017 07:58	<a href="#">WG979316</a>
2-Chloronaphthalene	ND		0.0200	1	05/17/2017 07:58	<a href="#">WG979316</a>
(S) p-Terphenyl-d14	67.6		23.0-120		05/17/2017 07:58	<a href="#">WG979316</a>
(S) Nitrobenzene-d5	73.9		14.0-149		05/17/2017 07:58	<a href="#">WG979316</a>
(S) 2-Fluorobiphenyl	68.7		34.0-125		05/17/2017 07:58	<a href="#">WG979316</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3218337-1 05/16/17 11:30

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

L908089-01 Original Sample (OS) • Duplicate (DUP)

(OS) L908089-01 05/16/17 11:37 • (DUP) R3218337-4 05/16/17 11:38

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chromium,Hexavalent	ND	0.000	1	0		20

L908344-07 Original Sample (OS) • Duplicate (DUP)

(OS) L908344-07 05/16/17 11:44 • (DUP) R3218337-9 05/16/17 11:44

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chromium,Hexavalent	ND	0.800	1	0		20

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

(LCS) R3218337-2 05/16/17 11:34 • (LCSD) R3218337-3 05/16/17 11:34

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 %
Chromium,Hexavalent	56.9	58.2	58.0	102	102	80-120			0	20

L908089-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908089-01 05/16/17 11:37 • (MS) R3218337-5 05/16/17 11:40 • (MSD) R3218337-6 05/16/17 11:40

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 %
Chromium,Hexavalent	20.0	ND	16.0	16.0	80	80	1	75-125			0	20

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



L908344-01 Original Sample (OS) • Duplicate (DUP)

(OS) L908344-01 05/16/17 11:59 • (DUP) WG978925-3 05/16/17 11:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.24	7.20	1	0.554	T8	1

L909286-01 Original Sample (OS) • Duplicate (DUP)

(OS) L909286-01 05/16/17 11:59 • (DUP) WG978925-4 05/16/17 11:59

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.83	6.81	1	0.293	T8	1

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

(LCS) WG978925-1 05/16/17 11:59 • (LCSD) WG978925-2 05/16/17 11:59

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	7.50	7.54	7.54	101	101	98.7-101			0.000	1

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



[L908344-06.07](#)

L908344-06 Original Sample (OS) • Duplicate (DUP)

(OS) L908344-06 05/16/17 14:49 • (DUP) WG980051-3 05/16/17 14:49

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.10	7.11	1	0.141	<u>T8</u>	1

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

(LCS) WG980051-1 05/16/17 14:49 • (LCSD) WG980051-2 05/16/17 14:49

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	7.50	7.57	7.58	101	101	98.7-101			0.132	1

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) WG978499-5 05/11/17 17:29

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	1.51			

L908089-01 Original Sample (OS) • Duplicate (DUP)

(OS) L908089-01 05/11/17 17:29 • (DUP) WG978499-1 05/11/17 17:29

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	1320	1320	1	0.152		20

L908344-07 Original Sample (OS) • Duplicate (DUP)

(OS) L908344-07 05/11/17 17:29 • (DUP) WG978499-4 05/11/17 17:29

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	224	234	1	4.49		20

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

(LCS) WG978499-2 05/11/17 17:29 • (LCSD) WG978499-3 05/11/17 17:29

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	1070	1070	1070	100	100	90.0-110			0.000	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3217222-1 05/11/17 07:51

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

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

(LCS) R3217222-2 05/11/17 07:54 • (LCSD) R3217222-3 05/11/17 07:56

	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	0.302	0.300	101	100	80-120			1	20

L908344-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908344-06 05/11/17 07:59 • (MS) R3217222-4 05/11/17 08:01 • (MSD) R3217222-5 05/11/17 08:04

	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	0.0400	0.332	0.303	97	88	1	75-125			9	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



[L908344-01,02,03,04,05,06,07](#)

Method Blank (MB)

(MB) R3218100-1 05/15/17 14:02

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	0.24	J	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	1.89	J	0.59	5.00

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3218100-2 05/15/17 14:04 • (LCSD) R3218100-3 05/15/17 14:07

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	110	108	110	108	80-120			2	20
Barium	100	113	110	113	110	80-120			3	20
Boron	100	107	103	107	103	80-120			4	20
Cadmium	100	111	108	111	108	80-120			3	20
Chromium	100	108	105	108	105	80-120			4	20
Copper	100	113	109	113	109	80-120			3	20
Lead	100	107	105	107	105	80-120			3	20
Nickel	100	110	106	110	106	80-120			3	20
Selenium	100	113	109	113	109	80-120			3	20
Silver	20.0	20.9	20.3	104	101	80-120			3	20
Zinc	100	110	107	110	107	80-120			2	20

L908688-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908688-01 05/15/17 14:09 • (MS) R3218100-6 05/15/17 14:17 • (MSD) R3218100-7 05/15/17 14:20

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	6.52	110	109	103	103	1	75-125			1	20
Barium	100	81.3	184	225	103	144	1	75-125		J5	20	20
Boron	100	ND	91.0	91.4	91	91	1	75-125			0	20
Cadmium	100	ND	104	104	104	104	1	75-125			0	20
Chromium	100	9.79	113	112	103	102	1	75-125			1	20



L908688-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908688-01 05/15/17 14:09 • (MS) R3218100-6 05/15/17 14:17 • (MSD) R3218100-7 05/15/17 14:20

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	20.2	129	130	109	109	1	75-125			0	20
Lead	100	9.50	115	114	106	105	1	75-125			1	20
Nickel	100	11.7	118	118	106	106	1	75-125			0	20
Selenium	100	ND	106	105	106	105	1	75-125			1	20
Silver	20.0	ND	20.1	19.9	101	99	1	75-125			1	20
Zinc	100	36.6	136	136	99	99	1	75-125			0	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc





Method Blank (MB)

(MB) R3218445-5 05/16/17 12:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000388	<span>U</span>	0.000150	0.00500
Ethylbenzene	0.000204	<span>U</span>	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) 93.3			77.0-120	
(S) a,a,a-Trifluorotoluene(PID) 102			75.0-128	

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

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

(LCS) R3218445-1 05/16/17 10:16 • (LCSD) R3218445-2 05/16/17 10:38

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	0.0483	0.0479	96.6	95.8	71.0-121			0.790	20
Toluene	0.0500	0.0482	0.0470	96.4	94.0	72.0-120			2.52	20
Ethylbenzene	0.0500	0.0478	0.0471	95.6	94.3	76.0-121			1.40	20
Total Xylene	0.150	0.140	0.137	93.4	91.4	75.0-124			2.16	20
(S) a,a,a-Trifluorotoluene(FID)				93.8	93.4	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				101	101	75.0-128				

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

(LCS) R3218445-3 05/16/17 11:00 • (LCSD) R3218445-4 05/16/17 11:22

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	4.86	4.85	88.4	88.2	70.0-136			0.340	20
(S) a,a,a-Trifluorotoluene(FID)				104	103	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				111	112	75.0-128				

L908344-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908344-01 05/16/17 15:16 • (MS) R3218445-6 05/16/17 18:14 • (MSD) R3218445-7 05/16/17 18:37

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	0.00234	0.0177	0.0162	35.4	32.3	1	10.0-146			9.18	29
Toluene	0.0500	0.00615	0.0201	0.0174	40.1	34.8	1	10.0-143			14.0	30
Ethylbenzene	0.0500	0.00441	0.0193	0.0153	38.6	30.5	1	10.0-147			23.4	31
Total Xylene	0.150	0.0146	0.0522	0.0417	25.1	18.1	1	10.0-149	<span>J6</span>	<span>J6</span>	22.4	30
(S) a,a,a-Trifluorotoluene(FID)					87.2	87.3		77.0-120				



[L908344-01,02,03,04,05,06,07](#)

L908344-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908344-01 05/16/17 15:16 • (MS) R3218445-6 05/16/17 18:14 • (MSD) R3218445-7 05/16/17 18:37

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 %
(S) a,a,a-Trifluorotoluene(PID)					96.4	96.2		75.0-128				

L908344-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908344-01 05/16/17 15:16 • (MS) R3218445-8 05/16/17 18:59 • (MSD) R3218445-9 05/16/17 19:21

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	0.634	2.89	1.52	52.6	27.5	1	10.0-147		J3	62.6	30
(S) a,a,a-Trifluorotoluene(FID)					90.8	87.7		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					99.5	98.4		75.0-128				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3217807-1 05/13/17 13:41

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	96.2			18.0-148

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) R3217807-2 05/13/17 13:54 • (LCSD) R3217807-3 05/13/17 14:10

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	52.0	47.9	86.7	79.8	50.0-150			8.37	20
(S) o-Terphenyl				109	95.0	18.0-148				

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

(LCS) R3218428-1 05/16/17 11:37 • (LCSD) R3218428-2 05/16/17 11:58

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	0.0673	0.0661	84.1	82.6	50.0-125			1.84	20
Acenaphthene	0.0800	0.0674	0.0659	84.2	82.4	52.0-120			2.17	20
Acenaphthylene	0.0800	0.0642	0.0633	80.2	79.1	51.0-120			1.42	20
Benzo(a)anthracene	0.0800	0.0635	0.0615	79.3	76.8	46.0-121			3.19	20
Benzo(a)pyrene	0.0800	0.0641	0.0620	80.2	77.5	42.0-121			3.34	20
Benzo(b)fluoranthene	0.0800	0.0665	0.0657	83.1	82.1	42.0-123			1.17	20
Benzo(g,h,i)perylene	0.0800	0.0754	0.0729	94.3	91.2	43.0-128			3.39	20
Benzo(k)fluoranthene	0.0800	0.0667	0.0650	83.4	81.3	45.0-128			2.61	20
Chrysene	0.0800	0.0655	0.0649	81.9	81.2	48.0-127			0.880	20
Dibenz(a,h)anthracene	0.0800	0.0722	0.0696	90.3	87.0	43.0-132			3.75	20
Fluoranthene	0.0800	0.0726	0.0710	90.7	88.8	49.0-129			2.14	20
Fluorene	0.0800	0.0680	0.0667	85.0	83.4	50.0-120			1.88	20
Indeno(1,2,3-cd)pyrene	0.0800	0.0734	0.0710	91.8	88.7	44.0-131			3.46	20
Naphthalene	0.0800	0.0659	0.0641	82.4	80.1	50.0-120			2.87	20
Phenanthrene	0.0800	0.0627	0.0610	78.3	76.2	48.0-120			2.77	20
Pyrene	0.0800	0.0539	0.0533	67.4	66.6	48.0-135			1.25	20
1-Methylnaphthalene	0.0800	0.0697	0.0686	87.2	85.7	52.0-122			1.72	20
2-Methylnaphthalene	0.0800	0.0659	0.0645	82.4	80.6	52.0-120			2.23	20
2-Chloronaphthalene	0.0800	0.0684	0.0667	85.6	83.4	50.0-120			2.51	20
(S) Nitrobenzene-d5				76.5	77.0	14.0-149				
(S) 2-Fluorobiphenyl				82.7	83.1	34.0-125				
(S) p-Terphenyl-d14				75.1	75.6	23.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L908267-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908267-01 05/17/17 03:23 • (MS) R3218789-2 05/17/17 03:44 • (MSD) R3218789-3 05/17/17 04:05

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 %
Anthracene	0.0800	ND	0.0638	0.0612	79.7	76.6	1	20.0-136			4.03	24
Acenaphthene	0.0800	ND	0.0622	0.0617	77.8	77.1	1	29.0-124			0.960	20
Acenaphthylene	0.0800	ND	0.0608	0.0605	76.0	75.6	1	35.0-120			0.570	20
Benzo(a)anthracene	0.0800	ND	0.0719	0.0595	88.6	73.1	1	13.0-132			18.8	27
Benzo(a)pyrene	0.0800	ND	0.101	0.0629	125	77.2	1	14.0-138		J3	46.3	27
Benzo(b)fluoranthene	0.0800	ND	0.124	0.0611	153	73.6	1	10.0-129	J5	J3	68.1	31
Benzo(g,h,i)perylene	0.0800	ND	0.148	0.0714	183	87.0	1	10.0-133	J5	J3	69.8	30
Benzo(k)fluoranthene	0.0800	ND	0.0879	0.0621	109	76.6	1	15.0-131		J3	34.5	27
Chrysene	0.0800	ND	0.0752	0.0615	92.9	75.7	1	15.0-137			20.2	25
Dibenz(a,h)anthracene	0.0800	ND	0.0991	0.0695	124	86.9	1	15.0-132		J3	35.1	27
Fluoranthene	0.0800	ND	0.0872	0.0702	107	85.9	1	13.0-139			21.6	28

L908267-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L908267-01 05/17/17 03:23 • (MS) R3218789-2 05/17/17 03:44 • (MSD) R3218789-3 05/17/17 04:05

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 %
Fluorene	0.0800	ND	0.0657	0.0640	82.2	80.0	1	27.0-122			2.63	22
Indeno(1,2,3-cd)pyrene	0.0800	ND	0.143	0.0699	176	85.7	1	11.0-133	J5	J3	68.4	29
Naphthalene	0.0800	ND	0.0631	0.0617	78.8	77.1	1	18.0-136			2.17	21
Phenanthrene	0.0800	ND	0.0675	0.0587	84.4	73.3	1	15.0-133			14.1	25
Pyrene	0.0800	ND	0.0590	0.0521	72.7	64.1	1	11.0-146			12.4	29
1-Methylnaphthalene	0.0800	ND	0.0690	0.0683	86.2	85.3	1	24.0-137			1.03	22
2-Methylnaphthalene	0.0800	ND	0.0652	0.0642	81.4	80.3	1	23.0-136			1.47	22
2-Chloronaphthalene	0.0800	ND	0.0646	0.0639	80.7	79.9	1	36.0-120			1.08	20
(S) Nitrobenzene-d5					72.0	72.5		14.0-149				
(S) 2-Fluorobiphenyl					79.9	79.1		34.0-125				
(S) p-Terphenyl-d14					70.5	72.6		23.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3218854-3 05/17/17 15:50

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	66.5			14.0-149
(S) 2-Fluorobiphenyl	67.4			34.0-125
(S) p-Terphenyl-d14	66.8			23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3218854-1 05/17/17 15:08 • (LCSD) R3218854-2 05/17/17 15:29

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	0.0520	0.0540	65.0	67.5	50.0-125			3.71	20
Acenaphthene	0.0800	0.0583	0.0605	72.9	75.6	52.0-120			3.68	20
Acenaphthylene	0.0800	0.0590	0.0608	73.8	76.0	51.0-120			2.89	20
Benzo(a)anthracene	0.0800	0.0542	0.0536	67.8	67.0	46.0-121			1.07	20
Benzo(a)pyrene	0.0800	0.0556	0.0561	69.5	70.1	42.0-121			0.970	20
Benzo(b)fluoranthene	0.0800	0.0572	0.0575	71.5	71.9	42.0-123			0.640	20
Benzo(g,h,i)perylene	0.0800	0.0663	0.0673	82.8	84.1	43.0-128			1.50	20
Benzo(k)fluoranthene	0.0800	0.0658	0.0684	82.2	85.5	45.0-128			3.89	20
Chrysene	0.0800	0.0593	0.0621	74.1	77.6	48.0-127			4.54	20
Dibenz(a,h)anthracene	0.0800	0.0634	0.0658	79.3	82.3	43.0-132			3.71	20
Fluoranthene	0.0800	0.0622	0.0630	77.7	78.7	49.0-129			1.29	20

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

(LCS) R3218854-1 05/17/17 15:08 • (LCSD) R3218854-2 05/17/17 15:29

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	0.0550	0.0566	68.7	70.8	50.0-120			2.97	20
Indeno(1,2,3-cd)pyrene	0.0800	0.0651	0.0668	81.4	83.5	44.0-131			2.52	20
Naphthalene	0.0800	0.0628	0.0637	78.5	79.6	50.0-120			1.42	20
Phenanthrene	0.0800	0.0567	0.0592	70.9	74.0	48.0-120			4.26	20
Pyrene	0.0800	0.0606	0.0615	75.7	76.9	48.0-135			1.57	20
1-Methylnaphthalene	0.0800	0.0588	0.0655	73.4	81.9	52.0-122			10.9	20
2-Methylnaphthalene	0.0800	0.0551	0.0620	68.9	77.5	52.0-120			11.7	20
2-Chloronaphthalene	0.0800	0.0580	0.0604	72.5	75.4	50.0-120			3.96	20
(S) Nitrobenzene-d5				69.4	70.1	14.0-149				
(S) 2-Fluorobiphenyl				67.4	68.6	34.0-125				
(S) p-Terphenyl-d14				66.9	66.5	23.0-120				

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



## Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
(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.
Rec.	Recovery.

## 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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> 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 <sup>1</sup>	DW21704
Florida	E87487	North Carolina <sup>2</sup>	41
Georgia	NELAP	North Dakota	R-140
Georgia <sup>1</sup>	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 <sup>1</sup>	90010	South Dakota	n/a
Kentucky <sup>2</sup>	16	Tennessee <sup>14</sup>	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas <sup>5</sup>	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	IN00003		

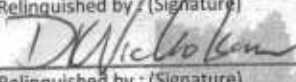
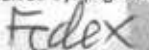
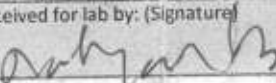
## Our Locations

A map of the United States showing the locations of 25 study sites. The sites are marked with pins: 24 purple pins and 1 orange pin. The orange pin is located in Tennessee (TN). The purple pins are located in Washington (WA), Oregon (OR), Idaho (ID), Nevada (NV), California (CA), Utah (UT), Arizona (AZ), New Mexico (NM), Texas (TX), Oklahoma (OK), Kansas (KS), Nebraska (NE), South Dakota (SD), North Dakota (ND), Minnesota (MN), Iowa (IA), Missouri (MO), Arkansas (AR), Louisiana (LA), Mississippi (MS), Alabama (AL), Georgia (GA), Florida (FL), South Carolina (SC), North Carolina (NC), Virginia (VA), West Virginia (WV), Ohio (OH), Indiana (IN), Michigan (MI), Wisconsin (WI), Illinois (IL), Kentucky (KY), Tennessee (TN), Pennsylvania (PA), New York (NY), and Maine (ME). The states are labeled with their abbreviations.

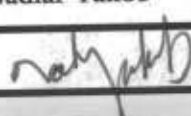
Company Name/Address: <b>Nicholson GeoSolutions, LLC</b> 3433 E. Lake Dr. Centennial, CO 80121				Billing Information: Tom Hogelin Linn Energy LLC 235 Callahan Ave Parachute, CO 81635				Analysis / Container / Preservative										Chain of Custody Page <u>1</u> of <u>1</u>  L.A.B S.C.I.E.N.C.E.S YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859 															
Report to: <b>Dave Nicholson</b>				Email To: <b>dknicholson@q.com</b>				<div style="display: flex; justify-content: space-around;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">SAR, Metals, Cr6 (1) 4oz Clear - No Pres</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">BTEX/TVPH (1) 4oz Clear - No Pres</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">TEPH(8015)Diesel &amp; Oil Range (1) 4oz Clear-No Pres</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">SPCON, pH (1) 4oz Clear - No Pres</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">PAHSIM 8270 (1) 4oz Soil Jar</div> </div>																									
Project Description: <b>Pit Reclamation</b>				City/State Collected:  																													
Phone: <b>303-601-2023</b> Fax:		Client Project #		Lab Project # <b>BERPETDCO030615S</b>																													
Collected by (print):		Site/Facility ID #		P.O. #		Acctnum: <b>BERPETDCO</b> Template: Prelogin: TSR: Cooler: Shipped Via: <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Rem./Contaminant</th> <th>Sample # (lab only)</th> </tr> <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> </table>																Rem./Contaminant	Sample # (lab only)		01		02		03		04		05
Rem./Contaminant	Sample # (lab only)																																
	01																																
	02																																
	03																																
	04																																
	05																																
	06																																
Collected by (signature): 		<b>Rush?</b> (Lab MUST Be Notified) Same Day .....200% Next Day .....100% Two Day .....50% Three Day .....25%		Date Results Needed Email? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes FAX? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		No. of Cntrs																											
Immediately Packed on Ice N <input checked="" type="checkbox"/> Y		Sample ID		Comp/Grab		Matrix *		Depth		Date		Time																					
I-31 Small		SS		5/6		1320		5		X		X		X		X		X															
F-06		SS		1520		5		X		X		X		X		X																	
F-01		SS		1425		5		X		X		X		X		X																	
Linn I-02		SS		1500		5		X		X		X		X		X																	
O-06		SS		1540		5		X		X		X		X		X																	
J-13		SS		1600		5		X		X		X		X		X																	
O-29		SS		1320		5		X		X		X		X		X																	
SS		SS		SS		SS		SS		SS		SS		SS		SS																	
SS		SS		SS		SS		SS		SS		SS		SS		SS																	
SS		SS		SS		SS		SS		SS		SS		SS		SS																	

\* 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, Cr6**

Relinquished by: (Signature) 		Date: <b>5/8/17</b>		Time: <b>1200</b>		Received by: (Signature) 		Samples returned via: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____		Condition: (lab use only) <b>NA</b>	
Relinquished by: (Signature)		Date:		Time:		Received by: (Signature)		Temp: °C <b>21</b>		Bottles Received: <b>35 = 402</b>	
Relinquished by: (Signature)		Date:		Time:		Received for lab by: (Signature) 		Date: <b>5-10-17</b>		Time: <b>845</b>	
COC Seal Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> NA		pH Checked:		NCF:							

# ESC LAB SCIENCES Cooler Receipt Form

Client:	Berkeley	SDG#	9-8 344	
Cooler Received/Opened On:	5/16/17	Temperature:	2.1	
Received By: Nadiar Yakob				
Signature: 				
Receipt Check List		NP	Yes	No
COC Seal Present / Intact?		/		
COC Signed / Accurate?			/	
Bottles arrive intact?			/	
Correct bottles used?			/	
Sufficient volume sent?				
If Applicable				
VOA Zero headspace?				
Preservation Correct / Checked?				