



Nicholson GeoSolutions LLC

3433 East Lake Drive
Centennial, CO 80121

March 27, 2017

Mr. Derek Johnson
Linn Energy, LLC
235 Callahan Avenue
Parachute, Colorado 81635

Subject: O-36B Landfarm Screening Soil Sample Results

Dear Derek:

Nicholson GeoSolutions LLC collected a screening level soil sample from the landfarm on the O-36B well pad in the Garden Gulch area, Garfield County, Colorado on March 9th, 2017. The sample was composited from 16 subsamples collected at depths of about 18 inches across the surface of the landfarm. The sample was 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, PAHs, 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 734.769 mg/kg, above the COGCC standard of 500 mg/kg but down from the value of 882 mg/kg recorded in August 2016. All other results were below the standards except for pH at 9.47 and arsenic at 11.8 mg/kg.

Given these results, continued treatment of the landfarm is recommended.

Nicholson GeoSolutions LLC

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

David K. Nicholson, P.G.
Principal Geologist

APPENDIX A
Laboratory Report

Linn Energy - Denver, CO

Sample Delivery Group: L895421
Samples Received: 03/11/2017
Project Number:
Description: GG 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.



¹ Cp: Cover Page	1
² Tc: Table of Contents	2
³ Ss: Sample Summary	3
⁴ Cn: Case Narrative	4
⁵ Sr: Sample Results	5
0-36B L895421-01	5
⁶ Qc: Quality Control Summary	7
Wet Chemistry by Method 3060A/7196A	7
Wet Chemistry by Method 9045D	8
Wet Chemistry by Method 9050AMod	9
Wet Chemistry by Method USDA LOI	10
Mercury by Method 7471A	11
Metals (ICP) by Method 6010B	12
Volatile Organic Compounds (GC) by Method 8015/8021	14
Semi-Volatile Organic Compounds (GC) by Method 8015	16
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	17
⁷ Gl: Glossary of Terms	19
⁸ Al: Accreditations & Locations	20
⁹ Sc: Chain of Custody	21



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



O-36B L895421-01 Solid

Collected by
Dave NicholsonCollected date/time
03/09/17 15:40Received date/time
03/11/17 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG960277	1	03/15/17 14:25	03/16/17 12:55	CCE
Wet Chemistry by Method 3060A/7196A	WG961683	1	03/17/17 09:37	03/17/17 15:14	MHM
Wet Chemistry by Method 9045D	WG960160	1	03/16/17 13:15	03/16/17 14:18	MA
Wet Chemistry by Method 9050AMod	WG959952	1	03/11/17 18:40	03/11/17 18:40	MAJ
Wet Chemistry by Method USDA LOI	WG961469	1	03/16/17 10:57	03/17/17 15:11	MMF
Mercury by Method 7471A	WG960516	1	03/14/17 09:51	03/14/17 12:59	JDG
Metals (ICP) by Method 6010B	WG960576	1	03/13/17 17:05	03/14/17 09:38	LTB
Metals (ICP) by Method 6010B	WG960576	10	03/13/17 17:05	03/14/17 13:10	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG960185	10	03/13/17 10:42	03/20/17 20:03	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG960996	1	03/14/17 10:41	03/15/17 18:33	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG960185	10	03/13/17 10:42	03/20/17 20:03	ACM
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG960600	2	03/14/17 10:03	03/15/17 05:41	CLG

¹Cp²Tc³Ss⁴Cn⁵Sr⁶Qc⁷Gl⁸Al⁹Sc



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

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

<u>ESC Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L895421-01	0-36B	9045D

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	8.66		1	03/16/2017 12:55	WG960277

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	03/17/2017 15:14	WG961683

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.47		1	03/16/2017 14:18	WG960160

Sample Narrative:

9045D L895421-01 WG960160: 9.47 at 18.2c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	3070		1	03/11/2017 18:40	WG959952

Wet Chemistry by Method USDA LOI

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	18900		10.0	1	03/17/2017 15:11	WG961469

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Mercury	0.0201		0.0200	1	03/14/2017 12:59	WG960516

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	11.8		2.00	1	03/14/2017 09:38	WG960576
Barium	8430		5.00	10	03/14/2017 13:10	WG960576
Boron	25.4		10.0	1	03/14/2017 09:38	WG960576
Cadmium	ND		0.500	1	03/14/2017 09:38	WG960576
Chromium	19.5		1.00	1	03/14/2017 09:38	WG960576
Copper	19.1		2.00	1	03/14/2017 09:38	WG960576
Lead	18.8		0.500	1	03/14/2017 09:38	WG960576
Nickel	17.0		2.00	1	03/14/2017 09:38	WG960576
Potassium	4040		100	1	03/14/2017 09:38	WG960576
Selenium	ND		2.00	1	03/14/2017 09:38	WG960576
Silver	ND		1.00	1	03/14/2017 09:38	WG960576
Zinc	73.9		5.00	1	03/14/2017 09:38	WG960576

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00247		0.000500	1	03/15/2017 18:33	WG960996
Toluene	0.00643		0.00500	1	03/15/2017 18:33	WG960996
Ethylbenzene	0.00174		0.000500	1	03/15/2017 18:33	WG960996



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Total Xylene	0.00593		0.00150	1	03/15/2017 18:33	WG960996
TPH (GC/FID) Low Fraction	0.169		0.100	1	03/15/2017 18:33	WG960996
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	98.3		77.0-120		03/15/2017 18:33	WG960996
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	89.4		75.0-128		03/15/2017 18:33	WG960996

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
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	685		40.0	10	03/20/2017 20:03	WG960185
C28-C40 Oil Range	49.6		40.0	10	03/20/2017 20:03	WG960185
(S) <i>o</i> -Terphenyl	87.3		18.0-148		03/20/2017 20:03	WG960185

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0350		0.0120	2	03/15/2017 05:41	WG960600
Acenaphthene	0.0513		0.0120	2	03/15/2017 05:41	WG960600
Acenaphthylene	ND		0.0120	2	03/15/2017 05:41	WG960600
Benzo(a)anthracene	ND		0.0120	2	03/15/2017 05:41	WG960600
Benzo(a)pyrene	ND		0.0120	2	03/15/2017 05:41	WG960600
Benzo(b)fluoranthene	ND		0.0120	2	03/15/2017 05:41	WG960600
Benzo(g,h,i)perylene	ND		0.0120	2	03/15/2017 05:41	WG960600
Benzo(k)fluoranthene	ND		0.0120	2	03/15/2017 05:41	WG960600
Chrysene	ND		0.0120	2	03/15/2017 05:41	WG960600
Dibenz(a,h)anthracene	ND		0.0120	2	03/15/2017 05:41	WG960600
Fluoranthene	ND		0.0120	2	03/15/2017 05:41	WG960600
Fluorene	0.0452		0.0120	2	03/15/2017 05:41	WG960600
Indeno(1,2,3-cd)pyrene	ND		0.0120	2	03/15/2017 05:41	WG960600
Naphthalene	0.194		0.0400	2	03/15/2017 05:41	WG960600
Phenanthrene	0.187		0.0120	2	03/15/2017 05:41	WG960600
Pyrene	0.123		0.0120	2	03/15/2017 05:41	WG960600
1-Methylnaphthalene	0.295		0.0400	2	03/15/2017 05:41	WG960600
2-Methylnaphthalene	0.539		0.0400	2	03/15/2017 05:41	WG960600
2-Chloronaphthalene	ND		0.0400	2	03/15/2017 05:41	WG960600
(S) <i>p</i> -Terphenyl- <i>d</i> 14	72.4		23.0-120		03/15/2017 05:41	WG960600
(S) Nitrobenzene- <i>d</i> 5	73.3		14.0-149		03/15/2017 05:41	WG960600
(S) 2-Fluorobiphenyl	78.6		34.0-125		03/15/2017 05:41	WG960600

Sample Narrative:

8270C-SIM L895421-01 WG960600: Dilution due to matrix



Method Blank (MB)

(MB) R3204164-1 03/17/17 15:10

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

L895306-01 Original Sample (OS) • Duplicate (DUP)

(OS) L895306-01 03/17/17 15:14 • (DUP) R3204164-4 03/17/17 15:14

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

L896142-01 Original Sample (OS) • Duplicate (DUP)

(OS) L896142-01 03/17/17 15:16 • (DUP) R3204164-8 03/17/17 15:16

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

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

(LCS) R3204164-2 03/17/17 15:10 • (LCSD) R3204164-3 03/17/17 15:11

	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	53.0	54.2	93	95	80-120			2	20

L895421-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895421-01 03/17/17 15:14 • (MS) R3204164-5 03/17/17 15:14 • (MSD) R3204164-6 03/17/17 15:14

	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	18.3	18.2	86	86	1	75-125			0	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L894941-02 Original Sample (OS) • Duplicate (DUP)

(OS) L894941-02 03/16/17 14:18 • (DUP) WG960160-3 03/16/17 14:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.03	7.05	1	0.284		1

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L895426-07 Original Sample (OS) • Duplicate (DUP)

(OS) L895426-07 03/16/17 14:18 • (DUP) WG960160-4 03/16/17 14:18

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.56	8.54	1	0.234		1

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) WG960160-1 03/16/17 14:18 • (LCSD) WG960160-2 03/16/17 14:18

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.07	6.00	6.02	98.8	99.2	98.4-102			0.333	1

Method Blank (MB)

(MB) WG959952-5 03/11/17 18:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	1.65			

L895196-01 Original Sample (OS) • Duplicate (DUP)

(OS) L895196-01 03/11/17 18:40 • (DUP) WG959952-1 03/11/17 18:40

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	3560	3550	1	0.281		20

L895426-07 Original Sample (OS) • Duplicate (DUP)

(OS) L895426-07 03/11/17 18:40 • (DUP) WG959952-4 03/11/17 18:40

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	468	465	1	0.643		20

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

(LCS) WG959952-2 03/11/17 18:40 • (LCSD) WG959952-3 03/11/17 18:40

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	umhos/cm	umhos/cm	umhos/cm	%	%	%			%	%
Specific Conductance	542	547	546	101	101	90.0-110			0.183	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3204160-1 03/17/17 15:10

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
TOC (Total Organic Carbon)	U		3.33	10.0

L895421-01 Original Sample (OS) • Duplicate (DUP)

(OS) L895421-01 03/17/17 15:11 • (DUP) R3204160-4 03/17/17 15:15

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
TOC (Total Organic Carbon)	18900	16600	1	12.8		20

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

(LCS) R3204160-2 03/17/17 15:15 • (LCSD) R3204160-3 03/17/17 15:16

	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	%	%	%			%	%
TOC (Total Organic Carbon)	5590	6680	7410	120	133	50.0-150			10.3	20

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



Method Blank (MB)

(MB) R3203162-1 03/14/17 12:31

	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) R3203162-2 03/14/17 12:34 • (LCSD) R3203162-3 03/14/17 12:36

	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	0.263	0.250	88	83	80-120			5	20

L895591-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895591-06 03/14/17 12:39 • (MS) R3203162-4 03/14/17 12:42 • (MSD) R3203162-5 03/14/17 12:56

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Mercury	0.499	0.0539	0.517	0.701	93	130	1	75-125		J3 J5	30	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3203083-1 03/14/17 08:45

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	0.661	U	0.53	2.00
Lead	U		0.19	0.500
Nickel	U		0.49	2.00
Potassium	13.7	U	10.2	100
Selenium	U		0.74	2.00
Silver	U		0.28	1.00
Zinc	1.09	U	0.59	5.00

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

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

(LCS) R3203083-2 03/14/17 08:47 • (LCSD) R3203083-3 03/14/17 08:50

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	99.8	101	100	101	80-120			1	20
Barium	100	101	102	101	102	80-120			1	20
Boron	100	102	102	102	102	80-120			0	20
Cadmium	100	99.7	101	100	101	80-120			1	20
Chromium	100	98.7	98.8	99	99	80-120			0	20
Copper	100	99.7	99.9	100	100	80-120			0	20
Lead	100	98.2	99.2	98	99	80-120			1	20
Nickel	100	99.6	101	100	101	80-120			1	20
Potassium	1000	955	945	96	95	80-120			1	20
Selenium	100	100	102	100	102	80-120			2	20
Silver	20.0	18.1	18.3	90	91	80-120			1	20
Zinc	100	99.6	102	100	102	80-120			2	20

L895484-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895484-01 03/14/17 08:53 • (MS) R3203083-6 03/14/17 09:01 • (MSD) R3203083-7 03/14/17 09:04

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 %
Arsenic	113	4.73	115	111	98	94	1	75-125			4	20
Barium	113	175	273	260	87	75	1	75-125			5	20



L895484-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895484-01 03/14/17 08:53 • (MS) R3203083-6 03/14/17 09:01 • (MSD) R3203083-7 03/14/17 09:04

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 %
Boron	113	10.4	122	116	99	93	1	75-125			6	20
Cadmium	113	0.266	113	109	100	96	1	75-125			4	20
Chromium	113	41.1	158	150	104	97	1	75-125			5	20
Copper	113	103	185	164	72	54	1	75-125	J6	J6	12	20
Lead	113	54.6	161	168	94	100	1	75-125			4	20
Nickel	113	83.5	189	179	94	85	1	75-125			6	20
Potassium	1130	2640	3860	3380	108	65	1	75-125		J6	13	20
Selenium	113	U	112	108	100	96	1	75-125			4	20
Silver	22.6	U	20.8	20.1	92	89	1	75-125			3	20
Zinc	113	85.3	179	173	84	78	1	75-125			4	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3203562-5 03/15/17 12:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000153	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) 100			77.0-120	
(S) a,a,a-Trifluorotoluene(PID) 92.0			75.0-128	

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3203562-1 03/15/17 10:24 • (LCSD) R3203562-2 03/15/17 10:45

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	0.0570	0.0492	114	98.4	71.0-121			14.7	20
Toluene	0.0500	0.0563	0.0486	113	97.1	72.0-120			14.8	20
Ethylbenzene	0.0500	0.0574	0.0494	115	98.8	76.0-121			14.9	20
Total Xylene	0.150	0.178	0.157	119	104	75.0-124			12.7	20
(S) a,a,a-Trifluorotoluene(FID)				98.8	99.4	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				99.6	99.6	75.0-128				

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

(LCS) R3203562-3 03/15/17 11:07 • (LCSD) R3203562-4 03/15/17 11:28

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	6.02	6.15	110	112	70.0-136			2.13	20
(S) a,a,a-Trifluorotoluene(FID)				101	101	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				110	110	75.0-128				

L895468-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895468-06 03/15/17 14:33 • (MS) R3203562-6 03/15/17 14:55 • (MSD) R3203562-7 03/15/17 15:16

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	0.0611	2.90	2.41	2.27	0.000	0.000	18	10.0-146	J6	J6	6.02	29
Toluene	0.0611	U	0.795	0.811	72.3	73.8	18	10.0-143			1.94	30
Ethylbenzene	0.0611	3.34	2.88	2.74	0.000	0.000	18	10.0-147	J6	J6	5.24	31
Total Xylene	0.183	5.36	6.22	6.05	25.9	20.7	18	10.0-149	J6	J6	2.79	30



[L895421-01](#)

L895468-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895468-06 03/15/17 14:33 • (MS) R3203562-6 03/15/17 14:55 • (MSD) R3203562-7 03/15/17 15:16

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
(S) a,a,a-Trifluorotoluene(FID)					119	114		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					114	113		75.0-128				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3203050-1 03/13/17 18:35

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	109			18.0-148

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

(LCS) R3203050-2 03/13/17 19:35 • (LCSD) R3203050-3 03/13/17 19:47

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	46.5	49.9	77.4	83.1	50.0-150			7.06	20
(S) o-Terphenyl				104	110	18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3203273-3 03/14/17 16:19

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) p-Terphenyl-d14	72.3			23.0-120
(S) Nitrobenzene-d5	69.8			14.0-149
(S) 2-Fluorobiphenyl	71.9			34.0-125

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) R3203273-1 03/14/17 15:35 • (LCSD) R3203273-2 03/14/17 15:57

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	0.0540	0.0557	67.5	69.6	50.0-125			3.08	20
Acenaphthene	0.0800	0.0581	0.0593	72.6	74.1	52.0-120			2.01	20
Acenaphthylene	0.0800	0.0535	0.0572	66.9	71.5	51.0-120			6.68	20
Benzo(a)anthracene	0.0800	0.0468	0.0474	58.5	59.2	46.0-121			1.13	20
Benzo(a)pyrene	0.0800	0.0471	0.0492	58.9	61.5	42.0-121			4.30	20
Benzo(b)fluoranthene	0.0800	0.0477	0.0488	59.6	61.0	42.0-123			2.34	20
Benzo(g,h,i)perylene	0.0800	0.0502	0.0507	62.7	63.3	43.0-128			1.01	20
Benzo(k)fluoranthene	0.0800	0.0569	0.0578	71.1	72.3	45.0-128			1.63	20
Chrysene	0.0800	0.0551	0.0565	68.8	70.6	48.0-127			2.47	20
Dibenz(a,h)anthracene	0.0800	0.0458	0.0456	57.2	57.0	43.0-132			0.380	20
Fluoranthene	0.0800	0.0598	0.0609	74.8	76.2	49.0-129			1.85	20

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

(LCS) R3203273-1 03/14/17 15:35 • (LCSD) R3203273-2 03/14/17 15:57

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 %
Fluorene	0.0800	0.0496	0.0548	61.9	68.5	50.0-120			9.98	20
Indeno(1,2,3-cd)pyrene	0.0800	0.0474	0.0479	59.2	59.9	44.0-131			1.13	20
Naphthalene	0.0800	0.0553	0.0563	69.2	70.4	50.0-120			1.74	20
Phenanthrene	0.0800	0.0549	0.0560	68.6	70.0	48.0-120			1.98	20
Pyrene	0.0800	0.0628	0.0593	78.6	74.1	48.0-135			5.80	20
1-Methylnaphthalene	0.0800	0.0526	0.0542	65.8	67.7	52.0-122			2.93	20
2-Methylnaphthalene	0.0800	0.0495	0.0508	61.9	63.5	52.0-120			2.50	20
2-Chloronaphthalene	0.0800	0.0488	0.0535	61.0	66.9	50.0-120			9.21	20
(S) p-Terphenyl-d14				61.4	56.0	23.0-120				
(S) Nitrobenzene-d5				66.3	55.3	14.0-149				
(S) 2-Fluorobiphenyl				61.6	60.3	34.0-125				

L895416-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L895416-01 03/14/17 18:31 • (MS) R3203273-4 03/14/17 18:53 • (MSD) R3203273-5 03/14/17 19:15

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 %
Anthracene	0.0936	U	0.0770	0.0716	82.3	76.5	1	20.0-136			7.32	24
Acenaphthene	0.0936	U	0.0823	0.0751	88.0	80.2	1	29.0-124			9.26	20
Acenaphthylene	0.0936	U	0.0835	0.0755	89.2	80.7	1	35.0-120			9.98	20
Benzo(a)anthracene	0.0936	U	0.0640	0.0597	68.4	63.8	1	13.0-132			7.04	27
Benzo(a)pyrene	0.0936	U	0.0679	0.0622	72.5	66.4	1	14.0-138			8.75	27
Benzo(b)fluoranthene	0.0936	U	0.0606	0.0537	64.7	57.4	1	10.0-129			12.0	31
Benzo(g,h,i)perylene	0.0936	U	0.0641	0.0550	68.5	58.8	1	10.0-133			15.2	30
Benzo(k)fluoranthene	0.0936	U	0.0710	0.0681	75.9	72.8	1	15.0-131			4.21	27
Chrysene	0.0936	U	0.0724	0.0641	77.4	68.5	1	15.0-137			12.2	25
Dibenz(a,h)anthracene	0.0936	U	0.0591	0.0512	63.2	54.7	1	15.0-132			14.5	27
Fluoranthene	0.0936	U	0.0816	0.0749	87.2	80.0	1	13.0-139			8.65	28
Fluorene	0.0936	U	0.0746	0.0720	79.7	76.9	1	27.0-122			3.54	22
Indeno(1,2,3-cd)pyrene	0.0936	U	0.0610	0.0522	65.2	55.7	1	11.0-133			15.6	29
Naphthalene	0.0936	U	0.0789	0.0719	84.3	76.8	1	18.0-136			9.36	21
Phenanthrene	0.0936	U	0.0740	0.0689	79.1	73.6	1	15.0-133			7.20	25
Pyrene	0.0936	U	0.0764	0.0717	81.7	76.6	1	11.0-146			6.46	29
1-Methylnaphthalene	0.0936	U	0.0757	0.0691	80.8	73.8	1	24.0-137			9.12	22
2-Methylnaphthalene	0.0936	U	0.0712	0.0649	76.0	69.3	1	23.0-136			9.18	22
2-Chloronaphthalene	0.0936	U	0.0736	0.0675	78.6	72.1	1	36.0-120			8.67	20
(S) p-Terphenyl-d14					70.6	64.3		23.0-120				
(S) Nitrobenzene-d5					76.9	71.1		14.0-149				
(S) 2-Fluorobiphenyl					77.8	70.9		34.0-125				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



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.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
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
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.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

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
Connecticut	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		

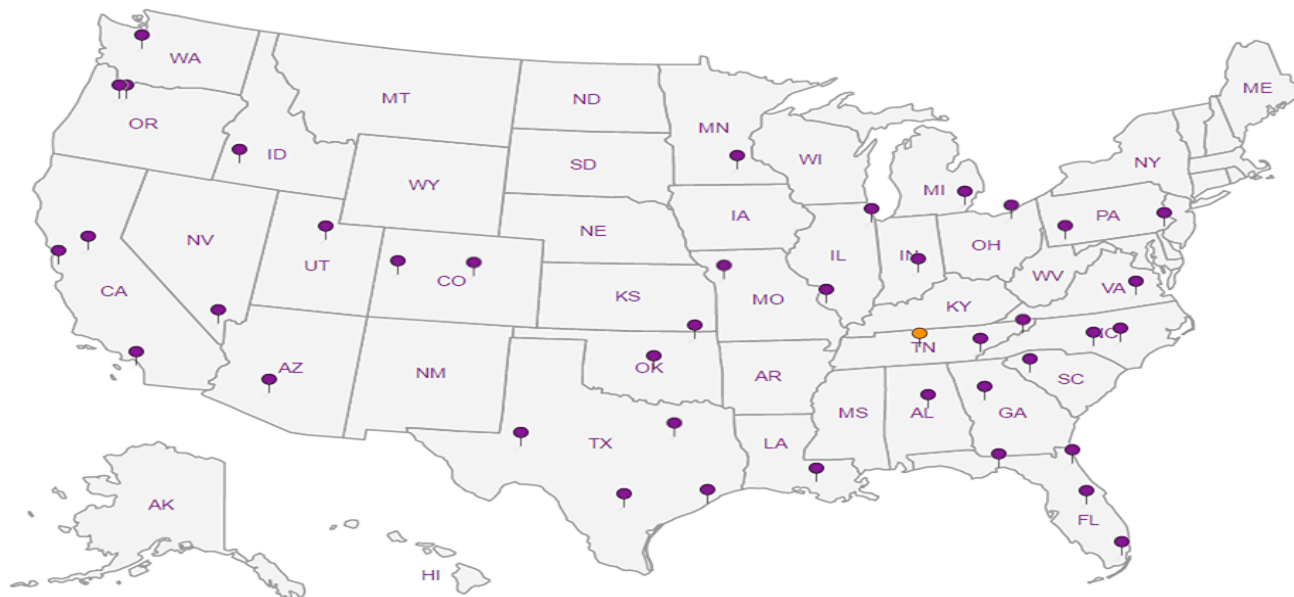
Third Party & Federal Accreditations

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	TN00003		

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

Our Locations

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



Company Name/Address:

Nicholson GeoSolutions. LLC.3433 E. Lake Dr.
Centennial, CO 80121

Billing Information:

Tom Hogelin
Berry Petroleum (Linn)
235 Callahan Ave
Parachute, CO

Report to:

Dave Nicholson

Email To:

dknicholson@q.com

Project

Description: **GG Pit Reclamation**

City/State

Collected:

Phone: **303-601-2023**

Client Project #

Lab Project #

Fax:

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

Same Day 200%

Next Day 100%

Two Day 50%

Three Day 25%

Date Results Needed

Email? ☐ No ☒ YesFAX? ☒ No ☐ YesNo.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

0-36B**SS****3/9****1540****6**

TVPH/BTEX

TEPH (diesel + motor oil)

PAHs 8270 SIM

SPECN, pH

SAR, metals, CRAT

TOC Total Organic Carbon

Analysis / Container / Preservative

Chain of Custody

Page 1 of 1

 **ESC**
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: 615-758-5859L# **895721****D076**Acctnum: **NICGEOCCO**

Template:

Prelogin:

TSR:

Cooler:

Shipped Via:

Rem./Contaminant

Sample # (lab only)

01* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other _____Remarks: **Metals: As, Ba, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn + Cr^{VI} + K**

pH _____ Temp _____

Flow _____ Other _____

Hold #

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Samples returned via: ☐ UPS

Condition: (lab use only)

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

☐ FedEx ☐ Courier ☐ _____

Temp: _____ °C Bottles Received:

COC Seal Intact: ☐ Y ☐ N ☒ NA

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

pH Checked:

NCF:

3-11-17**0900**

ESC LAB SCIENCES Cooler Receipt Form

Client: <i>NI 66060</i>	SDG#	855421	
Cooler Received/Opened On: 3/ 11 /17	Temperature:	2.1	
Received By: Timiesha Scott			
Signature: <i>[Signature]</i>			
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?			