



November 18, 2015

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

Subject: I-31 Reserve Pit Soil Sample Results

Dear Derek:

Nicholson GeoSolutions LLC was retained by Linn Energy, LLC (Linn) to conduct soil sampling of the soils beneath the former reserve pit on the I-31 well pad in the Garden Gulch area, Garfield County, Colorado.

Sampling was conducted on September 23rd, October 8th, October 24th, and November 9th, 2015. Impacted materials from the base and sidewalls of the pit had been previously excavated and stored in a bermed area on the well pad. Figure 1 shows the approximate extent of the pit and the locations of the confirmation samples collected. The laboratory analytical reports are contained in Appendix A.

During the initial sampling event the perimeter and inner corners of the pit were mapped using a hand-held GPS unit and seven discrete soil samples (I-31 P1 through I-31 P7) were collected to evaluate compliance with COGCC Table 910-1 standards. A PID was used to screen the bottom of the pit and select sample locations. The PID readings were 0.0 ppm along the north, south, and west walls, 5.1 ppm on the east wall, and ranged from 22.1 to 99.0 ppm on the bottom of the pit.

The initial confirmation 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 Table 910-1 standards and treatment options. Subsequent samples were analyzed for TVPH, TEPH, BTEX, and PAHs only.

Table 1 provides analytical results for the initial confirmation samples. The combined TPH for all initial confirmation samples except I-31 P5 (south wall) were above the COGCC standard of 500 mg/kg and ranged from 1,498.7 mg/kg to 4,994 mg/kg. Benzo(a)pyrene also exceeded the

standard of 0.022 mg/kg for four of the seven samples. Arsenic ranged from 4.55 to 8.68 mg/kg for the seven initial confirmation samples, within the range of natural background concentrations for the Garden Gulch area. All conductivity, pH, and SAR results were below the standards except for SAR for samples I-31 P2 and I-31 P6.

In response to the sample results, additional impacted materials were excavated from the base and sidewalls of the pit and stored in a bermed area on the well pad. Six additional discrete soil samples (I-31 P8 through I-31 P13) were collected on October 8th, 2015 to evaluate compliance with the standards (see Figure 1). The sample results are provided in Table 2.

The combined TPH for additional confirmation samples I-31 P8 (west bottom), I-31 P12 (east bottom), and I-31 P13 (east wall) were above the COGCC standard of 500 mg/kg and ranged from 899.47 mg/kg to 3,144.84 mg/kg. Benzo(a)pyrene also exceeded the standard of 0.022 mg/kg for these three samples.

Additional impacted materials were excavated from the areas of the base and sidewalls of the pit associated with these samples and stored in a bermed area on the well pad. Three additional discrete soil samples (I-31 P14 through I-31 P16) were collected in the same locations as the previous confirmation samples on October 24th, 2015 to evaluate compliance with the standards. The sample results are provided in Table 3.

All results for sample I-31 P14 (east bottom) and I-31 P16 (west bottom) were below the COGCC standards. The combined TPH and benzo(a)pyrene for additional confirmation sample I-31 P15 (east wall) were above the COGCC standards. Additional material was excavated from the east wall and one final confirmation sample (I-31 P17) was collected on November 9th, 2015. All results for this sample were below the COGCC standards.

Nicholson GeoSolutions LLC



David K. Nicholson, P.G.
Principal Geologist

Table 1 I-31 Pit Sample Results – September 23, 2015

Parameter	Table 910-1 Standards	Sample ID and Location						
		I-31 P1 (east wall)	I-31 P2 (east bottom)	I-31 P3 (center bottom)	I-31 P4 (north wall)	I-31 P5 (south wall)	I-31 P6 (west bottom)	I-31 P7 (west wall)
sp. conductance (mmhos/cm)	<4	0.573	1.78	0.776	1.54	0.296	2.16	2.35
pH (standard units)	6-9	8.17	7.37	7.42	7.49	6.97	7.41	7.44
SAR (ratio)	<12	3.3	12.1	8.94	4.54	1.27	15	3.72
TVPH – gasoline range	500 ¹	32.1	296	339	<0.5	<0.5	1.1	4.37
TEPH – diesel/motor oil range	500 ¹	1,466.6	4,698	4,182	3,418	69.94	1,505	2,463
benzene	0.17	0.0202	0.331	0.815	<0.0025	<0.0025	<0.0025	0.00343
toluene	85	<0.025	<0.5	1.18	<0.025	<0.025	<0.025	<0.025
ethylbenzene	100	0.0232	0.149	0.354	<0.0025	<0.0025	<0.0025	<0.0025
xylenes	175	0.199	3.32	6.88	<0.0075	<0.0075	<0.0075	0.0184
benzo(a)pyrene	0.022	0.0355	0.0289	0.0138	0.116	0.00607	0.0216	<0.06
arsenic	0.39	7.3	4.55	5.76	8.38	6.6	8.68	8.39

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

Table 2 I-31 Pit Sample Results – October 8, 2015

	Table 910-1 Standards	Sample ID and Location					
		I-31 P8 (west wall)	I-31 P9 (north wall)	I-31 P10 (south wall)	I-31 P11 (center bottom)	I-31 P12 (east bottom)	I-31 P13 (east wall)
TVPH – gasoline range	500 ¹	3.47	<0.5	<0.5	1.91	2.35	7.84
TEPH – diesel/motor oil range	500 ¹	896	125.7	121.6	103	1,906	3,137
benzene	0.17	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
toluene	85	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
ethylbenzene	100	<0.0025	<0.0025	<0.0025	0.00355	<0.0025	0.011
xylenes	175	0.0343	<0.0075	<0.0075	0.03	<0.0075	0.116
benzo(a)pyrene	0.022	0.0369	<0.006	<0.006	<0.006	0.0521	0.0432

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

Values in bold type exceed standards

All units in mg/kg

Table 3 I-31 Pit Sample Results – October 24 and November 9, 2015

	Table 910-1 Standards	Sample ID and Location			
		I-31 P14 (east bottom)	I-31 P15 (east wall)	I-31 P16 (west bottom)	I-31 P17 (east wall)
TVPH – gasoline range	500 ¹	<0.5	<0.5	<0.5	<0.5
TEPH – diesel/motor oil range	500 ¹	225.1	818	259.6	125
benzene	0.17	<0.0025	<0.0025	<0.0025	<0.0025
toluene	85	<0.025	<0.025	<0.025	<0.025
ethylbenzene	100	<0.0025	<0.0025	<0.0025	<0.0025
xylenes	175	<0.0075	<0.0075	<0.0075	<0.0075
benzo(a)pyrene	0.022	0.00984	0.0452	0.0114	0.0123

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

Values in bold type exceed standards

All units in mg/kg

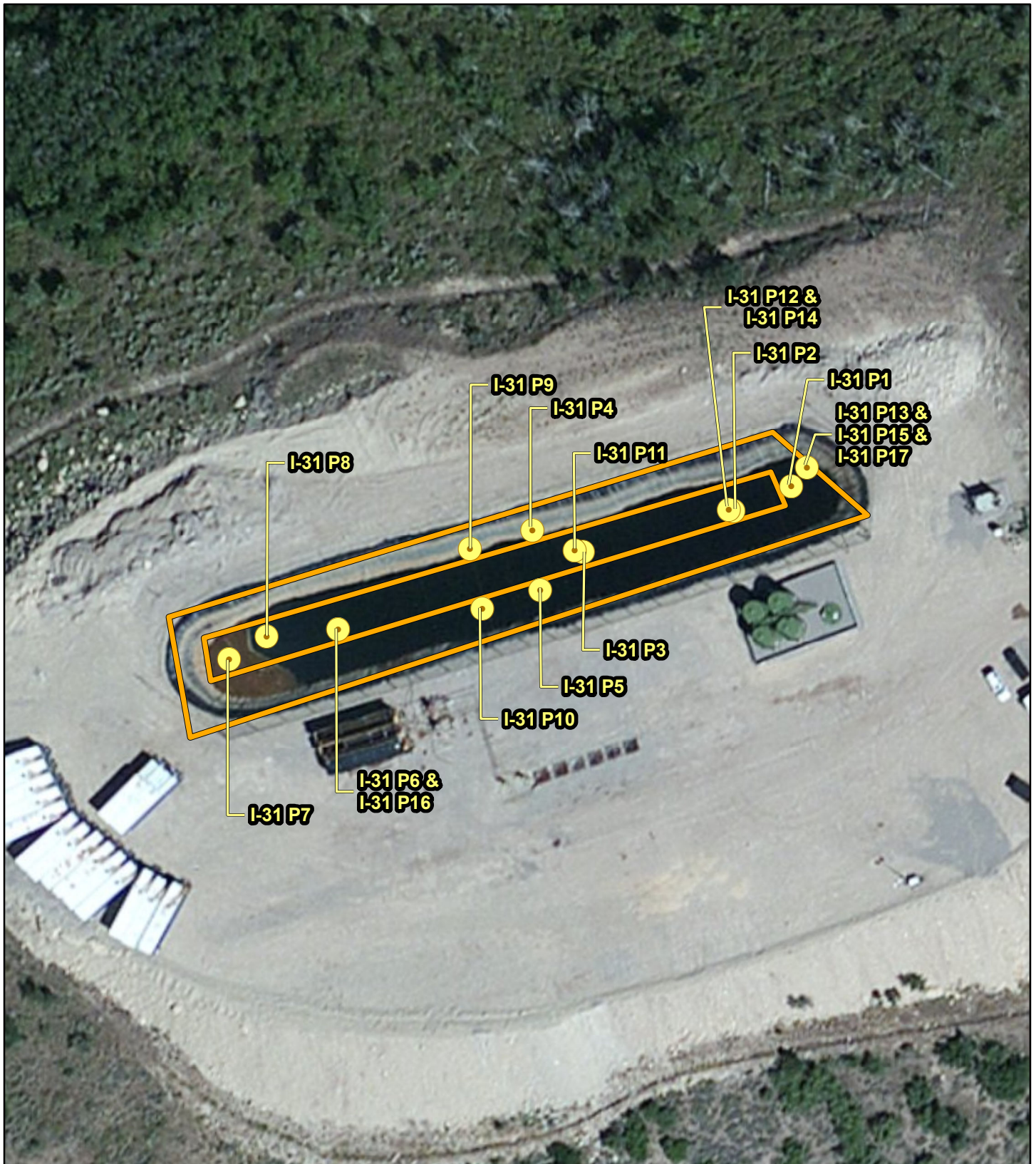


Figure 1

November
2015

GeoSolutions
NICHOLSON

Legend



Sample Location



Pit Boundary

0 37.5 75 150 Feet 1" = 75'

Linn Energy, LLC

**I-31
Pit Investigation**

APPENDIX A

Laboratory Reports



12065 Lebanon Rd.
Mt. Juliet, TN 37122
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1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

Report Summary

Wednesday September 30, 2015

Report Number: L790407

Samples Received: 09/24/15

Client Project:

Description: Pit Reclamation

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P1
Collected By : D Nicholson
Collection Date : 09/23/15 10:00

ESC Sample # : L790407-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	103.		mV	2580 B-2011	09/25/15	1
pH	8.17	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	3.30			Calc	09/25/15	1
Specific Conductance	573.		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0204	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	7.30	2.00	mg/kg	6010B	09/25/15	1
Barium	273.	0.500	mg/kg	6010B	09/25/15	1
Boron	11.4	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	21.5	1.00	mg/kg	6010B	09/25/15	1
Copper	18.0	2.00	mg/kg	6010B	09/25/15	1
Lead	11.2	0.500	mg/kg	6010B	09/25/15	1
Nickel	14.8	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	38.1	5.00	mg/kg	6010B	09/25/15	1
Benzene	0.0202	0.00250	mg/kg	8021	09/25/15	5
Toluene	BDL	0.0250	mg/kg	8021	09/25/15	5
Ethylbenzene	0.0232	0.00250	mg/kg	8021	09/25/15	5
Total Xylene	0.199	0.00750	mg/kg	8021	09/25/15	5
TPH (GC/FID) Low Fraction	32.1	0.500	mg/kg	8015	09/25/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	92.6		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	99.6		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	1370	40.0	mg/kg	8015	09/25/15	10
C28-C40 Oil Range	96.6	40.0	mg/kg	8015	09/25/15	10
Surrogate Recovery						
o-Terphenyl	106.		% Rec.	8015	09/25/15	10
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0376	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthene	0.108	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthylene	0.0827	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(a)anthracene	0.0388	0.0120	mg/kg	8270C-SIM	09/25/15	2

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-01 (PH) - 8.17 at 20.6c



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Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P1
Collected By : D Nicholson
Collection Date : 09/23/15 10:00

ESC Sample # : L790407-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0355	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(b)fluoranthene	0.0601	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(g,h,i)perylene	0.0338	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(k)fluoranthene	0.0134	0.0120	mg/kg	8270C-SIM	09/25/15	2
Chrysene	0.0552	0.0120	mg/kg	8270C-SIM	09/25/15	2
Dibenz(a,h)anthracene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluoranthene	0.0696	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluorene	0.116	0.0120	mg/kg	8270C-SIM	09/25/15	2
Indeno(1,2,3-cd)pyrene	0.0237	0.0120	mg/kg	8270C-SIM	09/25/15	2
Naphthalene	0.457	0.200	mg/kg	8270C-SIM	09/25/15	10
Phenanthrene	0.213	0.0120	mg/kg	8270C-SIM	09/25/15	2
Pyrene	0.202	0.0120	mg/kg	8270C-SIM	09/25/15	2
1-Methylnaphthalene	0.637	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Methylnaphthalene	0.902	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Chloronaphthalene	BDL	0.0400	mg/kg	8270C-SIM	09/25/15	2
Surrogate Recovery						
p-Terphenyl-d14	56.4		% Rec.	8270C-SIM	09/25/15	2
Nitrobenzene-d5	78.5		% Rec.	8270C-SIM	09/25/15	10
2-Fluorobiphenyl	74.6		% Rec.	8270C-SIM	09/25/15	2

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 09/29/15 10:26 Revised: 09/30/15 17:11
L790407-01 (PH) - 8.17 at 20.6c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P2
Collected By : D Nicholson
Collection Date : 09/23/15 10:10

ESC Sample # : L790407-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	95.0		mV	2580 B-2011	09/25/15	1
pH	7.37	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	12.1			Calc	09/25/15	1
Specific Conductance	1780		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0975	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	4.55	2.00	mg/kg	6010B	09/25/15	1
Barium	1030	0.500	mg/kg	6010B	09/25/15	1
Boron	18.7	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	22.2	1.00	mg/kg	6010B	09/25/15	1
Copper	20.8	2.00	mg/kg	6010B	09/25/15	1
Lead	18.4	0.500	mg/kg	6010B	09/25/15	1
Nickel	15.1	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	36.1	5.00	mg/kg	6010B	09/25/15	1
Benzene	0.331	0.0500	mg/kg	8021	09/25/15	100
Toluene	BDL	0.500	mg/kg	8021	09/25/15	100
Ethylbenzene	0.149	0.0500	mg/kg	8021	09/25/15	100
Total Xylene	3.32	0.150	mg/kg	8021	09/25/15	100
TPH (GC/FID) Low Fraction	296.	10.0	mg/kg	8015	09/25/15	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.8		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	104.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	4480	80.0	mg/kg	8015	09/25/15	20
C28-C40 Oil Range	218.	80.0	mg/kg	8015	09/25/15	20
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	09/25/15	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.139	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthene	0.150	0.120	mg/kg	8270C-SIM	09/25/15	20
Acenaphthylene	BDL	0.120	mg/kg	8270C-SIM	09/25/15	20
Benzo(a)anthracene	0.0354	0.0120	mg/kg	8270C-SIM	09/25/15	2

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-02 (PH) - 7.37 at 20.7c



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September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P2
Collected By : D Nicholson
Collection Date : 09/23/15 10:10

ESC Sample # : L790407-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0289	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(b)fluoranthene	0.0514	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(g,h,i)perylene	0.0262	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(k)fluoranthene	0.0126	0.0120	mg/kg	8270C-SIM	09/25/15	2
Chrysene	0.0683	0.0120	mg/kg	8270C-SIM	09/25/15	2
Dibenz(a,h)anthracene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluoranthene	0.0712	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluorene	0.323	0.120	mg/kg	8270C-SIM	09/25/15	20
Indeno(1,2,3-cd)pyrene	0.0190	0.0120	mg/kg	8270C-SIM	09/25/15	2
Naphthalene	0.777	0.400	mg/kg	8270C-SIM	09/25/15	20
Phenanthrene	0.409	0.0120	mg/kg	8270C-SIM	09/25/15	2
Pyrene	0.184	0.0120	mg/kg	8270C-SIM	09/25/15	2
1-Methylnaphthalene	1.16	0.400	mg/kg	8270C-SIM	09/25/15	20
2-Methylnaphthalene	1.99	0.400	mg/kg	8270C-SIM	09/25/15	20
2-Chloronaphthalene	BDL	0.400	mg/kg	8270C-SIM	09/25/15	20
Surrogate Recovery						
p-Terphenyl-d14	50.0		% Rec.	8270C-SIM	09/25/15	2
Nitrobenzene-d5	528.		% Rec.	8270C-SIM	09/25/15	20
2-Fluorobiphenyl	74.3		% Rec.	8270C-SIM	09/25/15	20

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L790407-02 (PH) - 7.37 at 20.7c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P3
Collected By : D Nicholson
Collection Date : 09/23/15 10:20

ESC Sample # : L790407-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	71.0		mV	2580 B-2011	09/25/15	1
pH	7.42	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	8.94			Calc	09/25/15	1
Specific Conductance	776.		umhos/cm	9050AMod	09/25/15	1
Mercury	0.130	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	5.76	2.00	mg/kg	6010B	09/25/15	1
Barium	1710	0.500	mg/kg	6010B	09/25/15	1
Boron	19.5	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	34.0	1.00	mg/kg	6010B	09/25/15	1
Copper	38.6	2.00	mg/kg	6010B	09/25/15	1
Lead	15.5	0.500	mg/kg	6010B	09/25/15	1
Nickel	26.0	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	44.8	5.00	mg/kg	6010B	09/25/15	1
Benzene	0.815	0.0500	mg/kg	8021	09/25/15	100
Toluene	1.18	0.500	mg/kg	8021	09/25/15	100
Ethylbenzene	0.354	0.0500	mg/kg	8021	09/25/15	100
Total Xylene	6.88	0.150	mg/kg	8021	09/25/15	100
TPH (GC/FID) Low Fraction	339.	10.0	mg/kg	8015	09/25/15	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.7		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	3910	80.0	mg/kg	8015	09/25/15	20
C28-C40 Oil Range	272.	80.0	mg/kg	8015	09/25/15	20
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	09/25/15	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.201	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthene	0.133	0.120	mg/kg	8270C-SIM	09/25/15	20
Acenaphthylene	BDL	0.120	mg/kg	8270C-SIM	09/25/15	20
Benzo(a)anthracene	0.0226	0.0120	mg/kg	8270C-SIM	09/25/15	2

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-03 (PH) - 7.42 at 20.8c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P3
Collected By : D Nicholson
Collection Date : 09/23/15 10:20

ESC Sample # : L790407-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0138	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(b)fluoranthene	0.0394	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(g,h,i)perylene	0.0134	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(k)fluoranthene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Chrysene	0.0458	0.0120	mg/kg	8270C-SIM	09/25/15	2
Dibenz(a,h)anthracene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluoranthene	0.0595	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluorene	0.427	0.120	mg/kg	8270C-SIM	09/25/15	20
Indeno(1,2,3-cd)pyrene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Naphthalene	BDL	0.400	mg/kg	8270C-SIM	09/25/15	20
Phenanthrene	0.533	0.0120	mg/kg	8270C-SIM	09/25/15	2
Pyrene	0.121	0.0120	mg/kg	8270C-SIM	09/25/15	2
1-Methylnaphthalene	0.867	0.400	mg/kg	8270C-SIM	09/25/15	20
2-Methylnaphthalene	1.67	0.400	mg/kg	8270C-SIM	09/25/15	20
2-Chloronaphthalene	BDL	0.400	mg/kg	8270C-SIM	09/25/15	20
Surrogate Recovery						
p-Terphenyl-d14	52.9		% Rec.	8270C-SIM	09/25/15	2
Nitrobenzene-d5	584.		% Rec.	8270C-SIM	09/25/15	20
2-Fluorobiphenyl	78.4		% Rec.	8270C-SIM	09/25/15	20

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L790407-03 (PH) - 7.42 at 20.8c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P4
Collected By : D Nicholson
Collection Date : 09/23/15 10:30

ESC Sample # : L790407-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	79.0		mV	2580 B-2011	09/25/15	1
pH	7.49	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	4.54			Calc	09/25/15	1
Specific Conductance	1540		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0203	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	8.38	2.00	mg/kg	6010B	09/25/15	1
Barium	213.	0.500	mg/kg	6010B	09/25/15	1
Boron	14.3	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	15.3	1.00	mg/kg	6010B	09/25/15	1
Copper	20.4	2.00	mg/kg	6010B	09/25/15	1
Lead	11.5	0.500	mg/kg	6010B	09/25/15	1
Nickel	15.1	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	47.3	5.00	mg/kg	6010B	09/25/15	1
Benzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Toluene	BDL	0.0250	mg/kg	8021	09/25/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	09/25/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	09/25/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.4		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	102.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	3050	80.0	mg/kg	8015	09/25/15	20
C28-C40 Oil Range	368.	80.0	mg/kg	8015	09/25/15	20
Surrogate Recovery						
o-Terphenyl	87.5		% Rec.	8015	09/25/15	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Acenaphthene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Acenaphthylene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(a)anthracene	0.105	0.0600	mg/kg	8270C-SIM	09/25/15	10

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-04 (PH) - 7.49 at 20.8c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P4
Collected By : D Nicholson
Collection Date : 09/23/15 10:30

ESC Sample # : L790407-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.116	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(b)fluoranthene	0.238	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(g,h,i)perylene	0.113	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(k)fluoranthene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Chrysene	0.152	0.0600	mg/kg	8270C-SIM	09/25/15	10
Dibenz(a,h)anthracene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Fluoranthene	0.168	0.0600	mg/kg	8270C-SIM	09/25/15	10
Fluorene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Indeno(1,2,3-cd)pyrene	0.0893	0.0600	mg/kg	8270C-SIM	09/25/15	10
Naphthalene	0.401	0.200	mg/kg	8270C-SIM	09/25/15	10
Phenanthrene	0.167	0.0600	mg/kg	8270C-SIM	09/25/15	10
Pyrene	0.490	0.0600	mg/kg	8270C-SIM	09/25/15	10
1-Methylnaphthalene	0.454	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Methylnaphthalene	0.760	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Chloronaphthalene	BDL	0.200	mg/kg	8270C-SIM	09/25/15	10
Surrogate Recovery						
p-Terphenyl-d14	57.7		% Rec.	8270C-SIM	09/25/15	10
Nitrobenzene-d5	113.		% Rec.	8270C-SIM	09/25/15	10
2-Fluorobiphenyl	88.0		% Rec.	8270C-SIM	09/25/15	10

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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L790407-04 (PH) - 7.49 at 20.8c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P5
Collected By : D Nicholson
Collection Date : 09/23/15 10:40

ESC Sample # : L790407-05

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	75.0		mV	2580 B-2011	09/25/15	1
pH	6.97	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	1.27			Calc	09/25/15	1
Specific Conductance	296.		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0249	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	6.60	2.00	mg/kg	6010B	09/25/15	1
Barium	394.	0.500	mg/kg	6010B	09/25/15	1
Boron	BDL	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	45.5	1.00	mg/kg	6010B	09/25/15	1
Copper	20.8	2.00	mg/kg	6010B	09/25/15	1
Lead	16.0	0.500	mg/kg	6010B	09/25/15	1
Nickel	28.7	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	51.9	5.00	mg/kg	6010B	09/25/15	1
Benzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Toluene	BDL	0.0250	mg/kg	8021	09/25/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	09/25/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	09/25/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.0		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	60.5	4.00	mg/kg	8015	09/26/15	1
C28-C40 Oil Range	9.44	4.00	mg/kg	8015	09/26/15	1
Surrogate Recovery						
o-Terphenyl	56.6		% Rec.	8015	09/26/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Acenaphthene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Benzo(a)anthracene	0.00610	0.00600	mg/kg	8270C-SIM	09/25/15	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-05 (PH) - 6.97 at 20.5c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P5
Collected By : D Nicholson
Collection Date : 09/23/15 10:40

ESC Sample # : L790407-05

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.00607	0.00600	mg/kg	8270C-SIM	09/25/15	1
Benzo(b)fluoranthene	0.0139	0.00600	mg/kg	8270C-SIM	09/25/15	1
Benzo(g,h,i)perylene	0.00948	0.00600	mg/kg	8270C-SIM	09/25/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Chrysene	0.0100	0.00600	mg/kg	8270C-SIM	09/25/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Fluoranthene	0.0110	0.00600	mg/kg	8270C-SIM	09/25/15	1
Fluorene	BDL	0.00600	mg/kg	8270C-SIM	09/25/15	1
Indeno(1,2,3-cd)pyrene	0.00650	0.00600	mg/kg	8270C-SIM	09/25/15	1
Naphthalene	BDL	0.0200	mg/kg	8270C-SIM	09/25/15	1
Phenanthrene	0.0171	0.00600	mg/kg	8270C-SIM	09/25/15	1
Pyrene	0.0297	0.00600	mg/kg	8270C-SIM	09/25/15	1
1-Methylnaphthalene	BDL	0.0200	mg/kg	8270C-SIM	09/25/15	1
2-Methylnaphthalene	BDL	0.0200	mg/kg	8270C-SIM	09/25/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	09/25/15	1
Surrogate Recovery						
p-Terphenyl-d14	70.8		% Rec.	8270C-SIM	09/25/15	1
Nitrobenzene-d5	108.		% Rec.	8270C-SIM	09/25/15	1
2-Fluorobiphenyl	84.7		% Rec.	8270C-SIM	09/25/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L790407-05 (PH) - 6.97 at 20.5c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P6
Collected By : D Nicholson
Collection Date : 09/23/15 10:50

ESC Sample # : L790407-06

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	102.		mV	2580 B-2011	09/25/15	1
pH	7.41	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	15.0			Calc	09/25/15	1
Specific Conductance	2160		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0265	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	8.68	2.00	mg/kg	6010B	09/25/15	1
Barium	506.	0.500	mg/kg	6010B	09/25/15	1
Boron	14.1	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	44.2	1.00	mg/kg	6010B	09/25/15	1
Copper	24.8	2.00	mg/kg	6010B	09/25/15	1
Lead	17.1	0.500	mg/kg	6010B	09/25/15	1
Nickel	26.3	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	358.	5.00	mg/kg	6010B	09/25/15	1
Benzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Toluene	BDL	0.0250	mg/kg	8021	09/25/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	09/25/15	5
TPH (GC/FID) Low Fraction	1.10	0.500	mg/kg	8015	09/25/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.8		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	104.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	1310	80.0	mg/kg	8015	09/25/15	20
C28-C40 Oil Range	195.	80.0	mg/kg	8015	09/25/15	20
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	09/25/15	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0398	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthene	0.0336	0.0120	mg/kg	8270C-SIM	09/25/15	2
Acenaphthylene	0.0470	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(a)anthracene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-06 (PH) - 7.41 at 20.6c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
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September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P6
Collected By : D Nicholson
Collection Date : 09/23/15 10:50

ESC Sample # : L790407-06

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0216	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(b)fluoranthene	0.0328	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(g,h,i)perylene	0.0235	0.0120	mg/kg	8270C-SIM	09/25/15	2
Benzo(k)fluoranthene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Chrysene	0.0131	0.0120	mg/kg	8270C-SIM	09/25/15	2
Dibenz(a,h)anthracene	BDL	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluoranthene	0.0183	0.0120	mg/kg	8270C-SIM	09/25/15	2
Fluorene	0.0849	0.0120	mg/kg	8270C-SIM	09/25/15	2
Indeno(1,2,3-cd)pyrene	0.0163	0.0120	mg/kg	8270C-SIM	09/25/15	2
Naphthalene	0.169	0.0400	mg/kg	8270C-SIM	09/25/15	2
Phenanthrene	0.124	0.0120	mg/kg	8270C-SIM	09/25/15	2
Pyrene	0.0798	0.0120	mg/kg	8270C-SIM	09/25/15	2
1-Methylnaphthalene	0.204	0.0400	mg/kg	8270C-SIM	09/25/15	2
2-Methylnaphthalene	0.386	0.0400	mg/kg	8270C-SIM	09/25/15	2
2-Chloronaphthalene	BDL	0.0400	mg/kg	8270C-SIM	09/25/15	2
Surrogate Recovery						
p-Terphenyl-d14	53.6		% Rec.	8270C-SIM	09/25/15	2
Nitrobenzene-d5	135.		% Rec.	8270C-SIM	09/25/15	2
2-Fluorobiphenyl	73.7		% Rec.	8270C-SIM	09/25/15	2

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L790407-06 (PH) - 7.41 at 20.6c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
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September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation
Sample ID : I-31 P7
Collected By : D Nicholson
Collection Date : 09/23/15 11:00

ESC Sample # : L790407-07

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	09/25/15	1
ORP	73.0		mV	2580 B-2011	09/25/15	1
pH	7.44	0.100	su	9045D	09/25/15	1
Sodium Adsorption Ratio	3.72			Calc	09/25/15	1
Specific Conductance	2350		umhos/cm	9050AMod	09/25/15	1
Mercury	0.0794	0.0200	mg/kg	7471A	09/25/15	1
Arsenic	8.39	2.00	mg/kg	6010B	09/25/15	1
Barium	411.	0.500	mg/kg	6010B	09/25/15	1
Boron	11.0	10.0	mg/kg	6010B	09/25/15	1
Cadmium	BDL	0.500	mg/kg	6010B	09/25/15	1
Chromium	29.9	1.00	mg/kg	6010B	09/25/15	1
Copper	23.1	2.00	mg/kg	6010B	09/25/15	1
Lead	20.4	0.500	mg/kg	6010B	09/25/15	1
Nickel	19.8	2.00	mg/kg	6010B	09/25/15	1
Selenium	BDL	2.00	mg/kg	6010B	09/25/15	1
Silver	BDL	1.00	mg/kg	6010B	09/25/15	1
Zinc	49.5	5.00	mg/kg	6010B	09/25/15	1
Benzene	0.00343	0.00250	mg/kg	8021	09/25/15	5
Toluene	BDL	0.0250	mg/kg	8021	09/25/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	09/25/15	5
Total Xylene	0.0184	0.00750	mg/kg	8021	09/25/15	5
TPH (GC/FID) Low Fraction	4.37	0.500	mg/kg	8015	09/25/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.3		% Rec.	8015	09/25/15	1
a,a,a-Trifluorotoluene(PID)	104.		% Rec.	8021	09/25/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	2180	200.	mg/kg	8015	09/24/15	50
C28-C40 Oil Range	283.	20.0	mg/kg	8015	09/24/15	5
Surrogate Recovery						
o-Terphenyl	64.0		% Rec.	8015	09/24/15	5
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.106	0.0600	mg/kg	8270C-SIM	09/25/15	10
Acenaphthene	0.0613	0.0600	mg/kg	8270C-SIM	09/25/15	10
Acenaphthylene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(a)anthracene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L790407-07 (PH) - 7.44 at 20.7c
L790407-07 (SV8270PAHSIM) - Dilution due to matrix



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

September 30, 2015

Date Received : September 24, 2015
Description : Pit Reclamation

Sample ID : I-31 P7

Collected By : D Nicholson
Collection Date : 09/23/15 11:00

ESC Sample # : L790407-07

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(b)fluoranthene	0.0995	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(g,h,i)perylene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Benzo(k)fluoranthene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Chrysene	0.0841	0.0600	mg/kg	8270C-SIM	09/25/15	10
Dibenz(a,h)anthracene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Fluoranthene	0.0830	0.0600	mg/kg	8270C-SIM	09/25/15	10
Fluorene	0.201	0.0600	mg/kg	8270C-SIM	09/25/15	10
Indeno(1,2,3-cd)pyrene	BDL	0.0600	mg/kg	8270C-SIM	09/25/15	10
Naphthalene	0.297	0.200	mg/kg	8270C-SIM	09/25/15	10
Phenanthrene	0.232	0.0600	mg/kg	8270C-SIM	09/25/15	10
Pyrene	0.314	0.0600	mg/kg	8270C-SIM	09/25/15	10
1-Methylnaphthalene	0.378	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Methylnaphthalene	0.773	0.200	mg/kg	8270C-SIM	09/25/15	10
2-Chloronaphthalene	BDL	0.200	mg/kg	8270C-SIM	09/25/15	10
Surrogate Recovery						
p-Terphenyl-d14	60.1		% Rec.	8270C-SIM	09/25/15	10
Nitrobenzene-d5	111.		% Rec.	8270C-SIM	09/25/15	10
2-Fluorobiphenyl	95.1		% Rec.	8270C-SIM	09/25/15	10

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 09/29/15 10:26 Revised: 09/30/15 17:12

L790407-07 (PH) - 7.44 at 20.7c

L790407-07 (SV8270PAHSIM) - Dilution due to matrix

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L790407-01	WG817470	SAMP	C10-C28 Diesel Range	R3080311	B
	WG817470	SAMP	C28-C40 Oil Range	R3080311	B
L790407-02	WG817301	SAMP	Nitrobenzene-d5	R3080616	J7
	WG817301	SAMP	2-Fluorobiphenyl	R3080616	J7
	WG817470	SAMP	C10-C28 Diesel Range	R3080311	B
	WG817470	SAMP	C28-C40 Oil Range	R3080311	B
	WG817470	SAMP	o-Terphenyl	R3080311	J7
L790407-03	WG817301	SAMP	Nitrobenzene-d5	R3080616	J7
	WG817301	SAMP	2-Fluorobiphenyl	R3080616	J7
	WG817470	SAMP	C10-C28 Diesel Range	R3080311	B
	WG817470	SAMP	C28-C40 Oil Range	R3080311	B
	WG817470	SAMP	o-Terphenyl	R3080311	J7
L790407-04	WG817470	SAMP	C10-C28 Diesel Range	R3080311	B
	WG817470	SAMP	C28-C40 Oil Range	R3080311	B
	WG817470	SAMP	o-Terphenyl	R3080311	J7
L790407-06	WG817470	SAMP	C10-C28 Diesel Range	R3080311	B
	WG817470	SAMP	C28-C40 Oil Range	R3080311	B
	WG817470	SAMP	o-Terphenyl	R3080311	J7
L790407-07	WG817574	SAMP	C10-C28 Diesel Range	R3080142	B
	WG817574	SAMP	C28-C40 Oil Range	R3080142	B

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
B	(EPA) - The indicated compound was found in the associated method blank as well as the laboratory sample.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.



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September 30, 2015

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
C10-C28 Diesel Range	< 4	mg/kg			WG817574	09/24/15 20:48
C28-C40 Oil Range	< 4	mg/kg			WG817574	09/24/15 20:48
o-Terphenyl		% Rec.	85.10	50-150	WG817574	09/24/15 20:48
Specific Conductance	1.75	umhos/cm			WG817495	09/25/15 11:02
Mercury	< .02	mg/kg			WG817428	09/25/15 07:15
Benzene	< .0005	mg/kg			WG817510	09/25/15 03:18
Ethylbenzene	< .0005	mg/kg			WG817510	09/25/15 03:18
Toluene	< .005	mg/kg			WG817510	09/25/15 03:18
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG817510	09/25/15 03:18
Total Xylene	< .0015	mg/kg			WG817510	09/25/15 03:18
a,a,a-Trifluorotoluene(FID)		% Rec.	98.50	59-128	WG817510	09/25/15 03:18
a,a,a-Trifluorotoluene(PID)		% Rec.	104.0	54-144	WG817510	09/25/15 03:18
Chromium, Hexavalent	< 2	mg/kg			WG817427	09/25/15 14:16
Arsenic	< 2	mg/kg			WG817557	09/25/15 15:42
Barium	< .5	mg/kg			WG817557	09/25/15 15:42
Boron	< 10	mg/kg			WG817557	09/25/15 15:42
Cadmium	< .5	mg/kg			WG817557	09/25/15 15:42
Chromium	< 1	mg/kg			WG817557	09/25/15 15:42
Copper	< 2	mg/kg			WG817557	09/25/15 15:42
Lead	< .5	mg/kg			WG817557	09/25/15 15:42
Nickel	< 2	mg/kg			WG817557	09/25/15 15:42
Selenium	< 2	mg/kg			WG817557	09/25/15 15:42
Silver	< 1	mg/kg			WG817557	09/25/15 15:42
Zinc	< 5	mg/kg			WG817557	09/25/15 15:42
C10-C28 Diesel Range	< 4	mg/kg			WG817470	09/25/15 10:02
C28-C40 Oil Range	< 4	mg/kg			WG817470	09/25/15 10:02
o-Terphenyl		% Rec.	62.90	50-150	WG817470	09/25/15 10:02
1-Methylnaphthalene	< .02	mg/kg			WG817301	09/25/15 05:07
2-Chloronaphthalene	< .02	mg/kg			WG817301	09/25/15 05:07
2-Methylnaphthalene	< .02	mg/kg			WG817301	09/25/15 05:07
Acenaphthene	< .006	mg/kg			WG817301	09/25/15 05:07
Acenaphthylene	< .006	mg/kg			WG817301	09/25/15 05:07
Anthracene	< .006	mg/kg			WG817301	09/25/15 05:07
Benzo(a)anthracene	< .006	mg/kg			WG817301	09/25/15 05:07
Benzo(a)pyrene	< .006	mg/kg			WG817301	09/25/15 05:07
Benzo(b)fluoranthene	< .006	mg/kg			WG817301	09/25/15 05:07
Benzo(g,h,i)perylene	< .006	mg/kg			WG817301	09/25/15 05:07
Benzo(k)fluoranthene	< .006	mg/kg			WG817301	09/25/15 05:07
Chrysene	< .006	mg/kg			WG817301	09/25/15 05:07
Dibenz(a,h)anthracene	< .006	mg/kg			WG817301	09/25/15 05:07
Fluoranthene	< .006	mg/kg			WG817301	09/25/15 05:07
Fluorene	< .006	mg/kg			WG817301	09/25/15 05:07
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG817301	09/25/15 05:07
Naphthalene	< .02	mg/kg			WG817301	09/25/15 05:07
Phenanthrene	< .006	mg/kg			WG817301	09/25/15 05:07

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Pyrene	< .006	mg/kg			WG817301	09/25/15 05:07
2-Fluorobiphenyl		% Rec.	77.40	40.6-122	WG817301	09/25/15 05:07
Nitrobenzene-d5		% Rec.	103.0	22.1-146	WG817301	09/25/15 05:07
p-Terphenyl-d14		% Rec.	73.40	32.2-131	WG817301	09/25/15 05:07
C10-C28 Diesel Range	< 4	mg/kg			WG817817	09/26/15 10:47
C28-C40 Oil Range	< 4	mg/kg			WG817817	09/26/15 10:47
o-Terphenyl		% Rec.	94.70	50-150	WG817817	09/26/15 10:47

Analyte	Units	Result	Duplicate		Limit	Ref Samp	Batch
			Duplicate	RPD			
Specific Conductance	umhos/cm	411.	409.	0.488	20	L789717-22	WG817495
Specific Conductance	umhos/cm	536.	537.	0.186	20	L790420-04	WG817495
ORP	mV	105.	103.	1.92	20	L790407-01	WG817487
pH	su	6.81	6.82	0.147	1	L790355-01	WG817475
pH	su	8.80	8.80	0.00	1	L790511-01	WG817475
Chromium, Hexavalent	mg/kg	0.00	0.00	0.00	20	L790453-01	WG817427

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
C10-C28 Diesel Range	mg/kg	60	40.4	67.4	50-100	WG817574
o-Terphenyl				86.60	50-150	WG817574
Specific Conductance	umhos/cm	873	873.	100.	90-110	WG817495
Mercury	mg/kg	.3	0.283	94.0	80-120	WG817428
Benzene	mg/kg	.05	0.0462	92.4	70-130	WG817510
Ethylbenzene	mg/kg	.05	0.0473	94.6	70-130	WG817510
Toluene	mg/kg	.05	0.0449	89.8	70-130	WG817510
Total Xylene	mg/kg	.15	0.143	95.4	70-130	WG817510
a,a,a-Trifluorotoluene(PID)				104.0	54-144	WG817510
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.54	101.	63.5-137	WG817510
a,a,a-Trifluorotoluene(FID)				107.0	59-128	WG817510
ORP	mV	100	106.	106.	90-110	WG817487
pH	su	6.37	6.37	100.	98.2-101.8	WG817475
Chromium, Hexavalent	mg/kg	59.8	58.6	98.0	80-120	WG817427
Arsenic	mg/kg	100	103.	103.	80-120	WG817557
Barium	mg/kg	100	105.	105.	80-120	WG817557

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Boron	mg/kg	100	106.	106.	80-120	WG817557
Cadmium	mg/kg	100	103.	103.	80-120	WG817557
Chromium	mg/kg	100	105.	105.	80-120	WG817557
Copper	mg/kg	100	109.	109.	80-120	WG817557
Lead	mg/kg	100	104.	104.	80-120	WG817557
Nickel	mg/kg	100	104.	104.	80-120	WG817557
Selenium	mg/kg	100	107.	107.	80-120	WG817557
Silver	mg/kg	100	102.	102.	80-120	WG817557
Zinc	mg/kg	100	102.	102.	80-120	WG817557
C10-C28 Diesel Range	mg/kg	60	51.3	85.4	50-100	WG817470
o-Terphenyl				83.60	50-150	WG817470
1-Methylnaphthalene	mg/kg	.08	0.0680	85.1	50.6-122	WG817301
2-Chloronaphthalene	mg/kg	.08	0.0581	72.7	53.9-121	WG817301
2-Methylnaphthalene	mg/kg	.08	0.0685	85.6	50.4-120	WG817301
Acenaphthene	mg/kg	.08	0.0591	73.9	52.4-120	WG817301
Acenaphthylene	mg/kg	.08	0.0571	71.4	49.6-120	WG817301
Anthracene	mg/kg	.08	0.0612	76.6	50.3-130	WG817301
Benzo(a)anthracene	mg/kg	.08	0.0618	77.2	46.7-125	WG817301
Benzo(a)pyrene	mg/kg	.08	0.0561	70.1	42.3-119	WG817301
Benzo(b)fluoranthene	mg/kg	.08	0.0556	69.4	43.6-124	WG817301
Benzo(g,h,i)perylene	mg/kg	.08	0.0607	75.9	45.1-132	WG817301
Benzo(k)fluoranthene	mg/kg	.08	0.0585	73.1	46.1-131	WG817301
Chrysene	mg/kg	.08	0.0598	74.8	49.5-131	WG817301
Dibenz(a,h)anthracene	mg/kg	.08	0.0644	80.5	44.8-133	WG817301
Fluoranthene	mg/kg	.08	0.0688	86.0	49.3-128	WG817301
Fluorene	mg/kg	.08	0.0632	79.0	50.6-121	WG817301
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0658	82.3	46.1-135	WG817301
Naphthalene	mg/kg	.08	0.0589	73.6	49.6-115	WG817301
Phenanthrene	mg/kg	.08	0.0552	68.9	48.8-121	WG817301
Pyrene	mg/kg	.08	0.0555	69.3	44.7-130	WG817301
2-Fluorobiphenyl				76.60	40.6-122	WG817301
Nitrobenzene-d5				105.0	22.1-146	WG817301
p-Terphenyl-d14				69.30	32.2-131	WG817301
C10-C28 Diesel Range	mg/kg	60	42.7	71.1	50-100	WG817817
o-Terphenyl				82.40	50-150	WG817817

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
C10-C28 Diesel Range	mg/kg	37.3	40.4	62.0	50-100	8.07	20	WG817574
o-Terphenyl				78.10	50-150			WG817574
Specific Conductance	umhos/	871.	873.	100.	90-110	0.229	20	WG817495
Mercury	mg/kg	0.246	0.283	82.0	80-120	14.0	20	WG817428
Benzene	mg/kg	0.0466	0.0462	93.0	70-130	0.730	20	WG817510
Ethylbenzene	mg/kg	0.0466	0.0473	93.0	70-130	1.59	20	WG817510
Toluene	mg/kg	0.0447	0.0449	89.0	70-130	0.520	20	WG817510
Total Xylene	mg/kg	0.139	0.143	93.0	70-130	2.76	20	WG817510

* Performance of this Analyte is outside of established criteria.

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Analyte	Laboratory Control Sample Duplicate				Limit	RPD	Limit	Batch
	Units	Result	Ref	%Rec				
a,a,a-Trifluorotoluene(PID)				103.0	54-144			
TPH (GC/FID) Low Fraction	mg/kg	5.48	5.54	100.	63.5-137	1.06	20	WG817510
a,a,a-Trifluorotoluene(FID)				108.0	59-128			WG817510
ORP	mV	104.	106.	104.	90-110	1.90	20	WG817487
pH	su	6.39	6.37	100.	98.2-101.8	0.313	1	WG817475
Chromium,Hexavalent	mg/kg	59.4	58.6	99.0	80-120	1.36	20	WG817427
Arsenic	mg/kg	99.8	103.	100.	80-120	3.00	20	WG817557
Barium	mg/kg	102.	105.	102.	80-120	3.00	20	WG817557
Boron	mg/kg	103.	106.	103.	80-120	3.00	20	WG817557
Cadmium	mg/kg	100.	103.	100.	80-120	3.00	20	WG817557
Chromium	mg/kg	101.	105.	101.	80-120	3.00	20	WG817557
Copper	mg/kg	108.	109.	108.	80-120	1.00	20	WG817557
Lead	mg/kg	101.	104.	101.	80-120	3.00	20	WG817557
Nickel	mg/kg	101.	104.	101.	80-120	3.00	20	WG817557
Selenium	mg/kg	105.	107.	104.	80-120	2.00	20	WG817557
Silver	mg/kg	98.9	102.	99.0	80-120	3.00	20	WG817557
Zinc	mg/kg	99.4	102.	99.0	80-120	3.00	20	WG817557
C10-C28 Diesel Range	mg/kg	53.9	51.3	90.0	50-100	4.99	20	WG817470
o-Terphenyl				89.60	50-150			WG817470
1-Methylnaphthalene	mg/kg	0.0707	0.0680	88.0	50.6-122	3.82	20	WG817301
2-Chloronaphthalene	mg/kg	0.0599	0.0581	75.0	53.9-121	3.06	20	WG817301
2-Methylnaphthalene	mg/kg	0.0710	0.0685	89.0	50.4-120	3.59	20	WG817301
Acenaphthene	mg/kg	0.0609	0.0591	76.0	52.4-120	3.01	20	WG817301
Acenaphthylene	mg/kg	0.0591	0.0571	74.0	49.6-120	3.35	20	WG817301
Anthracene	mg/kg	0.0638	0.0612	80.0	50.3-130	4.00	20	WG817301
Benzo(a)anthracene	mg/kg	0.0632	0.0618	79.0	46.7-125	2.27	20	WG817301
Benzo(a)pyrene	mg/kg	0.0578	0.0561	72.0	42.3-119	3.08	20	WG817301
Benzo(b)fluoranthene	mg/kg	0.0594	0.0556	74.0	43.6-124	6.74	20	WG817301
Benzo(g,h,i)perylene	mg/kg	0.0621	0.0607	78.0	45.1-132	2.17	20	WG817301
Benzo(k)fluoranthene	mg/kg	0.0580	0.0585	72.0	46.1-131	0.830	20	WG817301
Chrysene	mg/kg	0.0618	0.0598	77.0	49.5-131	3.29	20	WG817301
Dibenz(a,h)anthracene	mg/kg	0.0661	0.0644	83.0	44.8-133	2.65	20	WG817301
Fluoranthene	mg/kg	0.0706	0.0688	88.0	49.3-128	2.52	20	WG817301
Fluorene	mg/kg	0.0653	0.0632	82.0	50.6-121	3.29	20	WG817301
Indeno(1,2,3-cd)pyrene	mg/kg	0.0677	0.0658	85.0	46.1-135	2.90	20	WG817301
Naphthalene	mg/kg	0.0611	0.0589	76.0	49.6-115	3.72	20	WG817301
Phenanthrene	mg/kg	0.0566	0.0552	71.0	48.8-121	2.57	20	WG817301
Pyrene	mg/kg	0.0569	0.0555	71.0	44.7-130	2.51	20	WG817301
2-Fluorobiphenyl				78.20	40.6-122			WG817301
Nitrobenzene-d5				104.0	22.1-146			WG817301
p-Terphenyl-d14				71.20	32.2-131			WG817301
C10-C28 Diesel Range	mg/kg	42.2	42.7	70.0	50-100	1.01	20	WG817817
o-Terphenyl				78.10	50-150			WG817817

* Performance of this Analyte is outside of established criteria.
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Tax I.D. 62-0814289

Est. 1970

September 30, 2015

Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Mercury	mg/kg	0.310	0.0517	.3	86.0	75-125	L790353-22	WG817428
Chromium,Hexavalent	mg/kg	8.96	0.00	20	44.8*	75-125	L790453-01	WG817427
Arsenic	mg/kg	102.	1.68	100	101.	75-125	L790453-01	WG817557
Barium	mg/kg	722.	940.	100	0.00*	75-125	L790453-01	WG817557
Boron	mg/kg	116.	10.1	100	106.	75-125	L790453-01	WG817557
Cadmium	mg/kg	101.	-0.260	100	101.	75-125	L790453-01	WG817557
Chromium	mg/kg	114.	22.4	100	91.0	75-125	L790453-01	WG817557
Copper	mg/kg	126.	37.1	100	89.0	75-125	L790453-01	WG817557
Lead	mg/kg	147.	45.7	100	102.	75-125	L790453-01	WG817557
Nickel	mg/kg	111.	10.5	100	100.	75-125	L790453-01	WG817557
Selenium	mg/kg	106.	0.0720	100	106.	75-125	L790453-01	WG817557
Silver	mg/kg	100.	0.115	100	100.	75-125	L790453-01	WG817557
Zinc	mg/kg	118.	29.2	100	89.0	75-125	L790453-01	WG817557
1-Methylnaphthalene	mg/kg	0.0717	0.00	.08	89.6	28.4-137	L789944-02	WG817301
2-Chloronaphthalene	mg/kg	0.0615	0.00	.08	76.8	38.6-126	L789944-02	WG817301
2-Methylnaphthalene	mg/kg	0.0723	0.00	.08	90.3	26.6-137	L789944-02	WG817301
Acenaphthene	mg/kg	0.0605	0.00	.08	75.6	31.9-130	L789944-02	WG817301
Acenaphthylene	mg/kg	0.0586	0.00	.08	73.3	33.7-129	L789944-02	WG817301
Anthracene	mg/kg	0.0558	0.00	.08	69.8	26.5-141	L789944-02	WG817301
Benzo(a)anthracene	mg/kg	0.0493	0.00	.08	61.6	18.3-136	L789944-02	WG817301
Benzo(a)pyrene	mg/kg	0.0449	0.00	.08	56.1	16.9-135	L789944-02	WG817301
Benzo(b)fluoranthene	mg/kg	0.0413	0.00	.08	51.6	10-134	L789944-02	WG817301
Benzo(g,h,i)perylene	mg/kg	0.0430	0.00	.08	53.8	14.1-140	L789944-02	WG817301
Benzo(k)fluoranthene	mg/kg	0.0427	0.00	.08	53.4	18.2-138	L789944-02	WG817301
Chrysene	mg/kg	0.0477	0.00	.08	59.6	17.1-145	L789944-02	WG817301
Dibenz(a,h)anthracene	mg/kg	0.0469	0.00	.08	58.6	18.5-138	L789944-02	WG817301
Fluoranthene	mg/kg	0.0602	0.000611	.08	74.4	15.4-144	L789944-02	WG817301
Fluorene	mg/kg	0.0632	0.00	.08	79.0	23.5-136	L789944-02	WG817301
Indeno(1,2,3-cd)pyrene	mg/kg	0.0469	0.00	.08	58.6	14.5-142	L789944-02	WG817301
Naphthalene	mg/kg	0.0626	0.000780	.08	77.3	29.2-128	L789944-02	WG817301
Phenanthrene	mg/kg	0.0522	0.00	.08	65.2	20.1-134	L789944-02	WG817301
Pyrene	mg/kg	0.0479	0.000777	.08	58.9	11-148	L789944-02	WG817301
2-Fluorobiphenyl					81.60	40.6-122		WG817301
Nitrobenzene-d5					107.0	22.1-146		WG817301
p-Terphenyl-d14					60.50	32.2-131		WG817301
Benzene	mg/kg	0.177	0.0202	.05	62.6	49.7-127	L790407-01	WG817510
Ethylbenzene	mg/kg	0.135	0.0232	.05	44.6	40.8-141	L790407-01	WG817510
Toluene	mg/kg	0.149	0.0138	.05	54.1	49.8-132	L790407-01	WG817510
Total Xylene	mg/kg	0.588	0.199	.15	51.9	41.2-140	L790407-01	WG817510
a,a,a-Trifluorotoluene(PID)					98.10	54-144		WG817510
TPH (GC/FID) Low Fraction	mg/kg	52.4	32.1	5.5	73.9	28.5-138	L790407-01	WG817510
a,a,a-Trifluorotoluene(FID)					95.50	59-128		WG817510

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Mercury	mg/kg	0.293	0.310	80.4	75-125	6.00	20	L790353-22	WG817428
Chromium,Hexavalent	mg/kg	9.04	8.96	45.2*	75-125	0.889	20	L790453-01	WG817427

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September 30, 2015

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Arsenic	mg/kg	107.	102.	106.	75-125	5.00	20	L790453-01	WG817557
Barium	mg/kg	944.	722.	3.91*	75-125	27.0*	20	L790453-01	WG817557
Boron	mg/kg	124.	116.	114.	75-125	6.00	20	L790453-01	WG817557
Cadmium	mg/kg	106.	101.	106.	75-125	5.00	20	L790453-01	WG817557
Chromium	mg/kg	120.	114.	97.1	75-125	5.00	20	L790453-01	WG817557
Copper	mg/kg	133.	126.	96.2	75-125	5.00	20	L790453-01	WG817557
Lead	mg/kg	142.	147.	96.0	75-125	4.00	20	L790453-01	WG817557
Nickel	mg/kg	116.	111.	106.	75-125	5.00	20	L790453-01	WG817557
Selenium	mg/kg	111.	106.	111.	75-125	5.00	20	L790453-01	WG817557
Silver	mg/kg	106.	100.	106.	75-125	5.00	20	L790453-01	WG817557
Zinc	mg/kg	125.	118.	95.9	75-125	6.00	20	L790453-01	WG817557
1-Methylnaphthalene	mg/kg	0.0673	0.0717	84.1	28.4-137	6.34	20	L789944-02	WG817301
2-Chloronaphthalene	mg/kg	0.0565	0.0615	70.6	38.6-126	8.48	20	L789944-02	WG817301
2-Methylnaphthalene	mg/kg	0.0676	0.0723	84.5	26.6-137	6.61	20	L789944-02	WG817301
Acenaphthene	mg/kg	0.0553	0.0605	69.1	31.9-130	9.05	20	L789944-02	WG817301
Acenaphthylene	mg/kg	0.0531	0.0586	66.4	33.7-129	9.84	20	L789944-02	WG817301
Anthracene	mg/kg	0.0486	0.0558	60.7	26.5-141	13.9	21.2	L789944-02	WG817301
Benzo(a)anthracene	mg/kg	0.0316	0.0493	39.5	18.3-136	43.7*	24.6	L789944-02	WG817301
Benzo(a)pyrene	mg/kg	0.0271	0.0449	33.9	16.9-135	49.5*	25.2	L789944-02	WG817301
Benzo(b)fluoranthene	mg/kg	0.0244	0.0413	30.4	10-134	51.5*	30.9	L789944-02	WG817301
Benzo(g,h,i)perylene	mg/kg	0.0251	0.0430	31.4	14.1-140	52.6*	25.5	L789944-02	WG817301
Benzo(k)fluoranthene	mg/kg	0.0271	0.0427	33.9	18.2-138	44.7*	25.6	L789944-02	WG817301
Chrysene	mg/kg	0.0308	0.0477	38.6	17.1-145	42.9*	24.2	L789944-02	WG817301
Dibenz(a,h)anthracene	mg/kg	0.0277	0.0469	34.6	18.5-138	51.4*	24.3	L789944-02	WG817301
Fluoranthene	mg/kg	0.0443	0.0602	54.6	15.4-144	30.4*	27.1	L789944-02	WG817301
Fluorene	mg/kg	0.0558	0.0632	69.8	23.5-136	12.3	20	L789944-02	WG817301
Indeno(1,2,3-cd)pyrene	mg/kg	0.0276	0.0469	34.5	14.5-142	51.8*	25.8	L789944-02	WG817301
Naphthalene	mg/kg	0.0591	0.0626	72.9	29.2-128	5.74	20	L789944-02	WG817301
Phenanthrene	mg/kg	0.0432	0.0522	54.0	20.1-134	18.8	23.6	L789944-02	WG817301
Pyrene	mg/kg	0.0345	0.0479	42.2	11-148	32.4*	26.1	L789944-02	WG817301
2-Fluorobiphenyl				75.90	40.6-122				WG817301
Nitrobenzene-d5				103.0	22.1-146				WG817301
p-Terphenyl-d14				43.20	32.2-131				WG817301
Benzene	mg/kg	0.196	0.177	70.5	49.7-127	10.6	23.5	L790407-01	WG817510
Ethylbenzene	mg/kg	0.158	0.135	53.8	40.8-141	15.7	23.8	L790407-01	WG817510
Toluene	mg/kg	0.160	0.149	58.6	49.8-132	7.31	23.5	L790407-01	WG817510
Total Xylene	mg/kg	0.651	0.588	60.3	41.2-140	10.2	23.7	L790407-01	WG817510
a,a,a-Trifluorotoluene(PID)				96.80	54-144				WG817510
TPH (GC/FID) Low Fraction	mg/kg	45.4	52.4	48.6	28.5-138	14.3	23.6	L790407-01	WG817510
a,a,a-Trifluorotoluene(FID)				97.50	59-128				WG817510

Post Spike

* Performance of this Analyte is outside of established criteria.

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Est. 1970

September 30, 2015

Serial Dilution

Batch number /Run number / Sample number cross reference

WG817574: R3080142: L790407-
WG817495: R3080281: L790407-01 02 03 04 05 06
WG817391: R3080294: L790407-01 02 03 04 05 06
WG817428: R3080300: L790407-01 02 03 04 05 06
WG817470: R3080311: L790407-01 02 03 04 06
WG817510: R3080332: L790407-01 02 03 04 05 06
WG817487: R3080360: L790407-01 02 03 04 05 06
WG817475: R3080400: L790407-01 02 03 04 05 06
WG817427: R3080412: L790407-01 02 03 04 05 06
WG817557: R3080421: L790407-01 02 03 04 05 06
WG817301: R3080616: L790407-01 02 03 04 05 06
WG817817: R3080735: L790407-05

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
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The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

Report Summary

Wednesday October 14, 2015

Report Number: L793788

Samples Received: 10/10/15

Client Project:

Description: Pit and Landfarm Soil Sampling

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P8
Collected By : DK Nicholson
Collection Date : 10/08/15 11:00

ESC Sample # : L793788-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/12/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Total Xylene	0.0343	0.00750	mg/kg	8021	10/12/15	5
TPH (GC/FID) Low Fraction	3.47	0.500	mg/kg	8015	10/12/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.1		% Rec.	8015	10/12/15	1
a,a,a-Trifluorotoluene(PID)	89.6		% Rec.	8021	10/12/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	864.	20.0	mg/kg	8015	10/12/15	5
C28-C40 Oil Range	32.0	4.00	mg/kg	8015	10/12/15	1
Surrogate Recovery						
o-Terphenyl	125.		% Rec.	8015	10/12/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0477	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthene	0.0751	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthylene	0.00812	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)anthracene	0.0439	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)pyrene	0.0369	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(b)fluoranthene	0.0692	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(g,h,i)perylene	0.0443	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(k)fluoranthene	0.0150	0.00600	mg/kg	8270C-SIM	10/12/15	1
Chrysene	0.0557	0.00600	mg/kg	8270C-SIM	10/12/15	1
Dibenz(a,h)anthracene	0.0129	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluoranthene	0.0729	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluorene	0.0784	0.00600	mg/kg	8270C-SIM	10/12/15	1
Indeno(1,2,3-cd)pyrene	0.0295	0.00600	mg/kg	8270C-SIM	10/12/15	1
Naphthalene	0.137	0.0200	mg/kg	8270C-SIM	10/12/15	1
Phenanthrene	0.174	0.00600	mg/kg	8270C-SIM	10/12/15	1
Pyrene	0.174	0.00600	mg/kg	8270C-SIM	10/12/15	1
1-Methylnaphthalene	0.242	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Methylnaphthalene	0.218	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Surrogate Recovery						
p-Terphenyl-d14	79.8		% Rec.	8270C-SIM	10/12/15	1
Nitrobenzene-d5	105.		% Rec.	8270C-SIM	10/12/15	1
2-Fluorobiphenyl	78.8		% Rec.	8270C-SIM	10/12/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 10/14/15 13:25 Printed: 10/14/15 15:50



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P9
Collected By : DK Nicholson
Collection Date : 10/08/15 11:05

ESC Sample # : L793788-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/12/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/12/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	10/12/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.3		% Rec.	8015	10/12/15	1
a,a,a-Trifluorotoluene(PID)	92.0		% Rec.	8021	10/12/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	118.	4.00	mg/kg	8015	10/12/15	1
C28-C40 Oil Range	17.7	4.00	mg/kg	8015	10/12/15	1
Surrogate Recovery						
o-Terphenyl	75.6		% Rec.	8015	10/12/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(b)fluoranthene	0.00931	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(g,h,i)perylene	0.00681	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Chrysene	0.00811	0.00600	mg/kg	8270C-SIM	10/12/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluoranthene	0.00838	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluorene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Indeno(1,2,3-cd)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Naphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Phenanthrene	0.0171	0.00600	mg/kg	8270C-SIM	10/12/15	1
Pyrene	0.0322	0.00600	mg/kg	8270C-SIM	10/12/15	1
1-Methylnaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Methylnaphthalene	0.0346	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Surrogate Recovery						
p-Terphenyl-d14	70.4		% Rec.	8270C-SIM	10/12/15	1
Nitrobenzene-d5	92.5		% Rec.	8270C-SIM	10/12/15	1
2-Fluorobiphenyl	82.5		% Rec.	8270C-SIM	10/12/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P10
Collected By : DK Nicholson
Collection Date : 10/08/15 11:15

ESC Sample # : L793788-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/12/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/12/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	10/12/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.0		% Rec.	8015	10/12/15	1
a,a,a-Trifluorotoluene(PID)	91.7		% Rec.	8021	10/12/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	95.4	8.00	mg/kg	8015	10/14/15	2
C28-C40 Oil Range	26.2	8.00	mg/kg	8015	10/14/15	2
Surrogate Recovery						
o-Terphenyl	67.9		% Rec.	8015	10/14/15	2
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(b)fluoranthene	0.0103	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(g,h,i)perylene	0.00896	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Chrysene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluorene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Indeno(1,2,3-cd)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Naphthalene	0.0262	0.0200	mg/kg	8270C-SIM	10/12/15	1
Phenanthrene	0.00930	0.00600	mg/kg	8270C-SIM	10/12/15	1
Pyrene	0.0179	0.00600	mg/kg	8270C-SIM	10/12/15	1
1-Methylnaphthalene	0.0249	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Methylnaphthalene	0.0483	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Surrogate Recovery						
p-Terphenyl-d14	80.9		% Rec.	8270C-SIM	10/12/15	1
Nitrobenzene-d5	117.		% Rec.	8270C-SIM	10/12/15	1
2-Fluorobiphenyl	95.2		% Rec.	8270C-SIM	10/12/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P11
Collected By : DK Nicholson
Collection Date : 10/08/15 11:20

ESC Sample # : L793788-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/12/15	5
Ethylbenzene	0.00355	0.00250	mg/kg	8021	10/12/15	5
Total Xylene	0.0300	0.00750	mg/kg	8021	10/12/15	5
TPH (GC/FID) Low Fraction	1.91	0.500	mg/kg	8015	10/12/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.4		% Rec.	8015	10/12/15	1
a,a,a-Trifluorotoluene(PID)	90.9		% Rec.	8021	10/12/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	103.	4.00	mg/kg	8015	10/12/15	1
C28-C40 Oil Range	BDL	4.00	mg/kg	8015	10/12/15	1
Surrogate Recovery						
o-Terphenyl	85.7		% Rec.	8015	10/12/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthene	0.00755	0.00600	mg/kg	8270C-SIM	10/12/15	1
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(a)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(b)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(g,h,i)perylene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Chrysene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Fluorene	0.0122	0.00600	mg/kg	8270C-SIM	10/12/15	1
Indeno(1,2,3-cd)pyrene	BDL	0.00600	mg/kg	8270C-SIM	10/12/15	1
Naphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Phenanthrene	0.0193	0.00600	mg/kg	8270C-SIM	10/12/15	1
Pyrene	0.0100	0.00600	mg/kg	8270C-SIM	10/12/15	1
1-Methylnaphthalene	0.0270	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Methylnaphthalene	0.0330	0.0200	mg/kg	8270C-SIM	10/12/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/12/15	1
Surrogate Recovery						
p-Terphenyl-d14	71.5		% Rec.	8270C-SIM	10/12/15	1
Nitrobenzene-d5	119.		% Rec.	8270C-SIM	10/12/15	1
2-Fluorobiphenyl	83.8		% Rec.	8270C-SIM	10/12/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P12
Collected By : DK Nicholson
Collection Date : 10/08/15 11:40

ESC Sample # : L793788-05

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/12/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/12/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/12/15	5
TPH (GC/FID) Low Fraction	2.35	0.500	mg/kg	8015	10/12/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.9		% Rec.	8015	10/12/15	1
a,a,a-Trifluorotoluene(PID)	89.9		% Rec.	8021	10/12/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	1790	20.0	mg/kg	8015	10/12/15	5
C28-C40 Oil Range	116.	20.0	mg/kg	8015	10/12/15	5
Surrogate Recovery						
o-Terphenyl	200.		% Rec.	8015	10/12/15	5
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0613	0.0300	mg/kg	8270C-SIM	10/12/15	5
Acenaphthene	0.120	0.0300	mg/kg	8270C-SIM	10/12/15	5
Acenaphthylene	BDL	0.0300	mg/kg	8270C-SIM	10/12/15	5
Benzo(a)anthracene	0.0558	0.0300	mg/kg	8270C-SIM	10/12/15	5
Benzo(a)pyrene	0.0521	0.0300	mg/kg	8270C-SIM	10/12/15	5
Benzo(b)fluoranthene	0.0793	0.0300	mg/kg	8270C-SIM	10/12/15	5
Benzo(g,h,i)perylene	0.0629	0.0300	mg/kg	8270C-SIM	10/12/15	5
Benzo(k)fluoranthene	0.0301	0.0300	mg/kg	8270C-SIM	10/12/15	5
Chrysene	0.0800	0.0300	mg/kg	8270C-SIM	10/12/15	5
Dibenz(a,h)anthracene	0.0238	0.00300	mg/kg	8270C-SIM	10/12/15	5
Fluoranthene	0.103	0.0300	mg/kg	8270C-SIM	10/12/15	5
Fluorene	0.118	0.0300	mg/kg	8270C-SIM	10/12/15	5
Indeno(1,2,3-cd)pyrene	0.0402	0.0300	mg/kg	8270C-SIM	10/12/15	5
Naphthalene	0.405	0.100	mg/kg	8270C-SIM	10/12/15	5
Phenanthrene	0.252	0.0300	mg/kg	8270C-SIM	10/12/15	5
Pyrene	0.293	0.0300	mg/kg	8270C-SIM	10/12/15	5
1-Methylnaphthalene	0.587	0.100	mg/kg	8270C-SIM	10/12/15	5
2-Methylnaphthalene	0.756	0.100	mg/kg	8270C-SIM	10/12/15	5
2-Chloronaphthalene	BDL	0.100	mg/kg	8270C-SIM	10/12/15	5
Surrogate Recovery						
p-Terphenyl-d14	57.7		% Rec.	8270C-SIM	10/12/15	5
Nitrobenzene-d5	89.6		% Rec.	8270C-SIM	10/12/15	5
2-Fluorobiphenyl	58.3		% Rec.	8270C-SIM	10/12/15	5

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 14, 2015

Date Received : October 10, 2015
Description : Pit and Landfarm Soil Sampling
Sample ID : I-31 P13
Collected By : DK Nicholson
Collection Date : 10/08/15 11:50

ESC Sample # : L793788-06

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.00250	mg/kg	8021	10/13/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/13/15	5
Ethylbenzene	0.0110	0.00250	mg/kg	8021	10/13/15	5
Total Xylene	0.116	0.00750	mg/kg	8021	10/13/15	5
TPH (GC/FID) Low Fraction	7.84	0.500	mg/kg	8015	10/13/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.6		% Rec.	8015	10/13/15	1
a,a,a-Trifluorotoluene(PID)	88.8		% Rec.	8021	10/13/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	2960	40.0	mg/kg	8015	10/12/15	10
C28-C40 Oil Range	177.	40.0	mg/kg	8015	10/12/15	10
Surrogate Recovery						
o-Terphenyl	275.		% Rec.	8015	10/12/15	10
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0581	0.0120	mg/kg	8270C-SIM	10/14/15	2
Acenaphthene	0.144	0.0120	mg/kg	8270C-SIM	10/14/15	2
Acenaphthylene	0.0272	0.0120	mg/kg	8270C-SIM	10/14/15	2
Benzo(a)anthracene	0.0560	0.0120	mg/kg	8270C-SIM	10/14/15	2
Benzo(a)pyrene	0.0432	0.0120	mg/kg	8270C-SIM	10/14/15	2
Benzo(b)fluoranthene	0.0746	0.0120	mg/kg	8270C-SIM	10/14/15	2
Benzo(g,h,i)perylene	0.0414	0.0120	mg/kg	8270C-SIM	10/14/15	2
Benzo(k)fluoranthene	0.0191	0.0120	mg/kg	8270C-SIM	10/14/15	2
Chrysene	0.0744	0.0120	mg/kg	8270C-SIM	10/14/15	2
Dibenz(a,h)anthracene	BDL	0.0120	mg/kg	8270C-SIM	10/14/15	2
Fluoranthene	0.0982	0.0120	mg/kg	8270C-SIM	10/14/15	2
Fluorene	0.160	0.0120	mg/kg	8270C-SIM	10/14/15	2
Indeno(1,2,3-cd)pyrene	0.0229	0.0120	mg/kg	8270C-SIM	10/14/15	2
Naphthalene	0.530	0.0400	mg/kg	8270C-SIM	10/14/15	2
Phenanthrene	0.339	0.0120	mg/kg	8270C-SIM	10/14/15	2
Pyrene	0.281	0.0120	mg/kg	8270C-SIM	10/14/15	2
1-Methylnaphthalene	0.978	0.0400	mg/kg	8270C-SIM	10/14/15	2
2-Methylnaphthalene	0.919	0.0400	mg/kg	8270C-SIM	10/14/15	2
2-Chloronaphthalene	BDL	0.0400	mg/kg	8270C-SIM	10/14/15	2
Surrogate Recovery						
p-Terphenyl-d14	48.9		% Rec.	8270C-SIM	10/14/15	2
Nitrobenzene-d5	75.9		% Rec.	8270C-SIM	10/14/15	2
2-Fluorobiphenyl	69.3		% Rec.	8270C-SIM	10/14/15	2

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L793788-01	WG821135	SAMP	Acenaphthene	R3084645	J3
	WG821135	SAMP	Acenaphthylene	R3084645	J3
	WG821135	SAMP	Fluorene	R3084645	J3
	WG821135	SAMP	Naphthalene	R3084645	J3
	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821135	SAMP	Acenaphthene	R3084645	J3
L793788-02	WG821135	SAMP	Acenaphthylene	R3084645	J3
	WG821135	SAMP	Fluorene	R3084645	J3
	WG821135	SAMP	Naphthalene	R3084645	J3
	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821135	SAMP	Acenaphthene	R3084645	J3
	WG821135	SAMP	Acenaphthylene	R3084645	J3
L793788-03	WG821135	SAMP	Fluorene	R3084645	J3
	WG821135	SAMP	Naphthalene	R3084645	J3
	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821135	SAMP	Acenaphthene	R3084645	J3
	WG821135	SAMP	Acenaphthylene	R3084645	J3
	WG821135	SAMP	Fluorene	R3084645	J3
L793788-04	WG821135	SAMP	Naphthalene	R3084645	J3
	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821135	SAMP	Acenaphthene	R3084645	J3
	WG821135	SAMP	Acenaphthylene	R3084645	J3
	WG821135	SAMP	Fluorene	R3084645	J3
	WG821135	SAMP	Naphthalene	R3084645	J3
L793788-05	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821135	SAMP	Acenaphthene	R3084645	J3
	WG821135	SAMP	Acenaphthylene	R3084645	J3
	WG821135	SAMP	Dibenz(a,h)anthracene	R3084645	J
	WG821135	SAMP	Fluorene	R3084645	J3
	WG821135	SAMP	Naphthalene	R3084645	J3
L793788-06	WG821135	SAMP	1-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Methylnaphthalene	R3084645	J3
	WG821135	SAMP	2-Chloronaphthalene	R3084645	J3
	WG821245	SAMP	o-Terphenyl	R3084689	J1
	WG821245	SAMP	o-Terphenyl	R3084689	J1

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits
J3	The associated batch QC was outside the established quality control range for precision.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.



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Quality Assurance Report
Level II

L793788

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Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

October 14, 2015

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Benzene	< .0005	mg/kg			WG821213	10/12/15 09:41
Ethylbenzene	< .0005	mg/kg			WG821213	10/12/15 09:41
Toluene	< .005	mg/kg			WG821213	10/12/15 09:41
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG821213	10/12/15 09:41
Total Xylene	< .0015	mg/kg			WG821213	10/12/15 09:41
a,a,a-Trifluorotoluene(FID)		% Rec.	102.0	59-128	WG821213	10/12/15 09:41
a,a,a-Trifluorotoluene(PID)		% Rec.	95.20	54-144	WG821213	10/12/15 09:41
1-Methylnaphthalene	< .02	mg/kg			WG821135	10/12/15 05:04
2-Chloronaphthalene	< .02	mg/kg			WG821135	10/12/15 05:04
2-Methylnaphthalene	< .02	mg/kg			WG821135	10/12/15 05:04
Acenaphthene	< .006	mg/kg			WG821135	10/12/15 05:04
Acenaphthylene	< .006	mg/kg			WG821135	10/12/15 05:04
Anthracene	< .006	mg/kg			WG821135	10/12/15 05:04
Benzo(a)anthracene	< .006	mg/kg			WG821135	10/12/15 05:04
Benzo(a)pyrene	< .006	mg/kg			WG821135	10/12/15 05:04
Benzo(b)fluoranthene	< .006	mg/kg			WG821135	10/12/15 05:04
Benzo(g,h,i)perylene	< .006	mg/kg			WG821135	10/12/15 05:04
Benzo(k)fluoranthene	< .006	mg/kg			WG821135	10/12/15 05:04
Chrysene	< .006	mg/kg			WG821135	10/12/15 05:04
Dibenz(a,h)anthracene	< .006	mg/kg			WG821135	10/12/15 05:04
Fluoranthene	< .006	mg/kg			WG821135	10/12/15 05:04
Fluorene	< .006	mg/kg			WG821135	10/12/15 05:04
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG821135	10/12/15 05:04
Naphthalene	< .02	mg/kg			WG821135	10/12/15 05:04
Phenanthrene	< .006	mg/kg			WG821135	10/12/15 05:04
Pyrene	< .006	mg/kg			WG821135	10/12/15 05:04
2-Fluorobiphenyl		% Rec.	92.60	40.6-122	WG821135	10/12/15 05:04
Nitrobenzene-d5		% Rec.	106.0	22.1-146	WG821135	10/12/15 05:04
p-Terphenyl-d14		% Rec.	79.50	32.2-131	WG821135	10/12/15 05:04
C10-C28 Diesel Range	< 4	mg/kg			WG821245	10/12/15 12:57
C28-C40 Oil Range	< 4	mg/kg			WG821245	10/12/15 12:57
o-Terphenyl		% Rec.	92.70	50-150	WG821245	10/12/15 12:57
1-Methylnaphthalene	< .02	mg/kg			WG821136	10/14/15 00:42
2-Chloronaphthalene	< .02	mg/kg			WG821136	10/14/15 00:42
2-Methylnaphthalene	< .02	mg/kg			WG821136	10/14/15 00:42
Acenaphthene	< .006	mg/kg			WG821136	10/14/15 00:42
Acenaphthylene	< .006	mg/kg			WG821136	10/14/15 00:42
Anthracene	< .006	mg/kg			WG821136	10/14/15 00:42
Benzo(a)anthracene	< .006	mg/kg			WG821136	10/14/15 00:42
Benzo(a)pyrene	< .006	mg/kg			WG821136	10/14/15 00:42
Benzo(b)fluoranthene	< .006	mg/kg			WG821136	10/14/15 00:42
Benzo(g,h,i)perylene	< .006	mg/kg			WG821136	10/14/15 00:42
Benzo(k)fluoranthene	< .006	mg/kg			WG821136	10/14/15 00:42
Chrysene	< .006	mg/kg			WG821136	10/14/15 00:42
Dibenz(a,h)anthracene	< .006	mg/kg			WG821136	10/14/15 00:42
Fluoranthene	< .006	mg/kg			WG821136	10/14/15 00:42
Fluorene	< .006	mg/kg			WG821136	10/14/15 00:42
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG821136	10/14/15 00:42
Naphthalene	< .02	mg/kg			WG821136	10/14/15 00:42
Phenanthrene	< .006	mg/kg			WG821136	10/14/15 00:42
Pyrene	< .006	mg/kg			WG821136	10/14/15 00:42
2-Fluorobiphenyl		% Rec.	71.00	40.6-122	WG821136	10/14/15 00:42
Nitrobenzene-d5		% Rec.	65.90	22.1-146	WG821136	10/14/15 00:42

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Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
p-Terphenyl-d14		% Rec.	73.30	32.2-131		10/14/15 00:42
C10-C28 Diesel Range	< 4	mg/kg			WG821695	10/13/15 23:41
C28-C40 Oil Range	< 4	mg/kg			WG821695	10/13/15 23:41
o-Terphenyl		% Rec.	77.80	50-150	WG821695	10/13/15 23:41

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzene	mg/kg	.05	0.0458	91.7	70-130	WG821213
Ethylbenzene	mg/kg	.05	0.0460	92.0	70-130	WG821213
Toluene	mg/kg	.05	0.0452	90.4	70-130	WG821213
Total Xylene	mg/kg	.15	0.143	95.1	70-130	WG821213
a,a,a-Trifluorotoluene(FID)				102.0	59-128	WG821213
a,a,a-Trifluorotoluene(PID)				98.80	54-144	WG821213
TPH (GC/FID) Low Fraction	mg/kg	5.5	4.78	86.9	63.5-137	WG821213
a,a,a-Trifluorotoluene(FID)				101.0	59-128	WG821213
a,a,a-Trifluorotoluene(PID)				110.0	54-144	WG821213
1-Methylnaphthalene	mg/kg	.08	0.0694	86.8	50.6-122	WG821135
2-Chloronaphthalene	mg/kg	.08	0.0668	83.6	53.9-121	WG821135
2-Methylnaphthalene	mg/kg	.08	0.0690	86.2	50.4-120	WG821135
Acenaphthene	mg/kg	.08	0.0672	84.0	52.4-120	WG821135
Acenaphthylene	mg/kg	.08	0.0659	82.3	49.6-120	WG821135
Anthracene	mg/kg	.08	0.0740	92.5	50.3-130	WG821135
Benzo(a)anthracene	mg/kg	.08	0.0656	82.0	46.7-125	WG821135
Benzo(a)pyrene	mg/kg	.08	0.0642	80.3	42.3-119	WG821135
Benzo(b)fluoranthene	mg/kg	.08	0.0620	77.5	43.6-124	WG821135
Benzo(g,h,i)perylene	mg/kg	.08	0.0754	94.2	45.1-132	WG821135
Benzo(k)fluoranthene	mg/kg	.08	0.0668	83.5	46.1-131	WG821135
Chrysene	mg/kg	.08	0.0714	89.2	49.5-131	WG821135
Dibenz(a,h)anthracene	mg/kg	.08	0.0754	94.2	44.8-133	WG821135
Fluoranthene	mg/kg	.08	0.0790	98.8	49.3-128	WG821135
Fluorene	mg/kg	.08	0.0699	87.4	50.6-121	WG821135
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0748	93.5	46.1-135	WG821135
Naphthalene	mg/kg	.08	0.0645	80.6	49.6-115	WG821135
Phenanthrene	mg/kg	.08	0.0643	80.3	48.8-121	WG821135
Pyrene	mg/kg	.08	0.0623	77.8	44.7-130	WG821135
2-Fluorobiphenyl				85.30	40.6-122	WG821135
Nitrobenzene-d5				97.50	22.1-146	WG821135
p-Terphenyl-d14				74.70	32.2-131	WG821135
C10-C28 Diesel Range	mg/kg	60	41.5	69.2	50-100	WG821245
o-Terphenyl				90.70	50-150	WG821245
1-Methylnaphthalene	mg/kg	.08	0.0712	89.0	50.6-122	WG821136
2-Chloronaphthalene	mg/kg	.08	0.0675	84.4	53.9-121	WG821136
2-Methylnaphthalene	mg/kg	.08	0.0714	89.3	50.4-120	WG821136
Acenaphthene	mg/kg	.08	0.0684	85.5	52.4-120	WG821136
Acenaphthylene	mg/kg	.08	0.0672	84.0	49.6-120	WG821136
Anthracene	mg/kg	.08	0.0807	101.	50.3-130	WG821136
Benzo(a)anthracene	mg/kg	.08	0.0722	90.2	46.7-125	WG821136
Benzo(a)pyrene	mg/kg	.08	0.0733	91.6	42.3-119	WG821136
Benzo(b)fluoranthene	mg/kg	.08	0.0685	85.6	43.6-124	WG821136
Benzo(g,h,i)perylene	mg/kg	.08	0.0648	81.0	45.1-132	WG821136
Benzo(k)fluoranthene	mg/kg	.08	0.0744	93.0	46.1-131	WG821136
Chrysene	mg/kg	.08	0.0782	97.8	49.5-131	WG821136

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Dibenz(a,h)anthracene	mg/kg	.08	0.0688	86.0	44.8-133	WG821136
Fluoranthene	mg/kg	.08	0.0796	99.5	49.3-128	WG821136
Fluorene	mg/kg	.08	0.0703	87.8	50.6-121	WG821136
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0689	86.1	46.1-135	WG821136
Naphthalene	mg/kg	.08	0.0682	85.3	49.6-115	WG821136
Phenanthrene	mg/kg	.08	0.0714	89.3	48.8-121	WG821136
Pyrene	mg/kg	.08	0.0690	86.2	44.7-130	WG821136
2-Fluorobiphenyl				79.80	40.6-122	WG821136
Nitrobenzene-d5				86.90	22.1-146	WG821136
p-Terphenyl-d14				74.30	32.2-131	WG821136
C10-C28 Diesel Range	mg/kg	60	42.3	70.6	50-100	WG821695
o-Terphenyl				82.70	50-150	WG821695

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Benzene	mg/kg	0.0424	0.0458	85.0	70-130	7.73	20	WG821213
Ethylbenzene	mg/kg	0.0426	0.0460	85.0	70-130	7.75	20	WG821213
Toluene	mg/kg	0.0417	0.0452	83.0	70-130	7.90	20	WG821213
Total Xylene	mg/kg	0.131	0.143	88.0	70-130	8.37	20	WG821213
a,a,a-Trifluorotoluene(FID)				101.0	59-128			WG821213
a,a,a-Trifluorotoluene(PID)				99.40	54-144			WG821213
TPH (GC/FID) Low Fraction	mg/kg	5.09	4.78	92.0	63.5-137	6.20	20	WG821213
a,a,a-Trifluorotoluene(FID)				102.0	59-128			WG821213
a,a,a-Trifluorotoluene(PID)				110.0	54-144			WG821213
1-Methylnaphthalene	mg/kg	0.0526	0.0694	66.0	50.6-122	27.6*	20	WG821135
2-Chloronaphthalene	mg/kg	0.0512	0.0668	64.0	53.9-121	26.6*	20	WG821135
2-Methylnaphthalene	mg/kg	0.0525	0.0690	66.0	50.4-120	27.1*	20	WG821135
Acenaphthene	mg/kg	0.0541	0.0672	68.0	52.4-120	21.6*	20	WG821135
Acenaphthylene	mg/kg	0.0486	0.0659	61.0	49.6-120	30.2*	20	WG821135
Anthracene	mg/kg	0.0644	0.0740	80.0	50.3-130	13.9	20	WG821135
Benzo(a)anthracene	mg/kg	0.0564	0.0656	70.0	46.7-125	15.0	20	WG821135
Benzo(a)pyrene	mg/kg	0.0559	0.0642	70.0	42.3-119	13.9	20	WG821135
Benzo(b)fluoranthene	mg/kg	0.0537	0.0620	67.0	43.6-124	14.5	20	WG821135
Benzo(g,h,i)perylene	mg/kg	0.0623	0.0754	78.0	45.1-132	18.9	20	WG821135
Benzo(k)fluoranthene	mg/kg	0.0575	0.0668	72.0	46.1-131	15.1	20	WG821135
Chrysene	mg/kg	0.0602	0.0714	75.0	49.5-131	17.0	20	WG821135
Dibenz(a,h)anthracene	mg/kg	0.0627	0.0754	78.0	44.8-133	18.4	20	WG821135
Fluoranthene	mg/kg	0.0687	0.0790	86.0	49.3-128	14.0	20	WG821135
Fluorene	mg/kg	0.0548	0.0699	68.0	50.6-121	24.2*	20	WG821135
Indeno(1,2,3-cd)pyrene	mg/kg	0.0632	0.0748	79.0	46.1-135	16.8	20	WG821135
Naphthalene	mg/kg	0.0482	0.0645	60.0	49.6-115	28.8*	20	WG821135
Phenanthrene	mg/kg	0.0545	0.0643	68.0	48.8-121	16.5	20	WG821135
Pyrene	mg/kg	0.0534	0.0623	67.0	44.7-130	15.3	20	WG821135
2-Fluorobiphenyl				80.00	40.6-122			WG821135
Nitrobenzene-d5				100.0	22.1-146			WG821135
p-Terphenyl-d14				71.70	32.2-131			WG821135
C10-C28 Diesel Range	mg/kg	46.0	41.5	76.0	50-100	10.1	20	WG821245
o-Terphenyl				98.30	50-150			WG821245
1-Methylnaphthalene	mg/kg	0.0634	0.0712	79.0	50.6-122	11.6	20	WG821136
2-Chloronaphthalene	mg/kg	0.0599	0.0675	75.0	53.9-121	11.9	20	WG821136

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Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
2-Methylnaphthalene	mg/kg	0.0633	0.0714	79.0	50.4-120	12.1	20	WG821136
Acenaphthene	mg/kg	0.0605	0.0684	76.0	52.4-120	12.3	20	WG821136
Acenaphthylene	mg/kg	0.0597	0.0672	74.0	49.6-120	11.9	20	WG821136
Anthracene	mg/kg	0.0725	0.0807	90.0	50.3-130	10.7	20	WG821136
Benzo(a)anthracene	mg/kg	0.0638	0.0722	80.0	46.7-125	12.3	20	WG821136
Benzo(a)pyrene	mg/kg	0.0653	0.0733	82.0	42.3-119	11.5	20	WG821136
Benzo(b)fluoranthene	mg/kg	0.0608	0.0685	76.0	43.6-124	11.9	20	WG821136
Benzo(g,h,i)perylene	mg/kg	0.0572	0.0648	71.0	45.1-132	12.6	20	WG821136
Benzo(k)fluoranthene	mg/kg	0.0663	0.0744	83.0	46.1-131	11.5	20	WG821136
Chrysene	mg/kg	0.0695	0.0782	87.0	49.5-131	11.8	20	WG821136
Dibenz(a,h)anthracene	mg/kg	0.0603	0.0688	75.0	44.8-133	13.1	20	WG821136
Fluoranthene	mg/kg	0.0705	0.0796	88.0	49.3-128	12.1	20	WG821136
Fluorene	mg/kg	0.0623	0.0703	78.0	50.6-121	11.9	20	WG821136
Indeno(1,2,3-cd)pyrene	mg/kg	0.0609	0.0689	76.0	46.1-135	12.3	20	WG821136
Naphthalene	mg/kg	0.0603	0.0682	75.0	49.6-115	12.4	20	WG821136
Phenanthrene	mg/kg	0.0631	0.0714	79.0	48.8-121	12.3	20	WG821136
Pyrene	mg/kg	0.0608	0.0690	76.0	44.7-130	12.6	20	WG821136
2-Fluorobiphenyl				72.00	40.6-122			WG821136
Nitrobenzene-d5				74.70	22.1-146			WG821136
p-Terphenyl-d14				66.30	32.2-131			WG821136
C10-C28 Diesel Range	mg/kg	47.9	42.3	80.0	50-100	12.2	20	WG821695
o-Terphenyl				87.50	50-150			WG821695

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Benzene	mg/kg	0.183	0.00	.05	73.3	49.7-127	L793788-03	WG821213
Ethylbenzene	mg/kg	0.163	0.00	.05	65.1	40.8-141	L793788-03	WG821213
Toluene	mg/kg	0.172	0.000593	.05	68.6	49.8-132	L793788-03	WG821213
Total Xylene	mg/kg	0.505	0.00	.15	67.3	41.2-140	L793788-03	WG821213
a,a,a-Trifluorotoluene(FID)					97.40	59-128		WG821213
a,a,a-Trifluorotoluene(PID)					95.90	54-144		WG821213
TPH (GC/FID) Low Fraction	mg/kg	18.4	0.0882	5.5	66.4	28.5-138	L793788-03	WG821213
a,a,a-Trifluorotoluene(FID)					99.40	59-128		WG821213
a,a,a-Trifluorotoluene(PID)					106.0	54-144		WG821213
C10-C28 Diesel Range	mg/kg	43.9	0.00	60	73.2	50-100	L793682-01	WG821245
o-Terphenyl					90.80	50-150		WG821245
1-Methylnaphthalene	mg/kg	0.0685	0.00	.08	85.6	28.4-137	L793392-01	WG821136
2-Chloronaphthalene	mg/kg	0.0649	0.00	.08	81.2	38.6-126	L793392-01	WG821136
2-Methylnaphthalene	mg/kg	0.0684	0.00	.08	85.5	26.6-137	L793392-01	WG821136
Acenaphthene	mg/kg	0.0640	0.00	.08	80.1	31.9-130	L793392-01	WG821136
Acenaphthylene	mg/kg	0.0661	0.00	.08	82.6	33.7-129	L793392-01	WG821136
Anthracene	mg/kg	0.0771	0.00	.08	96.3	26.5-141	L793392-01	WG821136
Benzo(a)anthracene	mg/kg	0.0689	0.00162	.08	84.1	18.3-136	L793392-01	WG821136
Benzo(a)pyrene	mg/kg	0.0698	0.00	.08	87.3	16.9-135	L793392-01	WG821136
Benzo(b)fluoranthene	mg/kg	0.0588	0.00	.08	73.5	10-134	L793392-01	WG821136
Benzo(g,h,i)perylene	mg/kg	0.0572	0.000650	.08	70.7	14.1-140	L793392-01	WG821136
Benzo(k)fluoranthene	mg/kg	0.0726	0.00	.08	90.8	18.2-138	L793392-01	WG821136
Chrysene	mg/kg	0.0798	0.00907	.08	88.4	17.1-145	L793392-01	WG821136
Dibenz(a,h)anthracene	mg/kg	0.0665	0.00	.08	83.1	18.5-138	L793392-01	WG821136
Fluoranthene	mg/kg	0.0671	0.00	.08	83.9	15.4-144	L793392-01	WG821136
Fluorene	mg/kg	0.0641	0.00	.08	80.1	23.5-136	L793392-01	WG821136
Indeno(1,2,3-cd)pyrene	mg/kg	0.0628	0.00	.08	78.5	14.5-142	L793392-01	WG821136

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Quality Assurance Report
Level II

L793788

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Est. 1970

October 14, 2015

Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Naphthalene	mg/kg	0.0676	0.000626	.08	83.7	29.2-128	L793392-01	WG821136
Phenanthrene	mg/kg	0.0617	0.00	.08	77.2	20.1-134	L793392-01	WG821136
Pyrene	mg/kg	0.0577	0.000807	.08	71.1	11-148	L793392-01	WG821136
2-Fluorobiphenyl					75.10	40.6-122		WG821136
Nitrobenzene-d5					93.40	22.1-146		WG821136
p-Terphenyl-d14					68.20	32.2-131		WG821136
C10-C28 Diesel Range	mg/kg	52.2	0.444	60	86.3	50-100	L793460-06	WG821695
o-Terphenyl					82.00	50-150		WG821695

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Benzene	mg/kg	0.196	0.183	78.4	49.7-127	6.83	23.5	L793788-03	WG821213
Ethylbenzene	mg/kg	0.170	0.163	68.0	40.8-141	4.35	23.8	L793788-03	WG821213
Toluene	mg/kg	0.181	0.172	72.3	49.8-132	5.26	23.5	L793788-03	WG821213
Total Xylene	mg/kg	0.523	0.505	69.7	41.2-140	3.49	23.7	L793788-03	WG821213
a,a,a-Trifluorotoluene(FID)				97.10	59-128				WG821213
a,a,a-Trifluorotoluene(PID)				96.30	54-144				WG821213
TPH (GC/FID) Low Fraction	mg/kg	16.7	18.4	60.2	28.5-138	9.69	23.6	L793788-03	WG821213
a,a,a-Trifluorotoluene(FID)				97.70	59-128				WG821213
a,a,a-Trifluorotoluene(PID)				105.0	54-144				WG821213
C10-C28 Diesel Range	mg/kg	41.8	43.9	69.6	50-100	5.08	20	L793682-01	WG821245
o-Terphenyl				86.00	50-150				WG821245
1-Methylnaphthalene	mg/kg	0.0665	0.0685	83.1	28.4-137	2.97	20	L793392-01	WG821136
2-Chloronaphthalene	mg/kg	0.0638	0.0649	79.8	38.6-126	1.73	20	L793392-01	WG821136
2-Methylnaphthalene	mg/kg	0.0665	0.0684	83.1	26.6-137	2.78	20	L793392-01	WG821136
Acenaphthene	mg/kg	0.0634	0.0640	79.2	31.9-130	1.04	20	L793392-01	WG821136
Acenaphthylene	mg/kg	0.0649	0.0661	81.2	33.7-129	1.77	20	L793392-01	WG821136
Anthracene	mg/kg	0.0761	0.0771	95.1	26.5-141	1.29	21.2	L793392-01	WG821136
Benzo(a)anthracene	mg/kg	0.0814	0.0689	99.7	18.3-136	16.6	24.6	L793392-01	WG821136
Benzo(a)pyrene	mg/kg	0.0706	0.0698	88.2	16.9-135	1.08	25.2	L793392-01	WG821136
Benzo(b)fluoranthene	mg/kg	0.0611	0.0588	76.3	10-134	3.79	30.9	L793392-01	WG821136
Benzo(g,h,i)perylene	mg/kg	0.0572	0.0572	70.7	14.1-140	0.0100	25.5	L793392-01	WG821136
Benzo(k)fluoranthene	mg/kg	0.0673	0.0726	84.1	18.2-138	7.66	25.6	L793392-01	WG821136
Chrysene	mg/kg	0.128	0.0798	149.*	17.1-145	46.7*	24.2	L793392-01	WG821136
Dibenz(a,h)anthracene	mg/kg	0.0655	0.0665	81.8	18.5-138	1.58	24.3	L793392-01	WG821136
Fluoranthene	mg/kg	0.0701	0.0671	87.7	15.4-144	4.42	27.1	L793392-01	WG821136
Fluorene	mg/kg	0.0638	0.0641	79.7	23.5-136	0.470	20	L793392-01	WG821136
Indeno(1,2,3-cd)pyrene	mg/kg	0.0617	0.0628	77.2	14.5-142	1.67	25.8	L793392-01	WG821136
Naphthalene	mg/kg	0.0646	0.0676	79.9	29.2-128	4.57	20	L793392-01	WG821136
Phenanthrene	mg/kg	0.0616	0.0617	77.0	20.1-134	0.270	23.6	L793392-01	WG821136
Pyrene	mg/kg	0.0727	0.0577	89.9	11-148	23.1	26.1	L793392-01	WG821136
2-Fluorobiphenyl				74.50	40.6-122				WG821136
Nitrobenzene-d5				93.00	22.1-146				WG821136
p-Terphenyl-d14				64.60	32.2-131				WG821136
C10-C28 Diesel Range	mg/kg	53.9	52.2	89.1	50-100	3.18	20	L793460-06	WG821695
o-Terphenyl				87.40	50-150				WG821695

Batch number /Run number / Sample number cross reference

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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October 14, 2015

WG821213: R3084631: L793788-01 02 03 04 05 06
WG821135: R3084645: L793788-01 02 03 04 05
WG821245: R3084689: L793788-01 02 04 05 06
WG821695: R3085117 R3085262: L793788-03
WG821136: R3085120 R3085123: L793788-06

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
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October 14, 2015

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

Report Summary

Saturday October 31, 2015

Report Number: L796973

Samples Received: 10/27/15

Client Project:

Description: Pit Reclamation

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01,1461-02, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation
Sample ID : I-31 P14
Collected By : DK Nicholson
Collection Date : 10/24/15 11:50

ESC Sample # : L796973-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	10/30/15	1
Chromium, Trivalent	40.2	2.00	mg/kg	Calc.	10/30/15	1
ORP	164.		mV	2580 B-2011	10/30/15	1
pH	8.33	0.100	su	9045D	10/28/15	1
Sodium Adsorption Ratio	5.17			Calc	10/29/15	1
Specific Conductance	902.		umhos/cm	9050AMod	10/30/15	1
Mercury	BDL	0.0200	mg/kg	7471A	10/28/15	1
Arsenic	7.18	2.00	mg/kg	6010B	10/29/15	1
Barium	282.	0.500	mg/kg	6010B	10/29/15	1
Boron	BDL	10.0	mg/kg	6010B	10/29/15	1
Cadmium	BDL	0.500	mg/kg	6010B	10/29/15	1
Chromium	40.2	1.00	mg/kg	6010B	10/29/15	1
Copper	18.1	2.00	mg/kg	6010B	10/29/15	1
Lead	14.7	0.500	mg/kg	6010B	10/29/15	1
Nickel	24.1	2.00	mg/kg	6010B	10/29/15	1
Selenium	BDL	2.00	mg/kg	6010B	10/29/15	1
Silver	BDL	1.00	mg/kg	6010B	10/29/15	1
Zinc	50.1	5.00	mg/kg	6010B	10/29/15	1
Benzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/28/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/28/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	10/28/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.7		% Rec.	8015	10/28/15	1
a,a,a-Trifluorotoluene(PID)	99.6		% Rec.	8021	10/28/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	200.	4.00	mg/kg	8015	10/28/15	1
C28-C40 Oil Range	25.1	4.00	mg/kg	8015	10/28/15	1
Surrogate Recovery						
o-Terphenyl	45.9		% Rec.	8015	10/28/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0106	0.00600	mg/kg	8270C-SIM	10/29/15	1
Acenaphthene	0.0202	0.00600	mg/kg	8270C-SIM	10/29/15	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L796973-01 (PH) - 8.33 at 23.6c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation
Sample ID : I-31 P14
Collected By : DK Nicholson
Collection Date : 10/24/15 11:50

ESC Sample # : L796973-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)anthracene	0.0116	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)pyrene	0.00984	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(b)fluoranthene	0.0177	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(g,h,i)perylene	0.0113	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Chrysene	0.0196	0.00600	mg/kg	8270C-SIM	10/29/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluoranthene	0.0212	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluorene	0.0210	0.00600	mg/kg	8270C-SIM	10/29/15	1
Indeno(1,2,3-cd)pyrene	0.00662	0.00600	mg/kg	8270C-SIM	10/29/15	1
Naphthalene	0.0850	0.0200	mg/kg	8270C-SIM	10/29/15	1
Phenanthrene	0.0646	0.00600	mg/kg	8270C-SIM	10/29/15	1
Pyrene	0.0713	0.00600	mg/kg	8270C-SIM	10/29/15	1
1-Methylnaphthalene	0.105	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Methylnaphthalene	0.184	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/29/15	1
Surrogate Recovery						
p-Terphenyl-d14	82.6		% Rec.	8270C-SIM	10/29/15	1
Nitrobenzene-d5	117.		% Rec.	8270C-SIM	10/29/15	1
2-Fluorobiphenyl	85.9		% Rec.	8270C-SIM	10/29/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 10/31/15 08:36 Printed: 10/31/15 08:37
L796973-01 (PH) - 8.33 at 23.6c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation
Sample ID : I-31 P15
Collected By : DK Nicholson
Collection Date : 10/24/15 12:00

ESC Sample # : L796973-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	10/30/15	1
Chromium, Trivalent	28.0	2.00	mg/kg	Calc.	10/30/15	1
ORP	153.		mV	2580 B-2011	10/30/15	1
pH	8.10	0.100	su	9045D	10/28/15	1
Sodium Adsorption Ratio	5.65			Calc	10/29/15	1
Specific Conductance	1680		umhos/cm	9050AMod	10/30/15	1
Mercury	BDL	0.0200	mg/kg	7471A	10/28/15	1
Arsenic	4.48	2.00	mg/kg	6010B	10/29/15	1
Barium	249.	0.500	mg/kg	6010B	10/29/15	1
Boron	10.4	10.0	mg/kg	6010B	10/29/15	1
Cadmium	BDL	0.500	mg/kg	6010B	10/29/15	1
Chromium	28.0	1.00	mg/kg	6010B	10/29/15	1
Copper	17.9	2.00	mg/kg	6010B	10/29/15	1
Lead	11.7	0.500	mg/kg	6010B	10/29/15	1
Nickel	17.9	2.00	mg/kg	6010B	10/29/15	1
Selenium	BDL	2.00	mg/kg	6010B	10/29/15	1
Silver	BDL	1.00	mg/kg	6010B	10/29/15	1
Zinc	37.7	5.00	mg/kg	6010B	10/29/15	1
Benzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/28/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/28/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	10/28/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.6		% Rec.	8015	10/28/15	1
a,a,a-Trifluorotoluene(PID)	99.8		% Rec.	8021	10/28/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	713.	20.0	mg/kg	8015	10/28/15	5
C28-C40 Oil Range	105.	4.00	mg/kg	8015	10/28/15	1
Surrogate Recovery						
o-Terphenyl	86.1		% Rec.	8015	10/28/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0138	0.00600	mg/kg	8270C-SIM	10/29/15	1
Acenaphthene	0.0294	0.00600	mg/kg	8270C-SIM	10/29/15	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L796973-02 (PH) - 8.10 at 23.6c



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REPORT OF ANALYSIS

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October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation

Sample ID : I-31 P15

Collected By : DK Nicholson
Collection Date : 10/24/15 12:00

ESC Sample # : L796973-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Acenaphthylene	0.0477	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)anthracene	0.0275	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)pyrene	0.0452	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(b)fluoranthene	0.0784	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(g,h,i)perylene	0.0454	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(k)fluoranthene	0.0177	0.00600	mg/kg	8270C-SIM	10/29/15	1
Chrysene	0.0310	0.00600	mg/kg	8270C-SIM	10/29/15	1
Dibenz(a,h)anthracene	0.0139	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluoranthene	0.0375	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluorene	0.0195	0.00600	mg/kg	8270C-SIM	10/29/15	1
Indeno(1,2,3-cd)pyrene	0.0294	0.00600	mg/kg	8270C-SIM	10/29/15	1
Naphthalene	0.155	0.0200	mg/kg	8270C-SIM	10/29/15	1
Phenanthrene	0.0948	0.00600	mg/kg	8270C-SIM	10/29/15	1
Pyrene	0.208	0.00600	mg/kg	8270C-SIM	10/29/15	1
1-Methylnaphthalene	0.182	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Methylnaphthalene	0.370	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/29/15	1
Surrogate Recovery						
p-Terphenyl-d14	69.8		% Rec.	8270C-SIM	10/29/15	1
Nitrobenzene-d5	110.		% Rec.	8270C-SIM	10/29/15	1
2-Fluorobiphenyl	60.2		% Rec.	8270C-SIM	10/29/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L796973-02 (PH) - 8.10 at 23.6c



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation
Sample ID : I-31 P16
Collected By : DK Nicholson
Collection Date : 10/24/15 12:10

ESC Sample # : L796973-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	10/30/15	1
Chromium, Trivalent	44.5	2.00	mg/kg	Calc.	10/30/15	1
ORP	139.		mV	2580 B-2011	10/30/15	1
pH	8.49	0.100	su	9045D	10/28/15	1
Sodium Adsorption Ratio	5.82			Calc	10/29/15	1
Specific Conductance	797.		umhos/cm	9050AMod	10/30/15	1
Mercury	BDL	0.0200	mg/kg	7471A	10/28/15	1
Arsenic	6.41	2.00	mg/kg	6010B	10/29/15	1
Barium	336.	0.500	mg/kg	6010B	10/29/15	1
Boron	BDL	10.0	mg/kg	6010B	10/29/15	1
Cadmium	BDL	0.500	mg/kg	6010B	10/29/15	1
Chromium	44.5	1.00	mg/kg	6010B	10/29/15	1
Copper	20.4	2.00	mg/kg	6010B	10/29/15	1
Lead	14.4	0.500	mg/kg	6010B	10/29/15	1
Nickel	26.0	2.00	mg/kg	6010B	10/29/15	1
Selenium	BDL	2.00	mg/kg	6010B	10/29/15	1
Silver	BDL	1.00	mg/kg	6010B	10/29/15	1
Zinc	49.7	5.00	mg/kg	6010B	10/29/15	1
Benzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Toluene	BDL	0.0250	mg/kg	8021	10/28/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	10/28/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	10/28/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	10/28/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.7		% Rec.	8015	10/28/15	1
a,a,a-Trifluorotoluene(PID)	99.7		% Rec.	8021	10/28/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	226.	4.00	mg/kg	8015	10/28/15	1
C28-C40 Oil Range	33.6	4.00	mg/kg	8015	10/28/15	1
Surrogate Recovery						
o-Terphenyl	42.7		% Rec.	8015	10/28/15	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.0134	0.00600	mg/kg	8270C-SIM	10/29/15	1
Acenaphthene	0.0257	0.00600	mg/kg	8270C-SIM	10/29/15	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L796973-03 (PH) - 8.49 at 23.6c



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October 31, 2015

Date Received : October 27, 2015
Description : Pit Reclamation
Sample ID : I-31 P16
Collected By : DK Nicholson
Collection Date : 10/24/15 12:10

ESC Sample # : L796973-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)anthracene	0.0143	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(a)pyrene	0.0114	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(b)fluoranthene	0.0208	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(g,h,i)perylene	0.0131	0.00600	mg/kg	8270C-SIM	10/29/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Chrysene	0.0260	0.00600	mg/kg	8270C-SIM	10/29/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluoranthene	0.0262	0.00600	mg/kg	8270C-SIM	10/29/15	1
Fluorene	0.0288	0.00600	mg/kg	8270C-SIM	10/29/15	1
Indeno(1,2,3-cd)pyrene	0.00768	0.00600	mg/kg	8270C-SIM	10/29/15	1
Naphthalene	0.126	0.0200	mg/kg	8270C-SIM	10/29/15	1
Phenanthrene	0.0766	0.00600	mg/kg	8270C-SIM	10/29/15	1
Pyrene	0.0958	0.00600	mg/kg	8270C-SIM	10/29/15	1
1-Methylnaphthalene	0.146	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Methylnaphthalene	0.262	0.0200	mg/kg	8270C-SIM	10/29/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	10/29/15	1
Surrogate Recovery						
p-Terphenyl-d14	81.3		% Rec.	8270C-SIM	10/29/15	1
Nitrobenzene-d5	94.0		% Rec.	8270C-SIM	10/29/15	1
2-Fluorobiphenyl	82.3		% Rec.	8270C-SIM	10/29/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 10/31/15 08:36 Printed: 10/31/15 08:37
L796973-03 (PH) - 8.49 at 23.6c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L796973-01	WG825075	SAMP	o-Terphenyl	R3088626	J2
L796973-03	WG825075	SAMP	o-Terphenyl	R3088626	J2

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.



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Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Mercury	< .02	mg/kg			WG825012	10/28/15 17:09
C10-C28 Diesel Range	< 4	mg/kg			WG825075	10/28/15 13:14
C28-C40 Oil Range	< 4	mg/kg			WG825075	10/28/15 13:14
o-Terphenyl		% Rec.	97.40	50-150	WG825075	10/28/15 13:14
Benzene	< .0005	mg/kg			WG825041	10/28/15 14:02
Ethylbenzene	< .0005	mg/kg			WG825041	10/28/15 14:02
Toluene	< .005	mg/kg			WG825041	10/28/15 14:02
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG825041	10/28/15 14:02
Total Xylene	< .0015	mg/kg			WG825041	10/28/15 14:02
a,a,a-Trifluorotoluene(FID)		% Rec.	98.40	59-128	WG825041	10/28/15 14:02
a,a,a-Trifluorotoluene(PID)		% Rec.	101.0	54-144	WG825041	10/28/15 14:02
Arsenic	< 2	mg/kg			WG825158	10/29/15 14:51
Barium	< .5	mg/kg			WG825158	10/29/15 14:51
Boron	< 10	mg/kg			WG825158	10/29/15 14:51
Cadmium	< .5	mg/kg			WG825158	10/29/15 14:51
Chromium	< 1	mg/kg			WG825158	10/29/15 14:51
Copper	< 2	mg/kg			WG825158	10/29/15 14:51
Lead	< .5	mg/kg			WG825158	10/29/15 14:51
Nickel	< 2	mg/kg			WG825158	10/29/15 14:51
Selenium	< 2	mg/kg			WG825158	10/29/15 14:51
Silver	< 1	mg/kg			WG825158	10/29/15 14:51
Zinc	< 5	mg/kg			WG825158	10/29/15 14:51
1-Methylnaphthalene	< .02	mg/kg			WG824993	10/29/15 10:59
2-Chloronaphthalene	< .02	mg/kg			WG824993	10/29/15 10:59
2-Methylnaphthalene	< .02	mg/kg			WG824993	10/29/15 10:59
Acenaphthene	< .006	mg/kg			WG824993	10/29/15 10:59
Acenaphthylene	< .006	mg/kg			WG824993	10/29/15 10:59
Anthracene	< .006	mg/kg			WG824993	10/29/15 10:59
Benzo(a)anthracene	< .006	mg/kg			WG824993	10/29/15 10:59
Benzo(a)pyrene	< .006	mg/kg			WG824993	10/29/15 10:59
Benzo(b)fluoranthene	< .006	mg/kg			WG824993	10/29/15 10:59
Benzo(g,h,i)perylene	< .006	mg/kg			WG824993	10/29/15 10:59
Benzo(k)fluoranthene	< .006	mg/kg			WG824993	10/29/15 10:59
Chrysene	< .006	mg/kg			WG824993	10/29/15 10:59
Dibenz(a,h)anthracene	< .006	mg/kg			WG824993	10/29/15 10:59
Fluoranthene	< .006	mg/kg			WG824993	10/29/15 10:59
Fluorene	< .006	mg/kg			WG824993	10/29/15 10:59
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG824993	10/29/15 10:59
Naphthalene	< .02	mg/kg			WG824993	10/29/15 10:59
Phenanthrene	< .006	mg/kg			WG824993	10/29/15 10:59
Pyrene	< .006	mg/kg			WG824993	10/29/15 10:59
2-Fluorobiphenyl		% Rec.	89.40	40.6-122	WG824993	10/29/15 10:59
Nitrobenzene-d5		% Rec.	106.0	22.1-146	WG824993	10/29/15 10:59
p-Terphenyl-d14		% Rec.	78.20	32.2-131	WG824993	10/29/15 10:59
Chromium,Hexavalent	< 2	mg/kg			WG825105	10/30/15 10:15
Specific Conductance	1.32	umhos/cm			WG825491	10/30/15 16:32

* Performance of this Analyte is outside of established criteria.

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October 31, 2015

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
pH	su	7.01	7.01	0.00	1	L796726-01	WG825063
pH	su	8.29	8.29	0.00	1	L796973-04	WG825063
Chromium,Hexavalent	mg/kg	0.00	0.00	0.00	20	L796971-02	WG825105
ORP	mV	100.	101.	0.995	20	L796473-08	WG825058
ORP	mV	141.	141.	0.00	20	L796973-04	WG825058
Specific Conductance	umhos/cm	902.	902.	0.00	20	L796973-01	WG825491
Specific Conductance	umhos/cm	1170	1160	0.858	20	L796973-04	WG825491

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
pH	su	6.72	6.72	100.	98.2-101.8	WG825063
Mercury	mg/kg	.3	0.284	95.0	80-120	WG825012
C10-C28 Diesel Range	mg/kg	60	55.6	92.7	50-100	WG825075
o-Terphenyl				104.0	50-150	WG825075
Benzene	mg/kg	.05	0.0406	81.3	70-130	WG825041
Ethylbenzene	mg/kg	.05	0.0443	88.5	70-130	WG825041
Toluene	mg/kg	.05	0.0435	87.0	70-130	WG825041
Total Xylene	mg/kg	.15	0.139	92.5	70-130	WG825041
a,a,a-Trifluorotoluene(FID)				98.30	59-128	WG825041
a,a,a-Trifluorotoluene(PID)				102.0	54-144	WG825041
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.58	101.	63.5-137	WG825041
a,a,a-Trifluorotoluene(FID)				102.0	59-128	WG825041
a,a,a-Trifluorotoluene(PID)				104.0	54-144	WG825041
Arsenic	mg/kg	100	100.	100.	80-120	WG825158
Barium	mg/kg	100	101.	101.	80-120	WG825158
Boron	mg/kg	100	106.	106.	80-120	WG825158
Cadmium	mg/kg	100	101.	101.	80-120	WG825158
Chromium	mg/kg	100	108.	108.	80-120	WG825158
Copper	mg/kg	100	112.	112.	80-120	WG825158
Lead	mg/kg	100	103.	103.	80-120	WG825158
Nickel	mg/kg	100	102.	102.	80-120	WG825158
Selenium	mg/kg	100	104.	104.	80-120	WG825158
Silver	mg/kg	100	109.	109.	80-120	WG825158
Zinc	mg/kg	100	97.9	98.0	80-120	WG825158
1-Methylnaphthalene	mg/kg	.08	0.0796	99.5	50.6-122	WG824993
2-Chloronaphthalene	mg/kg	.08	0.0701	87.6	53.9-121	WG824993
2-Methylnaphthalene	mg/kg	.08	0.0790	98.8	50.4-120	WG824993
Acenaphthene	mg/kg	.08	0.0700	87.5	52.4-120	WG824993
Acenaphthylene	mg/kg	.08	0.0684	85.6	49.6-120	WG824993
Anthracene	mg/kg	.08	0.0716	89.6	50.3-130	WG824993
Benzo(a)anthracene	mg/kg	.08	0.0680	85.0	46.7-125	WG824993
Benzo(a)pyrene	mg/kg	.08	0.0659	82.4	42.3-119	WG824993
Benzo(b)fluoranthene	mg/kg	.08	0.0620	77.5	43.6-124	WG824993

* Performance of this Analyte is outside of established criteria.

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzo(g,h,i)perylene	mg/kg	.08	0.0620	77.5	45.1-132	WG824993
Benzo(k)fluoranthene	mg/kg	.08	0.0647	80.9	46.1-131	WG824993
Chrysene	mg/kg	.08	0.0744	93.1	49.5-131	WG824993
Dibenz(a,h)anthracene	mg/kg	.08	0.0569	71.1	44.8-133	WG824993
Fluoranthene	mg/kg	.08	0.0848	106.	49.3-128	WG824993
Fluorene	mg/kg	.08	0.0731	91.4	50.6-121	WG824993
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0608	76.0	46.1-135	WG824993
Naphthalene	mg/kg	.08	0.0741	92.6	49.6-115	WG824993
Phenanthrene	mg/kg	.08	0.0653	81.6	48.8-121	WG824993
Pyrene	mg/kg	.08	0.0630	78.7	44.7-130	WG824993
2-Fluorobiphenyl				87.20	40.6-122	WG824993
Nitrobenzene-d5				107.0	22.1-146	WG824993
p-Terphenyl-d14				69.50	32.2-131	WG824993
Chromium,Hexavalent	mg/kg	59.8	51.8	86.6	80-120	WG825105
ORP	mV	100	102.	102.	90-110	WG825058
Specific Conductance	umhos/cm	915	925.	101.	90-110	WG825491

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
pH	su	6.72	6.72	100.	98.2-101.8	0.00	1	WG825063
Mercury	mg/kg	0.276	0.284	92.0	80-120	3.00	20	WG825012
C10-C28 Diesel Range	mg/kg	54.6	55.6	91.0	50-100	1.77	20	WG825075
o-Terphenyl				97.50	50-150			WG825075
Benzene	mg/kg	0.0415	0.0406	83.0	70-130	2.05	20	WG825041
Ethylbenzene	mg/kg	0.0447	0.0443	89.0	70-130	0.890	20	WG825041
Toluene	mg/kg	0.0439	0.0435	88.0	70-130	1.04	20	WG825041
Total Xylene	mg/kg	0.140	0.139	93.0	70-130	0.680	20	WG825041
a,a,a-Trifluorotoluene(FID)				98.30	59-128			WG825041
a,a,a-Trifluorotoluene(PID)				101.0	54-144			WG825041
TPH (GC/FID) Low Fraction	mg/kg	5.68	5.58	103.	63.5-137	1.77	20	WG825041
a,a,a-Trifluorotoluene(FID)				99.30	59-128			WG825041
a,a,a-Trifluorotoluene(PID)				103.0	54-144			WG825041
Arsenic	mg/kg	96.3	100.	96.0	80-120	4.00	20	WG825158
Barium	mg/kg	97.3	101.	97.0	80-120	4.00	20	WG825158
Boron	mg/kg	101.	106.	101.	80-120	5.00	20	WG825158
Cadmium	mg/kg	96.3	101.	96.0	80-120	4.00	20	WG825158
Chromium	mg/kg	103.	108.	103.	80-120	5.00	20	WG825158
Copper	mg/kg	107.	112.	107.	80-120	4.00	20	WG825158
Lead	mg/kg	99.3	103.	99.0	80-120	4.00	20	WG825158
Nickel	mg/kg	98.0	102.	98.0	80-120	4.00	20	WG825158
Selenium	mg/kg	99.8	104.	100.	80-120	4.00	20	WG825158
Silver	mg/kg	104.	109.	104.	80-120	5.00	20	WG825158
Zinc	mg/kg	93.8	97.9	94.0	80-120	4.00	20	WG825158

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October 31, 2015

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
1-Methylnaphthalene	mg/kg	0.0805	0.0796	101.	50.6-122	1.08	20	WG824993
2-Chloronaphthalene	mg/kg	0.0685	0.0701	86.0	53.9-121	2.25	20	WG824993
2-Methylnaphthalene	mg/kg	0.0813	0.0790	102.	50.4-120	2.87	20	WG824993
Acenaphthene	mg/kg	0.0712	0.0700	89.0	52.4-120	1.78	20	WG824993
Acenaphthylene	mg/kg	0.0688	0.0684	86.0	49.6-120	0.520	20	WG824993
Anthracene	mg/kg	0.0714	0.0716	89.0	50.3-130	0.320	20	WG824993
Benzo(a)anthracene	mg/kg	0.0685	0.0680	86.0	46.7-125	0.750	20	WG824993
Benzo(a)pyrene	mg/kg	0.0628	0.0659	78.0	42.3-119	4.78	20	WG824993
Benzo(b)fluoranthene	mg/kg	0.0614	0.0620	77.0	43.6-124	0.910	20	WG824993
Benzo(g,h,i)perylene	mg/kg	0.0619	0.0620	77.0	45.1-132	0.150	20	WG824993
Benzo(k)fluoranthene	mg/kg	0.0672	0.0647	84.0	46.1-131	3.86	20	WG824993
Chrysene	mg/kg	0.0752	0.0744	94.0	49.5-131	0.970	20	WG824993
Dibenz(a,h)anthracene	mg/kg	0.0576	0.0569	72.0	44.8-133	1.18	20	WG824993
Fluoranthene	mg/kg	0.0906	0.0848	113.	49.3-128	6.60	20	WG824993
Fluorene	mg/kg	0.0703	0.0731	88.0	50.6-121	3.99	20	WG824993
Indeno(1,2,3-cd)pyrene	mg/kg	0.0617	0.0608	77.0	46.1-135	1.45	20	WG824993
Naphthalene	mg/kg	0.0749	0.0741	94.0	49.6-115	1.10	20	WG824993
Phenanthrene	mg/kg	0.0658	0.0653	82.0	48.8-121	0.780	20	WG824993
Pyrene	mg/kg	0.0667	0.0630	83.0	44.7-130	5.80	20	WG824993
2-Fluorobiphenyl				90.40	40.6-122			WG824993
Nitrobenzene-d5				126.0	22.1-146			WG824993
p-Terphenyl-d14				79.60	32.2-131			WG824993
Chromium, Hexavalent	mg/kg	52.0	51.8	87.0	80-120	0.385	20	WG825105
ORP	mV	102.	102.	102.	90-110	0.00	20	WG825058
Specific Conductance	umhos/	925.	925.	101.	90-110	0.00	20	WG825491

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Benzene	mg/kg	0.175	0.000101	.05	69.8	49.7-127	L796394-02	WG825041
Ethylbenzene	mg/kg	0.184	0.0000775	.05	73.7	40.8-141	L796394-02	WG825041
Toluene	mg/kg	0.183	0.000199	.05	73.1	49.8-132	L796394-02	WG825041
Total Xylene	mg/kg	0.575	0.000516	.15	76.6	41.2-140	L796394-02	WG825041
a,a,a-Trifluorotoluene(FID)					97.40	59-128		WG825041
a,a,a-Trifluorotoluene(PID)					100.0	54-144		WG825041
TPH (GC/FID) Low Fraction	mg/kg	16.8	0.00	5.5	61.1	28.5-138	L796394-02	WG825041
a,a,a-Trifluorotoluene(FID)					95.90	59-128		WG825041
a,a,a-Trifluorotoluene(PID)					103.0	54-144		WG825041
Arsenic	mg/kg	97.1	1.69	100	95.0	75-125	L796631-11	WG825158
Barium	mg/kg	110.	7.10	100	102.	75-125	L796631-11	WG825158
Boron	mg/kg	100.	0.496	100	100.	75-125	L796631-11	WG825158
Cadmium	mg/kg	97.7	0.0155	100	98.0	75-125	L796631-11	WG825158
Chromium	mg/kg	121.	11.7	100	109.	75-125	L796631-11	WG825158
Copper	mg/kg	110.	2.71	100	108.	75-125	L796631-11	WG825158
Lead	mg/kg	109.	4.47	100	104.	75-125	L796631-11	WG825158
Nickel	mg/kg	106.	1.96	100	104.	75-125	L796631-11	WG825158
Selenium	mg/kg	101.	1.23	100	100.	75-125	L796631-11	WG825158
Silver	mg/kg	109.	-0.0628	100	109.	75-125	L796631-11	WG825158
Zinc	mg/kg	100.	4.02	100	96.0	75-125	L796631-11	WG825158

* Performance of this Analyte is outside of established criteria.

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Est. 1970

Quality Assurance Report
Level II

October 31, 2015

L796973

Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
1-Methylnaphthalene	mg/kg	0.0803	0.00	.08	100.	28.4-137	L796863-01	WG824993
2-Chloronaphthalene	mg/kg	0.0686	0.00	.08	85.8	38.6-126	L796863-01	WG824993
2-Methylnaphthalene	mg/kg	0.0797	0.00	.08	99.7	26.6-137	L796863-01	WG824993
Acenaphthene	mg/kg	0.0690	0.00	.08	86.3	31.9-130	L796863-01	WG824993
Acenaphthylene	mg/kg	0.0656	0.00	.08	82.0	33.7-129	L796863-01	WG824993
Anthracene	mg/kg	0.0686	0.00	.08	85.7	26.5-141	L796863-01	WG824993
Benzo(a)anthracene	mg/kg	0.0687	0.00307	.08	82.1	18.3-136	L796863-01	WG824993
Benzo(a)pyrene	mg/kg	0.0662	0.00661	.08	74.4	16.9-135	L796863-01	WG824993
Benzo(b)fluoranthene	mg/kg	0.0716	0.0127	.08	73.6	10-134	L796863-01	WG824993
Benzo(g,h,i)perylene	mg/kg	0.0722	0.00907	.08	78.9	14.1-140	L796863-01	WG824993
Benzo(k)fluoranthene	mg/kg	0.0618	0.00411	.08	72.2	18.2-138	L796863-01	WG824993
Chrysene	mg/kg	0.0760	0.00971	.08	82.9	17.1-145	L796863-01	WG824993
Dibenz(a,h)anthracene	mg/kg	0.0641	0.00186	.08	77.8	18.5-138	L796863-01	WG824993
Fluoranthene	mg/kg	0.0911	0.0143	.08	96.0	15.4-144	L796863-01	WG824993
Fluorene	mg/kg	0.0701	0.00	.08	87.6	23.5-136	L796863-01	WG824993
Indeno(1,2,3-cd)pyrene	mg/kg	0.0684	0.00650	.08	77.4	14.5-142	L796863-01	WG824993
Naphthalene	mg/kg	0.0742	0.00163	.08	90.7	29.2-128	L796863-01	WG824993
Phenanthrene	mg/kg	0.0655	0.00302	.08	78.2	20.1-134	L796863-01	WG824993
Pyrene	mg/kg	0.0730	0.0104	.08	78.3	11-148	L796863-01	WG824993
2-Fluorobiphenyl					81.30	40.6-122		WG824993
Nitrobenzene-d5					98.80	22.1-146		WG824993
p-Terphenyl-d14					67.70	32.2-131		WG824993

Chromium, Hexavalent	mg/kg	8.04	0.00	20	40.2*	75-125	L796971-02	WG825105
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Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Benzene	mg/kg	0.185	0.175	73.9	49.7-127	5.68	23.5	L796394-02	WG825041
Ethylbenzene	mg/kg	0.197	0.184	78.6	40.8-141	6.38	23.8	L796394-02	WG825041
Toluene	mg/kg	0.195	0.183	78.0	49.8-132	6.43	23.5	L796394-02	WG825041
Total Xylene	mg/kg	0.612	0.575	81.5	41.2-140	6.21	23.7	L796394-02	WG825041
a,a,a-Trifluorotoluene(FID)				97.60	59-128				WG825041
a,a,a-Trifluorotoluene(PID)				101.0	54-144				WG825041
TPH (GC/FID) Low Fraction	mg/kg	20.5	16.8	74.7	28.5-138	20.1	23.6	L796394-02	WG825041
a,a,a-Trifluorotoluene(FID)				97.30	59-128				WG825041
a,a,a-Trifluorotoluene(PID)				103.0	54-144				WG825041

Arsenic	mg/kg	94.5	97.1	92.8	75-125	3.00	20	L796631-11	WG825158
Barium	mg/kg	105.	110.	98.4	75-125	4.00	20	L796631-11	WG825158
Boron	mg/kg	98.5	100.	98.0	75-125	2.00	20	L796631-11	WG825158
Cadmium	mg/kg	94.5	97.7	94.5	75-125	3.00	20	L796631-11	WG825158
Chromium	mg/kg	117.	121.	105.	75-125	3.00	20	L796631-11	WG825158
Copper	mg/kg	109.	110.	106.	75-125	2.00	20	L796631-11	WG825158
Lead	mg/kg	105.	109.	100.	75-125	4.00	20	L796631-11	WG825158
Nickel	mg/kg	102.	106.	99.7	75-125	4.00	20	L796631-11	WG825158
Selenium	mg/kg	97.8	101.	96.6	75-125	3.00	20	L796631-11	WG825158
Silver	mg/kg	105.	109.	105.	75-125	3.00	20	L796631-11	WG825158
Zinc	mg/kg	96.8	100.	92.7	75-125	4.00	20	L796631-11	WG825158

1-Methylnaphthalene	mg/kg	0.0799	0.0803	99.9	28.4-137	0.430	20	L796863-01	WG824993
2-Chloronaphthalene	mg/kg	0.0677	0.0686	84.6	38.6-126	1.40	20	L796863-01	WG824993
2-Methylnaphthalene	mg/kg	0.0788	0.0797	98.5	26.6-137	1.22	20	L796863-01	WG824993
Acenaphthene	mg/kg	0.0682	0.0690	85.2	31.9-130	1.25	20	L796863-01	WG824993
Acenaphthylene	mg/kg	0.0649	0.0656	81.1	33.7-129	1.13	20	L796863-01	WG824993

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



YOUR LAB OF CHOICE

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Quality Assurance Report
Level II

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Est. 1970

October 31, 2015

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref	Samp	Batch
			Ref	%Rec						
Anthracene	mg/kg	0.0683	0.0686	85.3	26.5-141	0.470	21.2	L796863-01	WG824993	
Benzo(a)anthracene	mg/kg	0.0688	0.0687	82.1	18.3-136	0.0700	24.6	L796863-01	WG824993	
Benzo(a)pyrene	mg/kg	0.0627	0.0662	70.1	16.9-135	5.32	25.2	L796863-01	WG824993	
Benzo(b)fluoranthene	mg/kg	0.0691	0.0716	70.5	10-134	3.49	30.9	L796863-01	WG824993	
Benzo(g,h,i)perylene	mg/kg	0.0707	0.0722	77.0	14.1-140	2.09	25.5	L796863-01	WG824993	
Benzo(k)fluoranthene	mg/kg	0.0594	0.0618	69.0	18.2-138	4.09	25.6	L796863-01	WG824993	
Chrysene	mg/kg	0.0763	0.0760	83.2	17.1-145	0.360	24.2	L796863-01	WG824993	
Dibenz(a,h)anthracene	mg/kg	0.0638	0.0641	77.4	18.5-138	0.460	24.3	L796863-01	WG824993	
Fluoranthene	mg/kg	0.0875	0.0911	91.5	15.4-144	4.03	27.1	L796863-01	WG824993	
Fluorene	mg/kg	0.0691	0.0701	86.3	23.5-136	1.44	20	L796863-01	WG824993	
Indeno(1,2,3-cd)pyrene	mg/kg	0.0679	0.0684	76.7	14.5-142	0.840	25.8	L796863-01	WG824993	
Naphthalene	mg/kg	0.0732	0.0742	89.4	29.2-128	1.33	20	L796863-01	WG824993	
Phenanthrene	mg/kg	0.0664	0.0655	79.2	20.1-134	1.30	23.6	L796863-01	WG824993	
Pyrene	mg/kg	0.0727	0.0730	77.9	11-148	0.430	26.1	L796863-01	WG824993	
2-Fluorobiphenyl				76.10	40.6-122				WG824993	
Nitrobenzene-d5				93.90	22.1-146				WG824993	
p-Terphenyl-d14				64.10	32.2-131				WG824993	
Chromium,Hexavalent	mg/kg	8.04	8.04	40.2*	75-125	0.00	20	L796971-02	WG825105	

Post Spike

Serial Dilution

Batch number /Run number / Sample number cross reference

WG825075: R3088626: L796973-01 02 03 04
WG825063: R3088638: L796973-01 02 03 04
WG825012: R3088657: L796973-01 02 03 04
WG825041: R3088766: L796973-01 02 03 04
WG825155: R3088945: L796973-01 02 03 04

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WG825158: R3089036: L796973-01 02 03 04
WG824993: R3089067: L796973-01 02 03 04
WG825105: R3089188: L796973-01 02 03 04
WG825058: R3089196: L796973-01 02 03 04
WG825491: R3089321: L796973-01 02 03 04

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
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The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

Report Summary

Tuesday November 17, 2015

Report Number: L800435

Samples Received: 11/12/15

Client Project:

Description: Pit Reclamation

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01,1461-02, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

November 17, 2015

Date Received : November 12, 2015
Description : Linn Energy Reclamation
Sample ID : I-31 P18
Collected By : David Cox
Collection Date : 11/09/15 13:40

ESC Sample # : L800435-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.00	mg/kg	3060A/7196A	11/14/15	1
ORP	152.		mV	2580 B-2011	11/14/15	1
pH	8.62	0.100	su	9045D	11/13/15	1
Sodium Adsorption Ratio	3.64			Calc	11/15/15	1
Specific Conductance	466.		umhos/cm	9050AMod	11/13/15	1
Mercury	BDL	0.0200	mg/kg	7471A	11/16/15	1
Arsenic	4.64	2.00	mg/kg	6010B	11/12/15	1
Barium	342.	0.500	mg/kg	6010B	11/12/15	1
Boron	BDL	10.0	mg/kg	6010B	11/12/15	1
Cadmium	BDL	0.500	mg/kg	6010B	11/12/15	1
Chromium	28.6	1.00	mg/kg	6010B	11/12/15	1
Copper	19.1	2.00	mg/kg	6010B	11/12/15	1
Lead	12.7	0.500	mg/kg	6010B	11/12/15	1
Nickel	20.9	2.00	mg/kg	6010B	11/12/15	1
Selenium	BDL	2.00	mg/kg	6010B	11/12/15	1
Silver	BDL	1.00	mg/kg	6010B	11/12/15	1
Zinc	49.9	5.00	mg/kg	6010B	11/12/15	1
Benzene	BDL	0.00250	mg/kg	8021	11/13/15	5
Toluene	BDL	0.0250	mg/kg	8021	11/13/15	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	11/13/15	5
Total Xylene	BDL	0.00750	mg/kg	8021	11/13/15	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	11/13/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.9		% Rec.	8015	11/13/15	1
a,a,a-Trifluorotoluene(PID)	100.		% Rec.	8021	11/13/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	125.	40.0	mg/kg	8015	11/13/15	10
C28-C40 Oil Range	BDL	40.0	mg/kg	8015	11/13/15	10
Surrogate Recovery						
o-Terphenyl	65.3		% Rec.	8015	11/13/15	10
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.00600	mg/kg	8270C-SIM	11/13/15	1
Acenaphthene	0.00810	0.00600	mg/kg	8270C-SIM	11/13/15	1
Acenaphthylene	BDL	0.00600	mg/kg	8270C-SIM	11/13/15	1
Benzo(a)anthracene	0.00696	0.00600	mg/kg	8270C-SIM	11/13/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

L800435-01 (DRORLA) - Cannot run at lower dilution due to viscosity of extract

L800435-01 (PH) - 8.62 at 23.1c



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REPORT OF ANALYSIS

Dave Nicholson
Linn Energy - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

November 17, 2015

Date Received : November 12, 2015
Description : Linn Energy Reclamation
Sample ID : I-31 P18
Collected By : David Cox
Collection Date : 11/09/15 13:40

ESC Sample # : L800435-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0123	0.00600	mg/kg	8270C-SIM	11/13/15	1
Benzo(b)fluoranthene	0.0209	0.00600	mg/kg	8270C-SIM	11/13/15	1
Benzo(g,h,i)perylene	0.0140	0.00600	mg/kg	8270C-SIM	11/13/15	1
Benzo(k)fluoranthene	BDL	0.00600	mg/kg	8270C-SIM	11/13/15	1
Chrysene	0.00860	0.00600	mg/kg	8270C-SIM	11/13/15	1
Dibenz(a,h)anthracene	BDL	0.00600	mg/kg	8270C-SIM	11/13/15	1
Fluoranthene	0.00776	0.00600	mg/kg	8270C-SIM	11/13/15	1
Fluorene	BDL	0.00600	mg/kg	8270C-SIM	11/13/15	1
Indeno(1,2,3-cd)pyrene	0.00821	0.00600	mg/kg	8270C-SIM	11/13/15	1
Naphthalene	0.0505	0.0200	mg/kg	8270C-SIM	11/13/15	1
Phenanthrene	0.0231	0.00600	mg/kg	8270C-SIM	11/13/15	1
Pyrene	0.0499	0.00600	mg/kg	8270C-SIM	11/13/15	1
1-Methylnaphthalene	0.0505	0.0200	mg/kg	8270C-SIM	11/13/15	1
2-Methylnaphthalene	0.0982	0.0200	mg/kg	8270C-SIM	11/13/15	1
2-Chloronaphthalene	BDL	0.0200	mg/kg	8270C-SIM	11/13/15	1
Surrogate Recovery						
p-Terphenyl-d14	74.7		% Rec.	8270C-SIM	11/13/15	1
Nitrobenzene-d5	98.2		% Rec.	8270C-SIM	11/13/15	1
2-Fluorobiphenyl	89.5		% Rec.	8270C-SIM	11/13/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 11/17/15 19:22 Printed: 11/17/15 19:23

L800435-01 (DRORLA) - Cannot run at lower dilution due to viscosity of extract

L800435-01 (PH) - 8.62 at 23.1c



YOUR LAB OF CHOICE

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Denver, CO 80202

Quality Assurance Report
Level II

L800435

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Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

November 17, 2015

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Arsenic	< 2	mg/kg			WG828564	11/12/15 19:35
Barium	< .5	mg/kg			WG828564	11/12/15 19:35
Boron	< 10	mg/kg			WG828564	11/12/15 19:35
Cadmium	< .5	mg/kg			WG828564	11/12/15 19:35
Chromium	< 1	mg/kg			WG828564	11/12/15 19:35
Copper	< 2	mg/kg			WG828564	11/12/15 19:35
Lead	< .5	mg/kg			WG828564	11/12/15 19:35
Nickel	< 2	mg/kg			WG828564	11/12/15 19:35
Selenium	< 2	mg/kg			WG828564	11/12/15 19:35
Silver	< 1	mg/kg			WG828564	11/12/15 19:35
Zinc	< 5	mg/kg			WG828564	11/12/15 19:35
1-Methylnaphthalene	< .02	mg/kg			WG828644	11/13/15 02:29
2-Chloronaphthalene	< .02	mg/kg			WG828644	11/13/15 02:29
2-Methylnaphthalene	< .02	mg/kg			WG828644	11/13/15 02:29
Acenaphthene	< .006	mg/kg			WG828644	11/13/15 02:29
Acenaphthylene	< .006	mg/kg			WG828644	11/13/15 02:29
Anthracene	< .006	mg/kg			WG828644	11/13/15 02:29
Benzo(a)anthracene	< .006	mg/kg			WG828644	11/13/15 02:29
Benzo(a)pyrene	< .006	mg/kg			WG828644	11/13/15 02:29
Benzo(b)fluoranthene	< .006	mg/kg			WG828644	11/13/15 02:29
Benzo(g,h,i)perylene	< .006	mg/kg			WG828644	11/13/15 02:29
Benzo(k)fluoranthene	< .006	mg/kg			WG828644	11/13/15 02:29
Chrysene	< .006	mg/kg			WG828644	11/13/15 02:29
Dibenz(a,h)anthracene	< .006	mg/kg			WG828644	11/13/15 02:29
Fluoranthene	< .006	mg/kg			WG828644	11/13/15 02:29
Fluorene	< .006	mg/kg			WG828644	11/13/15 02:29
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG828644	11/13/15 02:29
Naphthalene	< .02	mg/kg			WG828644	11/13/15 02:29
Phenanthrene	< .006	mg/kg			WG828644	11/13/15 02:29
Pyrene	< .006	mg/kg			WG828644	11/13/15 02:29
2-Fluorobiphenyl	% Rec.		84.00	40.6-122	WG828644	11/13/15 02:29
Nitrobenzene-d5	% Rec.		90.90	22.1-146	WG828644	11/13/15 02:29
p-Terphenyl-d14	% Rec.		66.40	32.2-131	WG828644	11/13/15 02:29
Specific Conductance	1.19	umhos/cm			WG828630	11/13/15 11:31
C10-C28 Diesel Range	< 4	mg/kg			WG828638	11/13/15 10:31
C28-C40 Oil Range	< 4	mg/kg			WG828638	11/13/15 10:31
o-Terphenyl	% Rec.		83.50	50-150	WG828638	11/13/15 10:31
Chromium,Hexavalent	< 2	mg/kg			WG828614	11/14/15 15:05
Mercury	< .02	mg/kg			WG829052	11/16/15 10:21
Benzene	< .0005	mg/kg			WG828555	11/12/15 22:48
Ethylbenzene	< .0005	mg/kg			WG828555	11/12/15 22:48
Toluene	< .005	mg/kg			WG828555	11/12/15 22:48
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG828555	11/12/15 22:48
Total Xylene	< .0015	mg/kg			WG828555	11/12/15 22:48
a,a,a-Trifluorotoluene(FID)	% Rec.		99.40	59-128	WG828555	11/12/15 22:48
a,a,a-Trifluorotoluene(PID)	% Rec.		102.0	54-144	WG828555	11/12/15 22:48

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Est. 1970

November 17, 2015

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Specific Conductance	umhos/cm	1320	1570	17.3	20	L799605-02	WG828630
Specific Conductance	umhos/cm	608.	650.	6.68	20	L799973-08	WG828630
pH	su	8.73	8.71	0.229	1	L800271-01	WG828573
Chromium, Hexavalent	mg/kg	0.00	0.00	0.00	20	L800481-05	WG828614
ORP	mV	106.	106.	0.00	20	L800677-01	WG828965

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Arsenic	mg/kg	100	98.2	98.0	80-120	WG828564
Barium	mg/kg	100	96.8	97.0	80-120	WG828564
Boron	mg/kg	100	98.8	99.0	80-120	WG828564
Cadmium	mg/kg	100	98.2	98.0	80-120	WG828564
Chromium	mg/kg	100	101.	101.	80-120	WG828564
Copper	mg/kg	100	101.	101.	80-120	WG828564
Lead	mg/kg	100	101.	101.	80-120	WG828564
Nickel	mg/kg	100	99.9	100.	80-120	WG828564
Selenium	mg/kg	100	101.	101.	80-120	WG828564
Silver	mg/kg	100	100.	100.	80-120	WG828564
Zinc	mg/kg	100	96.0	96.0	80-120	WG828564
1-Methylnaphthalene	mg/kg	.08	0.0624	78.1	50.6-122	WG828644
2-Chloronaphthalene	mg/kg	.08	0.0632	78.9	53.9-121	WG828644
2-Methylnaphthalene	mg/kg	.08	0.0624	77.9	50.4-120	WG828644
Acenaphthene	mg/kg	.08	0.0668	83.4	52.4-120	WG828644
Acenaphthylene	mg/kg	.08	0.0674	84.2	49.6-120	WG828644
Anthracene	mg/kg	.08	0.0586	73.2	50.3-130	WG828644
Benzo(a)anthracene	mg/kg	.08	0.0637	79.6	46.7-125	WG828644
Benzo(a)pyrene	mg/kg	.08	0.0540	67.5	42.3-119	WG828644
Benzo(b)fluoranthene	mg/kg	.08	0.0526	65.7	43.6-124	WG828644
Benzo(g,h,i)perylene	mg/kg	.08	0.0493	61.7	45.1-132	WG828644
Benzo(k)fluoranthene	mg/kg	.08	0.0568	71.0	46.1-131	WG828644
Chrysene	mg/kg	.08	0.0640	79.9	49.5-131	WG828644
Dibenz(a,h)anthracene	mg/kg	.08	0.0496	62.0	44.8-133	WG828644
Fluoranthene	mg/kg	.08	0.0628	78.5	49.3-128	WG828644
Fluorene	mg/kg	.08	0.0647	80.8	50.6-121	WG828644
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0496	62.0	46.1-135	WG828644
Naphthalene	mg/kg	.08	0.0572	71.5	49.6-115	WG828644
Phenanthrene	mg/kg	.08	0.0566	70.8	48.8-121	WG828644
Pyrene	mg/kg	.08	0.0636	79.5	44.7-130	WG828644
2-Fluorobiphenyl				83.90	40.6-122	WG828644
Nitrobenzene-d5				94.20	22.1-146	WG828644
p-Terphenyl-d14				70.00	32.2-131	WG828644

Specific Conductance	umhos/cm	915	942.	103.	90-110	WG828630
pH	su	6.72	6.71	99.9	98.5-101.5	WG828573
C10-C28 Diesel Range	mg/kg	60	51.1	85.1	50-100	WG828638
o-Terphenyl				84.60	50-150	WG828638

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November 17, 2015

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Chromium,Hexavalent	mg/kg	59.8	64.2	107.	80-120	WG828614
Mercury	mg/kg	.3	0.245	82.0	80-120	WG829052
Benzene	mg/kg	.05	0.0423	84.6	70-130	WG828555
Ethylbenzene	mg/kg	.05	0.0443	88.6	70-130	WG828555
Toluene	mg/kg	.05	0.0422	84.5	70-130	WG828555
Total Xylene	mg/kg	.15	0.135	90.3	70-130	WG828555
a,a,a-Trifluorotoluene(PID)				101.0	54-144	WG828555
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.36	97.5	63.5-137	WG828555
a,a,a-Trifluorotoluene(FID)				98.60	59-128	WG828555
ORP	mV	100	94.0	94.0	90-110	WG828965

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Arsenic	mg/kg	94.7	98.2	95.0	80-120	4.00	20	WG828564
Barium	mg/kg	94.0	96.8	94.0	80-120	3.00	20	WG828564
Boron	mg/kg	95.5	98.8	96.0	80-120	3.00	20	WG828564
Cadmium	mg/kg	94.8	98.2	95.0	80-120	4.00	20	WG828564
Chromium	mg/kg	95.8	101.	96.0	80-120	5.00	20	WG828564
Copper	mg/kg	98.6	101.	99.0	80-120	2.00	20	WG828564
Lead	mg/kg	96.6	101.	96.0	80-120	4.00	20	WG828564
Nickel	mg/kg	95.7	99.9	96.0	80-120	4.00	20	WG828564
Selenium	mg/kg	98.2	101.	98.0	80-120	2.00	20	WG828564
Silver	mg/kg	95.9	100.	96.0	80-120	4.00	20	WG828564
Zinc	mg/kg	93.4	96.0	93.0	80-120	3.00	20	WG828564
1-Methylnaphthalene	mg/kg	0.0615	0.0624	77.0	50.6-122	1.46	20	WG828644
2-Chloronaphthalene	mg/kg	0.0619	0.0632	77.0	53.9-121	1.93	20	WG828644
2-Methylnaphthalene	mg/kg	0.0619	0.0624	77.0	50.4-120	0.750	20	WG828644
Acenaphthene	mg/kg	0.0651	0.0668	81.0	52.4-120	2.57	20	WG828644
Acenaphthylene	mg/kg	0.0654	0.0674	82.0	49.6-120	3.01	20	WG828644
Anthracene	mg/kg	0.0586	0.0586	73.0	50.3-130	0.0700	20	WG828644
Benzo(a)anthracene	mg/kg	0.0646	0.0637	81.0	46.7-125	1.47	20	WG828644
Benzo(a)pyrene	mg/kg	0.0581	0.0540	73.0	42.3-119	7.42	20	WG828644
Benzo(b)fluoranthene	mg/kg	0.0603	0.0526	75.0	43.6-124	13.7	20	WG828644
Benzo(g,h,i)perylene	mg/kg	0.0515	0.0493	64.0	45.1-132	4.28	20	WG828644
Benzo(k)fluoranthene	mg/kg	0.0580	0.0568	72.0	46.1-131	2.03	20	WG828644
Chrysene	mg/kg	0.0629	0.0640	79.0	49.5-131	1.60	20	WG828644
Dibenz(a,h)anthracene	mg/kg	0.0521	0.0496	65.0	44.8-133	4.90	20	WG828644
Fluoranthene	mg/kg	0.0613	0.0628	76.0	49.3-128	2.47	20	WG828644
Fluorene	mg/kg	0.0640	0.0647	80.0	50.6-121	1.11	20	WG828644
Indeno(1,2,3-cd)pyrene	mg/kg	0.0528	0.0496	66.0	46.1-135	6.27	20	WG828644
Naphthalene	mg/kg	0.0563	0.0572	70.0	49.6-115	1.57	20	WG828644
Phenanthrene	mg/kg	0.0566	0.0566	71.0	48.8-121	0.100	20	WG828644
Pyrene	mg/kg	0.0628	0.0636	78.0	44.7-130	1.33	20	WG828644
2-Fluorobiphenyl				81.80	40.6-122			WG828644
Nitrobenzene-d5				92.50	22.1-146			WG828644
p-Terphenyl-d14				69.00	32.2-131			WG828644

Specific Conductance umhos/ 943. 942. 103. 90-110 0.106 20 WG828630

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November 17, 2015

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
pH	su	6.71	6.71	100.	98.5-101.5	0.00	1	WG828573
C10-C28 Diesel Range	mg/kg	51.4	51.1	86.0	50-100	0.610	20	WG828638
o-Terphenyl				82.30	50-150			WG828638
Chromium, Hexavalent	mg/kg	65.0	64.2	109.	80-120	1.24	20	WG828614
Mercury	mg/kg	0.283	0.245	94.0	80-120	14.0	20	WG829052
Benzene	mg/kg	0.0424	0.0423	85.0	70-130	0.220	20	WG828555
Ethylbenzene	mg/kg	0.0432	0.0443	86.0	70-130	2.65	20	WG828555
Toluene	mg/kg	0.0409	0.0422	82.0	70-130	3.10	20	WG828555
Total Xylene	mg/kg	0.131	0.135	87.0	70-130	3.20	20	WG828555
a,a,a-Trifluorotoluene (PID)				101.0	54-144			WG828555
TPH (GC/FID) Low Fraction	mg/kg	5.39	5.36	98.0	63.5-137	0.460	20	WG828555
a,a,a-Trifluorotoluene (FID)				98.30	59-128			WG828555
ORP	mV	95.0	94.0	95.0	90-110	1.06	20	WG828965

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Arsenic	mg/kg	102.	4.86	100	97.0	75-125	L799829-01	WG828564
Barium	mg/kg	144.	45.4	100	98.0	75-125	L799829-01	WG828564
Boron	mg/kg	97.0	1.42	100	96.0	75-125	L799829-01	WG828564
Cadmium	mg/kg	99.6	0.193	100	99.0	75-125	L799829-01	WG828564
Chromium	mg/kg	107.	6.88	100	101.	75-125	L799829-01	WG828564
Copper	mg/kg	108.	6.32	100	101.	75-125	L799829-01	WG828564
Lead	mg/kg	122.	13.1	100	109.	75-125	L799829-01	WG828564
Nickel	mg/kg	115.	8.73	100	106.	75-125	L799829-01	WG828564
Selenium	mg/kg	91.0	0.453	100	91.0	75-125	L799829-01	WG828564
Silver	mg/kg	101.	0.0341	100	101.	75-125	L799829-01	WG828564
Zinc	mg/kg	142.	35.8	100	106.	75-125	L799829-01	WG828564
1-Methylnaphthalene	mg/kg	0.0605	0.00	.08	75.7	28.4-137	L800123-04	WG828644
2-Chloronaphthalene	mg/kg	0.0611	0.00	.08	76.4	38.6-126	L800123-04	WG828644
2-Methylnaphthalene	mg/kg	0.0606	0.00	.08	75.7	26.6-137	L800123-04	WG828644
Acenaphthene	mg/kg	0.0633	0.00	.08	79.2	31.9-130	L800123-04	WG828644
Acenaphthylene	mg/kg	0.0645	0.00	.08	80.6	33.7-129	L800123-04	WG828644
Anthracene	mg/kg	0.0572	0.00	.08	71.5	26.5-141	L800123-04	WG828644
Benzo(a)anthracene	mg/kg	0.0637	0.00	.08	79.6	18.3-136	L800123-04	WG828644
Benzo(a)pyrene	mg/kg	0.0622	0.00	.08	77.7	16.9-135	L800123-04	WG828644
Benzo(b)fluoranthene	mg/kg	0.0596	0.00	.08	74.5	10-134	L800123-04	WG828644
Benzo(g,h,i)perylene	mg/kg	0.0550	0.00	.08	68.8	14.1-140	L800123-04	WG828644
Benzo(k)fluoranthene	mg/kg	0.0638	0.00	.08	79.8	18.2-138	L800123-04	WG828644
Chrysene	mg/kg	0.0627	0.00	.08	78.3	17.1-145	L800123-04	WG828644
Dibenz(a,h)anthracene	mg/kg	0.0577	0.00	.08	72.2	18.5-138	L800123-04	WG828644
Fluoranthene	mg/kg	0.0624	0.00	.08	77.9	15.4-144	L800123-04	WG828644
Fluorene	mg/kg	0.0620	0.00	.08	77.5	23.5-136	L800123-04	WG828644
Indeno(1,2,3-cd)pyrene	mg/kg	0.0566	0.00	.08	70.8	14.5-142	L800123-04	WG828644
Naphthalene	mg/kg	0.0552	0.00	.08	69.0	29.2-128	L800123-04	WG828644
Phenanthrene	mg/kg	0.0557	0.00	.08	69.6	20.1-134	L800123-04	WG828644

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Pyrene	mg/kg	0.0621	0.00	.08	77.6	11-148	L800123-04	WG828644
2-Fluorobiphenyl					83.20	40.6-122		WG828644
Nitrobenzene-d5					94.10	22.1-146		WG828644
p-Terphenyl-d14					72.10	32.2-131		WG828644
Chromium,Hexavalent	mg/kg	7.24	0.00	20	36.2*	75-125	L800481-05	WG828614
Mercury	mg/kg	0.294	0.0283	.3	89.0	75-125	L799437-03	WG829052
Benzene	mg/kg	0.196	0.00112	.05	78.1	49.7-127	L800432-12	WG828555
Ethylbenzene	mg/kg	0.197	0.000280	.05	78.7	40.8-141	L800432-12	WG828555
Toluene	mg/kg	0.199	0.000645	.05	79.3	49.8-132	L800432-12	WG828555
Total Xylene	mg/kg	0.581	0.00149	.15	77.3	41.2-140	L800432-12	WG828555
a,a,a-Trifluorotoluene(PID)					99.50	54-144		WG828555
TPH (GC/FID) Low Fraction	mg/kg	20.3	0.174	5.5	73.4	28.5-138	L800432-12	WG828555
a,a,a-Trifluorotoluene(FID)					95.60	59-128		WG828555

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Arsenic	mg/kg	96.9	102.	92.0	75-125	5.00	20	L799829-01	WG828564
Barium	mg/kg	139.	144.	93.4	75-125	3.00	20	L799829-01	WG828564
Boron	mg/kg	91.3	97.0	89.9	75-125	6.00	20	L799829-01	WG828564
Cadmium	mg/kg	95.0	99.6	94.8	75-125	5.00	20	L799829-01	WG828564
Chromium	mg/kg	102.	107.	95.2	75-125	5.00	20	L799829-01	WG828564
Copper	mg/kg	101.	108.	94.7	75-125	6.00	20	L799829-01	WG828564
Lead	mg/kg	117.	122.	104.	75-125	4.00	20	L799829-01	WG828564
Nickel	mg/kg	111.	115.	103.	75-125	3.00	20	L799829-01	WG828564
Selenium	mg/kg	86.7	91.0	86.2	75-125	5.00	20	L799829-01	WG828564
Silver	mg/kg	95.0	101.	95.0	75-125	6.00	20	L799829-01	WG828564
Zinc	mg/kg	137.	142.	101.	75-125	3.00	20	L799829-01	WG828564
1-Methylnaphthalene	mg/kg	0.0627	0.0605	78.4	28.4-137	3.60	20	L800123-04	WG828644
2-Chloronaphthalene	mg/kg	0.0634	0.0611	79.3	38.6-126	3.73	20	L800123-04	WG828644
2-Methylnaphthalene	mg/kg	0.0627	0.0606	78.4	26.6-137	3.51	20	L800123-04	WG828644
Acenaphthene	mg/kg	0.0659	0.0633	82.4	31.9-130	3.99	20	L800123-04	WG828644
Acenaphthylene	mg/kg	0.0673	0.0645	84.1	33.7-129	4.27	20	L800123-04	WG828644
Anthracene	mg/kg	0.0579	0.0572	72.4	26.5-141	1.20	21.2	L800123-04	WG828644
Benzo(a)anthracene	mg/kg	0.0666	0.0637	83.3	18.3-136	4.46	24.6	L800123-04	WG828644
Benzo(a)pyrene	mg/kg	0.0645	0.0622	80.6	16.9-135	3.64	25.2	L800123-04	WG828644
Benzo(b)fluoranthene	mg/kg	0.0623	0.0596	77.8	10-134	4.37	30.9	L800123-04	WG828644
Benzo(g,h,i)perylene	mg/kg	0.0571	0.0550	71.4	14.1-140	3.73	25.5	L800123-04	WG828644
Benzo(k)fluoranthene	mg/kg	0.0663	0.0638	82.9	18.2-138	3.88	25.6	L800123-04	WG828644
Chrysene	mg/kg	0.0641	0.0627	80.1	17.1-145	2.19	24.2	L800123-04	WG828644
Dibenz(a,h)anthracene	mg/kg	0.0592	0.0577	74.0	18.5-138	2.45	24.3	L800123-04	WG828644
Fluoranthene	mg/kg	0.0640	0.0624	80.0	15.4-144	2.55	27.1	L800123-04	WG828644
Fluorene	mg/kg	0.0639	0.0620	79.9	23.5-136	3.07	20	L800123-04	WG828644
Indeno(1,2,3-cd)pyrene	mg/kg	0.0585	0.0566	73.2	14.5-142	3.28	25.8	L800123-04	WG828644
Naphthalene	mg/kg	0.0572	0.0552	71.6	29.2-128	3.70	20	L800123-04	WG828644
Phenanthrene	mg/kg	0.0565	0.0557	70.6	20.1-134	1.40	23.6	L800123-04	WG828644
Pyrene	mg/kg	0.0642	0.0621	80.3	11-148	3.35	26.1	L800123-04	WG828644
2-Fluorobiphenyl				85.00	40.6-122				WG828644
Nitrobenzene-d5				92.90	22.1-146				WG828644
p-Terphenyl-d14				72.80	32.2-131				WG828644

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



YOUR LAB OF CHOICE

Linn Energy - Denver, CO
Dave Nicholson
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Denver, CO 80202

Quality Assurance Report
Level II

L800435

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

November 17, 2015

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Chromium,Hexavalent	mg/kg	7.24	7.24	36.2*	75-125	0.00	20	L800481-05	WG828614
Mercury	mg/kg	0.321	0.294	97.7	75-125	9.00	20	L799437-03	WG829052
Benzene	mg/kg	0.192	0.196	76.2	49.7-127	2.46	23.5	L800432-12	WG828555
Ethylbenzene	mg/kg	0.190	0.197	75.7	40.8-141	3.82	23.8	L800432-12	WG828555
Toluene	mg/kg	0.187	0.199	74.6	49.8-132	6.07	23.5	L800432-12	WG828555
Total Xylene	mg/kg	0.562	0.581	74.7	41.2-140	3.29	23.7	L800432-12	WG828555
a,a,a-Trifluorotoluene(PID)				99.70	54-144				WG828555
TPH (GC/FID) Low Fraction	mg/kg	19.8	20.3	71.3	28.5-138	2.84	23.6	L800432-12	WG828555
a,a,a-Trifluorotoluene(FID)				96.10	59-128				WG828555

Post Spike

Serial Dilution

Batch number /Run number / Sample number cross reference

WG828564: R3092650: L800435-01
WG828644: R3092801: L800435-01
WG828630: R3092838: L800435-01
WG828573: R3092871: L800435-01
WG828638: R3092940: L800435-01
WG828614: R3093028: L800435-01
WG828733: R3093063: L800435-01
WG829052: R3093248: L800435-01
WG828555: R3093291: L800435-01
WG828965: R3093361: L800435-01

* * Calculations are performed prior to rounding of reported values.

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The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.