



Nicholson GeoSolutions, LLC

3433 East Lake Drive
Centennial, CO 80121

June 9, 2014

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

Subject: Additional M04 Pit Investigation

Dear Derek:

Nicholson GeoSolutions LLC was retained by Linn Energy, LLC (Linn) to conduct additional soil sampling on the M04 well pad in the Garden Gulch area, Garfield County, Colorado. The sampling was witnessed by Carlos Lujan of the Colorado Oil and Gas Conservation Commission (COGCC).

Three borings were previously drilled into the former reserve pit at this well pad on April 8, 2014, as reported in the letter report dated April 21, 2014. For this additional investigation, three borings were drilled to the east of the former pit on May 14, 2014 to check for possible downgradient soil contamination. The locations of all six borings are shown on Figure 1.

One discrete soil sample was collected from each boring to evaluate compliance with the COGCC Table 910-1 standards. The depths of the samples ranged from about 14 to 15 feet. All samples were analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), BTEX (benzene, toluene, ethylbenzene, and xylenes), sodium adsorption ratio (SAR), pH, conductivity, PAHs, and metals.

Table 1 provides a summary of the analytical results for the soil samples collected for the additional investigation. The laboratory analytical report is contained in Appendix A. All results for the three samples were below the standards, except for arsenic. Arsenic ranged from 14 to 15 mg/kg, above the standard of 0.39 mg/kg but similar to background soil samples previously collected in the vicinity.

Sincerely,



David K. Nicholson, P.G.
Nicholson GeoSolutions LLC

Table 1 M04 Downgradient Sample Results – May 14, 2014

Parameter	Table 910-1 Standards	Sample ID and Depth		
		M4-B4-1 (15 ft)	M4-B5-1 (14 ft)	M4-B6-1 (15 ft)
sp. conductance (mmhos/cm)	<4	2.3	0.65	0.60
pH (standard units)	6-9	8.0	8.4	8.4
SAR (ratio)	<12	1.3	2.8	1.9
TVPH – gasoline range	500 ¹	<0.5	0.50	<0.50
TEPH – diesel range	500 ¹	90	152	46
benzene	0.17	<0.0025	0.0034	<0.0025
toluene	85	0.027	0.089	<0.025
ethylbenzene	100	0.0025	0.0054	<0.0025
xylenes	175	0.06	0.017	0.02
PAHs		All ok	All ok	All ok
arsenic	0.39	14	15	15

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

Values in bold type exceed standards

All units in mg/kg except where indicated





Figure 1

May
2014

GeoSolutions
NICHOLSON

Legend

-  Boring Location
-  Pit

0 30 60 120 Feet 1" = 60'

Berry Petroleum

**M04
Pit Investigation**

APPENDIX A
Laboratory Report



12065 Lebanon Rd.
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Dave Nicholson
Berry Petroleum Company - Denver, CO
1999 Broadway, Suite 3700
Denver, CO 80202

Report Summary

Friday May 23, 2014

Report Number: L699547

Samples Received: 05/16/14

Client Project:

Description: MO4

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
 Berry Petroleum Company - Denver, C
 1999 Broadway, Suite 3700
 Denver, CO 80202

May 23, 2014

Date Received : May 16, 2014
 Description : MO4
 Sample ID : MO4-4-1
 Collected By : D Nicholson
 Collection Date : 05/14/14 10:30

ESC Sample # : L699547-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	4.0	mg/kg	3060A/7196A	05/22/14	2
ORP	73.		mV	2580 B-2011	05/22/14	1
pH	8.0		su	9045D	05/20/14	1
Sodium Adsorption Ratio	1.3			Calc.	05/21/14	1
Specific Conductance	2300		umhos/cm	9050AMod	05/23/14	1
Mercury	BDL	0.020	mg/kg	7471	05/20/14	1
Arsenic	14.	2.0	mg/kg	6010B	05/22/14	1
Barium	170	0.50	mg/kg	6010B	05/22/14	1
Boron	12.	10.	mg/kg	6010B	05/22/14	1
Cadmium	0.62	0.50	mg/kg	6010B	05/22/14	1
Chromium	14.	1.0	mg/kg	6010B	05/22/14	1
Copper	15.	2.0	mg/kg	6010B	05/22/14	1
Lead	10.	0.50	mg/kg	6010B	05/22/14	1
Nickel	11.	2.0	mg/kg	6010B	05/22/14	1
Selenium	BDL	2.0	mg/kg	6010B	05/22/14	1
Silver	BDL	1.0	mg/kg	6010B	05/22/14	1
Zinc	45.	3.0	mg/kg	6010B	05/22/14	1
Benzene	BDL	0.0025	mg/kg	8021/8015	05/21/14	5
Toluene	0.027	0.025	mg/kg	8021/8015	05/21/14	5
Ethylbenzene	0.0025	0.0025	mg/kg	8021/8015	05/21/14	5
Total Xylene	0.060	0.0075	mg/kg	8021/8015	05/21/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	05/21/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.3		% Rec.	8021/8015	05/21/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	05/21/14	5
Diesel and Oil Ranges						
C10-C28 Diesel Range	57.	4.0	mg/kg	8015	05/21/14	1
C28-C40 Oil Range	33.	4.0	mg/kg	8015	05/21/14	1
Surrogate Recovery						
o-Terphenyl	84.5		% Rec.	8015	05/21/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
 L699547-01 (CR6) - diluted due to sample color
 L699547-01 (PH) - 8.0@22.7c



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May 23, 2014

Date Received : May 16, 2014
 Description : MO4

ESC Sample # : L699547-01

Sample ID : MO4-4-1

Site ID :

Collected By : D Nicholson
 Collection Date : 05/14/14 10:30

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Naphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
1-Methylnaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Methylnaphthalene	0.024	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Surrogate Recovery						
p-Terphenyl-d14	87.3		% Rec.	8270C-SIM	05/23/14	1
Nitrobenzene-d5	74.2		% Rec.	8270C-SIM	05/23/14	1
2-Fluorobiphenyl	84.2		% Rec.	8270C-SIM	05/23/14	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 05/23/14 16:18 Printed: 05/23/14 16:18
 L699547-01 (CR6) - diluted due to sample color
 L699547-01 (PH) - 8.0@22.7c



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REPORT OF ANALYSIS

Dave Nicholson
 Berry Petroleum Company - Denver, C
 1999 Broadway, Suite 3700
 Denver, CO 80202

May 23, 2014

Date Received : May 16, 2014
 Description : MO4
 Sample ID : MO4-5-1
 Collected By : D Nicholson
 Collection Date : 05/14/14 11:00

ESC Sample # : L699547-02
 Site ID :
 Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	4.0	mg/kg	3060A/7196A	05/22/14	2
ORP	65.		mV	2580 B-2011	05/22/14	1
pH	8.4		su	9045D	05/20/14	1
Sodium Adsorption Ratio	2.8			Calc.	05/21/14	1
Specific Conductance	650		umhos/cm	9050AMod	05/23/14	1
Mercury	BDL	0.020	mg/kg	7471	05/20/14	1
Arsenic	15.	2.0	mg/kg	6010B	05/22/14	1
Barium	170	0.50	mg/kg	6010B	05/22/14	1
Boron	10.	10.	mg/kg	6010B	05/22/14	1
Cadmium	BDL	0.50	mg/kg	6010B	05/22/14	1
Chromium	9.7	1.0	mg/kg	6010B	05/22/14	1
Copper	12.	2.0	mg/kg	6010B	05/22/14	1
Lead	7.9	0.50	mg/kg	6010B	05/22/14	1
Nickel	8.7	2.0	mg/kg	6010B	05/22/14	1
Selenium	BDL	2.0	mg/kg	6010B	05/22/14	1
Silver	BDL	1.0	mg/kg	6010B	05/22/14	1
Zinc	28.	3.0	mg/kg	6010B	05/22/14	1
Benzene	0.0034	0.0025	mg/kg	8021/8015	05/21/14	5
Toluene	0.089	0.025	mg/kg	8021/8015	05/21/14	5
Ethylbenzene	0.0054	0.0025	mg/kg	8021/8015	05/21/14	5
Total Xylene	0.17	0.0075	mg/kg	8021/8015	05/21/14	5
TPH (GC/FID) Low Fraction	0.50	0.50	mg/kg	GRO	05/21/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.6		% Rec.	8021/8015	05/21/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	05/21/14	5
Diesel and Oil Ranges						
C10-C28 Diesel Range	96.	4.0	mg/kg	8015	05/21/14	1
C28-C40 Oil Range	56.	4.0	mg/kg	8015	05/21/14	1
Surrogate Recovery						
o-Terphenyl	73.4		% Rec.	8015	05/21/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
 L699547-02 (CR6) - diluted due to sample color
 L699547-02 (PH) - 8.4@22.3c



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May 23, 2014

Date Received : May 16, 2014
 Description : MO4

ESC Sample # : L699547-02

Sample ID : MO4-5-1

Site ID :

Collected By : D Nicholson
 Collection Date : 05/14/14 11:00

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Naphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Pyrene	0.0063	0.0060	mg/kg	8270C-SIM	05/23/14	1
1-Methylnaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Methylnaphthalene	0.066	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Surrogate Recovery						
p-Terphenyl-d14	73.5		% Rec.	8270C-SIM	05/23/14	1
Nitrobenzene-d5	68.6		% Rec.	8270C-SIM	05/23/14	1
2-Fluorobiphenyl	77.0		% Rec.	8270C-SIM	05/23/14	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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 L699547-02 (CR6) - diluted due to sample color
 L699547-02 (PH) - 8.4@22.3c



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REPORT OF ANALYSIS

Dave Nicholson
 Berry Petroleum Company - Denver, C
 1999 Broadway, Suite 3700
 Denver, CO 80202

May 23, 2014

Date Received : May 16, 2014
 Description : MO4
 Sample ID : MO4-6-1
 Collected By : D Nicholson
 Collection Date : 05/14/14 11:20

ESC Sample # : L699547-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium,Hexavalent	BDL	4.0	mg/kg	3060A/7196A	05/22/14	2
ORP	72.		mV	2580 B-2011	05/22/14	1
pH	8.4		su	9045D	05/20/14	1
Sodium Adsorption Ratio	1.9			Calc.	05/21/14	1
Specific Conductance	600		umhos/cm	9050AMod	05/23/14	1
Mercury	BDL	0.020	mg/kg	7471	05/20/14	1
Arsenic	15.	2.0	mg/kg	6010B	05/22/14	1
Barium	210	0.50	mg/kg	6010B	05/22/14	1
Boron	20.	10.	mg/kg	6010B	05/22/14	1
Cadmium	0.75	0.50	mg/kg	6010B	05/22/14	1
Chromium	19.	1.0	mg/kg	6010B	05/22/14	1
Copper	20.	2.0	mg/kg	6010B	05/22/14	1
Lead	12.	0.50	mg/kg	6010B	05/22/14	1
Nickel	16.	2.0	mg/kg	6010B	05/22/14	1
Selenium	BDL	2.0	mg/kg	6010B	05/22/14	1
Silver	BDL	1.0	mg/kg	6010B	05/22/14	1
Zinc	62.	3.0	mg/kg	6010B	05/22/14	1
Benzene	BDL	0.0025	mg/kg	8021/8015	05/20/14	5
Toluene	BDL	0.025	mg/kg	8021/8015	05/20/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	05/20/14	5
Total Xylene	0.020	0.0075	mg/kg	8021/8015	05/20/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	05/20/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.3		% Rec.	8021/8015	05/20/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	05/20/14	5
Diesel and Oil Ranges						
C10-C28 Diesel Range	24.	4.0	mg/kg	8015	05/22/14	1
C28-C40 Oil Range	22.	4.0	mg/kg	8015	05/22/14	1
Surrogate Recovery						
o-Terphenyl	84.5		% Rec.	8015	05/22/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
 L699547-03 (PH) - 8.4@22.2c
 L699547-03 (CR6) - diluted due to sample color



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REPORT OF ANALYSIS

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 Berry Petroleum Company - Denver, C
 1999 Broadway, Suite 3700
 Denver, CO 80202

May 23, 2014

Date Received : May 16, 2014
 Description : MO4

ESC Sample # : L699547-03

Sample ID : MO4-6-1

Site ID :

Collected By : D Nicholson
 Collection Date : 05/14/14 11:20

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Naphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	05/23/14	1
1-Methylnaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Methylnaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	05/23/14	1
Surrogate Recovery						
p-Terphenyl-d14	77.1		% Rec.	8270C-SIM	05/23/14	1
Nitrobenzene-d5	78.7		% Rec.	8270C-SIM	05/23/14	1
2-Fluorobiphenyl	76.2		% Rec.	8270C-SIM	05/23/14	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 05/23/14 16:18 Printed: 05/23/14 16:18

L699547-03 (PH) - 8.4@22.2c

L699547-03 (CR6) - diluted due to sample color

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L699547-01	WG722082	SAMP	Chromium,Hexavalent	R2926619	0
L699547-02	WG721619	SAMP	C10-C28 Diesel Range	R2925686	J5
	WG721619	SAMP	C28-C40 Oil Range	R2925686	J5
	WG722082	SAMP	Chromium,Hexavalent	R2926619	0
L699547-03	WG722082	SAMP	Chromium,Hexavalent	R2926619	0

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high
0	(ESC) Sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary 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.

Summary of Remarks For Samples Printed
05/23/14 at 16:18:51

TSR Signing Reports: 134
R5 - Desired TAT

Always log As, Cd, Cr, Cu, Ni, Pb, Se, Ag, & Zn GW by 6020 Log all PAHs by 8270-SIM

Sample: L699547-01 Account: BERPETDCO Received: 05/16/14 10:00 Due Date: 05/23/14 00:00 RPT Date: 05/23/14 16:18

Sample: L699547-02 Account: BERPETDCO Received: 05/16/14 10:00 Due Date: 05/23/14 00:00 RPT Date: 05/23/14 16:18

Sample: L699547-03 Account: BERPETDCO Received: 05/16/14 10:00 Due Date: 05/23/14 00:00 RPT Date: 05/23/14 16:18



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 Dave Nicholson
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Quality Assurance Report
 Level II

L699547

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

May 23, 2014

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Mercury	< .02	mg/kg			WG721802	05/20/14 19:23
Benzene	< .0005	mg/kg			WG721997	05/20/14 21:09
Ethylbenzene	< .0005	mg/kg			WG721997	05/20/14 21:09
Toluene	< .005	mg/kg			WG721997	05/20/14 21:09
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG721997	05/20/14 21:09
Total Xylene	< .0015	mg/kg			WG721997	05/20/14 21:09
a,a,a-Trifluorotoluene(FID)		% Rec.	99.20	59-128	WG721997	05/20/14 21:09
a,a,a-Trifluorotoluene(PID)		% Rec.	104.0	54-144	WG721997	05/20/14 21:09
C10-C28 Diesel Range	< 4	mg/kg			WG721619	05/21/14 08:52
C28-C40 Oil Range	< 4	mg/kg			WG721619	05/21/14 08:52
o-Terphenyl		% Rec.	74.00	50-150	WG721619	05/21/14 08:52
Chromium,Hexavalent	< 2	mg/kg			WG722082	05/22/14 16:14
Arsenic	< 1	mg/kg			WG722088	05/22/14 21:33
Barium	< .25	mg/kg			WG722088	05/22/14 21:33
Boron	< 10	mg/kg			WG722088	05/22/14 21:33
Cadmium	< .25	mg/kg			WG722088	05/22/14 21:33
Chromium	< .5	mg/kg			WG722088	05/22/14 21:33
Copper	< 1	mg/kg			WG722088	05/22/14 21:33
Lead	< .25	mg/kg			WG722088	05/22/14 21:33
Nickel	< 1	mg/kg			WG722088	05/22/14 21:33
Selenium	< 1	mg/kg			WG722088	05/22/14 21:33
Silver	< .5	mg/kg			WG722088	05/22/14 21:33
Zinc	< 1.5	mg/kg			WG722088	05/22/14 21:33
1-Methylnaphthalene	< .02	mg/kg			WG722189	05/23/14 01:58
2-Chloronaphthalene	< .02	mg/kg			WG722189	05/23/14 01:58
2-Methylnaphthalene	< .02	mg/kg			WG722189	05/23/14 01:58
Acenaphthene	< .006	mg/kg			WG722189	05/23/14 01:58
Acenaphthylene	< .006	mg/kg			WG722189	05/23/14 01:58
Anthracene	< .006	mg/kg			WG722189	05/23/14 01:58
Benzo(a)anthracene	< .006	mg/kg			WG722189	05/23/14 01:58
Benzo(a)pyrene	< .006	mg/kg			WG722189	05/23/14 01:58
Benzo(b)fluoranthene	< .006	mg/kg			WG722189	05/23/14 01:58
Benzo(g,h,i)perylene	< .006	mg/kg			WG722189	05/23/14 01:58
Benzo(k)fluoranthene	< .006	mg/kg			WG722189	05/23/14 01:58
Chrysene	< .006	mg/kg			WG722189	05/23/14 01:58
Dibenz(a,h)anthracene	< .006	mg/kg			WG722189	05/23/14 01:58
Fluoranthene	< .006	mg/kg			WG722189	05/23/14 01:58
Fluorene	< .006	mg/kg			WG722189	05/23/14 01:58
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG722189	05/23/14 01:58
Naphthalene	< .02	mg/kg			WG722189	05/23/14 01:58
Phenanthrene	< .006	mg/kg			WG722189	05/23/14 01:58
Pyrene	< .006	mg/kg			WG722189	05/23/14 01:58
2-Fluorobiphenyl		% Rec.	84.70	38.2-135	WG722189	05/23/14 01:58
Nitrobenzene-d5		% Rec.	72.90	28.4-151	WG722189	05/23/14 01:58
p-Terphenyl-d14		% Rec.	91.50	34.2-141	WG722189	05/23/14 01:58
Specific Conductance	1.20	umhos/cm			WG722531	05/23/14 15:43

* Performance of this Analyte is outside of established criteria.

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Est. 1970

May 23, 2014

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Mercury	mg/kg	0.0	0.00398	37.0*	20	L696647-08	WG721802
pH	su	11.0	11.0	0.0	1	L698952-01	WG721943
pH	su	9.60	9.60	0.209	1	L699936-02	WG721943
ORP	mV	0.0	0.0	0.0	20	L699046-02	WG722288
ORP	mV	49.0	51.0	4.00	20	L700206-05	WG722288
Chromium,Hexavalent	mg/kg	0.0	0.0	0.0	20	L700133-05	WG722082
Chromium,Hexavalent	mg/kg	0.0	0.0	0.0	20	L699547-01	WG722082
Specific Conductance	umhos/cm	2100	2300	8.14	20	L699547-01	WG722531
Specific Conductance	umhos/cm	740.	670.	9.52	20	L700133-03	WG722531

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Mercury	mg/kg	12.4	12.4	100.	71.6-128	WG721802
Benzene	mg/kg	.05	0.0474	94.9	70-130	WG721997
Ethylbenzene	mg/kg	.05	0.0490	98.1	70-130	WG721997
Toluene	mg/kg	.05	0.0487	97.5	70-130	WG721997
Total Xylene	mg/kg	.15	0.150	99.9	70-130	WG721997
a,a,a-Trifluorotoluene(PID)				105.0	54-144	WG721997
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.31	96.5	63.5-137	WG721997
a,a,a-Trifluorotoluene(FID)				101.0	59-128	WG721997
pH	su	5.93	6.00	101.	98.3-101.7	WG721943
ORP	mV	100	100.	100.	90-110	WG722288
Chromium,Hexavalent	mg/kg	125	136.	109.	80-120	WG722082
Arsenic	mg/kg	237	251.	106.	83.1-117	WG722088
Barium	mg/kg	252	263.	104.	84.1-116	WG722088
Boron	mg/kg	118	128.	109.	74-126	WG722088
Cadmium	mg/kg	191	196.	103.	83.2-117	WG722088
Chromium	mg/kg	128	136.	106.	81.3-118	WG722088
Copper	mg/kg	123	131.	106.	83.7-116	WG722088
Lead	mg/kg	103	105.	102.	83.1-117	WG722088
Nickel	mg/kg	118	121.	103.	82-118	WG722088
Selenium	mg/kg	110	118.	107.	78.7-122	WG722088
Silver	mg/kg	47.3	48.1	102.	66.2-134	WG722088
Zinc	mg/kg	183	201.	110.	82-118	WG722088
1-Methylnaphthalene	mg/kg	.08	0.0664	83.1	48.9-127	WG722189
2-Chloronaphthalene	mg/kg	.08	0.0654	81.7	48.8-125	WG722189
2-Methylnaphthalene	mg/kg	.08	0.0654	81.8	45.7-131	WG722189
Acenaphthene	mg/kg	.08	0.0605	75.6	48.7-127	WG722189
Acenaphthylene	mg/kg	.08	0.0583	72.9	47.9-128	WG722189

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May 23, 2014

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Anthracene	mg/kg	.08	0.0653	81.6	51.3-136	WG722189
Benzo(a)anthracene	mg/kg	.08	0.0635	79.3	55-126	WG722189
Benzo(a)pyrene	mg/kg	.08	0.0605	75.7	51.9-127	WG722189
Benzo(b)fluoranthene	mg/kg	.08	0.0618	77.3	54-125	WG722189
Benzo(g,h,i)perylene	mg/kg	.08	0.0663	82.9	53.8-136	WG722189
Benzo(k)fluoranthene	mg/kg	.08	0.0695	86.9	53.9-132	WG722189
Chrysene	mg/kg	.08	0.0718	89.8	55.7-133	WG722189
Dibenz(a,h)anthracene	mg/kg	.08	0.0651	81.4	52.6-137	WG722189
Fluoranthene	mg/kg	.08	0.0641	80.1	54-132	WG722189
Fluorene	mg/kg	.08	0.0608	76.0	48.7-127	WG722189
Indeno(1,2,3-cd)pyrene	mg/kg	.08	0.0658	82.3	53.8-138	WG722189
Naphthalene	mg/kg	.08	0.0605	75.7	42-127	WG722189
Phenanthrene	mg/kg	.08	0.0607	75.8	49.6-126	WG722189
Pyrene	mg/kg	.08	0.0638	79.8	54-129	WG722189
2-Fluorobiphenyl				81.70	38.2-135	WG722189
Nitrobenzene-d5				73.10	28.4-151	WG722189
p-Terphenyl-d14				85.80	34.2-141	WG722189
Specific Conductance	umhos/cm	510	510.	100.	85-115	WG722531

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Benzene	mg/kg	0.0476	0.0474	95.0	70-130	0.300	20	WG721997
Ethylbenzene	mg/kg	0.0489	0.0490	98.0	70-130	0.290	20	WG721997
Toluene	mg/kg	0.0484	0.0487	97.0	70-130	0.650	20	WG721997
Total Xylene	mg/kg	0.149	0.150	99.0	70-130	0.460	20	WG721997
a,a,a-Trifluorotoluene(PID)				104.0	54-144			WG721997
TPH (GC/FID) Low Fraction	mg/kg	5.40	5.31	98.0	63.5-137	1.77	20	WG721997
a,a,a-Trifluorotoluene(FID)				101.0	59-128			WG721997
pH	su	6.00	6.00	101.	98.3-101.7	0.0	20	WG721943
ORP	mV	100.	100.	100.	90-110	0.0	20	WG722288
Chromium,Hexavalent	mg/kg	137.	136.	110.	80-120	0.733	20	WG722082
Arsenic	mg/kg	252.	251.	106.	83.1-117	0.0	20	WG722088
Barium	mg/kg	258.	263.	102.	84.1-116	2.00	20	WG722088
Boron	mg/kg	130.	128.	110.	74-126	1.00	20	WG722088
Cadmium	mg/kg	197.	196.	103.	83.2-117	0.0	20	WG722088
Chromium	mg/kg	136.	136.	106.	81.3-118	0.0	20	WG722088
Copper	mg/kg	126.	131.	103.	83.7-116	3.00	20	WG722088
Lead	mg/kg	103.	105.	100.	83.1-117	2.00	20	WG722088
Nickel	mg/kg	122.	121.	104.	82-118	1.00	20	WG722088
Selenium	mg/kg	118.	118.	107.	78.7-122	0.0	20	WG722088
Silver	mg/kg	47.8	48.1	101.	66.2-134	1.00	20	WG722088
Zinc	mg/kg	186.	201.	102.	82-118	7.00	20	WG722088
1-Methylnaphthalene	mg/kg	0.0587	0.0664	73.0	48.9-127	12.3	20	WG722189
2-Chloronaphthalene	mg/kg	0.0577	0.0654	72.0	48.8-125	12.4	20	WG722189
2-Methylnaphthalene	mg/kg	0.0581	0.0654	72.0	45.7-131	12.0	20	WG722189
Acenaphthene	mg/kg	0.0536	0.0605	67.0	48.7-127	12.1	20	WG722189

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Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Acenaphthylene	mg/kg	0.0511	0.0583	64.0	47.9-128	13.2	20	WG722189
Anthracene	mg/kg	0.0568	0.0653	71.0	51.3-136	13.9	20	WG722189
Benzo(a)anthracene	mg/kg	0.0566	0.0635	71.0	55-126	11.4	20	WG722189
Benzo(a)pyrene	mg/kg	0.0508	0.0605	64.0	51.9-127	17.4	20	WG722189
Benzo(b)fluoranthene	mg/kg	0.0521	0.0618	65.0	54-125	17.1	20	WG722189
Benzo(g,h,i)perylene	mg/kg	0.0572	0.0663	72.0	53.8-136	14.7	20	WG722189
Benzo(k)fluoranthene	mg/kg	0.0632	0.0695	79.0	53.9-132	9.61	20	WG722189
Chrysene	mg/kg	0.0626	0.0718	78.0	55.7-133	13.7	20	WG722189
Dibenz(a,h)anthracene	mg/kg	0.0568	0.0651	71.0	52.6-137	13.6	20	WG722189
Fluoranthene	mg/kg	0.0569	0.0641	71.0	54-132	11.9	20	WG722189
Fluorene	mg/kg	0.0539	0.0608	67.0	48.7-127	12.1	20	WG722189
Indeno(1,2,3-cd)pyrene	mg/kg	0.0575	0.0658	72.0	53.8-138	13.5	20	WG722189
Naphthalene	mg/kg	0.0548	0.0605	68.0	42-127	9.84	20	WG722189
Phenanthrene	mg/kg	0.0545	0.0607	68.0	49.6-126	10.7	20	WG722189
Pyrene	mg/kg	0.0568	0.0638	71.0	54-129	11.7	20	WG722189
2-Fluorobiphenyl				79.50	38.2-135			WG722189
Nitrobenzene-d5				71.40	28.4-151			WG722189
p-Terphenyl-d14				84.80	34.2-141			WG722189
Specific Conductance	umhos/	510.	510.	100.	85-115	0.0	20	WG722531

Analyte	Units	Matrix Spike				Limit	Ref Samp	Batch
		MS Res	Ref Res	TV	% Rec			
Mercury	mg/kg	0.470	0.00398	.5	93.0	80-120	L696647-08	WG721802
Benzene	mg/kg	0.177	0.00117	.05	70.0	49.7-127	L699547-03	WG721997
Ethylbenzene	mg/kg	0.164	0.00213	.05	65.0	40.8-141	L699547-03	WG721997
Toluene	mg/kg	0.181	0.00582	.05	70.0	49.8-132	L699547-03	WG721997
Total Xylene	mg/kg	0.513	0.0201	.15	66.0	41.2-140	L699547-03	WG721997
a,a,a-Trifluorotoluene(PID)					102.0	54-144		WG721997
TPH (GC/FID) Low Fraction	mg/kg	17.5	0.0277	5.5	64.0	28.5-138	L699547-03	WG721997
a,a,a-Trifluorotoluene(FID)					99.20	59-128		WG721997
Chromium,Hexavalent	mg/kg	19.8	0.0	20	99.0	75-125	L700133-01	WG722082
Lead	mg/kg	59.5	9.30	50	100.	75-125	L699644-01	WG722088
1-Methylnaphthalene	mg/kg	0.0551	0.	.08	68.9	41.8-133	L699495-01	WG722189
2-Chloronaphthalene	mg/kg	0.0556	0.	.08	69.5	42.4-129	L699495-01	WG722189
2-Methylnaphthalene	mg/kg	0.0548	0.	.08	68.5	37.5-137	L699495-01	WG722189
Acenaphthene	mg/kg	0.0510	0.	.08	63.8	39.4-132	L699495-01	WG722189
Acenaphthylene	mg/kg	0.0518	0.	.08	64.7	41.3-132	L699495-01	WG722189
Anthracene	mg/kg	0.0587	0.	.08	73.3	36.7-144	L699495-01	WG722189
Benzo(a)anthracene	mg/kg	0.0599	0.	.08	74.8	28-144	L699495-01	WG722189
Benzo(a)pyrene	mg/kg	0.0582	0.	.08	72.8	23.8-147	L699495-01	WG722189
Benzo(b)fluoranthene	mg/kg	0.0599	0.	.08	74.9	18.2-147	L699495-01	WG722189
Benzo(g,h,i)perylene	mg/kg	0.0507	0.	.08	63.4	9.2-155	L699495-01	WG722189
Benzo(k)fluoranthene	mg/kg	0.0588	0.	.08	73.5	26.5-143	L699495-01	WG722189
Chrysene	mg/kg	0.0609	0.	.08	76.1	27.4-150	L699495-01	WG722189
Dibenz(a,h)anthracene	mg/kg	0.0470	0.	.08	58.7	13.8-150	L699495-01	WG722189
Fluoranthene	mg/kg	0.0671	0.	.08	83.9	23.2-158	L699495-01	WG722189
Fluorene	mg/kg	0.0513	0.	.08	64.1	30.8-139	L699495-01	WG722189
Indeno(1,2,3-cd)pyrene	mg/kg	0.0482	0.	.08	60.3	10.7-155	L699495-01	WG722189

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Naphthalene	mg/kg	0.0510	0.	.08	63.7	34.9-133	L699495-01	WG722189
Phenanthrene	mg/kg	0.0530	0.	.08	66.2	20.2-150	L699495-01	WG722189
Pyrene	mg/kg	0.0483	0.	.08	60.3	22.6-151	L699495-01	WG722189
2-Fluorobiphenyl					81.80	38.2-135		WG722189
Nitrobenzene-d5					68.60	28.4-151		WG722189
p-Terphenyl-d14					67.90	34.2-141		WG722189

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Mercury	mg/kg	0.493	0.470	97.8	80-120	5.00	20	L696647-08	WG721802
Benzene	mg/kg	0.161	0.177	63.9	49.7-127	9.38	23.5	L699547-03	WG721997
Ethylbenzene	mg/kg	0.146	0.164	57.6	40.8-141	11.8	23.8	L699547-03	WG721997
Toluene	mg/kg	0.160	0.181	61.6	49.8-132	12.3	23.5	L699547-03	WG721997
Total Xylene	mg/kg	0.454	0.513	57.8	41.2-140	12.2	23.7	L699547-03	WG721997
a,a,a-Trifluorotoluene(PID)				103.0	54-144				WG721997
TPH (GC/FID) Low Fraction	mg/kg	14.6	17.5	53.0	28.5-138	18.1	23.6	L699547-03	WG721997
a,a,a-Trifluorotoluene(FID)				98.60	59-128				WG721997
Chromium, Hexavalent	mg/kg	19.8	19.8	99.0	75-125	0.0	20	L700133-01	WG722082
Lead	mg/kg	58.4	59.5	98.2	75-125	2.00	20	L699644-01	WG722088
1-Methylnaphthalene	mg/kg	0.0664	0.0551	83.0	41.8-133	18.5	20.9	L699495-01	WG722189
2-Chloronaphthalene	mg/kg	0.0679	0.0556	84.9	42.4-129	19.9	20	L699495-01	WG722189
2-Methylnaphthalene	mg/kg	0.0664	0.0548	83.0	37.5-137	19.2	20.4	L699495-01	WG722189
Acenaphthene	mg/kg	0.0620	0.0510	77.5	39.4-132	19.5	20	L699495-01	WG722189
Acenaphthylene	mg/kg	0.0627	0.0518	78.4	41.3-132	19.1	20	L699495-01	WG722189
Anthracene	mg/kg	0.0708	0.0587	88.5	36.7-144	18.8	20.7	L699495-01	WG722189
Benzo(a)anthracene	mg/kg	0.0725	0.0599	90.6	28-144	19.1	24.7	L699495-01	WG722189
Benzo(a)pyrene	mg/kg	0.0718	0.0582	89.8	23.8-147	20.9	25.3	L699495-01	WG722189
Benzo(b)fluoranthene	mg/kg	0.0800	0.0599	100.	18.2-147	28.8	29.5	L699495-01	WG722189
Benzo(g,h,i)perylene	mg/kg	0.0580	0.0507	72.5	9.2-155	13.4	29.2	L699495-01	WG722189
Benzo(k)fluoranthene	mg/kg	0.0670	0.0588	83.8	26.5-143	13.1	26.1	L699495-01	WG722189
Chrysene	mg/kg	0.0740	0.0609	92.5	27.4-150	19.4	25.7	L699495-01	WG722189
Dibenz(a,h)anthracene	mg/kg	0.0554	0.0470	69.3	13.8-150	16.4	25.8	L699495-01	WG722189
Fluoranthene	mg/kg	0.0812	0.0671	101.	23.2-158	19.0	26	L699495-01	WG722189
Fluorene	mg/kg	0.0619	0.0513	77.4	30.8-139	18.7	20	L699495-01	WG722189
Indeno(1,2,3-cd)pyrene	mg/kg	0.0576	0.0482	72.0	10.7-155	17.6	26.9	L699495-01	WG722189
Naphthalene	mg/kg	0.0618	0.0510	77.2	34.9-133	19.1	20.4	L699495-01	WG722189
Phenanthrene	mg/kg	0.0642	0.0530	80.2	20.2-150	19.1	24.6	L699495-01	WG722189
Pyrene	mg/kg	0.0551	0.0483	68.9	22.6-151	13.3	25.1	L699495-01	WG722189
2-Fluorobiphenyl				88.70	38.2-135				WG722189
Nitrobenzene-d5				76.10	28.4-151				WG722189
p-Terphenyl-d14				68.80	34.2-141				WG722189

Post Spike

* 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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Est. 1970

YOUR LAB OF CHOICE

Berry Petroleum Company - Denver, CO
Dave Nicholson
1999 Broadway, Suite 3700

Quality Assurance Report
Level II

Denver, CO 80202

May 23, 2014

L699547

Serial Dilution

Batch number /Run number / Sample number cross reference

WG721802: R2925172: L699547-01 02 03
WG721997: R2925325: L699547-01 02 03
WG721943: R2925353: L699547-01 02 03
WG721619: R2925686 R2927034: L699547-01 02 03
WG721866: R2925736: L699547-01 02 03
WG722288: R2926546: L699547-01 02 03
WG722082: R2926619: L699547-01 02 03
WG722088: R2926826: L699547-01 02 03
WG722189: R2926926 R2927171: L699547-01 02 03
WG722531: R2927314: L699547-01 02 03

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