



**Nicholson GeoSolutions LLC**

3433 East Lake Drive  
Centennial, CO 80121

May 19, 2018

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

**Subject: OM B-10 Small Landfarm Screening Soil Sample Results**

Dear Derek:

Nicholson GeoSolutions LLC collected a screening level soil sample from the small landfarm on the OM B-10 well pad on Old Mountain, Garfield County, Colorado on May 5<sup>th</sup>, 2018. The sample was composited from 16 subsamples collected at depths of about 12-18 inches across the surface of the landfarm. This sample was analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), PAHs, and BTEX to evaluate compliance with the COGCC Table 910-1 standards and whether additional treatment is necessary. The laboratory report is attached.

All results are below the COGCC standards including benzo(a)pyrene at 0.0174 mg/kg (standard = 0.022 mg/kg). Additional treatment of the landfarm should be conducted to further reduce the benzo(a)pyrene concentration in preparation for final composite sampling in the fall of 2018.

Nicholson GeoSolutions LLC

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

David K. Nicholson, P.G.  
Principal Geologist

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

May 16, 2018

## Berry Petroleum - Denver, CO

Sample Delivery Group: L991927  
Samples Received: 05/08/2018  
Project Number:  
Description: North Parachute Pit Reclamation  
  
Report To: Dave Nicholson  
1999 Broadway, Suite 3700  
Denver, CO 93309

Entire Report Reviewed By:



Jason Romer  
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## K-15 L991927-01 Solid

Collected by  
DK Nicholson

Collected date/time  
05/05/18 13:45

Received date/time  
05/08/18 08:45

| Method  | Batch     | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021         | WG1109082 | 1        | 05/09/18 09:32        | 05/09/18 19:27     | DWR     |
| Semi-Volatile Organic Compounds (GC) by Method 8015         | WG1109622 | 2        | 05/12/18 15:46        | 05/13/18 15:10     | DMW     |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG1109641 | 1        | 05/11/18 20:42        | 05/12/18 15:00     | KM      |

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

## L-15 L991927-02 Solid

Collected by  
DK Nicholson

Collected date/time  
05/05/18 14:15

Received date/time  
05/08/18 08:45

| Method  | Batch     | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021         | WG1109082 | 1        | 05/09/18 09:32        | 05/09/18 19:49     | DWR     |
| Semi-Volatile Organic Compounds (GC) by Method 8015         | WG1109622 | 5        | 05/12/18 15:46        | 05/13/18 16:50     | DMW     |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG1109641 | 1        | 05/11/18 20:42        | 05/12/18 15:22     | KM      |

## K-15/L-15 L991927-03 Solid

Collected by  
DK Nicholson

Collected date/time  
05/05/18 14:20

Received date/time  
05/08/18 08:45

| Method  | Batch     | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021         | WG1109082 | 1        | 05/09/18 09:32        | 05/09/18 20:12     | DWR     |
| Semi-Volatile Organic Compounds (GC) by Method 8015         | WG1109622 | 10       | 05/12/18 15:46        | 05/13/18 17:45     | DMW     |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG1109641 | 1        | 05/11/18 20:42        | 05/12/18 16:28     | KM      |

## B-10 L991927-04 Solid

Collected by  
DK Nicholson

Collected date/time  
05/05/18 14:55

Received date/time  
05/08/18 08:45

| Method  | Batch     | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021         | WG1109082 | 1        | 05/09/18 09:32        | 05/09/18 20:34     | DWR     |
| Semi-Volatile Organic Compounds (GC) by Method 8015         | WG1109622 | 10       | 05/12/18 15:46        | 05/13/18 18:00     | DMW     |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG1109641 | 1        | 05/11/18 20:42        | 05/12/18 16:50     | KM      |

## C-10 L991927-05 Solid

Collected by  
DK Nicholson

Collected date/time  
05/05/18 15:10

Received date/time  
05/08/18 08:45

| Method  | Batch     | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021         | WG1109082 | 1        | 05/09/18 09:32        | 05/09/18 20:56     | DWR     |
| Semi-Volatile Organic Compounds (GC) by Method 8015         | WG1109622 | 10       | 05/12/18 15:46        | 05/13/18 18:14     | DMW     |
| Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM | WG1109641 | 1        | 05/11/18 20:42        | 05/12/18 17:11     | KM      |

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L991927

DATE/TIME:

05/16/18 14:56

PAGE:

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All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer  
Technical Service Representative

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



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

| Analyte                         | Result<br>mg/kg | Qualifier | RDL<br>mg/kg | Dilution | Analysis<br>date / time | Batch                     |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene                         | 0.00153         |           | 0.000500     | 1        | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| Toluene                         | ND              |           | 0.00500      | 1        | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| Ethylbenzene                    | 0.000851        | B         | 0.000500     | 1        | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| Total Xylene                    | 0.00222         | B         | 0.00150      | 1        | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| TPH (GC/FID) Low Fraction       | ND              |           | 0.100        | 1        | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| (S) a,a,a-Trifluorotoluene(FID) | 93.4            |           | 77.0-120     |          | 05/09/2018 20:34        | <a href="#">WG1109082</a> |
| (S) a,a,a-Trifluorotoluene(PID) | 101             |           | 75.0-128     |          | 05/09/2018 20:34        | <a href="#">WG1109082</a> |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte              | Result<br>mg/kg | Qualifier | RDL<br>mg/kg | Dilution | Analysis<br>date / time | Batch                     |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | ND              |           | 40.0         | 10       | 05/13/2018 18:00        | <a href="#">WG1109622</a> |
| C28-C40 Oil Range    | 45.4            |           | 40.0         | 10       | 05/13/2018 18:00        | <a href="#">WG1109622</a> |
| (S) o-Terphenyl      | 67.9            |           | 18.0-148     |          | 05/13/2018 18:00        | <a href="#">WG1109622</a> |

## Sample Narrative:

L991927-04 WG1109622: Cannot run at lower dilution due to viscosity of extract

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

| Analyte                | Result<br>mg/kg | Qualifier | RDL<br>mg/kg | Dilution | Analysis<br>date / time | Batch                     |
|------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Anthracene             | ND              |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Acenaphthene           | ND              |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Acenaphthylene         | ND              |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Benzo(a)anthracene     | 0.0118          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Benzo(a)pyrene         | 0.0174          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Benzo(b)fluoranthene   | 0.0341          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Benzo(g,h,i)perylene   | 0.0311          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Benzo(k)fluoranthene   | 0.00857         |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Chrysene               | 0.0118          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Dibenz(a,h)anthracene  | 0.00763         |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Fluoranthene           | 0.0133          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Fluorene               | ND              |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Indeno(1,2,3-cd)pyrene | 0.0159          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Naphthalene            | ND              |           | 0.0200       | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Phenanthrene           | 0.0134          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| Pyrene                 | 0.0143          |           | 0.00600      | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| 1-Methylnaphthalene    | ND              |           | 0.0200       | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| 2-Methylnaphthalene    | 0.0231          |           | 0.0200       | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| 2-Chloronaphthalene    | ND              |           | 0.0200       | 1        | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| (S) p-Terphenyl-d14    | 75.9            |           | 23.0-120     |          | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| (S) Nitrobenzene-d5    | 41.8            |           | 14.0-149     |          | 05/12/2018 16:50        | <a href="#">WG1109641</a> |
| (S) 2-Fluorobiphenyl   | 55.8            |           | 34.0-125     |          | 05/12/2018 16:50        | <a href="#">WG1109641</a> |

Method Blank (MB)

(MB) R3309371-5 05/09/18 14:13

| Analyte                            | MB Result<br>mg/kg | MB Qualifier | MB MDL<br>mg/kg | MB RDL<br>mg/kg |
|------------------------------------|--------------------|--------------|-----------------|-----------------|
| Benzene                            | U                  |              | 0.000120        | 0.000500        |
| Toluene                            | 0.000311           | ⬇            | 0.000150        | 0.00500         |
| Ethylbenzene                       | 0.000255           | ⬇            | 0.000110        | 0.000500        |
| Total Xylene                       | U                  |              | 0.000460        | 0.00150         |
| TPH (GC/FID) Low Fraction          | 0.0230             | ⬇            | 0.0217          | 0.100           |
| (S)<br>a,a,a-Trifluorotoluene(FID) | 99.1               |              |                 | 77.0-120        |
| (S)<br>a,a,a-Trifluorotoluene(PID) | 108                |              |                 | 75.0-128        |

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3309371-1 05/09/18 12:22 • (LCSD) R3309371-2 05/09/18 12:44

| Analyte                            | Spike Amount<br>mg/kg | LCS Result<br>mg/kg | LCSD Result<br>mg/kg | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|------------------------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| Benzene                            | 0.0500                | 0.0539              | 0.0528               | 108           | 106            | 71.0-121         |               |                | 2.00     | 20              |
| Toluene                            | 0.0500                | 0.0544              | 0.0529               | 109           | 106            | 72.0-120         |               |                | 2.63     | 20              |
| Ethylbenzene                       | 0.0500                | 0.0563              | 0.0559               | 113           | 112            | 76.0-121         |               |                | 0.641    | 20              |
| Total Xylene                       | 0.150                 | 0.165               | 0.164                | 110           | 109            | 75.0-124         |               |                | 0.668    | 20              |
| (S)<br>a,a,a-Trifluorotoluene(FID) |                       |                     |                      | 95.6          | 97.5           | 77.0-120         |               |                |          |                 |
| (S)<br>a,a,a-Trifluorotoluene(PID) |                       |                     |                      | 104           | 105            | 75.0-128         |               |                |          |                 |

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

(LCS) R3309371-3 05/09/18 13:06 • (LCSD) R3309371-4 05/09/18 13:29

| Analyte                            | Spike Amount<br>mg/kg | LCS Result<br>mg/kg | LCSD Result<br>mg/kg | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|------------------------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| TPH (GC/FID) Low Fraction          | 5.50                  | 5.02                | 5.30                 | 91.2          | 96.3           | 70.0-136         |               |                | 5.47     | 20              |
| (S)<br>a,a,a-Trifluorotoluene(FID) |                       |                     |                      | 109           | 111            | 77.0-120         |               |                |          |                 |
| (S)<br>a,a,a-Trifluorotoluene(PID) |                       |                     |                      | 117           | 119            | 75.0-128         |               |                |          |                 |





[L991927-01,02,03,04,05](#)

L991935-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L991935-01 05/10/18 00:17 • (MS) R3309371-6 05/10/18 00:39 • (MSD) R3309371-7 05/10/18 01:01

| Analyte                            | Spike Amount<br>mg/kg | Original Result<br>mg/kg | MS Result<br>mg/kg | MSD Result<br>mg/kg | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|------------------------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| Benzene                            | 0.0500                | 5.72                     | 24.7               | 25.3                | 75.8         | 78.3          | 500      | 10.0-146         |              |               | 2.53     | 29              |
| Toluene                            | 0.0500                | 3.12                     | 25.6               | 25.3                | 89.7         | 88.8          | 500      | 10.0-143         |              |               | 0.926    | 30              |
| Ethylbenzene                       | 0.0500                | 30.5                     | 46.6               | 46.9                | 64.3         | 65.8          | 500      | 10.0-147         |              |               | 0.802    | 31              |
| Total Xylene                       | 0.150                 | 58.2                     | 115                | 115                 | 75.3         | 76.3          | 500      | 10.0-149         |              |               | 0.608    | 30              |
| (S)<br>a,a,a-Trifluorotoluene(FID) |                       |                          |                    |                     | 130          | 131           |          | 77.0-120         | J1           | J1            |          |                 |
| (S)<br>a,a,a-Trifluorotoluene(PID) |                       |                          |                    |                     | 133          | 134           |          | 75.0-128         | J1           | J1            |          |                 |

L991935-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L991935-01 05/10/18 00:17 • (MS) R3309371-8 05/10/18 01:23 • (MSD) R3309371-9 05/10/18 01:45

| Analyte                            | Spike Amount<br>mg/kg | Original Result<br>mg/kg | MS Result<br>mg/kg | MSD Result<br>mg/kg | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|------------------------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| TPH (GC/FID) Low Fraction          | 5.50                  | 1360                     | 1950               | 1860                | 21.6         | 18.0          | 500      | 10.0-147         |              |               | 5.15     | 30              |
| (S)<br>a,a,a-Trifluorotoluene(FID) |                       |                          |                    |                     | 139          | 137           |          | 77.0-120         | J1           | J1            |          |                 |
| (S)<br>a,a,a-Trifluorotoluene(PID) |                       |                          |                    |                     | 141          | 139           |          | 75.0-128         | J1           | J1            |          |                 |

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3309771-1 05/13/18 12:49

| Analyte              | MB Result<br>mg/kg | MB Qualifier | MB MDL<br>mg/kg | MB RDL<br>mg/kg |
|----------------------|--------------------|--------------|-----------------|-----------------|
| C10-C28 Diesel Range | U                  |              | 1.61            | 4.00            |
| C28-C40 Oil Range    | U                  |              | 0.274           | 4.00            |
| (S) o-Terphenyl      | 74.7               |              |                 | 18.0-148        |

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3309771-2 05/13/18 13:03 • (LCSD) R3309771-3 05/13/18 13:17

| Analyte              | Spike Amount<br>mg/kg | LCS Result<br>mg/kg | LCSD Result<br>mg/kg | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|----------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| C10-C28 Diesel Range | 50.0                  | 27.0                | 28.7                 | 53.9          | 57.5           | 50.0-150         |               |                | 6.39     | 20              |
| (S) o-Terphenyl      |                       |                     |                      | 67.9          | 66.7           | 18.0-148         |               |                |          |                 |

L991930-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L991930-05 05/13/18 17:04 • (MS) R3309771-4 05/13/18 17:18 • (MSD) R3309771-5 05/13/18 17:31

| Analyte              | Spike Amount<br>mg/kg | Original Result<br>mg/kg | MS Result<br>mg/kg | MSD Result<br>mg/kg | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | MS Qualifier | MSD Qualifier | RPD<br>% | RPD Limits<br>% |
|----------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| C10-C28 Diesel Range | 50.0                  | 176                      | 223                | 248                 | 94.4         | 145           | 5        | 50.0-150         |              |               | 10.8     | 20              |
| (S) o-Terphenyl      |                       |                          |                    |                     | 51.5         | 60.0          |          | 18.0-148         |              |               |          |                 |



Method Blank (MB)

(MB) R3309273-3 05/12/18 12:05

| Analyte                | MB Result<br>mg/kg | MB Qualifier | MB MDL<br>mg/kg | MB RDL<br>mg/kg |
|------------------------|--------------------|--------------|-----------------|-----------------|
| Anthracene             | U                  |              | 0.000600        | 0.00600         |
| Acenaphthene           | U                  |              | 0.000600        | 0.00600         |
| Acenaphthylene         | U                  |              | 0.000600        | 0.00600         |
| Benzo(a)anthracene     | U                  |              | 0.000600        | 0.00600         |
| Benzo(a)pyrene         | U                  |              | 0.000600        | 0.00600         |
| Benzo(b)fluoranthene   | U                  |              | 0.000600        | 0.00600         |
| Benzo(g,h,i)perylene   | U                  |              | 0.000600        | 0.00600         |
| Benzo(k)fluoranthene   | U                  |              | 0.000600        | 0.00600         |
| Chrysene               | U                  |              | 0.000600        | 0.00600         |
| Dibenz(a,h)anthracene  | U                  |              | 0.000600        | 0.00600         |
| Fluoranthene           | U                  |              | 0.000600        | 0.00600         |
| Fluorene               | U                  |              | 0.000600        | 0.00600         |
| Indeno(1,2,3-cd)pyrene | U                  |              | 0.000600        | 0.00600         |
| Naphthalene            | U                  |              | 0.00200         | 0.0200          |
| Phenanthrene           | U                  |              | 0.000600        | 0.00600         |
| Pyrene                 | U                  |              | 0.000600        | 0.00600         |
| 1-Methylnaphthalene    | U                  |              | 0.00200         | 0.0200          |
| 2-Methylnaphthalene    | U                  |              | 0.00200         | 0.0200          |
| 2-Chloronaphthalene    | U                  |              | 0.00200         | 0.0200          |
| (S) Nitrobenzene-d5    | 67.1               |              |                 | 14.0-149        |
| (S) 2-Fluorobiphenyl   | 88.4               |              |                 | 34.0-125        |
| (S) p-Terphenyl-d14    | 87.2               |              |                 | 23.0-120        |

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3309273-1 05/12/18 11:21 • (LCSD) R3309273-2 05/12/18 11:43

| Analyte               | Spike Amount<br>mg/kg | LCS Result<br>mg/kg | LCSD Result<br>mg/kg | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | LCS Qualifier | LCSD Qualifier | RPD<br>% | RPD Limits<br>% |
|-----------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| Anthracene            | 0.0800                | 0.0703              | 0.0685               | 87.8          | 85.6           | 50.0-125         |               |                | 2.54     | 20              |
| Acenaphthene          | 0.0800                | 0.0631              | 0.0601               | 78.8          | 75.2           | 52.0-120         |               |                | 4.72     | 20              |
| Acenaphthylene        | 0.0800                | 0.0645              | 0.0617               | 80.6          | 77.1           | 51.0-120         |               |                | 4.43     | 20              |
| Benzo(a)anthracene    | 0.0800                | 0.0674              | 0.0640               | 84.2          | 80.1           | 46.0-121         |               |                | 5.07     | 20              |
| Benzo(a)pyrene        | 0.0800                | 0.0691              | 0.0661               | 86.3          | 82.6           | 42.0-121         |               |                | 4.37     | 20              |
| Benzo(b)fluoranthene  | 0.0800                | 0.0652              | 0.0611               | 81.5          | 76.4           | 42.0-123         |               |                | 6.42     | 20              |
| Benzo(g,h,i)perylene  | 0.0800                | 0.0784              | 0.0738               | 98.0          | 92.3           | 43.0-128         |               |                | 5.99     | 20              |
| Benzo(k)fluoranthene  | 0.0800                | 0.0702              | 0.0671               | 87.7          | 83.9           | 45.0-128         |               |                | 4.43     | 20              |
| Chrysene              | 0.0800                | 0.0690              | 0.0666               | 86.3          | 83.2           | 48.0-127         |               |                | 3.58     | 20              |
| Dibenz(a,h)anthracene | 0.0800                | 0.0800              | 0.0767               | 100           | 95.8           | 43.0-132         |               |                | 4.32     | 20              |
| Fluoranthene          | 0.0800                | 0.0723              | 0.0679               | 90.3          | 84.9           | 49.0-129         |               |                | 6.23     | 20              |

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

(LCS) R3309273-1 05/12/18 11:21 • (LCSD) R3309273-2 05/12/18 11:43

| Analyte                | Spike Amount<br>mg/kg | LCS Result<br>mg/kg | LCSD Result<br>mg/kg | LCS Rec.<br>% | LCSD Rec.<br>% | Rec. Limits<br>% | <u>LCS Qualifier</u> | <u>LCSD Qualifier</u> | RPD<br>% | RPD Limits<br>% |
|------------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|----------------------|-----------------------|----------|-----------------|
| Fluorene               | 0.0800                | 0.0628              | 0.0601               | 78.5          | 75.2           | 50.0-120         |                      |                       | 4.30     | 20              |
| Indeno(1,2,3-cd)pyrene | 0.0800                | 0.0802              | 0.0765               | 100           | 95.7           | 44.0-131         |                      |                       | 4.66     | 20              |
| Naphthalene            | 0.0800                | 0.0558              | 0.0546               | 69.8          | 68.2           | 50.0-120         |                      |                       | 2.24     | 20              |
| Phenanthrene           | 0.0800                | 0.0661              | 0.0636               | 82.6          | 79.5           | 48.0-120         |                      |                       | 3.87     | 20              |
| Pyrene                 | 0.0800                | 0.0665              | 0.0638               | 83.2          | 79.7           | 48.0-135         |                      |                       | 4.22     | 20              |
| 1-Methylnaphthalene    | 0.0800                | 0.0578              | 0.0558               | 72.3          | 69.8           | 52.0-122         |                      |                       | 3.52     | 20              |
| 2-Methylnaphthalene    | 0.0800                | 0.0555              | 0.0537               | 69.3          | 67.1           | 52.0-120         |                      |                       | 3.26     | 20              |
| 2-Chloronaphthalene    | 0.0800                | 0.0651              | 0.0633               | 81.3          | 79.1           | 50.0-120         |                      |                       | 2.78     | 20              |
| (S) Nitrobenzene-d5    |                       |                     |                      | 71.8          | 68.4           | 14.0-149         |                      |                       |          |                 |
| (S) 2-Fluorobiphenyl   |                       |                     |                      | 94.6          | 88.9           | 34.0-125         |                      |                       |          |                 |
| (S) p-Terphenyl-d14    |                       |                     |                      | 88.2          | 84.0           | 23.0-120         |                      |                       |          |                 |

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L991927-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L991927-02 05/12/18 15:22 • (MS) R3309273-4 05/12/18 15:44 • (MSD) R3309273-5 05/12/18 16:06

| Analyte                | Spike Amount<br>mg/kg | Original Result<br>mg/kg | MS Result<br>mg/kg | MSD Result<br>mg/kg | MS Rec.<br>% | MSD Rec.<br>% | Dilution | Rec. Limits<br>% | <u>MS Qualifier</u> | <u>MSD Qualifier</u> | RPD<br>% | RPD Limits<br>% |
|------------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|---------------------|----------------------|----------|-----------------|
| Anthracene             | 0.0800                | 0.0121                   | 0.0861             | 0.0764              | 92.5         | 80.4          | 1        | 20.0-136         |                     |                      | 11.9     | 24              |
| Acenaphthene           | 0.0800                | 0.0140                   | 0.0682             | 0.0693              | 67.7         | 69.1          | 1        | 29.0-124         |                     |                      | 1.60     | 20              |
| Acenaphthylene         | 0.0800                | ND                       | 0.0640             | 0.0675              | 80.0         | 84.3          | 1        | 35.0-120         |                     |                      | 5.31     | 20              |
| Benzo(a)anthracene     | 0.0800                | 0.117                    | 0.195              | 0.177               | 97.2         | 74.6          | 1        | 13.0-132         |                     |                      | 9.76     | 27              |
| Benzo(a)pyrene         | 0.0800                | 0.107                    | 0.174              | 0.157               | 83.8         | 63.3          | 1        | 14.0-138         |                     |                      | 9.94     | 27              |
| Benzo(b)fluoranthene   | 0.0800                | 0.291                    | 0.350              | 0.322               | 73.3         | 38.2          | 1        | 10.0-129         |                     |                      | 8.35     | 31              |
| Benzo(g,h,i)perylene   | 0.0800                | 0.170                    | 0.234              | 0.213               | 80.6         | 54.7          | 1        | 10.0-133         |                     |                      | 9.28     | 30              |
| Benzo(k)fluoranthene   | 0.0800                | 0.0587                   | 0.146              | 0.134               | 110          | 93.8          | 1        | 15.0-131         |                     |                      | 8.99     | 27              |
| Chrysene               | 0.0800                | 0.172                    | 0.246              | 0.219               | 93.1         | 59.3          | 1        | 15.0-137         |                     |                      | 11.6     | 25              |
| Dibenz(a,h)anthracene  | 0.0800                | 0.0742                   | 0.145              | 0.132               | 88.1         | 72.2          | 1        | 15.0-132         |                     |                      | 9.19     | 27              |
| Fluoranthene           | 0.0800                | 0.127                    | 0.199              | 0.175               | 90.2         | 60.5          | 1        | 13.0-139         |                     |                      | 12.7     | 28              |
| Fluorene               | 0.0800                | 0.0137                   | 0.0730             | 0.0689              | 74.1         | 69.1          | 1        | 27.0-122         |                     |                      | 5.71     | 22              |
| Indeno(1,2,3-cd)pyrene | 0.0800                | 0.140                    | 0.211              | 0.192               | 88.4         | 64.7          | 1        | 11.0-133         |                     |                      | 9.41     | 29              |
| Naphthalene            | 0.0800                | 0.226                    | 0.249              | 0.229               | 28.6         | 4.58          | 1        | 18.0-136         |                     | J6                   | 8.05     | 21              |
| Phenanthrene           | 0.0800                | 0.133                    | 0.184              | 0.164               | 63.7         | 38.4          | 1        | 15.0-133         |                     |                      | 11.6     | 25              |
| Pyrene                 | 0.0800                | 0.0791                   | 0.140              | 0.127               | 76.5         | 60.1          | 1        | 11.0-146         |                     |                      | 9.77     | 29              |
| 1-Methylnaphthalene    | 0.0800                | 0.214                    | 0.223              | 0.206               | 11.8         | 0.000         | 1        | 24.0-137         | J6                  | J6                   | 8.18     | 22              |
| 2-Methylnaphthalene    | 0.0800                | 0.446                    | 0.438              | 0.387               | 0.000        | 0.000         | 1        | 23.0-136         | V                   | V                    | 12.5     | 22              |
| 2-Chloronaphthalene    | 0.0800                | ND                       | 0.0589             | 0.0628              | 73.6         | 78.5          | 1        | 36.0-120         |                     |                      | 6.34     | 20              |
| (S) Nitrobenzene-d5    |                       |                          |                    |                     | 77.2         | 76.1          |          | 14.0-149         |                     |                      |          |                 |
| (S) 2-Fluorobiphenyl   |                       |                          |                    |                     | 80.6         | 81.5          |          | 34.0-125         |                     |                      |          |                 |
| (S) p-Terphenyl-d14    |                       |                          |                    |                     | 84.6         | 79.9          |          | 23.0-120         |                     |                      |          |                 |



## Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

### Abbreviations and Definitions

|                              |  |
|------------------------------|--|
| MDL                          | Method Detection Limit.  |
| ND                           | Not detected at the Reporting Limit (or MDL where applicable).   |
| RDL                          | Reported Detection Limit.  |
| Rec.                         | Recovery.  |
| RPD                          | Relative Percent Difference.   |
| SDG                          | Sample Delivery Group.   |
| (S)                          | Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.   |
| U                            | Not detected at the Reporting Limit (or MDL where applicable).   |
| Analyte                      | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.   |
| Dilution                     | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.  |
| Limits                       | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.  |
| Original Sample              | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.  |
| Qualifier                    | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.  |
| Result                       | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Case Narrative (Cn)          | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.  |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.  |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.  |
| Sample Results (Sr)          | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.   |
| Sample Summary (Ss)          | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.  |

| Qualifier | Description   |
|-----------|---|
| B         | The same analyte is found in the associated blank.  |
| J         | The identification of the analyte is acceptable; the reported value is an estimate.                   |
| J1        | Surrogate recovery limits have been exceeded; values are outside upper control limits.                |
| J6        | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |
| V         | The sample concentration is too high to evaluate accurate spike recoveries.                           |

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



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

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

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

## State Accreditations

|                         |             |                             |                   |
|-------------------------|-------------|-----------------------------|-------------------|
| Alabama                 | 40660       | Nebraska                    | NE-OS-15-05       |
| Alaska                  | 17-026      | Nevada                      | TN-03-2002-34     |
| Arizona                 | AZ0612      | New Hampshire               | 2975              |
| Arkansas                | 88-0469     | New Jersey–NELAP            | TN002             |
| California              | 2932        | New Mexico <sup>1</sup>     | n/a               |
| Colorado                | TN00003     | New York                    | 11742             |
| Connecticut             | PH-0197     | North Carolina              | Env375            |
| Florida                 | E87487      | North Carolina <sup>1</sup> | DW21704           |
| Georgia                 | NELAP       | North Carolina <sup>3</sup> | 41                |
| Georgia <sup>1</sup>    | 923         | North Dakota                | R-140             |
| Idaho                   | TN00003     | Ohio–VAP                    | CL0069            |
| Illinois                | 200008      | Oklahoma                    | 9915              |
| Indiana                 | C-TN-01     | Oregon                      | TN2000002         |
| Iowa                    | 364         | Pennsylvania                | 68-02979          |
| Kansas                  | E-10277     | Rhode Island                | LA000356          |
| Kentucky <sup>1 6</sup> | 90010       | South Carolina              | 84004             |
| Kentucky <sup>2</sup>   | 16          | South Dakota                | n/a               |
| Louisiana               | AI30792     | Tennessee <sup>1 4</sup>    | 2006              |
| Louisiana <sup>1</sup>  | LA180010    | Texas                       | T 104704245-17-14 |
| Maine                   | TN0002      | Texas <sup>5</sup>          | LAB0152           |
| Maryland                | 324         | Utah                        | TN00003           |
| Massachusetts           | M-TN003     | Vermont                     | VT2006            |
| Michigan                | 9958        | Virginia                    | 460132            |
| Minnesota               | 047-999-395 | Washington                  | C847              |
| Mississippi             | TN00003     | West Virginia               | 233               |
| Missouri                | 340         | Wisconsin                   | 9980939910        |
| Montana                 | CERT0086    | Wyoming                     | A2LA              |

## Third Party Federal Accreditations

|                               |         |                    |               |
|-------------------------------|---------|--------------------|---------------|
| A2LA – ISO 17025              | 1461.01 | AIHA-LAP,LLC EMLAP | 100789        |
| A2LA – ISO 17025 <sup>5</sup> | 1461.02 | DOD                | 1461.01       |
| Canada                        | 1461.01 | USDA               | P330-15-00234 |
| EPA–Crypto                    | TN00003 |                    |               |

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

## Our Locations

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



# Berry Petroleum - Denver, CO

1999 Broadway, Suite 3700  
Denver, CO 93309

## Billing Information:

Don Wilbourn  
235 Callahan Ave  
Parachute, CO 81635

Report to:  
Dave Nicholson

Email To: dknicholson@q.com

Project Description: *North Parachute Pit Reclamation*

City/State  
Collected:

Phone: ~~303-999-4400~~  
Fax: ~~303-999-4401~~

Client Project #

Lab Project #

BERPETDCO-NICHOLSON

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

**Rush?** (Lab MUST Be Notified)

Quote #

Immediately  
Packed on Ice N ☒

☐ Same Day ☐ Five Day  
☐ Next Day ☐ 5 Day (Rad Only)  
☐ Two Day ☐ 10 Day (Rad Only)  
☐ Three Day

Date Results Needed

No.  
of  
Ents

| Sample ID        | Comp/Grab | Matrix * | Depth | Date | Time | No.<br>of<br>Ents |
|------------------|-----------|----------|-------|------|------|-------------------|
| K-15             |           | SS       |       | 5/5  | 1345 | 2                 |
| L-15             |           | SS       |       |      | 1415 | 2                 |
| K-15/L-15        |           | SS       |       |      | 1420 | 2                 |
| B-10             |           | SS       |       |      | 1455 | 2                 |
| C-10             |           | SS       |       |      | 1510 | 2                 |
| <del>D-361</del> |           | SS       |       |      |      | 2                 |
|                  |           | SS       |       |      |      | 2                 |
|                  |           | SS       |       |      |      | 2                 |
|                  |           | SS       |       |      |      | 2                 |
|                  |           | SS       |       |      |      | 2                 |
|                  |           | SS       |       |      |      | 2                 |

\* Matrix:

SS - Soil AIR - Air F - Filter  
GW - Groundwater B - Bioassay  
WW - WasteWater  
DW - Drinking Water  
OT - Other

Remarks:

Samples returned via:  
☐ UPS ☐ FedEx ☐ Courier

Tracking # *4276 0141 2910*

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes / No

HCL / MeOH

TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C Bottles Received:

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:  
NCF / OK

Analysis / Container / Preservative

Pres  
Chk

BTEXGRO 4ozClr-NoPres  
DRORLA, SV8270PAHSIM 4ozClr-NoPres

Chain of Custody Page 1 of 1



L.A.B. S.C.I.E.N.C.E.S.

a subsidiary of

12065 Lebanon Rd  
Mount Juliet, TN 37122  
Phone: 615-758-5858  
Phone: 800-767-5859  
Fax: 615-758-5859



L# *991927*

E172

Acctnum: BERPETDCO

Template: T134889

Prelogin: P648204

TSR: 134 - Mark W. Beasley

PB: *4-10-18 CM*

Shipped Via: FedEx Ground

Remarks Sample # (lab only)

Sample Receipt Checklist

COC Seal Present/Intact: ☒ Y ☐ N  
COC Signed/Accurate: ☒ Y ☐ N  
Bottles arrive intact: ☒ Y ☐ N  
Correct bottles used: ☒ Y ☐ N  
Sufficient volume sent: ☒ Y ☐ N  
If Applicable  
VOA Zero Headspace: ☐ Y ☒ N  
Preservation Correct/Checked: ☐ Y ☒ N

If preservation required by Login: Date/Time