

**Landfarm Closure Report
for the
State No. 2-30 Lease
Adams County, Colorado
COGCC Remediation #9854**

Prepared for:

Mr. Terry Pape
HRM Resources II, LLC
410 17th Street, Suite 1600
Denver, CO 80202



Nicholson GeoSolutions, LLC
3433 East Lake Drive
Centennial, CO 80121

November 2017

1.0 INTRODUCTION

Nicholson GeoSolutions LLC was retained by HRM Resources II, LLC to conduct landfarm closure at the State No. 2-30 Lease, an active oil well site located on State Institutional Land Trust Land in the SE¼ NW¼ Section 30, T2S, R62W, Adams County, Colorado. Remediation activities were conducted in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Series 900 Rules.

The unlined skim pit at the State 2-30 lease was ordered closed by John Axelson of the Colorado Oil and Gas Conservation Commission (COGCC) under Field Inspection Form (FIF) #679500122 dated August 5th, 2016. A Form 27 was submitted and excavation of the skim pit was conducted in September 2016 by Jayhawk Grading, Inc. under COGCC Remediation #9854.

Petroleum-contaminated soil was excavated to an approximate depth of 40 feet. Approximately 1,200 yards of impacted soils were excavated and stockpiled on site, in addition to several thousand yards of overburden.

The COGCC issued a letter to HRM on October 17th, 2016 that provided Conditions of Approval for land treatment of the impacted soil on the site. Based on this approval, Jayhawk constructed two landfarm cells on the site. Two composite soil samples were collected on October 21st, 2016 to evaluate the initial hydrocarbon concentrations of the landfarm material. The sample results showed that the soil petroleum concentrations in the two landfarm cells were relatively low (1,337 mg/kg and 1,783 mg/kg, respectively). The landfarms were tilled in October 2016 and April 2017.

2.0 SAMPLING ACTIVITIES

The following sections discuss the sampling activities conducted by Nicholson GeoSolutions for the State 2-30 landfarms.

2.1 Sampling Activities

A series of screening level composite samples were collected during 2016 and 2017 to evaluate the petroleum content of the landfarmed soils. The screening samples collected on August 22, 2017 indicated that the landfarms were ready for final discrete sampling.

Twelve discrete samples were collected from the landfarms at depth of about 12-16 inches on August 30th, 2017 and analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), and BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). Additional samples were collected from the same locations on September 15th, 2017 and analyzed for pH, conductivity, and sodium adsorption ratio (SAR). Figure 1 provides the approximate limits of the landfarms and the locations of the confirmation samples. The laboratory reports are included in Appendix A.

Table 1 provides the confirmation sample results for the landfarms.

Table 1 Landfarm Confirmation Sample Results

| Sample ID | pH | SAR | SC | BTEX | TVPH – Gasoline (mg/kg) | TEPH – Diesel (mg/kg) | TEPH – Motor Oil (mg/kg) |
|----------------------|---------------|-------------|------|---------|-------------------------|-----------------------|--------------------------|
| State230-LF-1 | 8.07 J | 17.0 | 2.04 | All ok | <0.1 UJ | 27.4 J | 17.5 J |
| State230-LF-2 | 8.08 J | 18.4 | 2.39 | All ND | <0.1 UJ | 35.4 J | 23.0 J |
| State230-LF-3 | 8.06 J | 16.5 | 2.55 | All ND | <0.1 UJ | 4.05 J | <4.0 UJ |
| State230-LF-4 | 7.97 J | 18.0 | 2.01 | All ND | <0.1 UJ | 53.6 J | 22.6 J |
| State230-LF-5 | 9.22 J | 42.5 | 1.51 | All ND | <0.1 UJ | 48.9 J | 19.2 J |
| State230-LF-6 | 8.15 J | 10.3 | 2.38 | All ok | <0.1 UJ | 73.5 J | 105 J |
| State230-LF-7 | 8.09 J | 18.8 | 2.09 | All ND | <0.1 UJ | 123 J | 53.6 J |
| State230-LF-8 | 9.34 J | 4.67 | 1.30 | All ND | <0.1 UJ | 20.9 J | 25.4 J |
| State230-LF-9 | 9.28 J | 3.27 | 1.06 | All ND | <0.1 UJ | 34.4 J | 38.2 J |
| State230-LF-10 | 10.2 J | 20.3 | 1.19 | All ND | <0.1 UJ | 16.5 J | 5.41 J |
| State230-LF-11 | 4.45 J | 17.9 | 1.69 | All ND | <0.1 UJ | 31.9 J | 29.6 J |
| State230-LF-12 | 8.27 J | 18.9 | 1.78 | All ND | <0.1 UJ | 207 J | 72.4 J |
| Table 910-1 Standard | 6-9 | <12 | <4.0 | Various | 500 ¹ | | |

Bold values exceed standards

¹The standard is 500 mg/kg for the combined TEPH/TVPH results ND = Not detected

J = estimated concentration UJ = estimated detection limit

All confirmation sample results were below the COGCC standards for petroleum; however, all samples failed for either SAR or pH or both. Based on these sample results, the landfarm material was buried at least three feet deep in the skim pit excavation. Clean fill was placed on top of this material to completely fill the skim pit excavation and

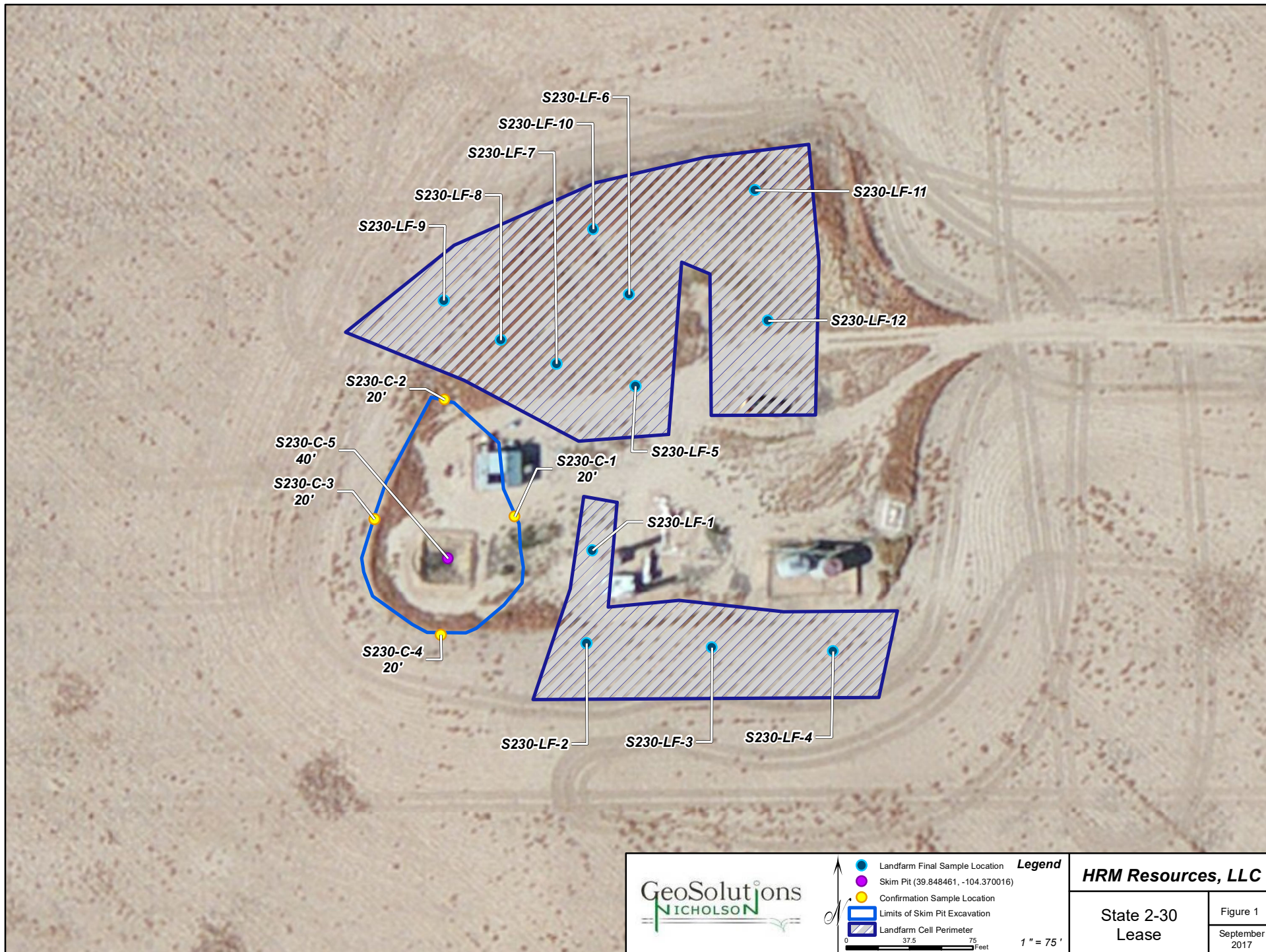
the site was regraded. Appendix B provides photos of the site after backfilling and regrading of the skim pit excavation.

2.2 Data Quality Review

A data quality review was conducted using the quality assurance reports supplied by the laboratory and standard EPA data validation guidance. All analyses were conducted within the recommended holding times except for pH which has a holding time of “immediate”. All pH results were qualified as estimate “J”.

For lab report L933465, all laboratory control sample (LCS), surrogate, laboratory duplicate, and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within the laboratory control limits, except for the MS/MSD results for BTEX (RPD ranged from 59.3% to 73.3%), TVPH-gasoline (RPD = 35.0%), and TEPH-diesel (MSD = 49.9%). BTEX, TVPH, and TEPH results were qualified as estimated “J” for positive results and not detected at an estimated detection limit “UJ” for non-detect results.

All results are usable for the intended purposes of this remediation.



APPENDIX A

Laboratory Reports

September 07, 2017

HRM Resources, LLC - Denver, CO

Sample Delivery Group: L933465
Samples Received: 09/01/2017
Project Number:
Description: HRM Landfarm Sampling

Report To: Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

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



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



5230-LF-1 L933465-01 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:00 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 16:45 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 23:12 | ACM |

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

5230-LF-2 L933465-02 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:10 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 17:07 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 23:25 | ACM |

5230-LF-3 L933465-03 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:20 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 17:30 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 22:33 | ACM |

5230-LF-4 L933465-04 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:30 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 17:52 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 23:38 | ACM |

5230-LF-5 L933465-05 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:40 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 18:14 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 23:51 | ACM |

5230-LF-6 L933465-06 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 08:50 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 18:37 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/07/17 00:30 | ACM |

5230-LF-7 L933465-07 Solid

| | | | Collected by Dave Nicholson | Collected date/time 08/30/17 09:00 | Received date/time 09/01/17 08:45 |
|---|-----------|----------|--------------------------------|---------------------------------------|--------------------------------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 18:59 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/07/17 01:20 | ACM |

ACCOUNT:

HRM Resources, LLC - Denver, CO

PROJECT:

SDG:

L933465

DATE/TIME:

09/07/17 13:28

PAGE:

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



5230-LF-8 L933465-08 Solid

Collected by
Dave Nicholson

Collected date/time
08/30/17 09:10

Received date/time
09/01/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 19:21 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/07/17 00:42 | ACM |

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

5230-LF-9 L933465-09 Solid

Collected by
Dave Nicholson

Collected date/time
08/30/17 09:20

Received date/time
09/01/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 19:43 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 22:59 | ACM |

5230-LF-10 L933465-10 Solid

Collected by
Dave Nicholson

Collected date/time
08/30/17 09:25

Received date/time
09/01/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 20:06 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/06/17 22:46 | ACM |

5230-LF-11 L933465-11 Solid

Collected by
Dave Nicholson

Collected date/time
08/30/17 09:30

Received date/time
09/01/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 20:28 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/07/17 00:55 | ACM |

5230-LF-12 L933465-12 Solid

Collected by
Dave Nicholson

Collected date/time
08/30/17 09:35

Received date/time
09/01/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|---|-----------|----------|-----------------------|--------------------|---------|
| Volatile Organic Compounds (GC) by Method 8015/8021 | WG1016307 | 1 | 09/01/17 17:59 | 09/03/17 20:50 | DWR |
| Semi-Volatile Organic Compounds (GC) by Method 8015 | WG1016591 | 1 | 09/05/17 23:54 | 09/07/17 01:07 | ACM |

ACCOUNT:

HRM Resources, LLC - Denver, CO

PROJECT:

SDG:

L933465

DATE/TIME:

09/07/17 13:28

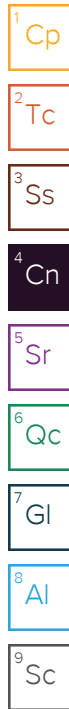
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All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected 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.

Mark W. Beasley
Technical Service Representative





Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------------------|--------------|----------|-------------------------|---------------------------|
| Benzene | 0.000617 | J3 | 0.000500 | 1 | 09/03/2017 16:45 | WG1016307 |
| Toluene | ND | J3 | 0.00500 | 1 | 09/03/2017 16:45 | WG1016307 |
| Ethylbenzene | ND | J3 | 0.000500 | 1 | 09/03/2017 16:45 | WG1016307 |
| Total Xylene | ND | J3 J6 | 0.00150 | 1 | 09/03/2017 16:45 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | J3 | 0.100 | 1 | 09/03/2017 16:45 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 94.1 | | 77.0-120 | | 09/03/2017 16:45 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 100 | | 75.0-128 | | 09/03/2017 16:45 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 27.4 | | 4.00 | 1 | 09/06/2017 23:12 | WG1016591 |
| C28-C40 Oil Range | 17.5 | | 4.00 | 1 | 09/06/2017 23:12 | WG1016591 |
| (S) o-Terphenyl | 74.1 | | 18.0-148 | | 09/06/2017 23:12 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 17:07 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 17:07 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 17:07 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 17:07 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 17:07 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 91.6 | | 77.0-120 | | 09/03/2017 17:07 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 97.5 | | 75.0-128 | | 09/03/2017 17:07 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 35.4 | | 4.00 | 1 | 09/06/2017 23:25 | WG1016591 |
| C28-C40 Oil Range | 23.0 | | 4.00 | 1 | 09/06/2017 23:25 | WG1016591 |
| (S) o-Terphenyl | 76.8 | | 18.0-148 | | 09/06/2017 23:25 | WG1016591 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 17:30 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 17:30 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 17:30 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 17:30 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 17:30 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 94.9 | | 77.0-120 | | 09/03/2017 17:30 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 101 | | 75.0-128 | | 09/03/2017 17:30 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 4.05 | | 4.00 | 1 | 09/06/2017 22:33 | WG1016591 |
| C28-C40 Oil Range | ND | | 4.00 | 1 | 09/06/2017 22:33 | WG1016591 |
| (S) o-Terphenyl | 73.3 | | 18.0-148 | | 09/06/2017 22:33 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 17:52 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 17:52 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 17:52 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 17:52 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 17:52 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 93.4 | | 77.0-120 | | 09/03/2017 17:52 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 99.7 | | 75.0-128 | | 09/03/2017 17:52 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 53.6 | | 4.00 | 1 | 09/06/2017 23:38 | WG1016591 |
| C28-C40 Oil Range | 22.6 | | 4.00 | 1 | 09/06/2017 23:38 | WG1016591 |
| (S) o-Terphenyl | 90.6 | | 18.0-148 | | 09/06/2017 23:38 | WG1016591 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 18:14 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 18:14 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 18:14 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 18:14 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 18:14 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 93.8 | | 77.0-120 | | 09/03/2017 18:14 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 99.4 | | 75.0-128 | | 09/03/2017 18:14 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|--------------------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 48.9 | J6 | 4.00 | 1 | 09/06/2017 23:51 | WG1016591 |
| C28-C40 Oil Range | 19.2 | | 4.00 | 1 | 09/06/2017 23:51 | WG1016591 |
| (S) o-Terphenyl | 84.3 | | 18.0-148 | | 09/06/2017 23:51 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | 0.000621 | | 0.000500 | 1 | 09/03/2017 18:37 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 18:37 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 18:37 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 18:37 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 18:37 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 94.7 | | 77.0-120 | | 09/03/2017 18:37 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 99.8 | | 75.0-128 | | 09/03/2017 18:37 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 73.5 | | 4.00 | 1 | 09/07/2017 00:30 | WG1016591 |
| C28-C40 Oil Range | 105 | | 4.00 | 1 | 09/07/2017 00:30 | WG1016591 |
| (S) o-Terphenyl | 78.8 | | 18.0-148 | | 09/07/2017 00:30 | WG1016591 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 18:59 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 18:59 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 18:59 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 18:59 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 18:59 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 93.5 | | 77.0-120 | | 09/03/2017 18:59 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 98.7 | | 75.0-128 | | 09/03/2017 18:59 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 123 | | 4.00 | 1 | 09/07/2017 01:20 | WG1016591 |
| C28-C40 Oil Range | 53.6 | | 4.00 | 1 | 09/07/2017 01:20 | WG1016591 |
| (S) o-Terphenyl | 87.8 | | 18.0-148 | | 09/07/2017 01:20 | WG1016591 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 19:21 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 19:21 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 19:21 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 19:21 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 19:21 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 90.4 | | 77.0-120 | | 09/03/2017 19:21 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 96.2 | | 75.0-128 | | 09/03/2017 19:21 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 20.9 | | 4.00 | 1 | 09/07/2017 00:42 | WG1016591 |
| C28-C40 Oil Range | 25.4 | | 4.00 | 1 | 09/07/2017 00:42 | WG1016591 |
| (S) o-Terphenyl | 86.3 | | 18.0-148 | | 09/07/2017 00:42 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 19:43 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 19:43 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 19:43 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 19:43 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 19:43 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 87.5 | | 77.0-120 | | 09/03/2017 19:43 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 92.7 | | 75.0-128 | | 09/03/2017 19:43 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 34.4 | | 4.00 | 1 | 09/06/2017 22:59 | WG1016591 |
| C28-C40 Oil Range | 38.2 | | 4.00 | 1 | 09/06/2017 22:59 | WG1016591 |
| (S) o-Terphenyl | 80.9 | | 18.0-148 | | 09/06/2017 22:59 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 20:06 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 20:06 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 20:06 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 20:06 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 20:06 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 96.0 | | 77.0-120 | | 09/03/2017 20:06 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 101 | | 75.0-128 | | 09/03/2017 20:06 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 16.5 | | 4.00 | 1 | 09/06/2017 22:46 | WG1016591 |
| C28-C40 Oil Range | 5.41 | | 4.00 | 1 | 09/06/2017 22:46 | WG1016591 |
| (S) o-Terphenyl | 84.4 | | 18.0-148 | | 09/06/2017 22:46 | WG1016591 |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 20:28 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 20:28 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 20:28 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 20:28 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 20:28 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 95.8 | | 77.0-120 | | 09/03/2017 20:28 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 101 | | 75.0-128 | | 09/03/2017 20:28 | WG1016307 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 31.9 | | 4.00 | 1 | 09/07/2017 00:55 | WG1016591 |
| C28-C40 Oil Range | 29.6 | | 4.00 | 1 | 09/07/2017 00:55 | WG1016591 |
| (S) o-Terphenyl | 91.0 | | 18.0-148 | | 09/07/2017 00:55 | WG1016591 |



Volatile Organic Compounds (GC) by Method 8015/8021

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|---------------------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| Benzene | ND | | 0.000500 | 1 | 09/03/2017 20:50 | WG1016307 |
| Toluene | ND | | 0.00500 | 1 | 09/03/2017 20:50 | WG1016307 |
| Ethylbenzene | ND | | 0.000500 | 1 | 09/03/2017 20:50 | WG1016307 |
| Total Xylene | ND | | 0.00150 | 1 | 09/03/2017 20:50 | WG1016307 |
| TPH (GC/FID) Low Fraction | ND | | 0.100 | 1 | 09/03/2017 20:50 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(FID) | 94.9 | | 77.0-120 | | 09/03/2017 20:50 | WG1016307 |
| (S) a,a,a-Trifluorotoluene(PID) | 100 | | 75.0-128 | | 09/03/2017 20:50 | WG1016307 |

Semi-Volatile Organic Compounds (GC) by Method 8015

| Analyte | Result mg/kg | Qualifier | RDL mg/kg | Dilution | Analysis date / time | Batch |
|----------------------|-----------------|-----------|--------------|----------|-------------------------|---------------------------|
| C10-C28 Diesel Range | 207 | | 4.00 | 1 | 09/07/2017 01:07 | WG1016591 |
| C28-C40 Oil Range | 72.4 | | 4.00 | 1 | 09/07/2017 01:07 | WG1016591 |
| (S) o-Terphenyl | 89.6 | | 18.0-148 | | 09/07/2017 01:07 | WG1016591 |

1
Cp2
Tc3
Ss4
Cn5
Sr6
Qc7
Gl8
Al9
Sc

Method Blank (MB)

(MB) R3247079-5 09/03/17 16:00

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|------------------------------------|--------------------|--------------|-----------------|-----------------|
| Benzene | U | | 0.000120 | 0.000500 |
| Toluene | 0.000184 | U | 0.000150 | 0.00500 |
| Ethylbenzene | 0.000149 | U | 0.000110 | 0.000500 |
| Total Xylene | U | | 0.000460 | 0.00150 |
| TPH (GC/FID) Low Fraction | U | | 0.0217 | 0.100 |
| (S) a,a,a-Trifluorotoluene(FID) | 98.4 | | | 77.0-120 |
| (S) a,a,a-Trifluorotoluene(PID) | 104 | | | 75.0-128 |

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

(LCS) R3247079-1 09/03/17 14:09 • (LCSD) R3247079-2 09/03/17 14:32

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|------------------------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| TPH (GC/FID) Low Fraction | 5.50 | 6.00 | 5.86 | 109 | 107 | 70.0-136 | | | 2.29 | 20 |
| (S) a,a,a-Trifluorotoluene(FID) | | | | 106 | 105 | 77.0-120 | | | | |
| (S) a,a,a-Trifluorotoluene(PID) | | | | 117 | 118 | 75.0-128 | | | | |

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

(LCS) R3247079-3 09/03/17 14:54 • (LCSD) R3247079-4 09/03/17 15:16

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|------------------------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| Benzene | 0.0500 | 0.0494 | 0.0508 | 98.8 | 102 | 71.0-121 | | | 2.69 | 20 |
| Toluene | 0.0500 | 0.0507 | 0.0518 | 101 | 104 | 72.0-120 | | | 2.11 | 20 |
| Ethylbenzene | 0.0500 | 0.0524 | 0.0538 | 105 | 108 | 76.0-121 | | | 2.66 | 20 |
| Total Xylene | 0.150 | 0.160 | 0.163 | 107 | 109 | 75.0-124 | | | 1.67 | 20 |
| (S) a,a,a-Trifluorotoluene(FID) | | | | 98.3 | 97.9 | 77.0-120 | | | | |
| (S) a,a,a-Trifluorotoluene(PID) | | | | 102 | 103 | 75.0-128 | | | | |

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L933465-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L933465-01 09/03/17 16:45 • (MS) R3247079-6 09/03/17 23:04 • (MSD) R3247079-7 09/03/17 23:27

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|------------------------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| Benzene | 0.0500 | 0.000617 | 0.0289 | 0.0157 | 56.5 | 30.1 | 1 | 10.0-146 | | J3 | 59.3 | 29 |
| Toluene | 0.0500 | ND | 0.0250 | 0.0127 | 48.8 | 24.2 | 1 | 10.0-143 | | J3 | 65.2 | 30 |
| Ethylbenzene | 0.0500 | ND | 0.0204 | 0.00944 | 40.7 | 18.9 | 1 | 10.0-147 | | J3 | 73.3 | 31 |
| Total Xylene | 0.150 | ND | 0.0587 | 0.0281 | 38.7 | 18.3 | 1 | 10.0-149 | J6 | J3 J6 | 70.6 | 30 |
| (S) a,a,a-Trifluorotoluene(FID) | | | | | 93.8 | 94.0 | | 77.0-120 | | | | |
| (S) a,a,a-Trifluorotoluene(PID) | | | | | 98.7 | 99.0 | | 75.0-128 | | | | |

L933465-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L933465-01 09/03/17 16:45 • (MS) R3247079-8 09/03/17 23:49 • (MSD) R3247079-9 09/04/17 00:11

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|------------------------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| TPH (GC/FID) Low Fraction | 5.50 | ND | 0.812 | 1.16 | 14.8 | 21.0 | 1 | 10.0-147 | | J3 | 35.0 | 30 |
| (S) a,a,a-Trifluorotoluene(FID) | | | | | 83.6 | 80.0 | | 77.0-120 | | | | |
| (S) a,a,a-Trifluorotoluene(PID) | | | | | 101 | 103 | | 75.0-128 | | | | |

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



Method Blank (MB)

(MB) R3247417-1 09/06/17 12:04

| Analyte | MB Result mg/kg | MB Qualifier | MB MDL mg/kg | MB RDL mg/kg |
|----------------------|--------------------|--------------|-----------------|-----------------|
| C10-C28 Diesel Range | U | | 1.61 | 4.00 |
| C28-C40 Oil Range | U | | 0.274 | 4.00 |
| (S) o-Terphenyl | 85.8 | | | 18.0-148 |

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

(LCS) R3247417-2 09/06/17 12:17 • (LCSD) R3247417-3 09/06/17 12:29

| Analyte | Spike Amount mg/kg | LCS Result mg/kg | LCSD Result mg/kg | LCS Rec. % | LCSD Rec. % | Rec. Limits % | LCS Qualifier | LCSD Qualifier | RPD % | RPD Limits % |
|----------------------|-----------------------|---------------------|----------------------|---------------|----------------|------------------|---------------|----------------|----------|-----------------|
| C10-C28 Diesel Range | 60.0 | 53.9 | 57.7 | 89.8 | 96.1 | 50.0-150 | | | 6.77 | 20 |
| (S) o-Terphenyl | | | | 93.7 | 97.4 | 18.0-148 | | | | |

L933465-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L933465-05 09/06/17 23:51 • (MS) R3247417-4 09/07/17 00:04 • (MSD) R3247417-5 09/07/17 00:17

| Analyte | Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | RPD Limits % |
|----------------------|-----------------------|--------------------------|--------------------|---------------------|--------------|---------------|----------|------------------|--------------|---------------|----------|-----------------|
| C10-C28 Diesel Range | 60.0 | 48.9 | 90.9 | 78.8 | 69.9 | 49.9 | 1 | 50.0-150 | | J6 | 14.2 | 20 |
| (S) o-Terphenyl | | | | | 88.8 | 86.1 | | 18.0-148 | | | | |

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



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, 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

| | |
|----|---|
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| J3 | The associated batch QC was outside the established quality control range for precision. |
| J6 | The sample matrix interfered with the ability to make any accurate determination; spike value is low. |

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



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

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

State Accreditations

| | | | |
|-----------------------|-------------|-----------------------------|-------------------|
| Alabama | 40660 | Nevada | TN-03-2002-34 |
| Alaska | UST-080 | New Hampshire | 2975 |
| Arizona | AZ0612 | New Jersey–NELAP | TN002 |
| Arkansas | 88-0469 | New Mexico | TN00003 |
| California | 01157CA | New York | 11742 |
| Colorado | TN00003 | North Carolina | Env375 |
| Connecticut | PH-0197 | North Carolina ¹ | DW21704 |
| Florida | E87487 | North Carolina ² | 41 |
| Georgia | NELAP | North Dakota | R-140 |
| Georgia ¹ | 923 | Ohio–VAP | CL0069 |
| Idaho | TN00003 | Oklahoma | 9915 |
| Illinois | 200008 | Oregon | TN200002 |
| Indiana | C-TN-01 | Pennsylvania | 68-02979 |
| Iowa | 364 | Rhode Island | 221 |
| Kansas | E-10277 | South Carolina | 84004 |
| Kentucky ¹ | 90010 | South Dakota | n/a |
| Kentucky ² | 16 | Tennessee ¹⁴ | 2006 |
| Louisiana | AI30792 | Texas | T 104704245-07-TX |
| Maine | TN0002 | Texas ⁵ | LAB0152 |
| Maryland | 324 | Utah | 6157585858 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 109 |
| Minnesota | 047-999-395 | Washington | C1915 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |
| Nebraska | NE-OS-15-05 | | |

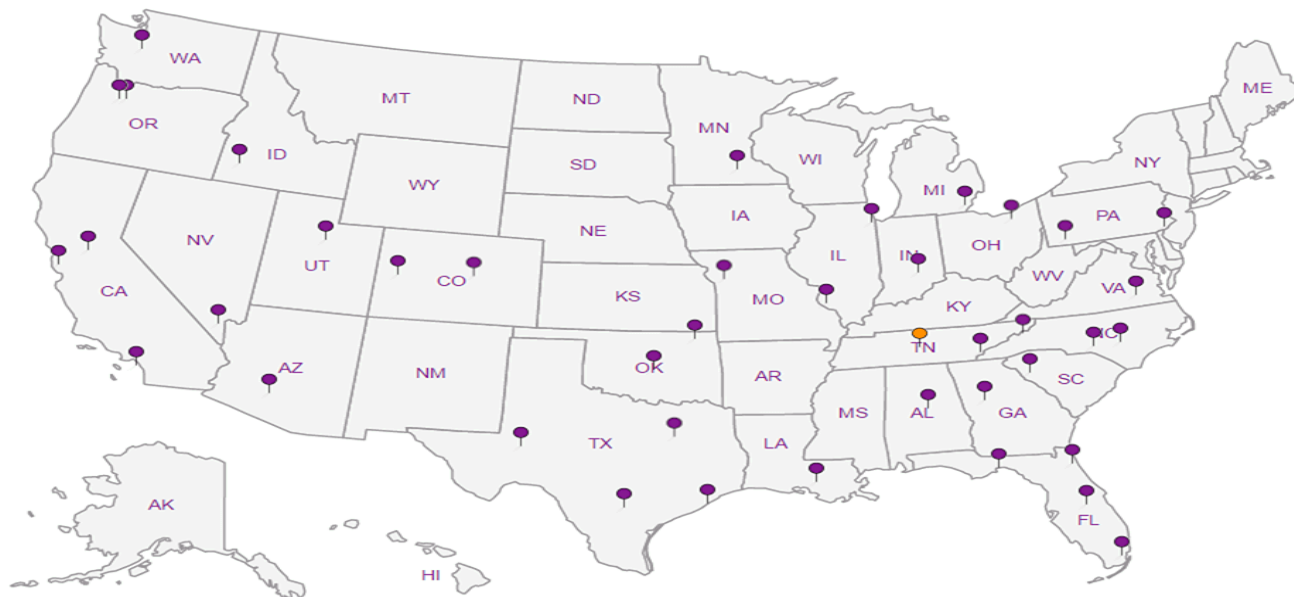
Third Party & Federal Accreditations

| | | | |
|-------------------------------|---------|--------------|---------|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC | 100789 |
| A2LA – ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | S-67674 |
| EPA–Crypto | TN00003 | | |

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

Our Locations

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



Company Name/Address:

Berry Petroleum Co.1999 Broadway Suite 3700
Denver, CO 80202

Billing Information:

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Parachute, CO 81635Terry Rapp
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Dave Nicholson

Email To:

dknicholson@q.com

Project

Description: HRM Landfarm Sampling

City/State

Collected:

Phone: 303-601-2023

Client Project #

Lab Project #

Fax:

~~BERPETDCO0306165~~

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

Same Day200%
 Next Day100%
 Two Day50%
 Three Day25%

Date Results Needed

Email? ☐ No ☐ YesFAX? ☐ No ☐ YesCW
No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

Cntrs

S230-LF-1

SS

8/30

0800

2

X

X

S230-LF-2

SS

0810

2

X

X

S230-LF-3

SS

0820

2

X

X

S230-LF-4

SS

0830

2

X

X

S230-LF-5

SS

0840

2

X

X

S230-LF-6

SS

0850

2

X

X

S230-LF-7

SS

0900

2

X

X

S230-LF-8

SS

0910

2

X

X

S230-LF-9

SS

0920

2

X

X

S230-LF-10

SS

0925

2

X

X

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks:

Track: 7215 4519 7712

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: ☐ UPS☐ FedEx ☐ Courier ☐

Temp: 1.5 °C Bottles Received: 48

Date: 9/1/17 Time: 0845

Hold #

Condition: (lab use only)

COC Seal Intact: ☐ Y ☐ N ☒ NA

pH Checked:

NCF:

Chain of Custody Page 1 of 2



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

YOUR LAB OF CHOICE

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


L# L933465

D024

Acctnum: BERPETDCO

Template:

Prelogin:

TSR:

Cooler:

Shipped Via:

Rem./Contaminant Sample # (lab only)

-01

-02

-03

-04

-05

-06

-07

-08

-09

-10

Company Name/Address:

Berry Petroleum Co.1999 Broadway Suite 3700
Denver, CO 80202

Billing Information:

Tom Hogelin
Linn Energy LLC
235 Callahan Ave
Parachute, CO 81635

Report to:

Dave Nicholson

Email To:

dknicholson@q.com

Project

Description: HRM Landfarm Sampling

Phone: 303-601-2023

Fax:

Client Project #

City/State

Collected:

Lab Project #

BERPETDCO030615S

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately

Packed on Ice N ☒ Y

Rush? (Lab MUST Be Notified)

Same Day 200%

Next Day 100%

Two Day 50%

Three Day 25%

Date Results Needed

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

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

No.
of
Cntrs

S230-LF-11

S230-LF-12

SS

SS

SS

SS

SS

SS

SS

SS

SS

SS

8/30

11

0930

0935

2

2

2

2

2

2

2

2

2

2

TEPH(8015)Diesel & Oil Range (1) 4oz Clear-No Pres

BTEX/TVPH (1) 4oz Clear - No Pres

Analysis / Container / Preservative

Chain of Custody

Page 2 of 2

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

YOUR LAB OF CHOICE

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

L# 933465

Table #

Acctnum:BERPETDCO

Template:

Prelogin:

TSR:

Cooler:

Shipped Via:

Item / Contaminant

Sample # (lab only)

-11

-12

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other

Remarks:

Relinquished by: (Signature)

Relinquished by: (Signature)

Relinquished by: (Signature)

Date:

8/30/17

Time:

1800

Received by: (Signature)

FedEx

Received by: (Signature)

Received for lab by: (Signature)

Received for lab by: (Signature)

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: ☐ UPS☐ FedEx ☐ Courier ☐ _____

Temp: _____ °C Bottles Received:

15.1 °C 48

Date: _____ Time: _____

9/1/17 0845

Hold #

Condition: (lab use only)

COC Seal Intact: ☐ Y ☐ N ☒ NA

pH Checked:

NCF:

OK

ESC LAB SCIENCES

Cooler Receipt Form

Client: BERPETDCO

SDG# 933465

Cooler Received/Opened On: 9 / 1 / 17

Temperature: 1.5

Received by : Chris Ward

Signature: Chris Ward

Receipt Check List

| | NP | Yes | No |
|---------------------------------|-------------------------------------|-----|----|
| COC Seal Present / Intact? | <input checked="" type="checkbox"/> | | |
| COC Signed / Accurate? | <input checked="" type="checkbox"/> | | |
| Bottles arrive intact? | <input checked="" type="checkbox"/> | | |
| Correct bottles used? | <input checked="" type="checkbox"/> | | |
| Sufficient volume sent? | <input checked="" type="checkbox"/> | | |
| If Applicable | | | |
| VOA Zero headspace? | | | |
| Preservation Correct / Checked? | | | |

September 22, 2017

HRM Resources, LLC - Denver, CO

Sample Delivery Group: L937333
Samples Received: 09/19/2017
Project Number: STATE 2-30
Description:

Report To: Dave Nicholson
410 17th St., Ste. 1600
Denver, CO 80202

Entire Report Reviewed By:



Mark W. Beasley
Technical Service Representative

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



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



5230-LF-1 L937333-01 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:00

Received date/time
09/19/17 08:45

¹Cp

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:13 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

²Tc

³Ss

5230-LF-2 L937333-02 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:05

Received date/time
09/19/17 08:45

⁴Cn

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:16 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

⁵Sr

⁶Qc

5230-LF-3 L937333-03 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:10

Received date/time
09/19/17 08:45

⁷Gl

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:18 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

⁸Al

⁹Sc

5230-LF-4 L937333-04 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:15

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:21 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

5230-LF-5 L937333-05 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:20

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:24 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

5230-LF-6 L937333-06 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:25

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:32 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

ACCOUNT:

HRM Resources, LLC - Denver, CO

PROJECT:

STATE 2-30

SDG:

L937333

DATE/TIME:

09/22/17 17:22

PAGE:

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



5230-LF-7 L937333-07 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:30

Received date/time
09/19/17 08:45

¹Cp

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:34 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

²Tc

³Ss

5230-LF-8 L937333-08 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:35

Received date/time
09/19/17 08:45

⁴Cn

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:37 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

⁵Sr

⁶Qc

5230-LF-9 L937333-09 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:40

Received date/time
09/19/17 08:45

⁷Gl

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:40 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

⁸Al

⁹Sc

5230-LF-10 L937333-10 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:45

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:43 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

5230-LF-11 L937333-11 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:50

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:45 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

5230-LF-12 L937333-12 Solid

Collected by
DK Nicholas

Collected date/time
09/15/17 08:55

Received date/time
09/19/17 08:45

| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst |
|----------------------------------|-----------|----------|-----------------------|--------------------|---------|
| Calculated Results | WG1022836 | 1 | 09/21/17 09:41 | 09/22/17 10:48 | TRB |
| Wet Chemistry by Method 9045D | WG1021675 | 1 | 09/22/17 11:00 | 09/22/17 11:29 | GB |
| Wet Chemistry by Method 9050AMod | WG1022228 | 1 | 09/21/17 00:06 | 09/21/17 00:06 | JLJ |

ACCOUNT:

HRM Resources, LLC - Denver, CO

PROJECT:

STATE 2-30

SDG:

L937333

DATE/TIME:

09/22/17 17:22

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. 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.

Mark W. Beasley
Technical Service Representative

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 17.0 | | 1 | 09/22/2017 10:13 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.07 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-01 WG1021675: 8.07 at 19.1c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2040 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 18.4 | | 1 | 09/22/2017 10:16 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.08 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-02 WG1021675: 8.08 at 19.6c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2390 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 16.5 | | 1 | 09/22/2017 10:18 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.06 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-03 WG1021675: 8.06 at 19.7c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2550 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 18.0 | | 1 | 09/22/2017 10:21 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 7.97 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-04 WG1021675: 7.97at 19.5c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2010 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 42.5 | | 1 | 09/22/2017 10:24 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 9.22 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-05 WG1021675: 9.22 at 19.7c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1510 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 10.3 | | 1 | 09/22/2017 10:32 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.15 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-06 WG1021675: 8.15at 19.6c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2380 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 18.8 | | 1 | 09/22/2017 10:34 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.09 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-07 WG1021675: 8.09 at 19.5c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 2090 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 4.67 | | 1 | 09/22/2017 10:37 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 9.34 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-08 WG1021675: 9.34 at 19.4c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1300 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 3.27 | | 1 | 09/22/2017 10:40 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 9.28 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-09 WG1021675: 9.28 at 19.7c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1060 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 20.3 | | 1 | 09/22/2017 10:43 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 10.2 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-10 WG1021675: 10.22at 19.5c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1190 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 17.9 | | 1 | 09/22/2017 10:45 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 4.45 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-11 WG1021675: 4.45 at 19.7c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1690 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Calculated Results

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|-------------------------|--------|-----------|----------|----------------------|-----------|
| Sodium Adsorption Ratio | 18.9 | | 1 | 09/22/2017 10:48 | WG1022836 |

¹ Cp

² Tc

Wet Chemistry by Method 9045D

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|---------|--------|-----------|----------|----------------------|---------------------------|
| pH | 8.27 | T8 | 1 | 09/22/2017 11:29 | WG1021675 |

³ Ss

⁴ Cn

Sample Narrative:

L937333-12 WG1021675: 8.27 at 19.9c

⁵ Sr

Wet Chemistry by Method 9050AMod

| Analyte | Result | Qualifier | Dilution | Analysis date / time | Batch |
|----------------------|--------|-----------|----------|----------------------|---------------------------|
| Specific Conductance | 1780 | | 1 | 09/21/2017 00:06 | WG1022228 |

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



L936840-01 Original Sample (OS) • Duplicate (DUP)

(OS) L936840-01 09/22/17 11:29 • (DUP) WG1021675-3 09/22/17 11:29

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---------|-----------------|------------|----------|---------|---------------|----------------|
| Analyte | su | su | | % | | % |
| pH | 12.5 | 12.5 | 1 | 0.0800 | T8 | 1 |

Sample Narrative:

OS: 12.51 at 19.3c
DUP: 12.51 at 19.3c

L937337-05 Original Sample (OS) • Duplicate (DUP)

(OS) L937337-05 09/22/17 11:29 • (DUP) WG1021675-4 09/22/17 11:29

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|---------|-----------------|------------|----------|---------|---------------|----------------|
| Analyte | su | su | | % | | % |
| pH | 8.01 | 8.02 | 1 | 0.125 | T8 | 1 |

Sample Narrative:

OS: 8.01 at 19.8c
DUP: 8.02 at 19.8c

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

(LCS) WG1021675-1 09/22/17 11:29 • (LCSD) WG1021675-2 09/22/17 11:29

| | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|---------|--------------|------------|-------------|----------|-----------|-------------|---------------|----------------|-------|------------|
| Analyte | su | su | su | % | % | % | | | % | % |
| pH | 10.0 | 9.96 | 9.98 | 99.6 | 99.8 | 98.4-102 | | | 0.201 | 1 |

Sample Narrative:

LCS: 9.96 at 20.2c
LCSD: 9.98 at 20.2c

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) WG1022228-1 09/21/17 00:06

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|----------------------|-----------|--------------|----------|----------|
| Analyte | umhos/cm | | umhos/cm | umhos/cm |
| Specific Conductance | 1.45 | | | |

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L937333-01 Original Sample (OS) • Duplicate (DUP)

(OS) L937333-01 09/21/17 00:06 • (DUP) WG1022228-4 09/21/17 00:06

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|----------------------|-----------------|------------|----------|---------|---------------|----------------|
| Analyte | umhos/cm | umhos/cm | | % | | % |
| Specific Conductance | 2040 | 2070 | 1 | 1.60 | | 20 |

L937337-05 Original Sample (OS) • Duplicate (DUP)

(OS) L937337-05 09/21/17 00:06 • (DUP) WG1022228-5 09/21/17 00:06

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|----------------------|-----------------|------------|----------|---------|---------------|----------------|
| Analyte | umhos/cm | umhos/cm | | % | | % |
| Specific Conductance | 590 | 600 | 1 | 1.68 | | 20 |

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

(LCS) WG1022228-2 09/21/17 00:06 • (LCSD) WG1022228-3 09/21/17 00:06

| | Spike Amount | LCS Result | LCSD Result | LCS Rec. | LCSD Rec. | Rec. Limits | LCS Qualifier | LCSD Qualifier | RPD | RPD Limits |
|----------------------|--------------|------------|-------------|----------|-----------|-------------|---------------|----------------|-------|------------|
| Analyte | umhos/cm | umhos/cm | umhos/cm | % | % | % | | | % | % |
| Specific Conductance | 559 | 552 | 555 | 98.7 | 99.3 | 90.0-110 | | | 0.542 | 20 |



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. |
| RDL | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| 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, 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

| | |
|----|---|
| T8 | Sample(s) received past/too close to holding time expiration. |
|----|---|

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



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

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

State Accreditations

| | | | |
|-----------------------|-------------|-----------------------------|-------------------|
| Alabama | 40660 | Nevada | TN-03-2002-34 |
| Alaska | UST-080 | New Hampshire | 2975 |
| Arizona | AZ0612 | New Jersey–NELAP | TN002 |
| Arkansas | 88-0469 | New Mexico | TN00003 |
| California | 01157CA | New York | 11742 |
| Colorado | TN00003 | North Carolina | Env375 |
| Connecticut | PH-0197 | North Carolina ¹ | DW21704 |
| Florida | E87487 | North Carolina ² | 41 |
| Georgia | NELAP | North Dakota | R-140 |
| Georgia ¹ | 923 | Ohio–VAP | CL0069 |
| Idaho | TN00003 | Oklahoma | 9915 |
| Illinois | 200008 | Oregon | TN200002 |
| Indiana | C-TN-01 | Pennsylvania | 68-02979 |
| Iowa | 364 | Rhode Island | 221 |
| Kansas | E-10277 | South Carolina | 84004 |
| Kentucky ¹ | 90010 | South Dakota | n/a |
| Kentucky ² | 16 | Tennessee ¹⁴ | 2006 |
| Louisiana | AI30792 | Texas | T 104704245-07-TX |
| Maine | TN0002 | Texas ⁵ | LAB0152 |
| Maryland | 324 | Utah | 6157585858 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 109 |
| Minnesota | 047-999-395 | Washington | C1915 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 9980939910 |
| Montana | CERT0086 | Wyoming | A2LA |
| Nebraska | NE-OS-15-05 | | |

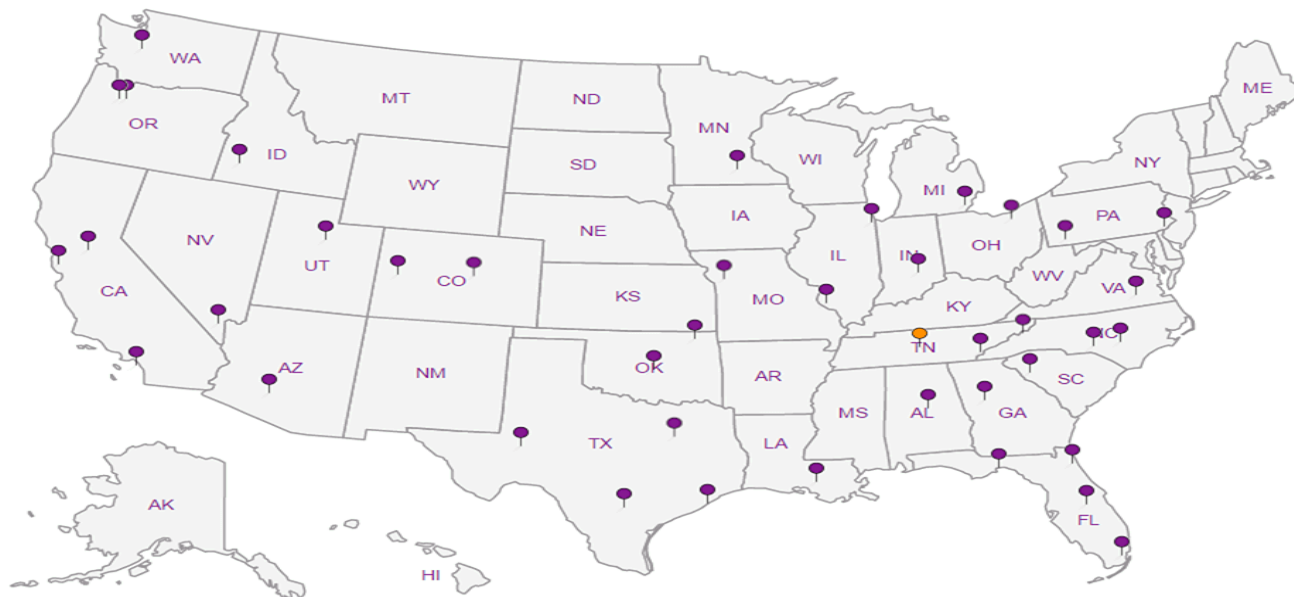
Third Party & Federal Accreditations

| | | | |
|-------------------------------|---------|--------------|---------|
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC | 100789 |
| A2LA – ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | S-67674 |
| EPA–Crypto | TN00003 | | |

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

Our Locations

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



Company Name/Address:

Nicholson GeoSolutions, LLC

3433 E. Lake Dr.
Centennial, CO 80121

Billing Information:

Terry Page
Tom Hogelin
Berry Petroleum Company
235 Callahan Ave 410 17th St
Parachute, CO 81435 Suite 1600
Denver, CO 80202

Report to:

Dave Nicholson

Email To:

dknicholson@q.com

Project

Description: **Pit Reclamation State 2-30**

City/State

Collected:

Phone: 303-601-2023

Client Project #

Lab Project #

Fax:

BERPETDC00306155

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

D Nicholson

Rush? (Lab MUST Be Notified)

Same Day 200%

Next Day 100%

Two Day 50%

Three Day 25%

Date Results Needed

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

| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | No. of Cnts |
|------------|-----------|----------|-------|------|------|-------------------|
| S230-LF-1 | | SS | | 9/15 | 0800 | 24 |
| S230-LF-2 | | SS | | | 0805 | 4 |
| S230-LF-3 | | SS | | | 0810 | 4 |
| S230-LF-4 | | SS | | | 0815 | 4 |
| S230-LF-5 | | SS | | | 0820 | 4 |
| S230-LF-6 | | SS | | | 0825 | 4 |
| S230-LF-7 | | SS | | | 0830 | 4 |
| S230-LF-8 | | SS | | | 0835 | 4 |
| S230-LF-9 | | SS | | | 0840 | 4 |
| S230-LF-10 | | SS | | | 0845 | 4 |
| S230-LF-11 | | SS | | | 0850 | 4 |
| S230-LF-12 | | SS | | | 0855 | 24 |

* Matrix: SS - Soil GW - Groundwater WW - Wastewater DW - Drinking Water OI - Other

Analysis / Container / Preservative

SAR, Metals, Gr6 (1) 4oz Clear - No Pres

BTEX/FVPH (1) 4oz Clear - No Pres

TEPH (8015) Diesel & Oil Range (1) 4oz Clear - No Pres

SPCON, pH (1) 4oz Clear - No Pres

Chain of Custody

Page 1 of 1

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

YOUR LAB OF CHOICE

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

L# 1937333

E225

Accnum: BERPETDC0

Template:

Prelogin:

TSR:

Cooler:

Shipped Via:

Item / Contaminant

Sample # (lab only)

-01
02
03
04
05
06
07
08
09
10
11
12

Remarks: ~~As, Ba, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Ag, Zn, Gr6~~

Flow _____ Other _____

Hold #

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Samples returned via: ☐ UPS

Condition: (lab use only)

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C Bottles Received:

COC Seal Intact: ☐ Y ☐ N ☐ NA

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 9/19/17 Time: 0842

pH Checked:

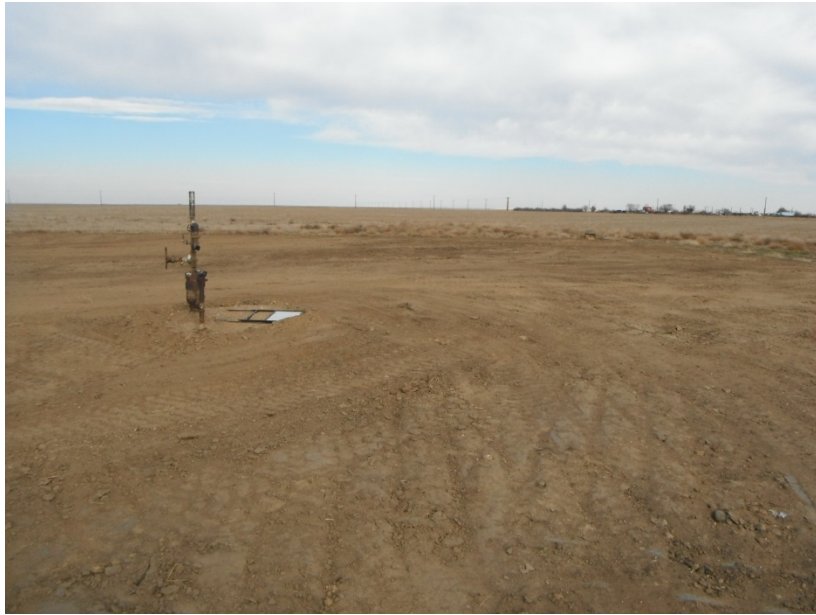
NCF:

ESC LAB SCIENCES Cooler Receipt Form

| Client: | | HRM RESDCO | | SDG# | L937333 | |
|------------------------------------|----|------------|--------------|------|---------|--|
| Cooler Received/Opened On: 9/19/17 | | | Temperature: | | 0.9°C | |
| Received by: Ian White | | | | | | |
| Signature: <i>Ian White</i> | | | | | | |
| Receipt Check List | | | | | | |
| | NP | Yes | No | | | |
| COC Seal Present / Intact? | / | | | | | |
| COC Signed / Accurate? | | / | | | | |
| Bottles arrive intact? | | / | | | | |
| Correct bottles used? | | / | | | | |
| Sufficient volume sent? | | / | | | | |
| If Applicable | | / | | | | |
| VOA Zero headspace? | | | | | | |
| Preservation Correct / Checked? | | | | | | |

APPENDIX B

Photographs



Former landfarm location looking north



Former skim pit location after backfilling looking west



Former landfarm location looking west



Former skim pit location after backfilling looking southeast