



**Nicholson GeoSolutions LLC**

3433 East Lake Drive  
Centennial, CO 80121

April 2, 2018

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

**Subject: Landfarm Sampling Results for the Anderson No. 1 Lease,  
COGCC Remediation #9050**

Dear Terry:

Nicholson GeoSolutions LLC was retained by HRM Resources II LLC (HRM) to conduct soil sampling of the landfarm on the Anderson No. 1 lease, Washington County, Colorado. Sampling of the landfarm was conducted at the required rate of approximately one sample per 100 yards of material on March 18<sup>th</sup>, 2018. The landfarm was previously sampled on October 18<sup>th</sup>, 2015, May 25<sup>th</sup>, 2016, October 29<sup>th</sup>, 2016, May 31<sup>st</sup>, 2017, and October 24<sup>th</sup>, 2017.

GPS mapping showed that the landfarm covers about 0.09 acres and contains an estimated 500 yards of material. A total of five discrete soil samples were collected at depths of approximately 12-16 inches. These samples were collected from approximately the same locations as those previously collected. The extent of the landfarm cell and the locations of the samples are shown on Figure 1. Tilling of the landfarm was performed on March 14<sup>th</sup>, April 25<sup>th</sup>, September 30<sup>th</sup> during 2017, and on March 12<sup>th</sup>, 2018. In addition, a nitrogen fertilizer was added during the April 2017 tilling.

All samples were analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range) and BTEX (benzene, toluene, ethylbenzene, and xylenes) to evaluate compliance with the COGCC Table 910-1 standards and further treatment needs. SAR, pH, and conductivity were previously analyzed in October 2016 for the landfarm samples from this site.

Table 1 provides a summary of the analytical results for the samples. The laboratory report is contained in Appendix A. For the March 2018 sampling event, the sum of the concentrations of gasoline, diesel, and motor oil range petroleum hydrocarbons (total petroleum hydrocarbons [TPH]) exceeded the COGCC standard of 500 mg/kg for all five samples.

**Table 1 Anderson No. 1 Landfarm Sample Results – March 18, 2018**

	Table 910-1 Standards	Anderson LF-1	Anderson LF-2	Anderson LF-3	Anderson LF-4	Anderson LF-5
TVPH – gasoline range	500 <sup>1</sup>	<0.1	<0.1	<0.1	<b>0.101</b>	<0.1
TEPH – diesel/motor oil range		<b>4,620</b>	<b>2,138</b>	<b>1,451</b>	<b>4,250</b>	<b>4,830</b>
benzene	0.17	<0.0005	0.00129	0.00074	0.000582	<0.0005
toluene	85	<0.005	<0.005	<0.005	<0.005	<0.005
ethylbenzene	100	<0.0005	0.000724	<0.0005	<0.0005	<0.0005
xylenes	175	<0.0015	0.00356	<0.0015	0.00163	<0.0015

<sup>1</sup>The standard is 500 for the combined total of TVPH and TEPH All units in mg/kg  
Values in bold type exceed standards

Table 2 provides the TPH results for the October 18<sup>th</sup>, 2015 and March 18<sup>th</sup>, 2018 samples and the percent difference between the two samples at each sample location. TPH ranged from 368 mg/kg to 9,010 mg/kg for the October 2015 samples and from 1,451 mg/kg to 4,830 mg/kg for the March 2018 samples. The TPH concentration was lower for the March 2018 samples at three of the five sample locations.

**Table 2 Comparison of TPH Results, October 18, 2015 and March 18, 2018**

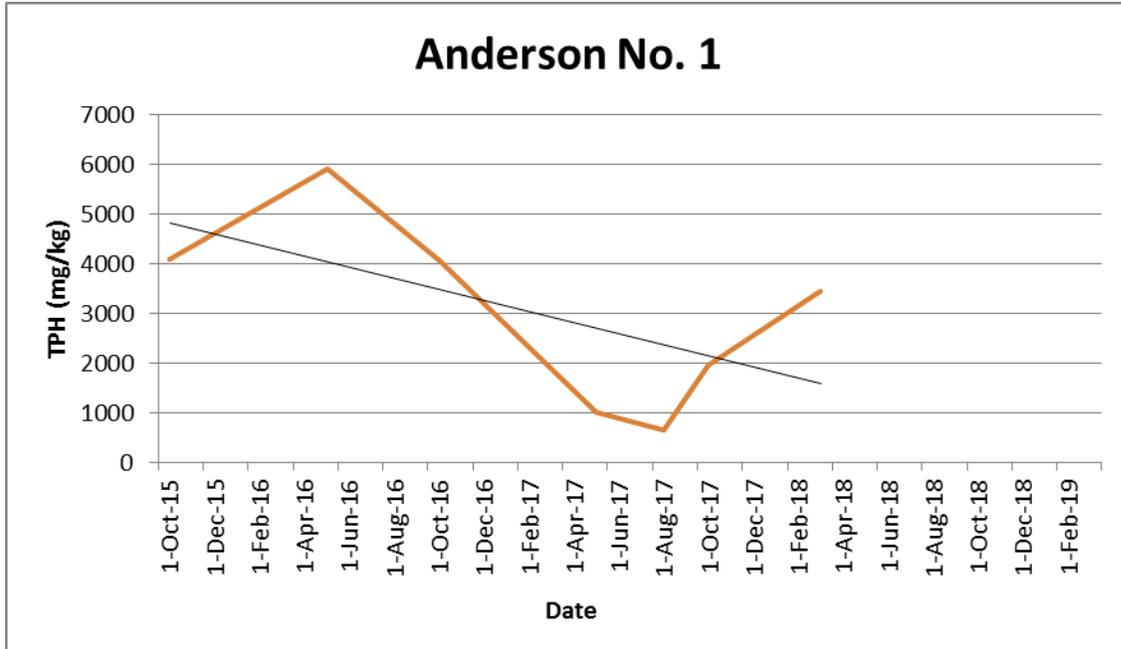
Sample Location	TPH (mg/kg) October 18, 2015	TPH (mg/kg) March 18, 2018	%Difference
Anderson-LF-1	7,525	4,620	-38.6
Anderson-LF-2	368	2,138	481.0
Anderson-LF-3	1,652	1,451	-12.2
Anderson-LF-4	1,925	4,250.1	120.8
Anderson-LF-5	9,010	4,830	-46.4

Table 3 provides summary statistics for the two sampling events. The average TPH concentration for the five samples decreased from 4,096 mg/kg to 3,458 mg/kg between October 18<sup>th</sup>, 2015 and March 18<sup>th</sup>, 2018. Using the results provided above in Table 2, the average TPH decrease for the overall landfarm was -15.6%.

**Table 3 Summary Statistics for the October 2015 and March 2018 Samples**

Sample Date	Minimum	Maximum	Average	Median	Average % Difference
Oct 18, 2015	368	9,010	4,096	1,925	
Mar 18, 2018	1,451	4,830	3,458	4,250	-15.6

Figure 1 shows the average TPH concentration in the landfarm from October 2015 to March 2018. Using the difference between the average TPH concentrations of 638 mg/kg, and the time period of 882 days, a biodegradation rate of 0.72 mg/kg-day is obtained. Using these data, and assuming a linear rate of decay, over 4,000 days of treatment remain to reach the standard of 500 mg/kg. However, recent sample results have been higher than expected, perhaps because of more aggressive tilling employed by HRM during the past two years. The trendline suggests that the average TPH concentration in the landfarms would reach the standard of 500 mg/kg in about two years.



**Figure 1      TPH Concentrations from October 2015 to March 2018**

Nicholson GeoSolutions LLC

David K. Nicholson, P.G.  
Principal Geologist



GeoSolutions  
NICHOLSON



**HRM Resources, LLC**

Anderson No. 1  
Landfarm  
Sampling

Figure 1  
November  
2015

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

March 29, 2018

## HRM Resources, LLC - Denver, CO

Sample Delivery Group: L978824  
Samples Received: 03/20/2018  
Project Number:  
Description: Anderson

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

Entire Report Reviewed By:



Olivia Studebaker  
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.



<b>Cp: Cover Page</b>	<b>1</b>	
<b>Tc: Table of Contents</b>	<b>2</b>	
<b>Ss: Sample Summary</b>	<b>3</b>	
<b>Cn: Case Narrative</b>	<b>4</b>	
<b>Sr: Sample Results</b>	<b>5</b>	
<b>ANDERSON-LF-1 L978824-01</b>	<b>5</b>	
<b>ANDERSON-LF-2 L978824-02</b>	<b>6</b>	
<b>ANDERSON-LF-3 L978824-03</b>	<b>7</b>	
<b>ANDERSON-LF-4 L978824-04</b>	<b>8</b>	
<b>ANDERSON-LF-5 L978824-05</b>	<b>9</b>	
<b>Qc: Quality Control Summary</b>	<b>10</b>	
<b>Volatile Organic Compounds (GC) by Method 8015/8021</b>	<b>10</b>	
<b>Semi-Volatile Organic Compounds (GC) by Method 8015</b>	<b>12</b>	
<b>Gl: Glossary of Terms</b>	<b>13</b>	
<b>Al: Accreditations &amp; Locations</b>	<b>14</b>	
<b>Sc: Sample Chain of Custody</b>	<b>15</b>	

# SAMPLE SUMMARY



## ANDERSON-LF-1 L978824-01 Solid

Collected by  
DK Nicholson  
Collected date/time  
03/18/18 11:40  
Received date/time  
03/20/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1087633	1	03/21/18 08:21	03/26/18 17:20	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1087675	20	03/21/18 18:16	03/22/18 07:08	ACM

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

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Qc

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Gl

8  
Al

9  
Sc

## ANDERSON-LF-2 L978824-02 Solid

Collected by  
DK Nicholson  
Collected date/time  
03/18/18 11:45  
Received date/time  
03/20/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1087633	1	03/21/18 08:21	03/22/18 05:47	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1087675	20	03/21/18 18:16	03/22/18 07:20	ACM

## ANDERSON-LF-3 L978824-03 Solid

Collected by  
DK Nicholson  
Collected date/time  
03/18/18 11:50  
Received date/time  
03/20/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1087633	1	03/21/18 08:21	03/22/18 06:11	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1087675	20	03/21/18 18:16	03/22/18 08:20	ACM

## ANDERSON-LF-4 L978824-04 Solid

Collected by  
DK Nicholson  
Collected date/time  
03/18/18 11:55  
Received date/time  
03/20/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1087633	1	03/21/18 08:21	03/22/18 06:35	DWR
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1087675	20	03/21/18 18:16	03/22/18 08:32	ACM

## ANDERSON-LF-5 L978824-05 Solid

Collected by  
DK Nicholson  
Collected date/time  
03/18/18 12:00  
Received date/time  
03/20/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG1087633	1	03/21/18 08:21	03/26/18 17:41	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1087675	10	03/21/18 18:16	03/22/18 08:56	ACM



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.

Olivia Studebaker  
Technical Service Representative

- 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	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.000500	1	03/26/2018 17:20	<a href="#">WG1087633</a>
Toluene	ND		0.00500	1	03/26/2018 17:20	<a href="#">WG1087633</a>
Ethylbenzene	ND		0.000500	1	03/26/2018 17:20	<a href="#">WG1087633</a>
Total Xylene	ND		0.00150	1	03/26/2018 17:20	<a href="#">WG1087633</a>
TPH (GC/FID) Low Fraction	ND		0.100	1	03/26/2018 17:20	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(FID)	102		77.0-120		03/26/2018 17:20	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(PID)	106		75.0-128		03/26/2018 17:20	<a href="#">WG1087633</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	2930		80.0	20	03/22/2018 07:08	<a href="#">WG1087675</a>
C28-C40 Oil Range	1690		80.0	20	03/22/2018 07:08	<a href="#">WG1087675</a>
(S) o-Terphenyl	19.0	J7	18.0-148		03/22/2018 07:08	<a href="#">WG1087675</a>

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	0.00129	<u>B</u>	0.000500	1	03/22/2018 05:47	<a href="#">WG1087633</a>
Toluene	ND		0.00500	1	03/22/2018 05:47	<a href="#">WG1087633</a>
Ethylbenzene	0.000724	<u>B</u>	0.000500	1	03/22/2018 05:47	<a href="#">WG1087633</a>
Total Xylene	0.00356	<u>B</u>	0.00150	1	03/22/2018 05:47	<a href="#">WG1087633</a>
TPH (GC/FID) Low Fraction	ND		0.100	1	03/22/2018 05:47	<a href="#">WG1087633</a>
<i>(S) a,a,a-Trifluorotoluene(FID)</i>	80.1		77.0-120		03/22/2018 05:47	<a href="#">WG1087633</a>
<i>(S) a,a,a-Trifluorotoluene(PID)</i>	85.2		75.0-128		03/22/2018 05:47	<a href="#">WG1087633</a>

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
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- 7 Gl
- 8 Al
- 9 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	1290		80.0	20	03/22/2018 07:20	<a href="#">WG1087675</a>
C28-C40 Oil Range	848		80.0	20	03/22/2018 07:20	<a href="#">WG1087675</a>
<i>(S) o-Terphenyl</i>	92.6	<u>J7</u>	18.0-148		03/22/2018 07:20	<a href="#">WG1087675</a>



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	0.000740	<u>B</u>	0.000500	1	03/22/2018 06:11	<a href="#">WG1087633</a>
Toluene	ND		0.00500	1	03/22/2018 06:11	<a href="#">WG1087633</a>
Ethylbenzene	ND		0.000500	1	03/22/2018 06:11	<a href="#">WG1087633</a>
Total Xylene	ND		0.00150	1	03/22/2018 06:11	<a href="#">WG1087633</a>
TPH (GC/FID) Low Fraction	ND		0.100	1	03/22/2018 06:11	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(FID)	93.7		77.0-120		03/22/2018 06:11	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(PID)	98.6		75.0-128		03/22/2018 06:11	<a href="#">WG1087633</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	824		80.0	20	03/22/2018 08:20	<a href="#">WG1087675</a>
C28-C40 Oil Range	627		80.0	20	03/22/2018 08:20	<a href="#">WG1087675</a>
(S) o-Terphenyl	75.8	<u>J7</u>	18.0-148		03/22/2018 08:20	<a href="#">WG1087675</a>

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	0.000582	<u>B</u>	0.000500	1	03/22/2018 06:35	<a href="#">WG1087633</a>
Toluene	ND		0.00500	1	03/22/2018 06:35	<a href="#">WG1087633</a>
Ethylbenzene	ND		0.000500	1	03/22/2018 06:35	<a href="#">WG1087633</a>
Total Xylene	0.00163	<u>B</u>	0.00150	1	03/22/2018 06:35	<a href="#">WG1087633</a>
TPH (GC/FID) Low Fraction	0.101		0.100	1	03/22/2018 06:35	<a href="#">WG1087633</a>
<i>(S) a,a,a-Trifluorotoluene(FID)</i>	81.1		77.0-120		03/22/2018 06:35	<a href="#">WG1087633</a>
<i>(S) a,a,a-Trifluorotoluene(PID)</i>	85.9		75.0-128		03/22/2018 06:35	<a href="#">WG1087633</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	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	2650		80.0	20	03/22/2018 08:32	<a href="#">WG1087675</a>
C28-C40 Oil Range	1600		80.0	20	03/22/2018 08:32	<a href="#">WG1087675</a>
<i>(S) o-Terphenyl</i>	114	<u>J7</u>	18.0-148		03/22/2018 08:32	<a href="#">WG1087675</a>



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.000500	1	03/26/2018 17:41	<a href="#">WG1087633</a>
Toluene	ND		0.00500	1	03/26/2018 17:41	<a href="#">WG1087633</a>
Ethylbenzene	ND		0.000500	1	03/26/2018 17:41	<a href="#">WG1087633</a>
Total Xylene	ND		0.00150	1	03/26/2018 17:41	<a href="#">WG1087633</a>
TPH (GC/FID) Low Fraction	ND		0.100	1	03/26/2018 17:41	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(FID)	94.7		77.0-120		03/26/2018 17:41	<a href="#">WG1087633</a>
(S) a,a,a-Trifluorotoluene(PID)	96.8		75.0-128		03/26/2018 17:41	<a href="#">WG1087633</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	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	3170		40.0	10	03/22/2018 08:56	<a href="#">WG1087675</a>
C28-C40 Oil Range	1660		40.0	10	03/22/2018 08:56	<a href="#">WG1087675</a>
(S) o-Terphenyl	88.0		18.0-148		03/22/2018 08:56	<a href="#">WG1087675</a>



Method Blank (MB)

(MB) R3296441-5 03/22/18 00:35

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	0.000398	↓	0.000120	0.000500
Toluene	0.000526	↓	0.000150	0.00500
Ethylbenzene	0.000284	↓	0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
<sup>(S)</sup> a,a,a-Trifluorotoluene(FID)	102			77.0-120
<sup>(S)</sup> a,a,a-Trifluorotoluene(PID)	109			75.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

(LCS) R3296441-1 03/21/18 22:34 • (LCSD) R3296441-2 03/21/18 22:58

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	0.0499	0.0536	99.8	107	71.0-121			7.11	20
Toluene	0.0500	0.0479	0.0509	95.8	102	72.0-120			6.14	20
Ethylbenzene	0.0500	0.0502	0.0542	100	108	76.0-121			7.66	20
Total Xylene	0.150	0.151	0.161	101	107	75.0-124			6.35	20
<sup>(S)</sup> a,a,a-Trifluorotoluene(FID)				103	103	77.0-120				
<sup>(S)</sup> a,a,a-Trifluorotoluene(PID)				108	109	75.0-128				

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

(LCS) R3296441-3 03/21/18 23:22 • (LCSD) R3296441-4 03/21/18 23:46

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	5.63	5.67	102	103	70.0-136			0.641	20
<sup>(S)</sup> a,a,a-Trifluorotoluene(FID)				108	108	77.0-120				
<sup>(S)</sup> a,a,a-Trifluorotoluene(PID)				121	120	75.0-128				



L978854-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L978854-01 03/22/18 10:27 • (MS) R3296441-6 03/22/18 10:51 • (MSD) R3296441-7 03/22/18 11:14

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	0.0702	0.477	0.508	32.5	35.0	25	10.0-146			6.26	29
Toluene	0.0500	0.0417	0.414	0.444	29.8	32.2	25	10.0-143			6.95	30
Ethylbenzene	0.0500	0.0182	0.418	0.451	32.0	34.7	25	10.0-147			7.60	31
Total Xylene	0.150	0.419	1.64	1.71	32.5	34.5	25	10.0-149	J6	J6	4.47	30
(S) a,a,a-Trifluorotoluene(FID)					102	102		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					110	109		75.0-128				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

L978854-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L978854-01 03/22/18 10:27 • (MS) R3296441-8 03/22/18 11:38 • (MSD) R3296441-9 03/22/18 12:02

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	5.51	46.0	49.4	29.4	31.9	25	10.0-147			7.19	30
(S) a,a,a-Trifluorotoluene(FID)					108	109		77.0-120				
(S) a,a,a-Trifluorotoluene(PID)					120	121		75.0-128				

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3295328-1 03/22/18 04:55

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	99.3			18.0-148

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

(LCS) R3295328-2 03/22/18 05:07 • (LCSD) R3295328-3 03/22/18 05:19

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	50.0	34.6	31.9	69.3	63.8	50.0-150			8.26	20
(S) o-Terphenyl				121	113	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.

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

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.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.



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	TN200002
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

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

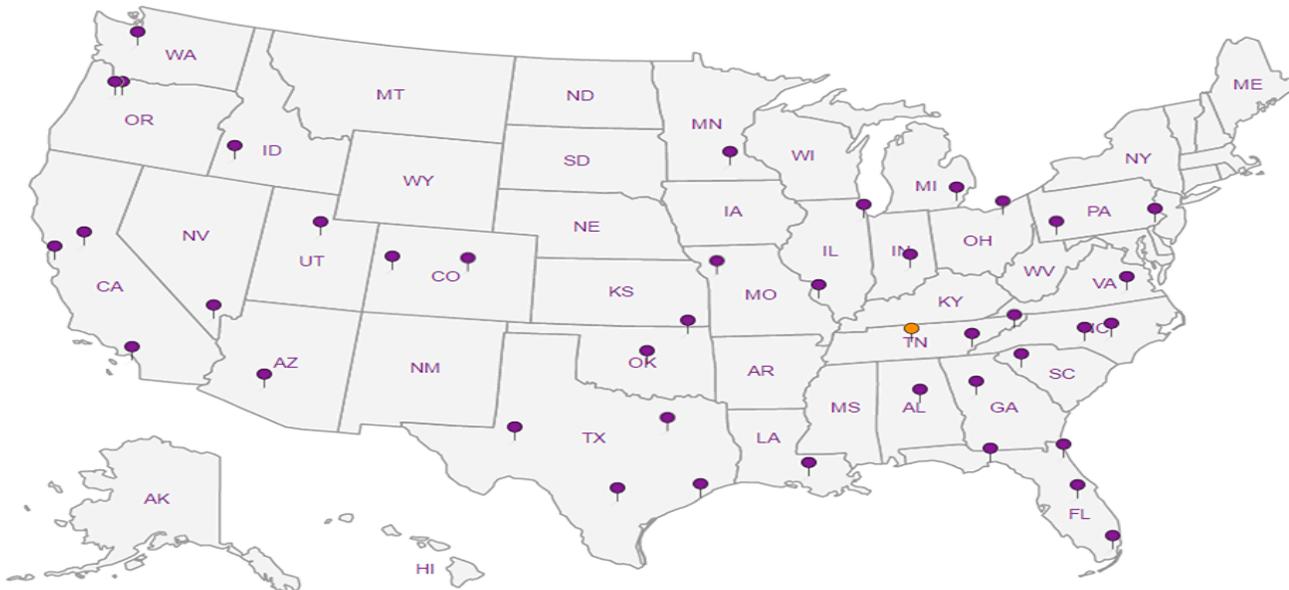
## Third Party Federal Accreditations

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.



Company Name/Address:  
**Nicholson GeoSolutions. LLC.**  
 3433 E. Lake Dr.  
 Centennial, CO 80121

Billing Information:  
 Terry Pape  
 HRM Resources II, LLC  
 410 17th St, Suite 1600  
 Denver, CO 80202

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



YOUR LAB OF CHOICE

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



Report to:  
**Dave Nicholson**

Email To:  
**dknicholson@q.com**

Project Description:  
**Anderson**

City/State Collected:

Phone: **303-601-2023**  
 Fax:

Client Project #

Lab Project #

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  Yes  
 FAX?  No    Yes

TEPH (diesel + motor oil)  
 BTEX / TPH

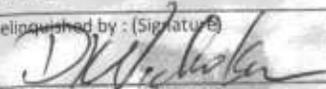
L# **978824**  
 Table **G219**  
 Acctnum: **NICGEOCCO**  
 Template:  
 Prelogin:  
 TSR:  
 Cooler:  
 Shipped Via:  
 Rem./Contaminant    Sample # (lab only)

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs													
Anderson-LF-1				3/18	1140	2	X	X											01
Anderson-LF-2					1145	2	X	X											02
Anderson-LF-3					1150	2	X	X											03
Anderson-LF-4					1155	2	X	X											04
Anderson-LF-5					1200	2	X	X											05

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

pH \_\_\_\_\_ Temp \_\_\_\_\_  
 Flow \_\_\_\_\_ Other \_\_\_\_\_

Remarks: **4094 8307 4020**

Relinquished by: (Signature) 	Date: <b>3/19/18</b>	Time: <b>1500</b>	Received by: (Signature) <b>FedEx</b>	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: <b>2.82</b> °C Bottles Received: <b>8</b>
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) <b>ym</b>	Date: <b>3/20/18</b> Time: <b>0845</b>

Hold # \_\_\_\_\_  
 Condition: (lab use only)  
 COC Seal Intact:    Y    N  NA  
 pH Checked: \_\_\_\_\_ NCF: \_\_\_\_\_

## ESC LAB SCIENCES Cooler Receipt Form

Client: <i>NIL GEOCCO</i>	SDG#		
Cooler Received/Opened On: <i>3/20/18</i>	Temperature:	<i>2.8</i>	<i>°C</i>
Received By: Jeff Mann			
Signature: <i>JM</i>			
Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	<i>/</i>		
COC Signed / Accurate?		<i>/</i>	
Bottles arrive intact?		<i>/</i>	
Correct bottles used?		<i>/</i>	
Sufficient volume sent?		<i>/</i>	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			