



Nicholson GeoSolutions LLC

3433 East Lake Drive
Centennial, CO 80121

June 21, 2017

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

**Subject: Lipplemann “P” Landfarm Sampling Results
COGCC Remediation #9058**

Dear Terry:

Nicholson GeoSolutions LLC was retained by HRM Resources II LLC (HRM) to conduct soil sampling of the landfarm on the Lipplemann “P” lease, Washington County, Colorado. Sampling of the landfarm was conducted at the required rate of approximately one sample per 100 yards of material on May 16th, 2017. The landfarm was previously sampled on October 18th, 2015, May 25th, 2016, and October 29th, 2016.

GPS mapping showed that three landfarm cells cover a total of about 0.38 acres and contain an estimated 980 yards of material. Eleven discrete soil samples were collected at depths of approximately 12-16 inches from approximately the same locations as those previously collected. The extent of the landfarm cells and the locations of the samples are shown on Figure 1.

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. All SAR and conductivity results were below the standards. The pH exceeded the standard for 5 of 11 samples.

Table 1 provides a summary of the analytical results for the samples. The laboratory report is contained in Appendix A. For the May 2017 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 nine of the 11 samples and ranged from 327 mg/kg to 2,730 mg/kg.

Table 1 Lippelmann “P” Landfarm Sample Results – May 16, 2017

	Table 910-1 Standards	Lippelmann LF-1	Lippelmann LF-2	Lippelmann LF-3	Lippelmann LF-4	Lippelmann LF-5
TVPH – gasoline range	500 ¹	0.189	0.148	0.107	<0.1	<0.1
TEPH – diesel/motor oil range		1,569	2,730	1,032	1,111	327
benzene	0.17	0.00199	0.00164	0.000918	<0.0005	0.000515
toluene	85	<0.005	<0.005	<0.005	<0.005	<0.005
ethylbenzene	100	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
xylenes	175	0.00159	<0.0015	<0.0015	<0.0015	<0.0015

	Standards	Lippelmann LF-6	Lippelmann LF-7	Lippelmann LF-8	Lippelmann LF-9	Lippelmann LF-10	Lippelmann LF-11
TVPH	500 ¹	0.139	0.162	<0.1	0.151	9.81	1.49
TEPH		1,086	775	441	533	1,427	943
benzene	0.17	0.00123	0.00136	0.00176	0.00251	<0.0005	0.00431
toluene	85	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
ethylbenzene	100	<0.0005	<0.0005	0.000616	0.000842	<0.0005	<0.0005
xylenes	175	<0.0015	<0.0015	0.00153	0.00194	0.156	0.036

¹The 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 18th, 2015 and May 16th, 2017 samples and the percent difference between the two samples at each sample location. TPH ranged from 932 mg/kg to 8,160 mg/kg for the October 2015 samples and from 327 mg/kg to 2,730 mg/kg for the May 2017 samples. The TPH concentration was lower for the May 2017 samples at 10 of the 11 sample locations and higher at one location.

Table 2 Comparison of TPH Results, October 18, 2015 and May 16, 2017

Sample Location	TPH (mg/kg) October 18, 2015	TPH (mg/kg) May 16, 2017	%Difference
Lippelmann-LF-1	932	1,569.2	68.4
Lippelmann-LF-2	7,351	2,730.2	-62.9
Lippelmann-LF-3	2,339	1,032.1	-55.9
Lippelmann-LF-4	3,155	1,111	-64.8
Lippelmann-LF-5	4,951	327	-93.4
Lippelmann-LF-6	2,874	1,086.2	-62.2
Lippelmann-LF-7	5,840	775.2	-86.7
Lippelmann-LF-8	1,582	441	-72.1
Lippelmann-LF-9	8,160	533.2	-93.5
Lippelmann-LF-10 ¹	65,653	1,436.8	-97.8
Lippelmann-LF-11 ¹	2,449	944.5	-61.4

¹comparison is between May 25th, 2016 and May 16, 2017

Table 3 provides summary statistics for the two sampling events. The average TPH concentration for the eleven samples decreased from 4,132 mg/kg to 1,090 mg/kg between October 18th, 2015 and May 16th, 2017. The median concentration dropped from 3,155 mg/kg to 1,032 mg/kg. Using the results provided above in Table 2, the average % TPH decrease for the overall landfarm was -73.6%.

Table 3 Summary Statistics for the October 2015 and May 2017 Samples

Sample Date	Minimum	Maximum	Average	Median	Average % Difference
Oct 18, 2015	932	8,160	4,132	3,155	
May 16, 2017	327	2,730	1,090	1,032	-73.6

Using the difference between the average TPH concentrations of 3,042 mg/kg, and the time period of 576 days, a biodegradation rate of 5.28 mg/kg-day is obtained. Using these data, and assuming a linear rate of decay, approximately 112 days of treatment remain to reach the standard of 500 mg/kg. The actual time required to reach the standard may be more than estimated if the decay is not linear.

Based on the analytical results, bioremediation of the TPH contained in the soils in the landfarm cells at the Lipplemann "P" lease is occurring. Tilling of the landfarm was performed on March 14th and April 25th during 2017. In addition, a nitrogen fertilizer was added during the April 2017 tilling. Additional treatment of the landfarm cells including tilling and the addition of water during dry periods will be conducted prior to the next sampling event in October 2017.

Nicholson GeoSolutions LLC

A handwritten signature in blue ink that reads "DK Nicholson". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

David K. Nicholson, P.G.
Principal Geologist



APPENDIX A
Laboratory Report

HRM Resources, LLC - Denver, CO

Sample Delivery Group: L910025
Samples Received: 05/17/2017
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.



LIPPLEMANN-LF-1 L910025-01 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:05	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/26/17 09:16	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/24/17 20:18	ACM

¹ Cp

² Tc

³ Ss

LIPPLEMANN-LF-2 L910025-02 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:10	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/23/17 07:43	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	20	05/23/17 07:08	05/25/17 03:15	ACM

⁴ Cn

⁵ Sr

⁶ Qc

LIPPLEMANN-LF-3 L910025-03 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:15	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/26/17 09:40	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/24/17 20:35	ACM

⁷ Gl

⁸ Al

⁹ Sc

LIPPLEMANN-LF-4 L910025-04 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:20	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/26/17 10:03	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/24/17 20:53	ACM

LIPPLEMANN-LF-6 L910025-05 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:30	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/23/17 08:51	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 01:35	ACM

LIPPLEMANN-LF-7 L910025-06 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:35	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/26/17 14:26	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 01:51	ACM

LIPPLEMANN-LF-8 L910025-07 Solid

			Collected by D. Nicholson	Collected date/time 05/16/17 12:40	Received date/time 05/17/17 08:45
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/23/17 09:37	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 02:58	ACM

ACCOUNT:

HRM Resources, LLC - Denver, CO

PROJECT:

SDG:

L910025

DATE/TIME:

05/30/17 09:00

PAGE:

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LIPPLEMANN-LF-9 L910025-08 Solid

Collected by
D. NicholsonCollected date/time
05/16/17 12:45Received date/time
05/17/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/23/17 10:00	BMB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 02:08	ACM

¹ Cp² Tc³ Ss

LIPPLEMANN-LF-10 L910025-09 Solid

Collected by
D. NicholsonCollected date/time
05/16/17 12:50Received date/time
05/17/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	25	05/22/17 13:12	05/26/17 14:48	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 02:25	ACM

⁴ Cn⁵ Sr⁶ Qc

LIPPLEMANN-LF-11 L910025-10 Solid

Collected by
D. NicholsonCollected date/time
05/16/17 12:55Received date/time
05/17/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG982188	1	05/22/17 13:12	05/26/17 15:11	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG981862	10	05/23/17 07:08	05/25/17 02:42	ACM

⁷ Gl⁸ Al⁹ Sc



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 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



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00199		0.000500	1	05/26/2017 09:16	WG982188
Toluene	ND		0.00500	1	05/26/2017 09:16	WG982188
Ethylbenzene	ND		0.000500	1	05/26/2017 09:16	WG982188
Total Xylene	0.00159		0.00150	1	05/26/2017 09:16	WG982188
TPH (GC/FID) Low Fraction	0.189	<u>B</u>	0.100	1	05/26/2017 09:16	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	83.2		77.0-120		05/26/2017 09:16	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	85.3		75.0-128		05/26/2017 09:16	WG982188

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	777		40.0	10	05/24/2017 20:18	WG981862
C28-C40 Oil Range	792		40.0	10	05/24/2017 20:18	WG981862
(S) <i>o</i> -Terphenyl	81.7		18.0-148		05/24/2017 20:18	WG981862

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	0.00164		0.000500	1	05/23/2017 07:43	WG982188
Toluene	ND		0.00500	1	05/23/2017 07:43	WG982188
Ethylbenzene	ND		0.000500	1	05/23/2017 07:43	WG982188
Total Xylene	ND		0.00150	1	05/23/2017 07:43	WG982188
TPH (GC/FID) Low Fraction	0.148	<u>B</u>	0.100	1	05/23/2017 07:43	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	79.3		77.0-120		05/23/2017 07:43	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	81.8		75.0-128		05/23/2017 07:43	WG982188

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	1380		80.0	20	05/25/2017 03:15	WG981862
C28-C40 Oil Range	1350		80.0	20	05/25/2017 03:15	WG981862
(S) <i>o</i> -Terphenyl	29.2	<u>J7</u>	18.0-148		05/25/2017 03:15	WG981862

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	0.000918		0.000500	1	05/26/2017 09:40	WG982188
Toluene	ND		0.00500	1	05/26/2017 09:40	WG982188
Ethylbenzene	ND		0.000500	1	05/26/2017 09:40	WG982188
Total Xylene	ND		0.00150	1	05/26/2017 09:40	WG982188
TPH (GC/FID) Low Fraction	0.107	<u>B</u>	0.100	1	05/26/2017 09:40	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	85.2		77.0-120		05/26/2017 09:40	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	89.2		75.0-128		05/26/2017 09:40	WG982188

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	582		40.0	10	05/24/2017 20:35	WG981862
C28-C40 Oil Range	450		40.0	10	05/24/2017 20:35	WG981862
(S) <i>o</i> -Terphenyl	68.9		18.0-148		05/24/2017 20:35	WG981862

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	05/26/2017 10:03	WG982188
Toluene	ND		0.00500	1	05/26/2017 10:03	WG982188
Ethylbenzene	ND		0.000500	1	05/26/2017 10:03	WG982188
Total Xylene	ND		0.00150	1	05/26/2017 10:03	WG982188
TPH (GC/FID) Low Fraction	ND		0.100	1	05/26/2017 10:03	WG982188
(S) a,a,a-Trifluorotoluene(FID)	87.3		77.0-120		05/26/2017 10:03	WG982188
(S) a,a,a-Trifluorotoluene(PID)	90.2		75.0-128		05/26/2017 10:03	WG982188

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	613		40.0	10	05/24/2017 20:53	WG981862
C28-C40 Oil Range	498		40.0	10	05/24/2017 20:53	WG981862
(S) o-Terphenyl	56.0		18.0-148		05/24/2017 20:53	WG981862

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	0.00123		0.000500	1	05/23/2017 08:51	WG982188
Toluene	ND		0.00500	1	05/23/2017 08:51	WG982188
Ethylbenzene	ND		0.000500	1	05/23/2017 08:51	WG982188
Total Xylene	ND		0.00150	1	05/23/2017 08:51	WG982188
TPH (GC/FID) Low Fraction	0.139	<u>B</u>	0.100	1	05/23/2017 08:51	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	80.5		77.0-120		05/23/2017 08:51	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	82.8		75.0-128		05/23/2017 08:51	WG982188

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	625		40.0	10	05/25/2017 01:35	WG981862
C28-C40 Oil Range	461		40.0	10	05/25/2017 01:35	WG981862
(S) <i>o</i> -Terphenyl	66.3		18.0-148		05/25/2017 01:35	WG981862

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	0.00136		0.000500	1	05/26/2017 14:26	WG982188
Toluene	ND		0.00500	1	05/26/2017 14:26	WG982188
Ethylbenzene	ND		0.000500	1	05/26/2017 14:26	WG982188
Total Xylene	ND		0.00150	1	05/26/2017 14:26	WG982188
TPH (GC/FID) Low Fraction	0.162	<u>B</u>	0.100	1	05/26/2017 14:26	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	81.3		77.0-120		05/26/2017 14:26	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	83.6		75.0-128		05/26/2017 14:26	WG982188

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	473		40.0	10	05/25/2017 01:51	WG981862
C28-C40 Oil Range	302		40.0	10	05/25/2017 01:51	WG981862
(S) <i>o</i> -Terphenyl	68.5		18.0-148		05/25/2017 01:51	WG981862

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	0.00176		0.000500	1	05/23/2017 09:37	WG982188
Toluene	ND		0.00500	1	05/23/2017 09:37	WG982188
Ethylbenzene	0.000616		0.000500	1	05/23/2017 09:37	WG982188
Total Xylene	0.00153		0.00150	1	05/23/2017 09:37	WG982188
TPH (GC/FID) Low Fraction	ND		0.100	1	05/23/2017 09:37	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	89.2		77.0-120		05/23/2017 09:37	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	91.9		75.0-128		05/23/2017 09:37	WG982188

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	185		40.0	10	05/25/2017 02:58	WG981862
C28-C40 Oil Range	256		40.0	10	05/25/2017 02:58	WG981862
(S) <i>o</i> -Terphenyl	65.2		18.0-148		05/25/2017 02:58	WG981862

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	0.00251		0.000500	1	05/23/2017 10:00	WG982188
Toluene	ND		0.00500	1	05/23/2017 10:00	WG982188
Ethylbenzene	0.000842		0.000500	1	05/23/2017 10:00	WG982188
Total Xylene	0.00194		0.00150	1	05/23/2017 10:00	WG982188
TPH (GC/FID) Low Fraction	0.151	<u>B</u>	0.100	1	05/23/2017 10:00	WG982188
(S) a,a,a-Trifluorotoluene(FID)	79.8		77.0-120		05/23/2017 10:00	WG982188
(S) a,a,a-Trifluorotoluene(PID)	82.2		75.0-128		05/23/2017 10:00	WG982188

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	287		40.0	10	05/25/2017 02:08	WG981862
C28-C40 Oil Range	246		40.0	10	05/25/2017 02:08	WG981862
(S) o-Terphenyl	68.4		18.0-148		05/25/2017 02:08	WG981862

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		0.0125	25	05/26/2017 14:48	WG982188
Toluene	ND		0.125	25	05/26/2017 14:48	WG982188
Ethylbenzene	ND		0.0125	25	05/26/2017 14:48	WG982188
Total Xylene	0.156		0.0375	25	05/26/2017 14:48	WG982188
TPH (GC/FID) Low Fraction	9.81		2.50	25	05/26/2017 14:48	WG982188
(S) a,a,a-Trifluorotoluene(FID)	92.9		77.0-120		05/26/2017 14:48	WG982188
(S) a,a,a-Trifluorotoluene(PID)	95.7		75.0-128		05/26/2017 14:48	WG982188

Sample Narrative:

8015/8021 L910025-09 WG982188: IS/SURR failed on lower dilution.

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	891		40.0	10	05/25/2017 02:25	WG981862
C28-C40 Oil Range	536		40.0	10	05/25/2017 02:25	WG981862
(S) o-Terphenyl	52.9		18.0-148		05/25/2017 02:25	WG981862

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	0.00431		0.000500	1	05/26/2017 15:11	WG982188
Toluene	ND		0.00500	1	05/26/2017 15:11	WG982188
Ethylbenzene	ND		0.000500	1	05/26/2017 15:11	WG982188
Total Xylene	0.0360		0.00150	1	05/26/2017 15:11	WG982188
TPH (GC/FID) Low Fraction	1.49		0.100	1	05/26/2017 15:11	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	76.5	J2	77.0-120		05/26/2017 15:11	WG982188
(S) <i>a,a,a</i> -Trifluorotoluene(PID)	75.8		75.0-128		05/26/2017 15:11	WG982188

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	621		40.0	10	05/25/2017 02:42	WG981862
C28-C40 Oil Range	322		40.0	10	05/25/2017 02:42	WG981862
(S) <i>o</i> -Terphenyl	96.5		18.0-148		05/25/2017 02:42	WG981862

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3221026-5 05/23/17 00:50

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	0.0277	J	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID) 98.5			77.0-120	
(S) a,a,a-Trifluorotoluene(PID) 95.7			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) R3221026-1 05/22/17 22:55 • (LCSD) R3221026-2 05/22/17 23:18

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	0.0471	0.0477	94.1	95.3	71.0-121			1.28	20
Toluene	0.0500	0.0476	0.0481	95.2	96.3	72.0-120			1.18	20
Ethylbenzene	0.0500	0.0494	0.0500	98.7	100	76.0-121			1.27	20
Total Xylene	0.150	0.147	0.149	98.2	99.5	75.0-124			1.28	20
(S) a,a,a-Trifluorotoluene(FID)				97.1	97.1	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				101	101	75.0-128				

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

(LCS) R3221026-3 05/22/17 23:41 • (LCSD) R3221026-4 05/23/17 00:04

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	6.08	6.38	111	116	70.0-136			4.90	20
(S) a,a,a-Trifluorotoluene(FID)				104	105	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				99.2	99.2	75.0-128				

L910024-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L910024-01 05/23/17 06:11 • (MS) R3221026-6 05/23/17 01:36 • (MSD) R3221026-7 05/23/17 01:59

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	0.00214	0.0312	0.0411	58.1	78.0	1	10.0-146			27.5	29
Toluene	0.0500	ND	0.0221	0.0252	42.4	48.5	1	10.0-143			12.9	30
Ethylbenzene	0.0500	ND	0.0148	0.0134	28.9	26.0	1	10.0-147			10.2	31
Total Xylene	0.150	ND	0.0408	0.0360	26.7	23.5	1	10.0-149	J6	J6	12.5	30
(S) a,a,a-Trifluorotoluene(FID)					73.6	64.7		77.0-120	J2	J2		



L910024-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L910024-01 05/23/17 06:11 • (MS) R3221026-6 05/23/17 01:36 • (MSD) R3221026-7 05/23/17 01:59												
Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
(S) a,a,a-Trifluorotoluene(PID)					76.2	67.4		75.0-128		J2		

L910024-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L910024-01 05/23/17 06:11 • (MS) R3221026-8 05/23/17 02:22 • (MSD) R3221026-9 05/23/17 02:45												
Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
TPH (GC/FID) Low Fraction	5.50	0.174	1.56	1.51	25.2	24.3	1	10.0-147			3.12	30
(S) a,a,a-Trifluorotoluene(FID)					63.3	64.5		77.0-120	J2	J2		
(S) a,a,a-Trifluorotoluene(PID)					63.2	64.6		75.0-128	J2	J2		

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3220242-1 05/23/17 11:30

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	102			18.0-148

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) R3220242-2 05/23/17 11:47 • (LCSD) R3220242-3 05/23/17 12:04

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	47.2	48.1	78.7	80.2	50.0-150			1.98	20
(S) o-Terphenyl				94.7	96.7	18.0-148				

L910136-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L910136-03 05/24/17 18:17 • (MS) R3220855-1 05/24/17 18:35 • (MSD) R3220855-2 05/24/17 18:52

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	U	45.6	47.1	76.0	78.5	1	50.0-150			3.28	20
(S) o-Terphenyl					83.3	87.7		18.0-148				



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
(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.
Rec.	Recovery.

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

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ 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		

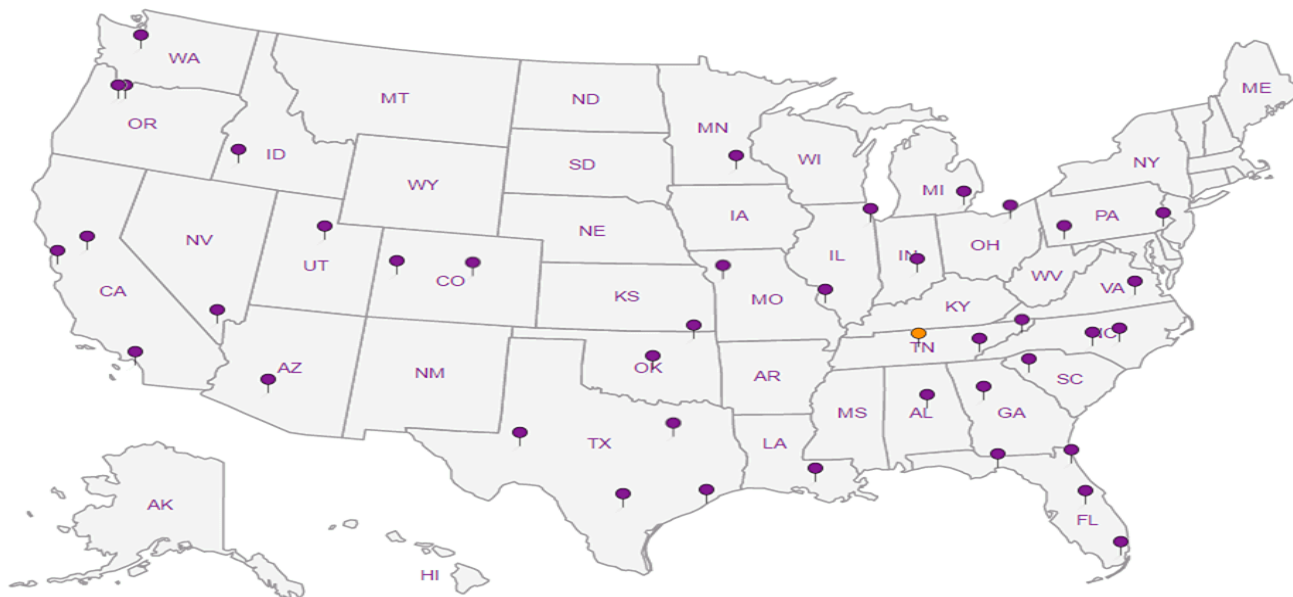
Third Party & Federal Accreditations

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, LLC3433 E. Lake Dr,
Centennial, CO 80121

Billing Information:

Terry Pape
HRM Resources
410 17th St. Suite 1600
Denver, CO 80202

Report to:

Dave Nicholson

Email To:

dknicholson@q.com

Project
Description: **HRM Landfarm Sampling**City/State
Collected:Phone: **303-601-2023**

Client Project #

Lab Project #

Fax:

BERPETDCO030615S

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)


Date Results Needed

Immediately

Packed on Ice N Y

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

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

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	Cntrs	TEPH(8015)Diesel & Oil Range (1) 4oz Clear-No Pres	BTEX/TVPH (1) 4oz Clear - No Pres	Analysis / Container / Preservative	Chain of Custody
Lippelmann-LF-1		SS		5/16	1205	2	X	X		YOUR LAB OF CHOICE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859 
Lippelmann-LF-2		SS		5/16	1210	2	X	X		
Lippelmann-LF-3		SS		5/16	1215	2	X	X		
Lippelmann-LF-4		SS		5/16	1220	2	X	X		
Lippelmann-LF-5		SS		5/16	1225	2	X	X		
Lippelmann-LF-6		SS		5/16	1230	2	X	X		
Lippelmann-LF-7		SS		5/16	1235	2	X	X		
Lippelmann-LF-8		SS		5/16	1240	2	X	X		
Lippelmann-LF-9		SS		5/16	1245	2	X	X		
Lippelmann-LF-10		SS		5/16	1250	2	X	X		
Lippelmann-LF-11		SS		5/16	1255	2	X	X		

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

pH _____ Temp _____

Flow _____ Other _____

Remarks:

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Samples returned via: ☐ UPS

Hold #

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: _____ Time: _____

pH Checked:

NCF:

Andy Vann



Login #:L910025	Client: HRMRESDCO	Date:05/17/17	Evaluated by:Andy Vann
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Non-Conformance (check applicable items)

Sample Integrity	Chain of Custody Clarification	If Broken Container:
Parameter(s) past holding time	Login Clarification Needed	
Improper temperature	Chain of custody is incomplete	Insufficient packing material around container
Improper container type	Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation	Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courier)
Insufficient sample volume.	Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.	Trip Blank not received.	If no Chain of Custody:
Broken container	Client did not "X" analysis.	Received by:
Broken container:	Chain of Custody is missing	Date/Time:
Sufficient sample remains		Temp./Cont. Rec./pH:
		Carrier:
		Tracking#

Login Comments: We did not receive LF-5

Client informed by:	Call	Email	Voice Mail	Date: 5/18/17	Time: 1240
TSR Initials: MB	Client Contact: Dave Nicholson				

Login Instructions:

Client notified, sample LF-5 was not collected

HRM Resources, LLC - Denver, CO

Sample Delivery Group: L913021
Samples Received: 06/01/2017
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.



Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
LIPPLEMANN-LF-5 L913021-01	5	
Qc: Quality Control Summary	6	⁴ Cn
Volatile Organic Compounds (GC) by Method 8015/8021	6	⁵ Sr
Semi-Volatile Organic Compounds (GC) by Method 8015	7	
Gl: Glossary of Terms	8	⁶ Qc
Al: Accreditations & Locations	9	⁷ Gl
Sc: Chain of Custody	10	⁸ Al
		⁹ Sc

LIPPLEMANN-LF-5 L913021-01 Solid

Collected by
DK Nicholson

Collected date/time
05/31/17 08:45

Received date/time
06/01/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method 8015/8021	WG986439	1	06/04/17 14:05	06/07/17 20:30	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG986464	10	06/07/17 11:37	06/08/17 02:21	ACM

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



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 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



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000515		0.000500	1	06/07/2017 20:30	WG986439
Toluene	ND		0.00500	1	06/07/2017 20:30	WG986439
Ethylbenzene	ND		0.000500	1	06/07/2017 20:30	WG986439
Total Xylene	ND		0.00150	1	06/07/2017 20:30	WG986439
TPH (GC/FID) Low Fraction	ND		0.100	1	06/07/2017 20:30	WG986439
(S) a,a,a-Trifluorotoluene(FID)	92.0		77.0-120		06/07/2017 20:30	WG986439
(S) a,a,a-Trifluorotoluene(PID)	97.4		75.0-128		06/07/2017 20:30	WG986439

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	221		40.0	10	06/08/2017 02:21	WG986464
C28-C40 Oil Range	106		40.0	10	06/08/2017 02:21	WG986464
(S) o-Terphenyl	107		18.0-148		06/08/2017 02:21	WG986464

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3223911-5 06/07/17 11:32

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	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) 98.6			77.0-120	
(S) a,a,a-Trifluorotoluene(PID) 103			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) R3223911-1 06/07/17 09:41 • (LCSD) R3223911-2 06/07/17 10:04

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	0.0485	0.0485	96.9	96.9	71.0-121			0.000	20
Toluene	0.0500	0.0479	0.0475	95.7	95.1	72.0-120			0.710	20
Ethylbenzene	0.0500	0.0480	0.0482	96.0	96.4	76.0-121			0.330	20
Total Xylene	0.150	0.139	0.140	92.7	93.1	75.0-124			0.500	20
(S) a,a,a-Trifluorotoluene(FID)				97.8	98.2	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				102	102	75.0-128				

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

(LCS) R3223911-3 06/07/17 10:26 • (LCSD) R3223911-4 06/07/17 10:48

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	5.73	5.49	104	99.8	70.0-136			4.41	20
(S) a,a,a-Trifluorotoluene(FID)				108	107	77.0-120				
(S) a,a,a-Trifluorotoluene(PID)				116	115	75.0-128				



Method Blank (MB)

(MB) R3223990-1 06/07/17 21:12

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	82.7			18.0-148

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) R3223990-2 06/07/17 21:27 • (LCSD) R3223990-3 06/07/17 21:43

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	42.6	47.6	70.9	79.4	50.0-150			11.3	20
(S) o-Terphenyl				83.2	89.9	18.0-148				

L913029-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L913029-01 06/08/17 02:49 • (MS) R3223990-4 06/08/17 03:02 • (MSD) R3223990-5 06/08/17 03:17

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	6.00	1540	1660	1740	199	331	10	50.0-150	V	V	4.67	20
(S) o-Terphenyl					92.6	92.7		18.0-148				



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
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.
(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.
Rec.	Recovery.

Qualifier	Description
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V	The sample concentration is too high to evaluate accurate spike recoveries.
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¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ 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		

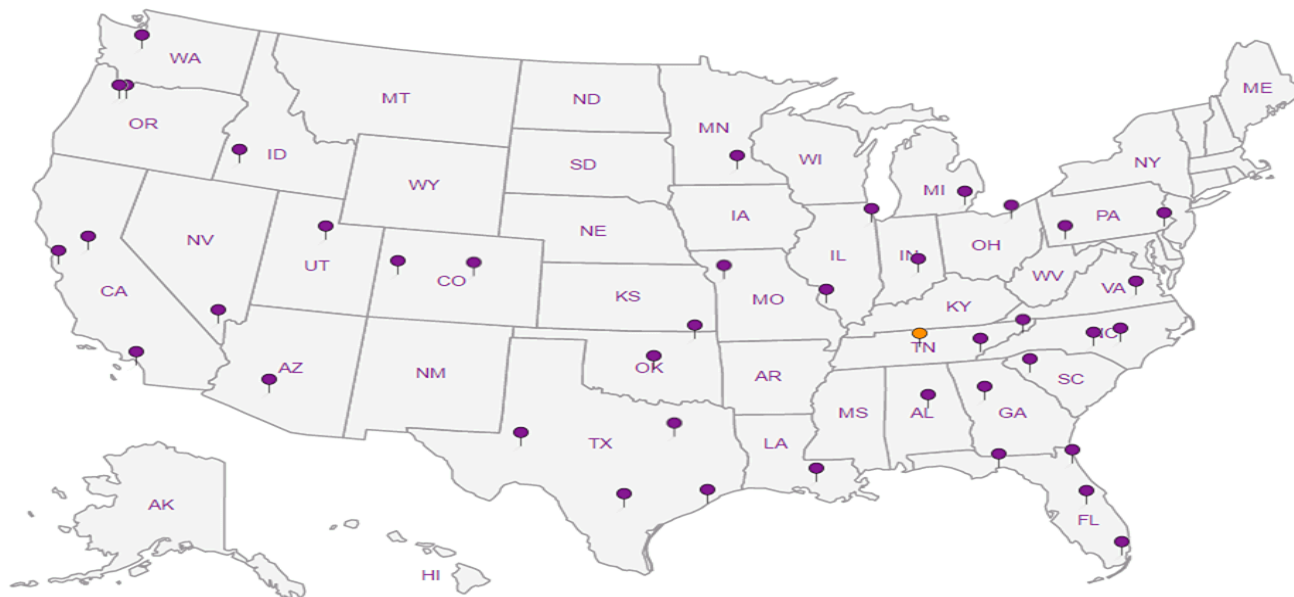
Third Party & Federal Accreditations


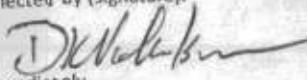
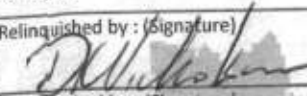
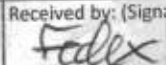
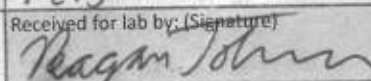
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

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 Pape HRM Resources 410 17th St. Suite 1600 Denver, CO 80202				Analysis / Container / Preservative										Chain of Custody Page 1 of 1	
Report to: Dave Nicholson				Email To: dknicholson@q.com				TEPH(8015)Diesel & Oil Range (1) 4oz Clear-No Pres BTEX/TPH (1) 4oz Clear - No Pres										 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# 913021 C192 Acctnum: HRMRESDCO Template: Prelogin: TSR: Cooler: Shipped Via: Rem./Contaminant: Sample # (lab only)	
Project Description: HRM Landfarm Sampling				City/State Collected:															
Phone: 303-601-2023		Client Project #		Lab Project #		P.O. #													
Fax:				BERPETDCO030615S															
Collected by (print):				Site/Facility ID #				Date Results Needed											
Collected by (signature): 				Rush? (Lab MUST Be Notified) Same Day200% Next Day100% Two Day50% Three Day25%				Email? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes FAX? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes				No. of Cntrs							
Packed on Ice N <input checked="" type="checkbox"/>																			
Sample ID				Comp/Grab		Matrix *		Depth		Date		Time		No. of Cntrs					
Lippelmann-L5-5						SS				5/31		0845		2		X X			
						SS								2					
						SS								2					
						SS								2					
						SS								2					
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						SS								2					
						SS								2					
* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____																			
Remarks:																			
Relinquished by: (Signature) 				Date: 5/31/17		Time: 1700		Received by: (Signature) 				Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier <input type="checkbox"/> _____				Hold #			
Relinquished by: (Signature)				Date:		Time:		Received by: (Signature) 7215 4521 9490				Temp: °C Bottles Received: 2				Condition: (lab use only)			
Relinquished by: (Signature)				Date:		Time:		Received for lab by: (Signature) 				Date: 6/1/17 Time: 8:45				COC Seal Intact: <input type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> NA pH Checked: NCF:			

ESC LAB SCIENCES Cooler Receipt Form

Client: <u>HRM RESDCO</u>	SDG#	<u>513021</u>	
Cooler Received/Opened On: <u>6/ / 17</u>	Temperature: <u>79</u>		
Received by : Reagan Johnson			
Signature: <u>Reagan Johnson</u>			
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?			