



Nicholson GeoSolutions LLC

3433 East Lake Drive
Centennial, CO 80121

November 14, 2016

Mr. Terry Pape
HRM Resources, LLC
410 17th Street, Suite 1100
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 October 29th, 2016. The landfarm was previously sampled on October 18th, 2015 and May 25th, 2016.

GPS mapping showed that three landfarm cells cover a total of about 0.38 acres and contain an estimated 980 yards of material. Nine discrete soil samples were collected at depths of approximately 12-16 inches from approximately the same locations as those previously collected. Two additional samples (Lipplemann-LF-10 and Lipplemann-LF-11) were also collected from material that was excavated from the former skim pit at the site in May 2016 after collapse of the shared wall between it and the adjacent evaporation pit. 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), BTEX (benzene, toluene, ethylbenzene, and xylenes), sodium adsorption ratio (SAR), pH, and conductivity to evaluate compliance with the COGCC Table 910-1 standards and further treatment needs.

Table 1 provides a summary of the analytical results for the samples. The laboratory report is contained in Appendix A. For the October 2016 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 10 of the 11 samples and ranged from 491 mg/kg to 4,590 mg/kg. In addition, pH exceeded the standard for 5 of 11 samples. All SAR and conductivity results were below the standards.

Table 1 Lippelmann “P” Landfarm Sample Results – October 29, 2016

	Table 910-1 Standards	Lippelmann LF-1	Lippelmann LF-2	Lippelmann LF-3	Lippelmann LF-4	Lippelmann LF-5
TVPH – gasoline range	500 ¹	<0.1	<0.1	<0.1	<0.1	<0.1
TEPH – diesel/motor oil range	500 ¹	3,381 J	722 J	1,346 J	491 J	3,590 J
benzene	0.17	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	0.00506 J	<0.0005 UJ
toluene	85	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ
ethylbenzene	100	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ
xylenes	175	<0.0015 UJ	<0.0015 UJ	<0.0015 UJ	<0.0015 UJ	0.00157 J
SAR (ratio)	<12	4.14	6.76	8.83	2.73	2.15
pH (units)	6-9	9.63	9.14	9.24	9.58	8.92
sp. conductance (mmhos/cm)	<4.0	0.696	0.475	0.631	0.435	0.52

	Standards	Lippelmann LF-6	Lippelmann LF-7	Lippelmann LF-8	Lippelmann LF-9	Lippelmann LF-10	Lippelmann LF-11
TVPH	500 ¹	<0.1	<0.1	<0.1	<0.1	68.8	1.21
TEPH	500 ¹	1,237	4,590	4,290	1,453	2,837	3,331
benzene	0.17	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	0.0216 J	0.00404 J
toluene	85	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ	<0.005 UJ
ethylbenzene	100	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	0.144 J	<0.0005 UJ
xylenes	175	<0.0015 UJ	<0.0015 UJ	<0.0015 UJ	<0.0015 UJ	0.139 J	0.0283 J
SAR (ratio)	<12	2.43	2.61	2.27	2.85	4.45	4.10
pH (units)	6-9	8.80	8.60	8.10	9.24	8.81	8.71
sp. conductance (mmhos/cm)	<4.0	0.619	0.715	0.648	0.506	0.868	0.87

¹The standard is 500 for the combined total of TVPH and TEPH All units in mg/kg except where indicated

J = estimated concentration UJ = estimated detection limit

Values in bold type exceed standards

Table 2 provides the TPH results for the October 18th, 2015 and October 29th, 2016 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 491 mg/kg to 4,590 mg/kg for the October 2016 samples. The TPH concentration was lower for the October 2016 samples at nine of the 11 sample locations and higher at two locations.

Table 2 Comparison of TPH Results, October 18, 2015 and October 29, 2016

Sample Location	TPH (mg/kg) October 18, 2015	TPH (mg/kg) October 29, 2016	%Difference
Lippelmann-LF-1	932	3,354	259.9
Lippelmann-LF-2	7,351	722	-90.2
Lippelmann-LF-3	2,339	1,346	-42.5
Lippelmann-LF-4	3,155	491	-84.4
Lippelmann-LF-5	4,951	3,590	-27.5
Lippelmann-LF-6	2,874	1,237	-57.0
Lippelmann-LF-7	5,840	4,590	-21.4
Lippelmann-LF-8	1,582	4,290	171.2
Lippelmann-LF-9	8,160	1,453	-82.2
Lippelmann-LF-10 ¹	65,653	2,906	-95.6
Lippelmann-LF-11 ¹	2,449	3,332	36.1

¹comparison is between May 25th, 2016 and October 29th, 2016

Table 3 provides summary statistics for the two sampling events for the nine sample locations sampled during each sample event. The average TPH concentration for the nine samples decreased from 4,132 mg/kg to 2,483 mg/kg between October 18th, 2015 and October 29th, 2016. The median concentration dropped from 3,155 mg/kg to 1,453 mg/kg. Using the results provided above in Table 2, the average % TPH decrease for the overall landfarm was 39.9%.

Table 3 Summary Statistics for the October 2015 and October 2016 Samples

Sample Date	Minimum	Maximum	Average	Median	Average % Difference
Oct 18, 2015	932	8,160	4,132	3,155	
Oct 29, 2016	491	4,590	2,483	1,453	-39.9%

Using the difference between the average TPH concentrations of 1,649 mg/kg, and the time period of 376 days, a biodegradation rate of 4.39 mg/kg-day is obtained. Using these data, approximately 452 days of treatment remain to reach the standard of 500 mg/kg.

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 10th and August 14th during 2016. Additional treatment of the landfarm cells including tilling will be conducted prior to the next sampling event in May 2017.

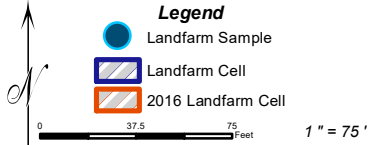
Nicholson GeoSolutions LLC



David K. Nicholson, P.G.
Principal Geologist



GeoSolutions
NICHOLSON



HRM Resources, LLC

Lipplemann 'P'
Landfarm
Sampling

Figure 1
May
2016

APPENDIX A
Laboratory Report

November 10, 2016

HRM Resources, LLC - Denver, CO

Sample Delivery Group: L869696
Samples Received: 11/01/2016
Project Number:
Description: Lippleman P

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.



¹Cp: Cover Page	1
²Tc: Table of Contents	2
³Ss: Sample Summary	3
⁴Cn: Case Narrative	6
⁵Sr: Sample Results	7
LIPPLEMAN-LF-1 L869696-01	7
LIPPLEMAN-LF-2 L869696-02	8
LIPPLEMAN-LF-3 L869696-03	9
LIPPLEMAN-LF-4 L869696-04	10
LIPPLEMAN-LF-5 L869696-05	11
LIPPLEMAN-LF-6 L869696-06	12
LIPPLEMAN-LF-7 L869696-07	13
LIPPLEMAN-LF-8 L869696-08	14
LIPPLEMAN-LF-9 L869696-09	15
LIPPLEMAN-LF-10 L869696-10	16
LIPPLEMAN-LF-11 L869696-11	17
⁶Qc: Quality Control Summary	18
Wet Chemistry by Method 9045D	18
Wet Chemistry by Method 9050AMod	20
Volatile Organic Compounds (GC) by Method 8015/8021	22
Semi-Volatile Organic Compounds (GC) by Method 8015	24
⁷Gl: Glossary of Terms	25
⁸Al: Accreditations & Locations	26
⁹Sc: Chain of Custody	27



SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



LIPPLEMAN-LF-1 L869696-01 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 09:35	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 03:50	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 21:09	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 17:10	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

¹ Cp

² Tc

³ Ss

⁴ Cn

LIPPLEMAN-LF-2 L869696-02 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 09:40	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 03:52	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/08/16 20:12	DMG
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 17:32	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

LIPPLEMAN-LF-3 L869696-03 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 09:45	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 03:55	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 22:15	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 17:54	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

⁹ Sc

LIPPLEMAN-LF-4 L869696-04 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 09:50	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 03:58	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 20:56	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 18:16	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

LIPPLEMAN-LF-5 L869696-05 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 09:55	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:01	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	100	11/07/16 02:37	11/08/16 04:03	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 18:38	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

ACCOUNT:

HRM Resources, LLC - Denver, CO

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



LIPPLEMAN-LF-6 L869696-06 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 10:00	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:04	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 22:29	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 19:00	LRL
Wet Chemistry by Method 9045D	WG922755	1	11/08/16 07:55	11/08/16 08:44	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

¹ Cp

² Tc

³ Ss

⁴ Cn

LIPPLEMAN-LF-7 L869696-07 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 10:05	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:06	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 22:42	ACM
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 19:22	LRL
Wet Chemistry by Method 9045D	WG922756	1	11/05/16 12:39	11/07/16 10:39	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

LIPPLEMAN-LF-8 L869696-08 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 10:10	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 12:45	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	200	11/07/16 02:37	11/08/16 20:38	DMG
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 19:44	LRL
Wet Chemistry by Method 9045D	WG922756	1	11/05/16 12:39	11/07/16 10:39	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

⁹ Sc

LIPPLEMAN-LF-9 L869696-09 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 10:15	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:12	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/08/16 20:25	DMG
Volatile Organic Compounds (GC) by Method 8015/8021	WG923605	1	11/02/16 14:33	11/04/16 20:07	LRL
Wet Chemistry by Method 9045D	WG922756	1	11/05/16 12:39	11/07/16 10:39	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

LIPPLEMAN-LF-10 L869696-10 Solid

			Collected by DK Nicholson	Collected date/time 10/29/16 10:20	Received date/time 11/01/16 09:00
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:15	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/07/16 23:08	ACM
Volatile Organic Compounds (GC) by Method 8015	WG923605	24.75	11/02/16 14:33	11/05/16 21:53	BMB
Volatile Organic Compounds (GC) by Method 8021	WG923605	1	11/02/16 14:33	11/05/16 00:24	LRL
Wet Chemistry by Method 9045D	WG922756	1	11/05/16 12:39	11/07/16 10:39	MHM
Wet Chemistry by Method 9050AMod	WG922908	1	11/02/16 19:59	11/02/16 19:59	MZ

ACCOUNT:

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



LIPPLEMAN-LF-11 L869696-11 Solid

Collected by
DK NicholsonCollected date/time
10/29/16 10:25Received date/time
11/01/16 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG922935	1	11/04/16 06:53	11/08/16 04:23	LTB
Semi-Volatile Organic Compounds (GC) by Method 8015	WG924180	10	11/07/16 02:37	11/08/16 03:36	ACM
Volatile Organic Compounds (GC) by Method 8015	WG923605	1	11/02/16 14:33	11/05/16 22:15	BMB
Volatile Organic Compounds (GC) by Method 8021	WG923605	1	11/02/16 14:33	11/05/16 00:46	LRL
Wet Chemistry by Method 9045D	WG922756	1	11/05/16 12:39	11/07/16 10:39	MHM
Wet Chemistry by Method 9050AMod	WG924105	1	11/07/16 16:57	11/07/16 16:57	MZ

¹Cp²Tc³Ss⁴Cn⁵Sr⁶Qc⁷Gl⁸Al⁹Sc

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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

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

ESC Sample ID	Project Sample ID	Method
L869696-01	LIPPLEMAN-LF-1	9045D
L869696-02	LIPPLEMAN-LF-2	9045D
L869696-03	LIPPLEMAN-LF-3	9045D
L869696-04	LIPPLEMAN-LF-4	9045D
L869696-05	LIPPLEMAN-LF-5	9045D
L869696-06	LIPPLEMAN-LF-6	9045D
L869696-07	LIPPLEMAN-LF-7	9045D
L869696-08	LIPPLEMAN-LF-8	9045D
L869696-09	LIPPLEMAN-LF-9	9045D
L869696-10	LIPPLEMAN-LF-10	9045D
L869696-11	LIPPLEMAN-LF-11	9045D

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	4.14		1	11/08/2016 03:50	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.63		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-01 WG922755: 9.63 at 20.2c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 17:10	WG923605
Toluene	ND		0.00500	1	11/04/2016 17:10	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 17:10	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 17:10	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 17:10	WG923605
(S) a,a,a-Trifluorotoluene(FID)	84.8		59.0-128		11/04/2016 17:10	WG923605
(S) a,a,a-Trifluorotoluene(PID)	78.8		54.0-144		11/04/2016 17:10	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2640		40.0	10	11/07/2016 21:09	WG924180
C28-C40 Oil Range	714		40.0	10	11/07/2016 21:09	WG924180
(S) o-Terphenyl	162	J1	50.0-150		11/07/2016 21:09	WG924180

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	6.76		1	11/08/2016 03:52	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.14		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-02 WG922755: 9.14 at 19.9c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 17:32	WG923605
Toluene	ND		0.00500	1	11/04/2016 17:32	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 17:32	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 17:32	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 17:32	WG923605
(S) a,a,a-Trifluorotoluene(FID)	90.2		59.0-128		11/04/2016 17:32	WG923605
(S) a,a,a-Trifluorotoluene(PID)	82.8		54.0-144		11/04/2016 17:32	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	378		40.0	10	11/08/2016 20:12	WG924180
C28-C40 Oil Range	344		40.0	10	11/08/2016 20:12	WG924180
(S) o-Terphenyl	92.0		50.0-150		11/08/2016 20:12	WG924180

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	8.83		1	11/08/2016 03:55	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.24		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-03 WG922755: 9.24 at 20.1c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 17:54	WG923605
Toluene	ND		0.00500	1	11/04/2016 17:54	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 17:54	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 17:54	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 17:54	WG923605
(S) a,a,a-Trifluorotoluene(FID)	88.3		59.0-128		11/04/2016 17:54	WG923605
(S) a,a,a-Trifluorotoluene(PID)	81.5		54.0-144		11/04/2016 17:54	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	954	<u>V</u>	40.0	10	11/07/2016 22:15	WG924180
C28-C40 Oil Range	392		40.0	10	11/07/2016 22:15	WG924180
(S) o-Terphenyl	149		50.0-150		11/07/2016 22:15	WG924180

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	2.73		1	11/08/2016 03:58	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.58		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-04 WG922755: 9.58 at 19.9c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.000506		0.000500	1	11/04/2016 18:16	WG923605
Toluene	ND		0.00500	1	11/04/2016 18:16	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 18:16	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 18:16	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 18:16	WG923605
(S) a,a,a-Trifluorotoluene(FID)	93.3		59.0-128		11/04/2016 18:16	WG923605
(S) a,a,a-Trifluorotoluene(PID)	86.0		54.0-144		11/04/2016 18:16	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	372		40.0	10	11/07/2016 20:56	WG924180
C28-C40 Oil Range	119		40.0	10	11/07/2016 20:56	WG924180
(S) o-Terphenyl	134		50.0-150		11/07/2016 20:56	WG924180

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	2.15		1	11/08/2016 04:01	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.92		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-05 WG922755: 8.92 at 20.1c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	520 umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 18:38	WG923605
Toluene	ND		0.00500	1	11/04/2016 18:38	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 18:38	WG923605
Total Xylene	0.00157	B	0.00150	1	11/04/2016 18:38	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 18:38	WG923605
(S) a,a,a-Trifluorotoluene(FID)	82.2		59.0-128		11/04/2016 18:38	WG923605
(S) a,a,a-Trifluorotoluene(PID)	76.2		54.0-144		11/04/2016 18:38	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2490		400	100	11/08/2016 04:03	WG924180
C28-C40 Oil Range	1100		400	100	11/08/2016 04:03	WG924180
(S) o-Terphenyl	191	J7	50.0-150		11/08/2016 04:03	WG924180

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	2.43		1	11/08/2016 04:04	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.80		1	11/08/2016 08:44	WG922755

Sample Narrative:

9045D L869696-06 WG922755: 8.80 at 19.8c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 19:00	WG923605
Toluene	ND		0.00500	1	11/04/2016 19:00	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 19:00	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 19:00	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 19:00	WG923605
(S) a,a,a-Trifluorotoluene(FID)	85.3		59.0-128		11/04/2016 19:00	WG923605
(S) a,a,a-Trifluorotoluene(PID)	78.3		54.0-144		11/04/2016 19:00	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	877		40.0	10	11/07/2016 22:29	WG924180
C28-C40 Oil Range	360		40.0	10	11/07/2016 22:29	WG924180
(S) o-Terphenyl	128		50.0-150		11/07/2016 22:29	WG924180

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	2.61		1	11/08/2016 04:06	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.60		1	11/07/2016 10:39	WG922756

Sample Narrative:

9045D L869696-07 WG922756: 8.60 at 20.3c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 19:22	WG923605
Toluene	ND		0.00500	1	11/04/2016 19:22	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 19:22	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 19:22	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 19:22	WG923605
(S) a,a,a-Trifluorotoluene(FID)	81.7		59.0-128		11/04/2016 19:22	WG923605
(S) a,a,a-Trifluorotoluene(PID)	75.3		54.0-144		11/04/2016 19:22	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	3580		40.0	10	11/07/2016 22:42	WG924180
C28-C40 Oil Range	1010		40.0	10	11/07/2016 22:42	WG924180
(S) o-Terphenyl	330	J1	50.0-150		11/07/2016 22:42	WG924180

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	2.27		1	11/08/2016 12:45	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.10		1	11/07/2016 10:39	WG922756

Sample Narrative:

9045D L869696-08 WG922756: 8.10 at 20.2c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	648		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 19:44	WG923605
Toluene	ND		0.00500	1	11/04/2016 19:44	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 19:44	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 19:44	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 19:44	WG923605
(S) a,a,a-Trifluorotoluene(FID)	85.1		59.0-128		11/04/2016 19:44	WG923605
(S) a,a,a-Trifluorotoluene(PID)	79.5		54.0-144		11/04/2016 19:44	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2050		800	200	11/08/2016 20:38	WG924180
C28-C40 Oil Range	2240		800	200	11/08/2016 20:38	WG924180
(S) o-Terphenyl	63.5	J7	50.0-150		11/08/2016 20:38	WG924180

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	2.85		1	11/08/2016 04:12	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.24		1	11/07/2016 10:39	WG922756

Sample Narrative:

9045D L869696-09 WG922756: 9.24 at 20.1c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	506 umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	11/04/2016 20:07	WG923605
Toluene	ND		0.00500	1	11/04/2016 20:07	WG923605
Ethylbenzene	ND		0.000500	1	11/04/2016 20:07	WG923605
Total Xylene	ND		0.00150	1	11/04/2016 20:07	WG923605
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2016 20:07	WG923605
(S) a,a,a-Trifluorotoluene(FID)	93.0		59.0-128		11/04/2016 20:07	WG923605
(S) a,a,a-Trifluorotoluene(PID)	85.7		54.0-144		11/04/2016 20:07	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	882		40.0	10	11/08/2016 20:25	WG924180
C28-C40 Oil Range	571		40.0	10	11/08/2016 20:25	WG924180
(S) o-Terphenyl	103		50.0-150		11/08/2016 20:25	WG924180

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	4.45		1	11/08/2016 04:15	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.81		1	11/07/2016 10:39	WG922756

Sample Narrative:

9045D L869696-10 WG922756: 8.81 at 20.0c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/02/2016 19:59	WG922908

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.0216		0.000500	1	11/05/2016 00:24	WG923605
Toluene	ND		0.00500	1	11/05/2016 00:24	WG923605
Ethylbenzene	0.144		0.000500	1	11/05/2016 00:24	WG923605
Total Xylene	0.139		0.00150	1	11/05/2016 00:24	WG923605
TPH (GC/FID) Low Fraction	68.8		2.48	24.75	11/05/2016 21:53	WG923605
(S) a,a,a-Trifluorotoluene(FID)	83.6		59.0-128		11/05/2016 21:53	WG923605
(S) a,a,a-Trifluorotoluene(FID)	65.5		59.0-128		11/05/2016 00:24	WG923605
(S) a,a,a-Trifluorotoluene(PID)	74.5		54.0-144		11/05/2016 00:24	WG923605
(S) a,a,a-Trifluorotoluene(PID)	90.8		54.0-144		11/05/2016 21:53	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2280		40.0	10	11/07/2016 23:08	WG924180
C28-C40 Oil Range	557		40.0	10	11/07/2016 23:08	WG924180
(S) o-Terphenyl	164	J1	50.0-150		11/07/2016 23:08	WG924180

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	4.10		1	11/08/2016 04:23	WG922935

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.71		1	11/07/2016 10:39	WG922756

Sample Narrative:

9045D L869696-11 WG922756: 8.71 at 20.5c

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		1	11/07/2016 16:57	WG924105

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	0.00404		0.000500	1	11/05/2016 00:46	WG923605
Toluene	ND		0.00500	1	11/05/2016 00:46	WG923605
Ethylbenzene	ND		0.000500	1	11/05/2016 00:46	WG923605
Total Xylene	0.0283		0.00150	1	11/05/2016 00:46	WG923605
TPH (GC/FID) Low Fraction	1.21		0.100	1	11/05/2016 22:15	WG923605
(S) a,a,a-Trifluorotoluene(FID)	64.2		59.0-128		11/05/2016 22:15	WG923605
(S) a,a,a-Trifluorotoluene(FID)	65.6		59.0-128		11/05/2016 00:46	WG923605
(S) a,a,a-Trifluorotoluene(PID)	75.9		54.0-144		11/05/2016 00:46	WG923605
(S) a,a,a-Trifluorotoluene(PID)	69.5		54.0-144		11/05/2016 22:15	WG923605

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	2740		40.0	10	11/08/2016 03:36	WG924180
C28-C40 Oil Range	591		40.0	10	11/08/2016 03:36	WG924180
(S) o-Terphenyl	237	J1	50.0-150		11/08/2016 03:36	WG924180

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L869670-07 Original Sample (OS) • Duplicate (DUP)

(OS) L869670-07 11/08/16 08:44 • (DUP) WG922755-3 11/08/16 08:44						
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.15	7.12	1	0.420		1

L869696-06 Original Sample (OS) • Duplicate (DUP)

(OS) L869696-06 11/08/16 08:44 • (DUP) WG922755-4 11/08/16 08:44						
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.80	8.81	1	0.114		1

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

(LCS) WG922755-1 11/08/16 08:44 • (LCSD) WG922755-2 11/08/16 08:44									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD
Analyte	su	su	su	%	%	%			%
pH	6.11	6.12	6.12	100	100	98.4-102			0.000

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L869696-07 Original Sample (OS) • Duplicate (DUP)

(OS) L869696-07 11/07/16 10:39 • (DUP) WG922756-3 11/07/16 10:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.60	8.58	1	0.233		1

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

L870023-03 Original Sample (OS) • Duplicate (DUP)

(OS) L870023-03 11/07/16 10:39 • (DUP) WG922756-4 11/07/16 10:39

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	4.62	4.62	1	0.000		1

⁷ Gl

⁸ Al

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

(LCS) WG922756-1 11/07/16 10:39 • (LCSD) WG922756-2 11/07/16 10:39

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	su	su	su	%	%	%			%	%
pH	6.11	6.04	6.03	98.9	98.7	98.4-102			0.166	1

⁹ Sc



Method Blank (MB)

(MB) WG922908-1 11/02/16 19:59				
	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	1.03			

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L869687-03 Original Sample (OS) • Duplicate (DUP)

(OS) L869687-03 11/02/16 19:59 • (DUP) WG922908-4 11/02/16 19:59						
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	706	706	1	0.000		20

L869696-10 Original Sample (OS) • Duplicate (DUP)

(OS) L869696-10 11/02/16 19:59 • (DUP) WG922908-5 11/02/16 19:59						
	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	868	868	1	0.000		20

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

(LCS) WG922908-2 11/02/16 19:59 • (LCSD) WG922908-3 11/02/16 19:59									
	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD
Analyte	umhos/cm	umhos/cm	umhos/cm	%	%	%			RPD Limits
Specific Conductance	542	548	548	101	101	90.0-110			0.000 20



Method Blank (MB)

(MB) WG924105-1 11/07/16 16:57

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	0.910			

L870803-01 Original Sample (OS) • Duplicate (DUP)

(OS) L870803-01 11/07/16 16:57 • (DUP) WG924105-4 11/07/16 16:57

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	402	405	1	0.743		20

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

(LCS) WG924105-2 11/07/16 16:57 • (LCSD) WG924105-3 11/07/16 16:57

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCSD Result umhos/cm	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Specific Conductance	542	555	554	102	102	90.0-110			0.180	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3176099-5 11/04/16 14:15

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	0.000151	J	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) 98.7			59.0-128	
(S) a,a,a-Trifluorotoluene(PID) 91.6			54.0-144	

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) R3176099-1 11/04/16 11:58 • (LCSD) R3176099-2 11/04/16 12:47

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	0.0543	0.0522	109	104	70.0-130			4.11	20
Toluene	0.0500	0.0535	0.0510	107	102	70.0-130			4.69	20
Ethylbenzene	0.0500	0.0547	0.0523	109	105	70.0-130			4.51	20
Total Xylene	0.150	0.166	0.160	110	106	70.0-130			3.72	20
(S) a,a,a-Trifluorotoluene(FID)				96.8	97.8	59.0-128				
(S) a,a,a-Trifluorotoluene(PID)				100	101	54.0-144				

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

(LCS) R3176099-3 11/04/16 13:09 • (LCSD) R3176099-4 11/04/16 13:31

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	5.25	5.85	95.4	106	63.5-137			10.9	20
(S) a,a,a-Trifluorotoluene(FID)				98.8	99.5	59.0-128				
(S) a,a,a-Trifluorotoluene(PID)				108	109	54.0-144				

L869690-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869690-02 11/04/16 16:25 • (MS) R3176099-6 11/04/16 20:29 • (MSD) R3176099-7 11/04/16 20:51

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	ND	0.0223	0.0265	43.8	52.1	1	49.7-127	J6		17.0	23.5
Toluene	0.0500	ND	0.0154	0.0178	29.8	34.7	1	49.8-132	J6	J6	14.7	23.5
Ethylbenzene	0.0500	ND	0.0103	0.0119	20.6	23.8	1	40.8-141	J6	J6	14.4	23.8
Total Xylene	0.150	0.00246	0.0338	0.0420	20.9	26.3	1	41.2-140	J6	J3 J6	21.5	23.7
(S) a,a,a-Trifluorotoluene(FID)					67.2	69.6		59.0-128				



L869690-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869690-02 11/04/16 16:25 • (MS) R3176099-6 11/04/16 20:29 • (MSD) R3176099-7 11/04/16 20:51

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 %
(S) a,a,a-Trifluorotoluene(PID)					65.8	67.2		54.0-144				

L869690-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869690-02 11/04/16 16:25 • (MS) R3176099-8 11/04/16 21:13 • (MSD) R3176099-9 11/04/16 21:36

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	1.34	1.21	23.8	21.4	1	28.5-138	J6	J6	10.1	23.6
(S) a,a,a-Trifluorotoluene(FID)					74.5	81.7		59.0-128				
(S) a,a,a-Trifluorotoluene(PID)					74.3	79.0		54.0-144				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3176440-1 11/07/16 18:41

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	122			50.0-150

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3176440-2 11/07/16 18:55 • (LCSD) R3176440-3 11/07/16 19:09

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	50.3	52.6	83.8	87.7	50.0-150			4.48	20
(S) o-Terphenyl				124	127	50.0-150				

L869696-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L869696-03 11/07/16 22:15 • (MS) R3176440-4 11/07/16 21:22 • (MSD) R3176440-5 11/07/16 21:36

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	954	2730	2380	2960	2370	10	50.0-150	V	V	13.8	20
(S) o-Terphenyl					161	156		50.0-150	J1	J1		



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.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
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.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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		

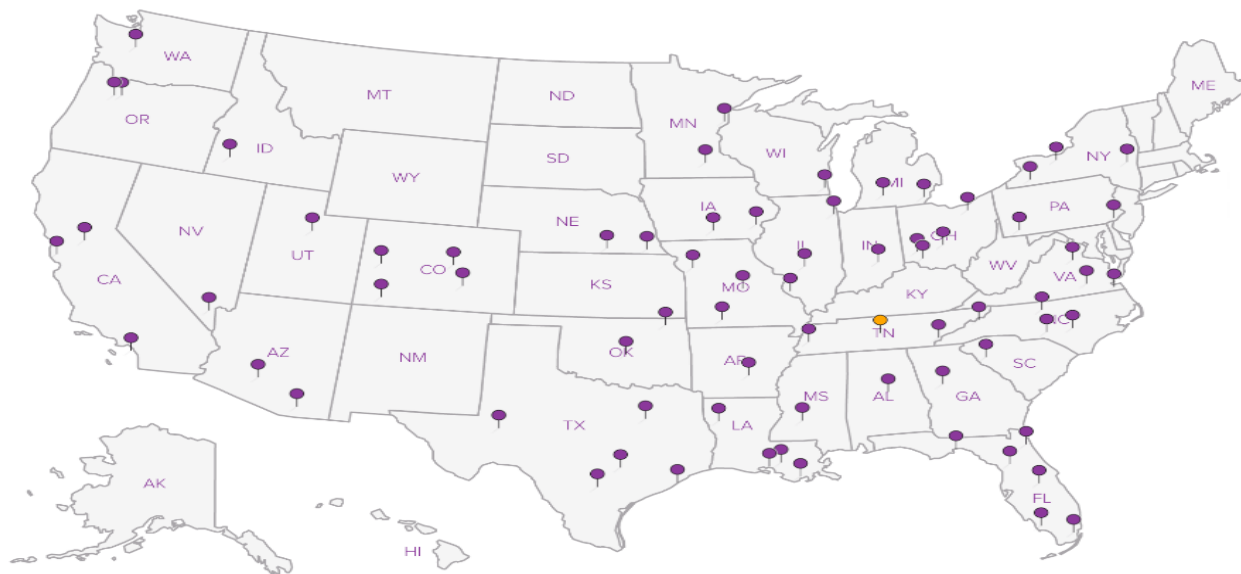
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	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

Report to:

Dave Nicholson

Email To:

dknicholson@q.com

Project:

Description: **Lippelmann P**

City/State

Collected:

Phone: **303-601-2023**

Client Project #

Lab Project #

Fax:

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	No. of Cntrs	TVPH/BTEX - 4oz Soil Jar	TEPH - 4oz Soil Jar (diesel + motor oil)	SAR - 4oz Soil Jar	pH/SPCON - 4oz Soil Jar								
Lippelmann-LF-1	Grab	SS		10/29	0935	4	X	X	X	X								-01
Lippelmann-LF-2	Grab	SS			0940	4	X	X	X	X								-02
Lippelmann-LF-3	Grab	SS			0945	4	X	X	X	X								-03
Lippelmann-LF-4	Grab	SS			0950	4	X	X	X	X								-04
Lippelmann-LF-5	Grab	SS			0955	4	X	X	X	X								-05
Lippelmann-LF-6	Grab	SS			1000	4	X	X	X	X								-06
Lippelmann-LF-7	Grab	SS			1005	4	X	X	X	X								-07
Lippelmann-LF-8	Grab	SS			1010	4	X	X	X	X								-08
Lippelmann-LF-9	Grab	SS			1015	4	X	X	X	X								-09
Lippelmann-LF-10	Grab	SS			1020	4	X	X	X	X								-10
Lippelmann-LF-11	"	"			1025	4	X	X	X	X								-11

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

pH _____ Temp _____

Remarks:

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: 11/1/16 Time: 09:00

pH Checked:

NCF:

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# **18691616**Ta **E190**Acctnum: **NICGEOCCO**

Template:

Prelogin:

TSR:

Cooler:

Shipped Via:

Rem./Contaminant Sample # (lab only)



Cooler Receipt Form

Client: <u>NHGE0000 HRMRES DCO</u>	SDG#	<u>1869696</u>		
Cooler Received/Opened On: <u>11/1/16</u>	Temperature Upon Receipt:	<u>3.1</u> °c		
Received By: <u>Don Wright</u>				
Signature: <u>[Signature]</u>				
Receipt Check List		Yes	No	N/A
Were custody seals on outside of cooler and intact?				<input checked="" type="checkbox"/>
Were custody papers properly filled out?		<input checked="" type="checkbox"/>		
Did all bottles arrive in good condition?		<input checked="" type="checkbox"/>		
Were correct bottles used for the analyses requested?		<input checked="" type="checkbox"/>		
Was sufficient amount of sample sent in each bottle?		<input checked="" type="checkbox"/>		
Were all applicable sample containers correctly preserved and checked for preservation? (Any not in accepted range noted on COC)				<input checked="" type="checkbox"/>
If applicable, was an observable VOA headspace present?				<input checked="" type="checkbox"/>
Non Conformance Generated. (If yes see attached NCF)				