

## TECHNICAL MEMORANDUM

**DATE** February 21, 2020

**Project No.** 19125681

**TO** April Stegall, Reclamation Agent  
Wexpro Company

**CC** Adam Plonsky, Jeremy Yeglin

**FROM** Matthew Somogyi

**EMAIL** [Matthew\\_Somogyi@golder.com](mailto:Matthew_Somogyi@golder.com)

### **DOMINION ENERGY WEXPRO, EXPLORATION AND PRODUCTION PIT DELINEATION – FIELD INVESTIGATION SUMMARY FOR THE BW MUSSER 11 PAD, COGCC PIT ID 100382 (PIT 3), POWDER WASH GAS FIELD, MOFFAT COUNTY, COLORADO**

On behalf of Wexpro Company (Wexpro), d/b/a Dominion Energy Wexpro, Golder Associates Inc. (Golder) performed an environmental investigation of potential salt and petroleum impacts at eighteen (18) former exploration and production (E&P) pits in the Powder Wash Gas Field in Moffat County, Colorado. The investigation was performed between October 16, 2019 and November 21, 2019. This memorandum summarizes the subsurface investigation performed at the BW Musser 11 (BWM11) pad, Colorado Oil and Gas Conservation Commission (COGCC) Pit ID 100382 (Pit 3).

Pit 3 is located at Pad BWM11 at the approximate latitude/longitude coordinates 40.922432770/-108.293417107. The subsurface investigation at Pit 3 was performed on October 17, 2019 and November 21, 2019. Drilling was performed by Henderson Drilling Inc. of Casper, WY operating a Geoprobe 7822 direct-push drill rig. The Geoprobe advanced 2-inch PVC sample liners to collect continuous core in 5-foot increments. A Golder geologist and technician were present to oversee the drilling activities and perform field screening and soil sample collection. Field screening included photoionization detector (PID) and electrical conductivity (EC) measurements conducted at regular 2-foot intervals. The PID and EC meters were calibrated daily prior to the start of work. Decontamination of downhole tooling was performed between boreholes by rinsing with fresh water and brushing off debris from the core barrel to remove soil and/or contamination from tooling in direct contact with subsurface materials. Investigation derived waste (IDW) included soil not retained for laboratory analysis and decontamination fluids. All IDW was contained as drilling progressed and managed by Wexpro for disposal in accordance with applicable regulations.

Ten boreholes were completed at Pit 3 to attempt to delineate the horizontal and vertical extents of soil impacts from historical operations. An original borehole was completed at the assumed center of the pit to a depth of 20 feet (ft) below ground surface (bgs). An offset borehole was then completed at the assumed center of the pit to the depth of refusal at 37 ft bgs. Four perimeter boreholes were completed approximately 20 ft away, generally north, south, east, and west, from the original center borehole to attempt to define the horizontal extents of soil impacts. One perimeter borehole required one stepout borehole, and one perimeter required two stepout boreholes. The location of each borehole was logged in the field with a handheld GPS with approximately +/- 1 meter (m) lateral accuracy and +/- 2 m vertical accuracy. Upon completion, each borehole was backfilled with dry

bentonite chips to the existing grade. Borehole depths ranged from 8.5 ft to 37 ft bgs. Visual and olfactory evidence of potential impacts included black and yellow discoloration and strong hydrocarbon-like odor. Representative photos of lithologies and/or impacts encountered at Pit 3 are provided as Attachment 1.

Soil samples collected from Pit 3 were assigned unique sample identifiers "P3-BX-Xft," where "P3" represents the pit number, "BX" represents the borehole number, and "Xft" represents the sample depth. Soil samples were collected directly from the retrieved core with freshly gloved hands and/or a clean stainless-steel scoop, placed in laboratory-provided containers, and immediately stored on ice. A total of 7 samples were collected for laboratory analysis based on field screening results: one sample from each apparently unimpacted perimeter borehole and three samples representing the center of the pit or impacted portions of the pit. Soil samples collected from Pit 3 were submitted to Pace National Center for Testing and Innovation (Pace Analytical), a State of Colorado certified environmental laboratory located in Mt. Juliet, TN (certification number TN100003) for laboratory analysis of total petroleum hydrocarbons – diesel range organics, total petroleum hydrocarbons – gasoline range organics, benzene, toluene, ethylbenzene, xylene, electrical conductivity, sodium absorption ratio, chloride, and sulfate. Additionally, the sample with the highest field PID or EC reading from all boreholes completed at Pit 3 was analyzed for all constituents identified on the COGCC Table 910-1 list for soil samples. No groundwater was encountered during this investigation. As such, no groundwater sampling or analysis was performed. Laboratory results compared to applicable COGCC Table 910-1 Concentration Levels are presented in Table 1, and the complete analytical report is provided as Attachment 2.

Sample results from two original perimeter boreholes and the center borehole included exceedances of the COGCC Table 910-1 Concentration Levels for arsenic, benzene, diesel range organics, total petroleum hydrocarbons – gasoline range organics, and xylenes. Based on analytical results, horizontal impacted soil delineation of Pit 3 is considered complete. Vertical impacted soil delineation is considered incomplete because impacted soil was observed to the depth of refusal at the center borehole and bedrock was not recovered to confirm refusal occurred at the bedrock surface.



Matthew Somogyi  
Senior Hydrogeologist



Jeremy Yeglin, P.E.  
Associate, Senior Consultant

MS/JY/dls

## Attachments

Table 1 –Pit 3 Analytical Results Summary  
Figure 1 –Pit 3 Borehole Locations  
Attachment 1 – Representative Pit 3 Photos  
Attachment 2 – Analytical Laboratory Report

Table

Table 1 - Analytical Results Summary  
Pad BW Musser 11  
Pit 3  
COGCC ID 100382

Pit Number			P3	P3	P3	P3	P3	P3	P3
Sample Name			P3-B1-16-18'	P3-B2-8-8.5'	P3-B3-16-18'	P3- B3 STEPOUT 2-25-30FT	P3-B4 -28-30'	P3- B4 STEPOUT1-8FT	P3-B5 -18-20'
Sample Date			17 Oct 2019	17 Oct 2019	17 Oct 2019	21 Nov 2019	17 Oct 2019	21 Nov 2019	17 Oct 2019
Sample Time			11:15	11:42	12:40	14:30	13:50	16:10	15:00
Analyte	Units	Table 910-1 Concentration Levels							
Acenaphthene	mg/kg	1,000	NA	NA	0.0181	NA	NA	NA	NA
Anthracene	mg/kg	1,000	NA	NA	0.0284	NA	NA	NA	NA
Arsenic	mg/kg	0.36	NA	NA	5.02	NA	NA	NA	NA
Barium	mg/kg	15,000	NA	NA	125	NA	NA	NA	NA
Benzene	mg/kg	0.17	< 0.001	< 0.001	< 0.25	< 0.00100	0.968	< 0.00100	1.07
Benzo[a]anthracene	mg/kg	0.22	NA	NA	< 0.006	NA	NA	NA	NA
Benzo[a]pyrene	mg/kg	0.022	NA	NA	< 0.006	NA	NA	NA	NA
Benzo[b]fluoranthene	mg/kg	0.22	NA	NA	< 0.006	NA	NA	NA	NA
Benzo[k]fluoranthene	mg/kg	2.2	NA	NA	< 0.006	NA	NA	NA	NA
Cadmium	mg/kg	70	NA	NA	< 0.5	NA	NA	NA	NA
Chloride	mg/kg	-	325	< 10	NA	< 10.0	14.2	< 10.0	33.6
Chromium (III)	mg/kg	120,000	NA	NA	10.5	NA	NA	NA	NA
Chrysene	mg/kg	22	NA	NA	< 0.006	NA	NA	NA	NA
Copper	mg/kg	3,100	NA	NA	6.04	NA	NA	NA	NA
Dibenz[a,h]anthracene	mg/kg	0.022	NA	NA	< 0.006	NA	NA	NA	NA
Diesel Fuels, Total (DRO)	mg/kg	500	< 4	< 4	781	< 4.00	312	< 4.00	1520
Ethylbenzene	mg/kg	100	< 0.0025	< 0.0025	7.09	< 0.00250	21.2	< 0.00250	95
Fluoranthene	mg/kg	1,000	NA	NA	< 0.006	NA	NA	NA	NA
Fluorene	mg/kg	1,000	NA	NA	0.14	NA	NA	NA	NA
Hexavalent Chromium	mg/kg	23	NA	NA	< 2	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	mg/kg	0.22	NA	NA	< 0.006	NA	NA	NA	NA
Lead	mg/kg	400	NA	NA	5.38	NA	NA	NA	NA
Mercury	mg/kg	23	NA	NA	< 0.03	NA	NA	NA	NA
Naphthalene	mg/kg	23	NA	NA	2.76	NA	NA	NA	NA
Nickel	mg/kg	1,600	NA	NA	7.13	NA	NA	NA	NA
pH	SU	6-9	NA	NA	8.79	NA	NA	NA	NA
Pyrene	mg/kg	1,000	NA	NA	0.00944	NA	NA	NA	NA
Selenium	mg/kg	390	NA	NA	< 2	NA	NA	NA	NA
Silver	mg/kg	390	NA	NA	< 1	NA	NA	NA	NA
Sodium Adsorption Ratio	-	<12	1.72	1.55	5.93	0.885	3.56	2.29	3.07
Specific Conductance	umhos/cm	<4,000 or 2x background	2430	291	232	1730	145	408	250
Sulfate	mg/kg	-	1050	< 50	NA	1220	< 50	167	< 50
Toluene	mg/kg	85	< 0.005	< 0.005	2.57	< 0.00500	13.3	< 0.00500	40.8
TPH as Gasoline (GRO)	mg/kg	500	0.102	0.23	2120	0.225	1820	< 0.100	8130
Xylenes, Total	mg/kg	175	< 0.0065	< 0.0065	56.3	< 0.00650	102	< 0.00650	412
Zinc	mg/kg	23,000	NA	NA	21.1	NA	NA	NA	NA

Notes:

Gray shading means a non-detect result is reported at a laboratory reporting limit that exceeds the COGCC Table 910-1 level

Orange shading means the laboratory result exceeds the COGCC Table 910-1 level

"NA" means not analyzed

Sample Time in Mountain Time

Figure



P3-B4-STEP-OUT 1

P3-B2

P3-B3

P3-B3-OFFSET

P3-B5

P3-B1

P3-B5-OFFSET

P3-B4

P3-B3-STEP-OUT 1

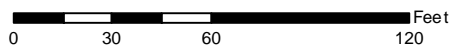
P3-B3-STEP-OUT 2

#### LEGEND

▲ NO ANALYTICAL SAMPLE

#### ANALYTICAL SAMPLE

- EXCEEDANCE OF COGCC  
TABLE 910-1 CONCENTRATION LEVEL
- NO EXCEEDANCE OF COGCC  
TABLE 910-1 CONCENTRATION LEVEL



#### REFERENCE(S)

1. GPS POINT DATA COLLECTED BY GAI IN OCTOBER AND NOVEMBER OF 2019.
2. AERIAL IMAGERY: ESRI BASEMAP SERVICE, DIGITAL GLOBE, VIVID IMAGERY CAPTURED ON 5/26/2013.

#### CLIENT

DOMINION ENERGY WEXPRO

#### PROJECT

EXPLORATION AND PRODUCTION  
PIT DELINEATION PROJECT  
CRAIG, CO

#### TITLE

**BOREHOLE LOCATIONS FOR:**  
**PAD NAME: BW MUSSER 11**  
**PIT NUMBER: 3**  
**COGCC ID: 100382**

#### CONSULTANT



YYYY-MM-DD 2020-02-18

DESIGNED RHG

PREPARED RHG

REVIEWED TLH

APPROVED MKS

#### PROJECT NO.

19125681

#### FIGURE

1

**ATTACHMENT 1**

## **Representative Pit 3 Photos**





**Photograph 1:** Typical lithology observed at the BW Musser 11 pad, Pit 3, COGCC ID 100382. Black clayey silt was encountered consistently at all boreholes completed at this pad. Note the black coloration, which was indicative of soil impacts at Pit 3.



**ATTACHMENT 2**

## Analytical Laboratory Report

## Golder & Associates - CO

Sample Delivery Group: L1151992  
Samples Received: 10/19/2019  
Project Number: 19125681  
Description: Wexpro - Craig Pits Delin. Short 910-1 List

Report To: Matt Somogyi  
7245 W Alaska Drive, Ste 200  
Lakewood, CO 80226

Entire Report Reviewed By:

**[Preliminary Report]**

Chris Ward  
Project Manager

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 Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



## P3-B1-16-18' L1151992-12 Solid

Collected by  
Tricia Hall

Collected date/time  
10/17/19 11:15

Received date/time  
10/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1366144	1	10/25/19 14:23	10/25/19 14:23	TRB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1368293	1	10/23/19 18:30	10/23/19 22:24	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1368242	1	10/24/19 09:00	10/24/19 14:17	ST	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1368242	5	10/24/19 09:00	10/24/19 20:09	ST	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1368340	1	10/24/19 23:40	10/25/19 21:18	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1370276	1	10/22/19 09:37	10/27/19 16:02	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1370304	1	10/22/19 09:37	10/30/19 12:04	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1368551	1	10/24/19 10:00	10/24/19 23:55	KME	Mt. Juliet, TN

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

## P3-B2-8-8.5' L1151992-13 Solid

Collected by  
Tricia Hall

Collected date/time  
10/17/19 11:42

Received date/time  
10/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1366144	1	10/25/19 14:31	10/25/19 14:31	TRB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1368293	1	10/23/19 18:30	10/23/19 22:24	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1368242	1	10/24/19 09:00	10/24/19 15:13	ST	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1368340	1	10/24/19 23:40	10/25/19 21:21	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1370276	1	10/22/19 09:37	10/27/19 16:23	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1370304	1	10/22/19 09:37	10/30/19 12:25	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1368551	1	10/24/19 10:00	10/25/19 00:08	KME	Mt. Juliet, TN

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

## P3-B3-16-18' L1151992-14 Solid

Collected by  
Tricia Hall

Collected date/time  
10/17/19 12:40

Received date/time  
10/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1366144	1	10/25/19 14:34	10/25/19 14:34	TRB	Mt. Juliet, TN
Calculated Results	WG1368340	1	10/24/19 23:40	10/25/19 21:24	JDG	Mt. Juliet, TN
Wet Chemistry by Method 3060A/7196A	WG1366657	1	10/21/19 13:23	10/21/19 20:31	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1366714	1	10/21/19 13:29	10/21/19 15:32	ANP	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1368293	1	10/23/19 18:30	10/23/19 22:24	AKA	Mt. Juliet, TN
Mercury by Method 7471A	WG1368330	1	10/23/19 16:46	10/24/19 13:25	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1368340	1	10/24/19 23:40	10/25/19 21:24	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015/8021	WG1370276	500	10/22/19 09:37	10/27/19 16:43	ACG	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1368551	5	10/24/19 10:00	10/25/19 01:20	KME	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1368456	1	10/23/19 23:09	10/24/19 13:10	SNR	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1368456	20	10/23/19 23:09	10/25/19 08:36	SNR	Mt. Juliet, TN

## P3-B4-28-30' L1151992-15 Solid

Collected by  
Tricia Hall

Collected date/time  
10/17/19 13:50

Received date/time  
10/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1366144	1	10/25/19 14:37	10/25/19 14:37	TRB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1368293	1	10/23/19 18:30	10/23/19 22:24	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1368242	1	10/24/19 09:00	10/24/19 15:30	ST	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1368340	1	10/24/19 23:40	10/25/19 21:27	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1370276	200	10/22/19 09:37	10/27/19 17:04	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1372333	20	10/22/19 09:37	10/30/19 18:46	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1368551	5	10/24/19 10:00	10/25/19 00:35	KME	Mt. Juliet, TN

## SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



P3-B5-18-20' L1151992-16 Solid

Collected by  
Tricia HallCollected date/time  
10/17/19 15:00Received date/time  
10/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1366144	1	10/25/19 14:39	10/25/19 14:39	TRB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1368293	1	10/23/19 18:30	10/23/19 22:24	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1368242	1	10/24/19 09:00	10/24/19 15:46	ST	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1368340	1	10/24/19 23:40	10/25/19 21:30	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1370276	1000	10/22/19 09:37	10/27/19 17:24	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1372306	80	10/22/19 09:37	10/31/19 04:30	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1368551	5	10/24/19 10:00	10/25/19 00:48	KME	Mt. Juliet, TN

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

ACCOUNT:

Golder &amp; Associates - CO

PROJECT:

19125681

SDG:

L1151992

DATE/TIME:

01/16/20 17:44

PAGE:

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All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All 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.

## [Preliminary Report]

Chris Ward  
Project Manager

## Report Revision History

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Version 1: 10/31/19 16:06  
Version 2: 12/06/19 16:32  
Version 3: 12/19/19 14:17  
Version 4: 12/19/19 15:01  
Version 5: 01/16/20 11:23  
Version 6: 01/16/20 12:42  
Version 7: 01/16/20 14:44

## Project Narrative

---

Arsenic run by 6010 instead of 6020 due to laboratory error. Arsenic captured to its MDL for the lower detection limit - CMW 1/15/20

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc





## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.72		1	10/25/2019 14:23	WG1366144

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	2430		10.0	1	10/23/2019 22:24	<a href="#">WG1368293</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	325		10.0	1	10/24/2019 14:17	<a href="#">WG1368242</a>
Sulfate	1050		250	5	10/24/2019 20:09	<a href="#">WG1368242</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	71000		100	1	10/25/2019 21:18	<a href="#">WG1368340</a>
Magnesium	13700		100	1	10/25/2019 21:18	<a href="#">WG1368340</a>
Sodium	500		100	1	10/25/2019 21:18	<a href="#">WG1368340</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.102	<u>B</u>	0.100	1	10/27/2019 16:02	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(FID)	97.2		77.0-120		10/27/2019 16:02	<a href="#">WG1370276</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/30/2019 12:04	<a href="#">WG1370304</a>
Toluene	ND		0.00500	1	10/30/2019 12:04	<a href="#">WG1370304</a>
Ethylbenzene	ND		0.00250	1	10/30/2019 12:04	<a href="#">WG1370304</a>
Total Xylenes	ND		0.00650	1	10/30/2019 12:04	<a href="#">WG1370304</a>
(S) Toluene-d8	107		75.0-131		10/30/2019 12:04	<a href="#">WG1370304</a>
(S) 4-Bromofluorobenzene	95.9		67.0-138		10/30/2019 12:04	<a href="#">WG1370304</a>
(S) 1,2-Dichloroethane-d4	103		70.0-130		10/30/2019 12:04	<a href="#">WG1370304</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		4.00	1	10/24/2019 23:55	<a href="#">WG1368551</a>
(S) o-Terphenyl	77.6		18.0-148		10/24/2019 23:55	<a href="#">WG1368551</a>

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	1.55		1	10/25/2019 14:31	WG1366144

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	291		10.0	1	10/23/2019 22:24	<a href="#">WG1368293</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	ND		10.0	1	10/24/2019 15:13	<a href="#">WG1368242</a>
Sulfate	ND		50.0	1	10/24/2019 15:13	<a href="#">WG1368242</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	80700		100	1	10/25/2019 21:21	<a href="#">WG1368340</a>
Magnesium	14600		100	1	10/25/2019 21:21	<a href="#">WG1368340</a>
Sodium	299	<u>B</u>	100	1	10/25/2019 21:21	<a href="#">WG1368340</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.230	<u>B</u>	0.100	1	10/27/2019 16:23	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(FID)	95.3		77.0-120		10/27/2019 16:23	<a href="#">WG1370276</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/30/2019 12:25	<a href="#">WG1370304</a>
Toluene	ND		0.00500	1	10/30/2019 12:25	<a href="#">WG1370304</a>
Ethylbenzene	ND		0.00250	1	10/30/2019 12:25	<a href="#">WG1370304</a>
Total Xylenes	ND		0.00650	1	10/30/2019 12:25	<a href="#">WG1370304</a>
(S) Toluene-d8	107		75.0-131		10/30/2019 12:25	<a href="#">WG1370304</a>
(S) 4-Bromofluorobenzene	98.9		67.0-138		10/30/2019 12:25	<a href="#">WG1370304</a>
(S) 1,2-Dichloroethane-d4	101		70.0-130		10/30/2019 12:25	<a href="#">WG1370304</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		4.00	1	10/25/2019 00:08	<a href="#">WG1368551</a>
(S) o-Terphenyl	65.7		18.0-148		10/25/2019 00:08	<a href="#">WG1368551</a>



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.93		1	10/25/2019 14:34	WG1366144

## Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Trivalent	10.5		1.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>

## Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	10/21/2019 20:31	<a href="#">WG1366657</a>

## Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.79	<a href="#">T8</a>	1	10/21/2019 15:32	<a href="#">WG1366714</a>

## Sample Narrative:

L1151992-14 WG1366714: 8.79 at 20.8C

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	232		10.0	1	10/23/2019 22:24	<a href="#">WG1368293</a>

## Mercury by Method 7471A

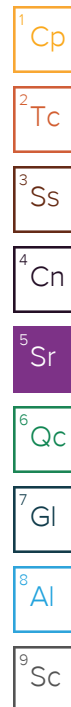
Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	ND		0.0300	1	10/24/2019 13:25	<a href="#">WG1368330</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	5.02		0.460	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Barium	125		0.500	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Boron	ND		10.0	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Cadmium	ND		0.500	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Chromium	10.5		1.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Copper	6.04		2.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Lead	5.38		0.500	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Nickel	7.13		2.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Selenium	ND		2.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Silver	ND		1.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>
Zinc	21.1		5.00	1	10/25/2019 21:24	<a href="#">WG1368340</a>

## Sample Narrative:

L1151992-14 WG1368340: Arsenic captured to MDL for the lower detection limit - CMW 1/15/20





Collected date/time: 10/17/19 12:40

L1151992

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.250	500	10/27/2019 16:43	<a href="#">WG1370276</a>
Toluene	2.57		2.50	500	10/27/2019 16:43	<a href="#">WG1370276</a>
Ethylbenzene	7.09		0.250	500	10/27/2019 16:43	<a href="#">WG1370276</a>
Total Xylene	56.3		0.750	500	10/27/2019 16:43	<a href="#">WG1370276</a>
TPH (GC/FID) Low Fraction	2120		50.0	500	10/27/2019 16:43	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(FID)	99.2		77.0-120		10/27/2019 16:43	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(PID)	93.7		72.0-128		10/27/2019 16:43	<a href="#">WG1370276</a>

## Sample Narrative:

L1151992-14 WG1370276: Non-target compounds too high to run at a lower dilution.

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	781	<u>V</u>	20.0	5	10/25/2019 01:20	<a href="#">WG1368551</a>
(S) o-Terphenyl	81.3		18.0-148		10/25/2019 01:20	<a href="#">WG1368551</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	0.0284		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Acenaphthene	0.0181		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Acenaphthylene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Benzo(a)anthracene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Benzo(a)pyrene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Benzo(b)fluoranthene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Benzo(g,h,i)perylene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Benzo(k)fluoranthene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Chrysene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Dibenz(a,h)anthracene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Fluoranthene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Fluorene	0.140		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Naphthalene	2.76		0.400	20	10/25/2019 08:36	<a href="#">WG1368456</a>
Phenanthrene	0.178		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
Pyrene	0.00944		0.00600	1	10/24/2019 13:10	<a href="#">WG1368456</a>
1-Methylnaphthalene	2.01		0.400	20	10/25/2019 08:36	<a href="#">WG1368456</a>
2-Methylnaphthalene	3.24		0.400	20	10/25/2019 08:36	<a href="#">WG1368456</a>
2-Chloronaphthalene	ND		0.0200	1	10/24/2019 13:10	<a href="#">WG1368456</a>
(S) p-Terphenyl-d14	91.3	<u>J7</u>	23.0-120		10/25/2019 08:36	<a href="#">WG1368456</a>
(S) p-Terphenyl-d14	123	<u>J1</u>	23.0-120		10/24/2019 13:10	<a href="#">WG1368456</a>
(S) Nitrobenzene-d5	996	<u>J7</u>	14.0-149		10/25/2019 08:36	<a href="#">WG1368456</a>
(S) Nitrobenzene-d5	374	<u>J1</u>	14.0-149		10/24/2019 13:10	<a href="#">WG1368456</a>
(S) 2-Fluorobiphenyl	97.6	<u>J7</u>	34.0-125		10/25/2019 08:36	<a href="#">WG1368456</a>
(S) 2-Fluorobiphenyl	117		34.0-125		10/24/2019 13:10	<a href="#">WG1368456</a>

## Sample Narrative:

L1151992-14 WG1368456: Surrogate failure due to matrix interference



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.56		1	10/25/2019 14:37	WG1366144

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	145		10.0	1	10/23/2019 22:24	<a href="#">WG1368293</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	14.2	B	10.0	1	10/24/2019 15:30	<a href="#">WG1368242</a>
Sulfate	ND		50.0	1	10/24/2019 15:30	<a href="#">WG1368242</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	33300		100	1	10/25/2019 21:27	<a href="#">WG1368340</a>
Magnesium	5730		100	1	10/25/2019 21:27	<a href="#">WG1368340</a>
Sodium	222	B	100	1	10/25/2019 21:27	<a href="#">WG1368340</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	1820		20.0	200	10/27/2019 17:04	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(FID)	97.4		77.0-120		10/27/2019 17:04	<a href="#">WG1370276</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.968		0.0200	20	10/30/2019 18:46	<a href="#">WG1372333</a>
Toluene	13.3		0.100	20	10/30/2019 18:46	<a href="#">WG1372333</a>
Ethylbenzene	21.2		0.0500	20	10/30/2019 18:46	<a href="#">WG1372333</a>
Total Xylenes	102	V	0.130	20	10/30/2019 18:46	<a href="#">WG1372333</a>
(S) Toluene-d8	101		75.0-131		10/30/2019 18:46	<a href="#">WG1372333</a>
(S) 4-Bromofluorobenzene	107		67.0-138		10/30/2019 18:46	<a href="#">WG1372333</a>
(S) 1,2-Dichloroethane-d4	97.6		70.0-130		10/30/2019 18:46	<a href="#">WG1372333</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	312		20.0	5	10/25/2019 00:35	<a href="#">WG1368551</a>
(S) o-Terphenyl	78.8		18.0-148		10/25/2019 00:35	<a href="#">WG1368551</a>



## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.07		1	10/25/2019 14:39	WG1366144

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	250		10.0	1	10/23/2019 22:24	<a href="#">WG1368293</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	33.6	B	10.0	1	10/24/2019 15:46	<a href="#">WG1368242</a>
Sulfate	ND		50.0	1	10/24/2019 15:46	<a href="#">WG1368242</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	80500		100	1	10/25/2019 21:30	<a href="#">WG1368340</a>
Magnesium	11700		100	1	10/25/2019 21:30	<a href="#">WG1368340</a>
Sodium	332	B	100	1	10/25/2019 21:30	<a href="#">WG1368340</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	8130		100	1000	10/27/2019 17:24	<a href="#">WG1370276</a>
(S) a,a,a-Trifluorotoluene(FID)	97.1		77.0-120		10/27/2019 17:24	<a href="#">WG1370276</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	1.07		0.0800	80	10/31/2019 04:30	<a href="#">WG1372306</a>
Toluene	40.8		0.400	80	10/31/2019 04:30	<a href="#">WG1372306</a>
Ethylbenzene	95.0		0.200	80	10/31/2019 04:30	<a href="#">WG1372306</a>
Total Xylenes	412		0.520	80	10/31/2019 04:30	<a href="#">WG1372306</a>
(S) Toluene-d8	97.2		75.0-131		10/31/2019 04:30	<a href="#">WG1372306</a>
(S) 4-Bromofluorobenzene	130		67.0-138		10/31/2019 04:30	<a href="#">WG1372306</a>
(S) 1,2-Dichloroethane-d4	111		70.0-130		10/31/2019 04:30	<a href="#">WG1372306</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	1520		20.0	5	10/25/2019 00:48	<a href="#">WG1368551</a>
(S) o-Terphenyl	51.4		18.0-148		10/25/2019 00:48	<a href="#">WG1368551</a>





Method Blank (MB)

(MB) R3463406-1 10/21/19 20:24

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chromium,Hexavalent	U		0.640	2.00

L1151992-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-05 10/21/19 20:26 • (DUP) R3463406-3 10/21/19 20:26

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chromium,Hexavalent	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3463406-2 10/21/19 20:25

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Chromium,Hexavalent	24.0	24.8	103	80.0-120	

L1151992-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151992-10 10/21/19 20:27 • (MS) R3463406-4 10/21/19 20:27 • (MSD) R3463406-5 10/21/19 20:28

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chromium,Hexavalent	20.0	ND	10.8	11.7	54.2	58.5	1	75.0-125	J6	J6	7.67	20

L1151992-10 Original Sample (OS) • Matrix Spike (MS)

(OS) L1151992-10 10/21/19 20:27 • (MS) R3463406-6 10/21/19 20:29

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Chromium,Hexavalent	653	ND	580	88.8	50	75.0-125	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1151992-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-05 10/21/19 15:32 • (DUP) R3463290-2 10/21/19 15:32

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.25	8.22	1	0.364		1

Sample Narrative:

OS: 8.25 at 21.5C  
DUP: 8.22 at 21.3C

Laboratory Control Sample (LCS)

(LCS) R3463290-1 10/21/19 15:32

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:

LCS: 9.99 at 19.6C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3464299-1 10/23/19 22:24

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	U		10.0	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1151992-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-05 10/23/19 22:24 • (DUP) R3464299-3 10/23/19 22:24

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	1200	1180	1	1.01		20

L1151992-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-14 10/23/19 22:24 • (DUP) R3464299-4 10/23/19 22:24

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	232	231	1	0.648		20

Laboratory Control Sample (LCS)

(LCS) R3464299-2 10/23/19 22:24

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	393	392	99.7	85.0-115	

Method Blank (MB)

(MB) R3464622-1 10/24/19 10:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	4.54	J	0.795	10.0
Sulfate	U		0.570	50.0

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

L1151992-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-04 10/24/19 11:50 • (DUP) R3464622-3 10/24/19 12:06

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	66.2	92.8	1	33.4	J3	15

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3464622-6 10/24/19 19:03

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte		mg/kg		%		%
Chloride		4.43	1	0.000		15
Sulfate		42.7	1	0.000		15

L1151992-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1151992-04 10/24/19 19:19 • (DUP) R3464622-7 10/24/19 19:36

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Sulfate	1240	1120	5	10.2		15

Laboratory Control Sample (LCS)

(LCS) R3464622-2 10/24/19 10:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Chloride	200	197	98.7	80.0-120	
Sulfate	200	191	95.3	80.0-120	



L1151992-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151992-12 10/24/19 14:17 • (MS) R3464622-4 10/24/19 14:34 • (MSD) R3464622-5 10/24/19 14:57

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 %
Chloride	500	325	823	864	99.6	108	1	80.0-120			4.87	15
Sulfate	500	1080	1880	2130	158	208	1	80.0-120	E J5	E J5	12.5	15

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



Method Blank (MB)

(MB) R3464663-1 10/24/19 12:21

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Mercury	U		0.00280	0.0300

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

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

(LCS) R3464663-2 10/24/19 12:23 • (LCSD) R3464663-3 10/24/19 12:25

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Mercury	0.500	0.532	0.520	106	104	80.0-120			2.22	20

L1151920-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151920-01 10/24/19 12:27 • (MS) R3464663-4 10/24/19 12:30 • (MSD) R3464663-5 10/24/19 12:32

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Mercury	0.542	0.00814	0.450	0.419	81.5	75.8	1	75.0-125			7.15	20



Method Blank (MB)

(MB) R3465303-1 10/26/19 08:22

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.460	0.460
Barium	U		0.170	0.500
Boron	U		1.26	10.0
Cadmium	U		0.0700	0.500
Calcium	11.3	U	4.63	100
Chromium	U		0.140	1.00
Copper	U		0.530	2.00
Lead	U		0.190	0.500
Magnesium	5.01	U	1.11	100
Nickel	U		0.490	2.00
Selenium	U		0.620	2.00
Silver	U		0.120	1.00
Sodium	45.9	U	9.85	100
Zinc	0.597	U	0.590	5.00

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) R3465303-2 10/26/19 08:24 • (LCSD) R3465303-3 10/26/19 08:27

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 %
Arsenic	100	95.9	94.1	95.9	94.1	80.0-120			1.90	20
Barium	100	103	101	103	101	80.0-120			1.78	20
Boron	100	99.4	96.2	99.4	96.2	80.0-120			3.34	20
Cadmium	100	95.9	94.1	95.9	94.1	80.0-120			1.91	20
Calcium	1000	999	981	99.9	98.1	80.0-120			1.80	20
Chromium	100	101	98.5	101	98.5	80.0-120			2.13	20
Copper	100	97.6	95.8	97.6	95.8	80.0-120			1.86	20
Lead	100	98.3	97.0	98.3	97.0	80.0-120			1.38	20
Magnesium	1000	1030	1010	103	101	80.0-120			1.58	20
Nickel	100	99.6	98.0	99.6	98.0	80.0-120			1.62	20
Selenium	100	96.1	95.3	96.1	95.3	80.0-120			0.806	20
Silver	20.0	17.9	17.4	89.3	87.1	80.0-120			2.59	20
Sodium	1000	1030	1010	103	101	80.0-120			2.19	20
Zinc	100	98.7	96.5	98.7	96.5	80.0-120			2.31	20



[L1151992-12,13,14,15,16](#)

L1151948-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151948-02 10/26/19 08:30 • (MS) R3465303-6 10/26/19 08:37 • (MSD) R3465303-7 10/26/19 08:40

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 %
Arsenic	100	2.58	92.1	93.4	89.5	90.9	1	75.0-125			1.44	20
Barium	100	184	307	252	124	68.1	1	75.0-125		J6	19.9	20
Boron	100	9.92	101	101	90.8	91.0	1	75.0-125			0.237	20
Cadmium	100	0.214	89.9	91.5	89.7	91.3	1	75.0-125			1.73	20
Calcium	1000	32500	27900	30700	0.000	0.000	1	75.0-125	V	V	9.55	20
Chromium	100	20.3	110	108	90.1	87.8	1	75.0-125			2.11	20
Copper	100	20.6	114	114	93.7	93.2	1	75.0-125			0.516	20
Lead	100	7.55	102	102	94.7	94.7	1	75.0-125			0.00518	20
Magnesium	1000	7720	8550	8070	82.8	35.1	1	75.0-125		V	5.74	20
Nickel	100	17.8	115	113	96.8	95.4	1	75.0-125			1.27	20
Selenium	100	U	90.0	91.1	90.0	91.1	1	75.0-125			1.20	20
Silver	20.0	U	16.6	16.8	82.8	83.9	1	75.0-125			1.33	20
Sodium	1000	859	1850	1780	99.3	91.9	1	75.0-125			4.07	20
Zinc	100	63.7	149	131	85.7	67.6	1	75.0-125		J6	13.0	20

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Method Blank (MB)

(MB) R3465996-5 10/27/19 09:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	0.000131	U	0.000120	0.000500
Toluene	0.000338	U	0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	0.0331	U	0.0217	0.100
(S) a,a,a-Trifluorotoluene(PID)	95.3			72.0-128
(S) a,a,a-Trifluorotoluene(FID)	98.8			77.0-120

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

(LCS) R3465996-1 10/27/19 06:57 • (LCSD) R3465996-2 10/27/19 07:18

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	0.0595	0.0583	119	117	76.0-121			2.04	20
Toluene	0.0500	0.0538	0.0525	108	105	80.0-120			2.45	20
Ethylbenzene	0.0500	0.0551	0.0540	110	108	80.0-124			2.02	20
Total Xylene	0.150	0.154	0.149	103	99.3	37.0-160			3.30	20
(S) a,a,a-Trifluorotoluene(PID)				105	105	72.0-128				
(S) a,a,a-Trifluorotoluene(FID)				98.1	98.4	77.0-120				

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

(LCS) R3465996-3 10/27/19 07:38 • (LCSD) R3465996-4 10/27/19 07:59

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	5.52	4.60	100	83.6	72.0-127			18.2	20
(S) a,a,a-Trifluorotoluene(PID)				118	119	72.0-128				
(S) a,a,a-Trifluorotoluene(FID)				105	108	77.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3466681-2 10/30/19 03:04

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	108			75.0-131
(S) 4-Bromofluorobenzene	96.3			67.0-138
(S) 1,2-Dichloroethane-d4	105			70.0-130

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3466681-1 10/30/19 01:21

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.128	102	70.0-123	
Ethylbenzene	0.125	0.124	99.2	74.0-126	
Toluene	0.125	0.111	88.8	75.0-121	
Xylenes, Total	0.375	0.314	83.7	72.0-127	
(S) Toluene-d8			104	75.0-131	
(S) 4-Bromofluorobenzene			97.9	67.0-138	
(S) 1,2-Dichloroethane-d4			112	70.0-130	



Method Blank (MB)

(MB) R3466953-3 10/30/19 22:37

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	102			75.0-131
(S) 4-Bromofluorobenzene	102			67.0-138
(S) 1,2-Dichloroethane-d4	114			70.0-130

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

(LCS) R3466953-1 10/30/19 21:14 • (LCSD) R3466953-2 10/30/19 21:34

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	0.125	0.144	0.140	115	112	70.0-123			2.82	20
Ethylbenzene	0.125	0.145	0.143	116	114	74.0-126			1.39	20
Toluene	0.125	0.130	0.128	104	102	75.0-121			1.55	20
Xylenes, Total	0.375	0.361	0.351	96.3	93.6	72.0-127			2.81	20
(S) Toluene-d8				104	102	75.0-131				
(S) 4-Bromofluorobenzene				100	103	67.0-138				
(S) 1,2-Dichloroethane-d4				114	116	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3466840-2 10/30/19 15:02

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	100			75.0-131
(S) 4-Bromofluorobenzene	98.6			67.0-138
(S) 1,2-Dichloroethane-d4	93.9			70.0-130

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3466840-1 10/30/19 13:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.111	88.8	70.0-123	
Ethylbenzene	0.125	0.120	96.0	74.0-126	
Toluene	0.125	0.116	92.8	75.0-121	
Xylenes, Total	0.375	0.364	97.1	72.0-127	
(S) Toluene-d8			98.6	75.0-131	
(S) 4-Bromofluorobenzene			96.6	67.0-138	
(S) 1,2-Dichloroethane-d4			99.3	70.0-130	

L1151992-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151992-15 10/30/19 18:46 • (MS) R3466840-3 10/30/19 23:26 • (MSD) R3466840-4 10/30/19 23:48

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	2.50	0.968	3.35	3.25	95.3	91.3	20	10.0-149			3.03	37
Ethylbenzene	2.50	21.2	25.0	23.2	152	80.0	20	10.0-160			7.47	38
Toluene	2.50	13.3	16.5	15.4	128	84.0	20	10.0-156			6.90	38
Xylenes, Total	7.50	102	115	107	173	66.7	20	10.0-160	V		7.21	38
(S) Toluene-d8					105	99.2		75.0-131				
(S) 4-Bromofluorobenzene					111	107		67.0-138				
(S) 1,2-Dichloroethane-d4					97.8	97.9		70.0-130				



Method Blank (MB)

(MB) R3464842-1 10/24/19 16:43

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) High Fraction	U		0.769	4.00
(S) o-Terphenyl	74.9			18.0-148

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Laboratory Control Sample (LCS)

(LCS) R3464842-2 10/24/19 16:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	33.2	66.4	50.0-150	
(S) o-Terphenyl			92.9	18.0-148	

L1151992-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1151992-14 10/25/19 01:20 • (MS) R3464842-3 10/25/19 01:33 • (MSD) R3464842-4 10/25/19 01:46

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) High Fraction	48.3	781	689	679	0.000	0.000	5	50.0-150	V	V	1.46	20
(S) o-Terphenyl					107	115		18.0-148				



Method Blank (MB)

(MB) R3465093-1 10/24/19 12:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Anthracene	U		0.000600	0.00600
Acenaphthene	U		0.000600	0.00600
Acenaphthylene	U		0.000600	0.00600
Benzo(a)anthracene	U		0.000600	0.00600
Benzo(a)pyrene	U		0.000600	0.00600
Benzo(b)fluoranthene	U		0.000600	0.00600
Benzo(g,h,i)perylene	U		0.000600	0.00600
Benzo(k)fluoranthene	U		0.000600	0.00600
Chrysene	U		0.000600	0.00600
Dibenz(a,h)anthracene	U		0.000600	0.00600
Fluoranthene	U		0.000600	0.00600
Fluorene	U		0.000600	0.00600
Indeno(1,2,3-cd)pyrene	U		0.000600	0.00600
Naphthalene	U		0.00200	0.0200
Phenanthrene	U		0.000600	0.00600
Pyrene	U		0.000600	0.00600
1-Methylnaphthalene	U		0.00200	0.0200
2-Methylnaphthalene	U		0.00200	0.0200
2-Chloronaphthalene	U		0.00200	0.0200
(S) Nitrobenzene-d5	112			14.0-149
(S) 2-Fluorobiphenyl	119			34.0-125
(S) p-Terphenyl-d14	122	J1		23.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3465093-2 10/24/19 13:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Anthracene	0.0800	0.0902	113	50.0-126	
Acenaphthene	0.0800	0.0873	109	50.0-120	
Acenaphthylene	0.0800	0.0926	116	50.0-120	
Benzo(a)anthracene	0.0800	0.0951	119	45.0-120	
Benzo(a)pyrene	0.0800	0.0839	105	42.0-120	
Benzo(b)fluoranthene	0.0800	0.0907	113	42.0-121	
Benzo(g,h,i)perylene	0.0800	0.0940	117	45.0-125	
Benzo(k)fluoranthene	0.0800	0.0868	109	49.0-125	
Chrysene	0.0800	0.0878	110	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0945	118	47.0-125	
Fluoranthene	0.0800	0.0891	111	49.0-129	

Laboratory Control Sample (LCS)

(LCS) R3465093-2 10/24/19 13:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Fluorene	0.0800	0.0918	115	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0944	118	46.0-125	
Naphthalene	0.0800	0.0819	102	50.0-120	
Phenanthrene	0.0800	0.0921	115	47.0-120	
Pyrene	0.0800	0.0882	110	43.0-123	
1-Methylnaphthalene	0.0800	0.0858	107	51.0-121	
2-Methylnaphthalene	0.0800	0.0829	104	50.0-120	
2-Chloronaphthalene	0.0800	0.0838	105	50.0-120	
(S) Nitrobenzene-d5			103	14.0-149	
(S) 2-Fluorobiphenyl			108	34.0-125	
(S) p-Terphenyl-d14			107	23.0-120	

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1152334-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1152334-01 10/24/19 18:19 • (MS) R3465093-3 10/24/19 18:40 • (MSD) R3465093-4 10/24/19 19:00

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 %
Anthracene	0.0800	ND	0.0809	0.0958	101	120	1	10.0-145			16.9	30
Acenaphthene	0.0800	ND	0.0869	0.0961	109	120	1	14.0-127			10.1	27
Acenaphthylene	0.0800	ND	0.0898	0.0997	112	125	1	21.0-124		J5	10.4	25
Benzo(a)anthracene	0.0800	0.00602	0.0941	0.100	110	117	1	10.0-139			6.08	30
Benzo(a)pyrene	0.0800	0.0118	0.0905	0.0972	98.4	107	1	10.0-141			7.14	31
Benzo(b)fluoranthene	0.0800	0.0198	0.0999	0.107	100	109	1	10.0-140			6.86	36
Benzo(g,h,i)perylene	0.0800	0.0181	0.109	0.121	114	129	1	10.0-140			10.4	33
Benzo(k)fluoranthene	0.0800	0.00628	0.0826	0.0892	95.4	104	1	10.0-137			7.68	31
Chrysene	0.0800	0.00928	0.0893	0.0943	100	106	1	10.0-145			5.45	30
Dibenz(a,h)anthracene	0.0800	ND	0.0860	0.0933	108	117	1	10.0-132			8.14	31
Fluoranthene	0.0800	ND	0.0849	0.112	106	140	1	10.0-153			27.5	33
Fluorene	0.0800	ND	0.0914	0.0938	114	117	1	11.0-130			2.59	29
Indeno(1,2,3-cd)pyrene	0.0800	0.0120	0.0963	0.106	105	117	1	10.0-137			9.59	32
Naphthalene	0.0800	ND	0.0788	0.0802	98.5	100	1	10.0-135			1.76	27
Phenanthrene	0.0800	ND	0.0826	0.105	103	131	1	10.0-144			23.9	31
Pyrene	0.0800	0.00632	0.0967	0.101	113	118	1	10.0-148			4.35	35
1-Methylnaphthalene	0.0800	ND	0.0835	0.0837	104	105	1	10.0-142			0.239	28
2-Methylnaphthalene	0.0800	ND	0.0821	0.0959	103	120	1	10.0-137			15.5	28
2-Chloronaphthalene	0.0800	ND	0.0939	0.0939	117	117	1	29.0-120			0.000	24
(S) Nitrobenzene-d5					109	93.4		14.0-149				
(S) 2-Fluorobiphenyl					128	102		34.0-125	J1			
(S) p-Terphenyl-d14					107	104		23.0-120				



## Guide to Reading and Understanding Your Laboratory Report

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

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

### Qualifier Description

B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
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.
T8	Sample(s) received past/too close to holding time expiration.
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 GI

8 AI

9 Sc



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

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

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico <sup>1</sup>	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1 6</sup>	90010	South Carolina	84004
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana <sup>1</sup>	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

## Third Party Federal Accreditations

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

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

## Our Locations

Pace National 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. Pace National performs all testing at our central laboratory.



# Golder & Associates - CO

7245 W Alaska Drive, Ste 200  
Lakewood, CO 80226

## Billing Information:

Accounts Payable  
7245 W Alaska Drive, Ste 200  
Lakewood, CO 80226

Pres  
Chk

Report to:  
**Matt Somogyi**

Email To: [matthew\\_somogyi@golder.com](mailto:matthew_somogyi@golder.com)

Project  
Description: **Wexpro - Craig Pits Delin. Short**

City/State  
Collected: **Craig, CO**

Please Circle:  
PT (MT) CT ET

Phone: **800-235-7784**  
Fax: **303-985-2080**

Client Project #  
**19125681**

Lab Project #  
**GOLDCO-00062103**

Collected by (print):  
**Tricia Hall**

Site/Facility ID #

P.O. #

Collected by (signature):  
**Tricia Hall**

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

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

Quote #

Date Results Needed  
**Standard**

Immediately  
Packed on Ice N ☐ Y ☒

No.  
of  
Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time
-----------	-----------	----------	-------	------	------

P2-B5-FF-24-26 FT	G	SS	24-26	10/16/19	1800	2	✓	✓	✓	✓	✓								
P2-B5-FF-29-30 FT	G	SS	29-30	10/16/19	1810	1	✓	✓	✓	✓	✓								
P1-B5-FF-20 FT	G	SS	20	10/17/19	0900	1	✓	✓	✓	✓	✓								
P1-B6-FF-15 FT	G	SS	15	10/17/19	0945	1	✓	✓	✓	✓	✓								
P1-B6-FF-12-14 FT	G	SS	12-14	10/17/19	1000	1	✓	✓	✓	✓	✓								
P3-B1-FF-16-18 FT	G	SS	16-18	10/17/19	1115	1	✓	✓	✓	✓	✓								
P3-B2-FF-8-8.5 FT	G	SS	8-8.5	10/17/19	1142	1	✓	✓	✓	✓	✓								
P3-B3-FF-16-18 FT	G	SS	16-18	10/17/19	1240	2	✓	✓	✓	✓	✓	✓							
P3-B4-FF-28-30 FT	G	SS	28-30	10/17/19	1350	1	✓	✓	✓	✓	✓								
P3-B5-FF-18-20 FT	G	SS	18-20	10/17/19	1500	1	✓	✓	✓	✓	✓								

\* Matrix:  
SS - Soil AIR - Air F - Filter  
GW - Groundwater B - Bioassay  
WW - WasteWater  
DW - Drinking Water  
OT - Other \_\_\_\_\_

## Remarks:

Samples returned via:

☐ UPS ☐ FedEx ☐ Courier

Tracking #

pH \_\_\_\_\_ Temp \_\_\_\_\_

Flow \_\_\_\_\_ Other \_\_\_\_\_

## Sample Receipt Checklist

COC Seal Present/Intact: ☒ Y ☐ N  
COC Signed/Accurate: ☒ Y ☐ N  
Bottles arrive intact: ☒ Y ☐ N  
Correct bottles used: ☒ Y ☐ N  
Sufficient volume sent: ☒ Y ☐ N  
If Applicable  
VOA Zero Headspace: ☒ Y ☐ N  
Preservation Correct/Checked: ☒ Y ☐ N  
RAD Screen <0.5 mR/hr: ☒ Y ☐ N

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes ☐ No ☒

HCL / MeOH  
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C **1.210 ± 1.25** **24**

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: **10/19/19** Time: **8:45**

Hold:

Condition:  
NCF / **OK**

## Analysis / Container / Preservative

CHLORIDE,SPCON,SO4 8ozClr-NoPres

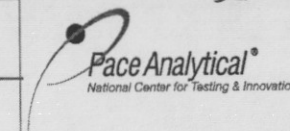
DRO 8ozClr-NoPres

GRO, V8260BTEX 8ozClr-NoPres

SAR (Ca, Mg, Na) 8ozClr-NoPres

Full Table 910 (160Z)

Chain of Custody Page 2 of 2



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



SDG # **1151992**

Table #

Acctnum: **GOLDCO**

Template: **T157215**

Prelogin: **P735037**

PM: **288 - Daphne Richards**

PB: **BF 10/9/19**

Shipped Via: **FedEX Saver**

Remarks | Sample # (lab only)

Hold  
On Hold  
On Hold  
On Hold  
12  
13  
14  
15  
16





## Golder & Associates - CO

Sample Delivery Group: L1164432  
Samples Received: 11/23/2019  
Project Number: 19125681  
Description: Wexpro - Craig Pits Delin. Short 910-1 List

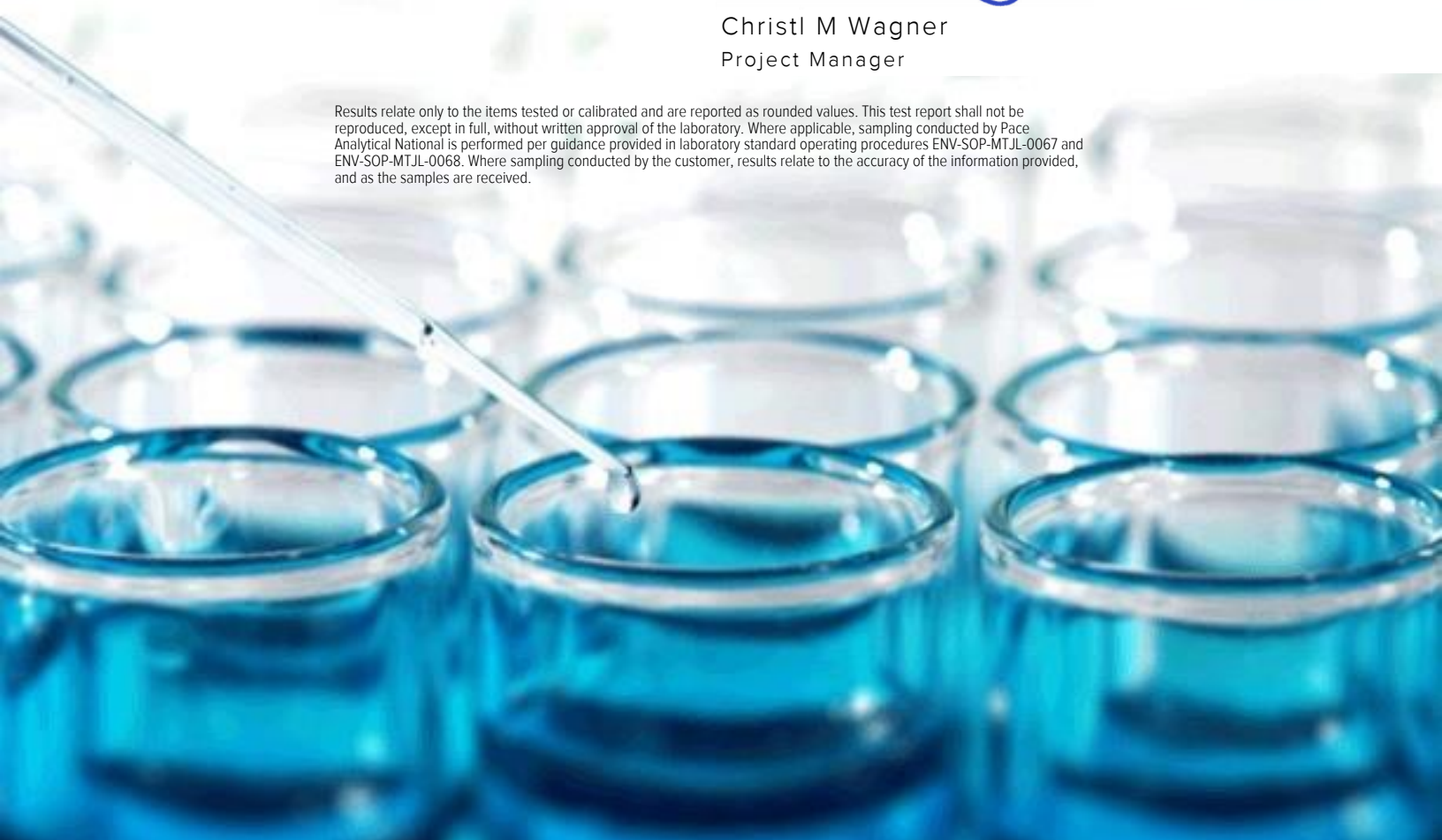
Report To: Matt Somogyi  
7245 W Alaska Drive, Ste 200  
Lakewood, CO 80226

Entire Report Reviewed By:



Christl M Wagner  
Project Manager

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 Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





Cp: Cover Page	1	<sup>1</sup> Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	<sup>2</sup> Tc
Cn: Case Narrative	4	
Sr: Sample Results	5	<sup>3</sup> Ss
P3- B3 STEPOUT 2-25-30FT L1164432-13	5	
P3- B4 STEPOUT1-8FT L1164432-14	6	<sup>4</sup> Cn
Qc: Quality Control Summary	7	<sup>5</sup> Sr
Wet Chemistry by Method 9050AMod	7	
Wet Chemistry by Method 9056A	8	<sup>6</sup> Qc
Metals (ICP) by Method 6010B	9	
Volatile Organic Compounds (GC) by Method 8015D/GRO	10	<sup>7</sup> Gl
Volatile Organic Compounds (GC/MS) by Method 8260B	11	
Semi-Volatile Organic Compounds (GC) by Method 8015	12	<sup>8</sup> Al
Gl: Glossary of Terms	13	
Al: Accreditations & Locations	14	<sup>9</sup> Sc
Sc: Sample Chain of Custody	15	





## P3- B3 STEPOUT 2-25-30FT L1164432-13 Solid

Collected by  
Tricia HallCollected date/time  
11/21/19 14:30Received date/time  
11/23/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1386728	1	12/02/19 15:06	12/02/19 15:06	EL	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1389429	1	12/01/19 13:00	12/01/19 15:45	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1389430	1	12/01/19 17:40	12/02/19 01:18	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1389430	5	12/01/19 17:40	12/02/19 04:32	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1386876	1	11/26/19 15:59	12/02/19 23:15	TRB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1390223	1	11/26/19 09:44	12/03/19 16:14	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1388748	1	11/26/19 09:44	11/30/19 01:08	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1387427	1	11/26/19 17:01	11/26/19 22:08	JDG	Mt. Juliet, TN

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

## P3- B4 STEPOUT1-8FT L1164432-14 Solid

Collected by  
Tricia HallCollected date/time  
11/21/19 16:10Received date/time  
11/23/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1386728	1	12/02/19 15:09	12/02/19 15:09	EL	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1389429	1	12/01/19 13:00	12/01/19 15:45	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1389430	1	12/01/19 17:40	12/02/19 01:33	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1386876	1	11/26/19 15:59	12/02/19 23:18	TRB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1390223	1	11/26/19 09:44	12/03/19 16:37	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1388748	1	11/26/19 09:44	11/30/19 01:28	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1387427	1	11/26/19 17:01	11/26/19 21:54	JDG	Mt. Juliet, TN



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All 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.

Christl M Wagner  
Project Manager

#### Report Revision History

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Version 1: 12/09/19 11:33  
Version 2: 01/16/20 11:23  
Version 3: 01/16/20 13:21  
Version 4: 01/17/20 09:55  
Version 5: 01/17/20 14:40  
Version 6: 01/20/20 15:26  
Version 7: 01/20/20 16:49

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



Collected date/time: 11/21/19 14:30

L1164432

## Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.885		1	12/02/2019 15:06	WG1386728

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	1730		10.0	1	12/01/2019 15:45	<a href="#">WG1389429</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	ND		10.0	1	12/02/2019 01:18	<a href="#">WG1389430</a>
Sulfate	1220		250	5	12/02/2019 04:32	<a href="#">WG1389430</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	33900		100	1	12/02/2019 23:15	<a href="#">WG1386876</a>
Magnesium	8120		100	1	12/02/2019 23:15	<a href="#">WG1386876</a>
Sodium	179	<u>B</u>	100	1	12/02/2019 23:15	<a href="#">WG1386876</a>

## Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.225	<u>B</u>	0.100	1	12/03/2019 16:14	<a href="#">WG1390223</a>
(S) a,a,a-Trifluorotoluene(FID)	96.7		77.0-120		12/03/2019 16:14	<a href="#">WG1390223</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/30/2019 01:08	<a href="#">WG1388748</a>
Toluene	ND		0.00500	1	11/30/2019 01:08	<a href="#">WG1388748</a>
Ethylbenzene	ND		0.00250	1	11/30/2019 01:08	<a href="#">WG1388748</a>
Total Xylenes	ND		0.00650	1	11/30/2019 01:08	<a href="#">WG1388748</a>
(S) Toluene-d8	103		75.0-131		11/30/2019 01:08	<a href="#">WG1388748</a>
(S) 4-Bromofluorobenzene	83.7		67.0-138		11/30/2019 01:08	<a href="#">WG1388748</a>
(S) 1,2-Dichloroethane-d4	103		70.0-130		11/30/2019 01:08	<a href="#">WG1388748</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		4.00	1	11/26/2019 22:08	<a href="#">WG1387427</a>
(S) o-Terphenyl	80.0		18.0-148		11/26/2019 22:08	<a href="#">WG1387427</a>

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	2.29		1	12/02/2019 15:09	WG1386728

## Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	408		10.0	1	12/01/2019 15:45	<a href="#">WG1389429</a>

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chloride	ND		10.0	1	12/02/2019 01:33	<a href="#">WG1389430</a>
Sulfate	167		50.0	1	12/02/2019 01:33	<a href="#">WG1389430</a>

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Calcium	928		100	1	12/02/2019 23:18	<a href="#">WG1386876</a>
Magnesium	1420		100	1	12/02/2019 23:18	<a href="#">WG1386876</a>
Sodium	113	<u>B</u>	100	1	12/02/2019 23:18	<a href="#">WG1386876</a>

## Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	12/03/2019 16:37	<a href="#">WG1390223</a>
(S) a,a,a-Trifluorotoluene(FID)	100		77.0-120		12/03/2019 16:37	<a href="#">WG1390223</a>

## Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/30/2019 01:28	<a href="#">WG1388748</a>
Toluene	ND		0.00500	1	11/30/2019 01:28	<a href="#">WG1388748</a>
Ethylbenzene	ND		0.00250	1	11/30/2019 01:28	<a href="#">WG1388748</a>
Total Xylenes	ND		0.00650	1	11/30/2019 01:28	<a href="#">WG1388748</a>
(S) Toluene-d8	99.9		75.0-131		11/30/2019 01:28	<a href="#">WG1388748</a>
(S) 4-Bromofluorobenzene	84.2		67.0-138		11/30/2019 01:28	<a href="#">WG1388748</a>
(S) 1,2-Dichloroethane-d4	103		70.0-130		11/30/2019 01:28	<a href="#">WG1388748</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		4.00	1	11/26/2019 21:54	<a href="#">WG1387427</a>
(S) o-Terphenyl	77.7		18.0-148		11/26/2019 21:54	<a href="#">WG1387427</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3477833-1 12/01/19 15:45

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1164116-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1164116-05 12/01/19 15:45 • (DUP) R3477833-3 12/01/19 15:45

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	378	377	1	0.265		20

L1164432-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1164432-14 12/01/19 15:45 • (DUP) R3477833-4 12/01/19 15:45

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	408	410	1	0.489		20

Laboratory Control Sample (LCS)

(LCS) R3477833-2 12/01/19 15:45

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	475	525	111	85.0-115	

Method Blank (MB)

(MB) R3477936-1 12/01/19 19:17

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Chloride	4.47	J	0.795	10.0
Sulfate	U		0.570	50.0

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1164432-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1164432-06 12/01/19 22:04 • (DUP) R3477936-3 12/01/19 22:19

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Chloride	ND	5.02	1	0.000		15
Sulfate	ND	4.72	1	0.000		15

L1165003-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1165003-01 12/02/19 03:47 • (DUP) R3477936-6 12/02/19 04:02

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Sulfate	40.6	33.9	1	18.0	J P1	15

Laboratory Control Sample (LCS)

(LCS) R3477936-2 12/01/19 19:32

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Chloride	200	220	110	80.0-120	
Sulfate	200	208	104	80.0-120	

L1164432-09 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1164432-09 12/01/19 23:48 • (MS) R3477936-4 12/02/19 00:03 • (MSD) R3477936-5 12/02/19 00:18

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Chloride	500	43.0	552	558	102	103	1	80.0-120			1.22	15

Method Blank (MB)

(MB) R3478334-1 12/02/19 22:03

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Calcium	U		4.63	100
Magnesium	U		1.11	100
Sodium	40.7	⬇	9.85	100

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R3478334-2 12/02/19 22:05 • (LCSD) R3478334-3 12/02/19 22:08

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 %
Calcium	1000	1020	991	102	99.1	80.0-120			2.47	20
Magnesium	1000	1040	1020	104	102	80.0-120			2.36	20
Sodium	1000	1040	1010	104	101	80.0-120			2.61	20

L1164432-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1164432-03 12/02/19 22:11 • (MS) R3478334-6 12/02/19 22:18 • (MSD) R3478334-7 12/02/19 22:20

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 %
Calcium	1000	12800	11600	19900	0.000	718	1	75.0-125	⬇	J3 ⬇	53.0	20
Magnesium	1000	3260	4110	5580	85.2	232	1	75.0-125		J3 J5	30.3	20
Sodium	1000	143	1130	1120	99.1	97.7	1	75.0-125			1.19	20

Method Blank (MB)

(MB) R3479355-3 12/03/19 11:09

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0557	⬇	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	102			77.0-120

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

Laboratory Control Sample (LCS)

(LCS) R3479355-2 12/03/19 10:16

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.33	96.9	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			104	77.0-120	





Method Blank (MB)

(MB) R3477985-2 11/29/19 20:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000400	0.00100
Ethylbenzene	U		0.000530	0.00250
Toluene	U		0.00125	0.00500
Xylenes, Total	U		0.00478	0.00650
(S) Toluene-d8	101			75.0-131
(S) 4-Bromofluorobenzene	83.8			67.0-138
(S) 1,2-Dichloroethane-d4	101			70.0-130

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

Laboratory Control Sample (LCS)

(LCS) R3477985-1 11/29/19 19:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.127	102	70.0-123	
Ethylbenzene	0.125	0.134	107	74.0-126	
Toluene	0.125	0.102	81.6	75.0-121	
Xylenes, Total	0.375	0.449	120	72.0-127	
(S) Toluene-d8			101	75.0-131	
(S) 4-Bromofluorobenzene			105	67.0-138	
(S) 1,2-Dichloroethane-d4			98.5	70.0-130	

L1164432-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1164432-14 11/30/19 01:28 • (MS) R3477985-3 11/30/19 04:08 • (MSD) R3477985-4 11/30/19 04:28

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	0.125	ND	0.144	0.117	115	93.6	1	10.0-149			20.7	37
Ethylbenzene	0.125	ND	0.147	0.120	118	96.0	1	10.0-160			20.2	38
Toluene	0.125	ND	0.112	0.0936	89.6	74.9	1	10.0-156			17.9	38
Xylenes, Total	0.375	ND	0.486	0.391	130	104	1	10.0-160			21.7	38
(S) Toluene-d8					99.4	103		75.0-131				
(S) 4-Bromofluorobenzene					103	100		67.0-138				
(S) 1,2-Dichloroethane-d4					96.5	99.1		70.0-130				



Method Blank (MB)

(MB) R3476698-1 11/26/19 21:23

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) High Fraction	U		0.769	4.00
(S) o-Terphenyl	80.0			18.0-148

Laboratory Control Sample (LCS)

(LCS) R3476698-2 11/26/19 21:41

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) High Fraction	50.0	44.3	88.6	50.0-150	
(S) o-Terphenyl			83.0	18.0-148	

L1164481-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1164481-03 11/27/19 12:09 • (MS) R3476698-3 11/27/19 12:23 • (MSD) R3476698-4 11/27/19 12:37

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) High Fraction	50.3	16.1	43.3	43.5	54.1	55.4	1	50.0-150			0.461	20
(S) o-Terphenyl					67.5	68.6		18.0-148				

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



## Guide to Reading and Understanding Your Laboratory Report

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

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

### Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

### Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
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



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

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

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

## State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico <sup>1</sup>	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1 6</sup>	90010	South Carolina	84004
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana <sup>1</sup>	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

## Third Party Federal Accreditations

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

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

## Our Locations

Pace National 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. Pace National performs all testing at our central laboratory.







