



VIA ELECTRONIC MAIL –

February 19, 2024

Jake Janicek
EH&S Specialist
Environmental Health and Safety
Caerus Piceance LLC
143 Diamond Avenue
Parachute, Colorado 81635

**Subject: Report of Work Completed
PG16 Dumpline Release
South Parachute Field
Garfield County, Colorado**

Dear Mr. Janicek:

WSP USA Inc. (WSP), on behalf of Caerus Piceance LLC (Caerus), completed initial point of release (POR) characterization soil sampling associated with the dumpline release at the SHORE-67S95W/16SWNE (Facility ID: 334599) (PG16) pad location (Site). The release was discovered by a Caerus lease operator while conducting routine route services at the Site on January 30, 2024. The release was observed pooling at the pad surface from the vertical section of dumpline on the south end of the tank battery containment. The initial spill release information can be referenced under the Spill/Release Point ID: 485970. All initial POR field characterization work was completed per ECMC Rule 913.C.(3) *Remediation of Spill and Releases pursuant to Rule 912*. This report of work completed (ROWC) documents the initial release characterization field investigative work completed at the Site. The Site is located in the Caerus’ South Parachute area of operation in Garfield County, Colorado (Figure 1).

SOIL SAMPLING ACTIVITIES – PG16 DUMPLINE RELEASE

On February 1, 2024, WSP responded to the release location to collect an initial characterization soil sample from below the POR. Western Slope Field Services, Inc. (WCO) personnel of Rifle, Colorado, was contracted by Caerus to assist in the removal of overburden material from the known POR location associated with the dumpline release. Following the daylighting of the POR location, WSP personnel collected one soil sample directly beneath the POR [39.440244°, -108.001083°] location at 7 feet below ground surface (bgs) using a decontaminated hand auger. The soil sampling activities were conducted by a WSP geologist who inspected the soil sample for the presence or absence of petroleum hydrocarbons odor and/or staining. The soil sample was characterized by visually inspecting the confirmation soil sample and field screening the soil head space using a photoionization detector (PID) to monitor for the presence or absence of volatile organic vapors (VOC’s). The below table summarizes the field screening observations.

Field Soil Screening Results – February 1, 2024

Sample ID	PID (ppm)	Notes	Submitted for Analysis
20240201-PG16-(POR)@7	1,840	Odor/staining	Full Table 915-1

ppm – parts per million

The POR confirmation soil sample was submitted to Pace Analytical (Pace) of Mount Juliet, Tennessee for analysis of ECMC full list Table 915-1 constituents. The POR soil analytical results will be evaluated under the Protection of Groundwater Soil Screening Level Concentrations (PGSSLCs). A photolog depicting the POR soil sampling activities is provided in Enclosure A. The POR location soil sample location is shown on Figure 2.

WSP USA
820 MEGAN AVENUE, UNIT B
RIFLE CO 81650

Tel.: 970-285-9985
wsp.com



ANALYTICAL RESULTS – PG16 DUMPLINE RELEASE

Laboratory analytical results of the POR confirmation soil sample collected on February 1, 2024 indicate exceedances of ECMC Cleanup Concentrations (CCs) and Table 915-1 PGSSLCs. The documented exceedances for each sample are summarized in the table below.

Summary of POR Confirmation Soil Analytical Exceedances – February 1, 2024

Confirmation Soil Sample ID	ECMC Table 915-1 Contaminants of Concern	Units	ECMC Protection of Groundwater Soil Screening Level Concentrations	Confirmation Soil Sample Concentration
20240201-PG16-(POR)@7	Arsenic	mg/kg	0.29 (M)	12.2
	Barium	mg/kg	82 (M)	783
	pH	SU	6 – 8.3	8.45
	SAR	unitless	<6	81.7
	TPH	mg/kg	500	8,509
	Benzene	mg/kg	0.0026 (M)	19.0
	Toluene	mg/kg	0.69 (M)	198
	Ethylbenzene	mg/kg	0.78 (M)	40.9
	Total Xylenes	mg/kg	9.9 (M)	421
	1,2,4-trimethylbenzene	mg/kg	0.0081 (R)	90.7
	1,3,5-trimethylbenzene	mg/kg	0.0087 (R)	83.3
	1-methylnaphthalene	mg/kg	0.006 (R)	0.441
	2-methylnaphthalene	mg/kg	0.019 (R)	1.28
	Naphthalene	mg/kg	0.0038 (R)	0.747

Key:

ECMC – Colorado Energy and Carbon Management Commission
 mg/kg – milligram per kilogram
 R – risk based value

TPH – total petroleum hydrocarbons

SU – standard unit

M – method based value

BOLD – indicates exceeding ECMC standard

All other analytes were either below the laboratory reporting detection limit (RDL) or within the ECMC Table 915-1 PGSSLCs. The laboratory analytical report is included in Enclosure B. The results are summarized in Table 1 and on Figure 3.

CONCLUSIONS – PG16 DUMPLINE RELEASE

Based on the analytical data provided herein, there are remaining ECMC Table 915-1 exceedances of arsenic, barium, pH, sodium adsorption ratio (SAR), total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, total xylenes (BTEX), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene associated with POR confirmation soil sample 20240201-PG16-(POR)@7 collected at the Site on February 1, 2024.

WSP recommends that Caerus complete a subsurface investigation using an environmental drill rig equipped with solid-stem drilling technology. WSP recommends that a minimum of five soil borings be advanced; one located immediately adjacent to the POR location and one in each cardinal direction of the POR location. If vertical and/or lateral impacts are observed beyond the four advanced soil borings surrounding the POR location, subsequent soil borings will be advanced in each cardinal direction until impacts are defined. These soil borings will be advanced up to five feet past field observed hydrocarbon impacts and the total depth of the soil borings will be determined based on the vertical extent of impacts observed at the POR location. The proposed soil boring locations are illustrated on the enclosed Figure 4. The laboratory analytical report is included in Enclosure B and results are summarized in Table 1.

Please reference the “Remediation Summary”, and “Operator Comments” sections of ECMC Initial Form 27 Document Number (DN) 403690230 on how Caerus plans to address the documented arsenic, barium, and pH



exceedances per ECMC Table 915 e.(2)C. A geographic proximity location map showing the Battlement Mesa 34C (BM 34C) location with respect to the Site is shown on the enclosed Figure 5. The laboratory analytical report is included in Enclosure B. The results of the produced water sample collected at the BM 34C are summarized in Table 2 and Figure 5.

Additionally, WSP recommends that Caerus requests the ECMC Director per ECMC Rule 915.e.(2).C to sample under a reduced suite of SAR, TPH, BTEX, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene for all future soil sampling associated with the PG16 dumpline release investigation.

Please contact us at (970) 618-4514 or (970) 658-7025 if you have any questions regarding this report or require additional information.

Kind regards,

A handwritten signature in black ink, appearing to read 'Dustin Held'.

Dustin Held
Lead Consultant, Environmental Geologist

A handwritten signature in black ink, appearing to read 'Parker Coit'.

Parker Coit, P.G.
Lead Consultant, Geologist

Encl.

FIGURES

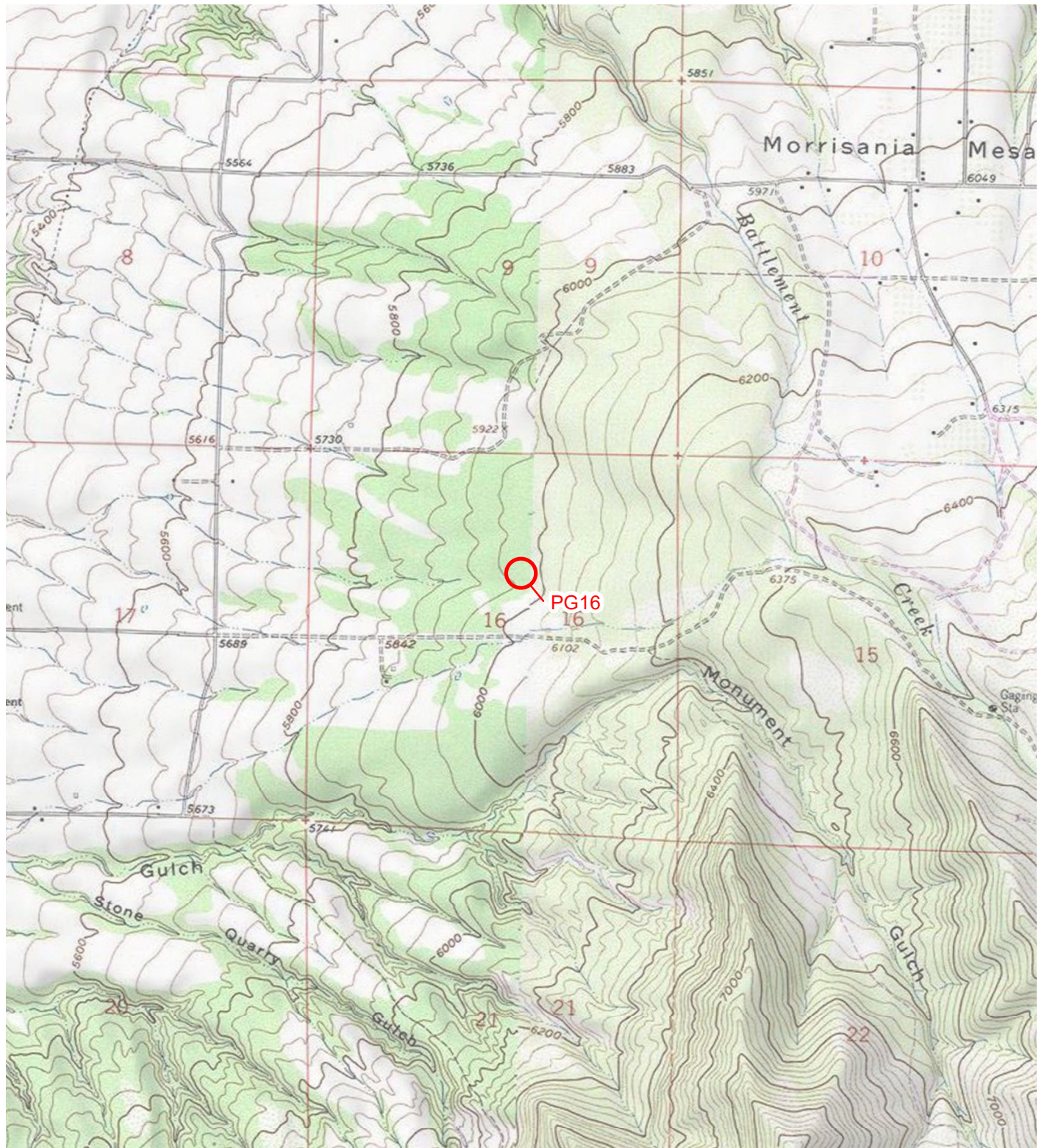


IMAGE COURTESY OF ESRI/USGS

LEGEND

 SITE LOCATION

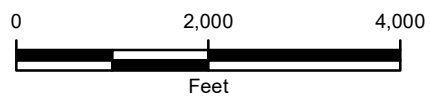


FIGURE 1
SITE LOCATION MAP
PG16
SWNE SEC 16 T7S R95W
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC







20240201-PG16-(POR)@7
39.440244, -108.001082

BACKGROUND IMAGERY COURTESY OF GOOGLE EARTH (2022)

LEGEND

-  POINT OF RELEASE
-  SAMPLE LOCATION

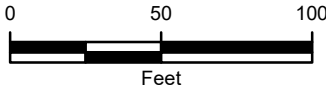


FIGURE 2
SITE MAP
PG16
SWNE SEC 16 T7S R95W
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC







20240201-PG16-(POR)@7
 2/1/2024
 AS: **12.2**
 BA: **783**
 pH: **8.45**
 SAR: **81.7**
 TPH: **8,509**
 B: **19.0**
 T: **198**
 E: **40.9**
 X: **421**
 1,2,4-TRIMETH: **90.7**
 1,3,5-TRIMETH: **83.3**
 1-METH: **0.441**
 2-METH: **1.28**
 NAPH: **0.747**

SAMPLE NAME
 SAMPLE DATE
 AS: ARSENIC (mg/kg)
 BA: BARIUM (mg/kg)
 pH: POTENTIAL OF HYDROGEN (SU)
 SAR: SODIUM ADSORPTION RATIO (unitless)
 TPH: TOTAL PETROLEUM HYDROCARBONS (mg/kg)
 B: BENZENE (mg/kg)
 T: TOLUENE (mg/kg)
 E: ETHYLBENZENE (mg/kg)
 X: TOTAL XYLENES (mg/kg)
 1,2,4-TRIMETH: 1,2,4-TRIMETHYLBENZENE (mg/kg)
 1,3,5-TRIMETH: 1,3,5-TRIMETHYLBENZENE (mg/kg)
 1-METH: 1-METHYLNAPHTHALENE (mg/kg)
 2-METH: 2-METHYLNAPHTHALENE (mg/kg)
 NAPH: NAPHTHALENE (mg/kg)
BOLD: INDICATES RESULT EXCEEDS THE ECMC CONCENTRATION LEVEL
 ECMC: ENERGY AND CARBON MANAGEMENT COMMISSION
 SU: STANDARD UNITS
 mg/kg: MILLIGRAMS PER KILOGRAM

BACKGROUND IMAGERY COURTESY OF GOOGLE EARTH (2022)

LEGEND

-  POINT OF RELEASE
-  SAMPLE LOCATION

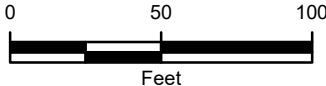


FIGURE 3
 SOIL ANALYTICAL MAP
 PG16
 SWNE SEC 16 T7S R95W
 GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC





BACKGROUND IMAGERY COURTESY OF GOOGLE EARTH (2022)

LEGEND

- ✖ POINT OF RELEASE
- SAMPLE LOCATION
- PROPOSED SOIL BORINGS

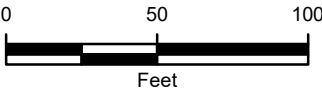


FIGURE 4
PROPOSED SOIL BORING LOCATION MAP
PG16
SWNE SEC 16 T7S R95W
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC



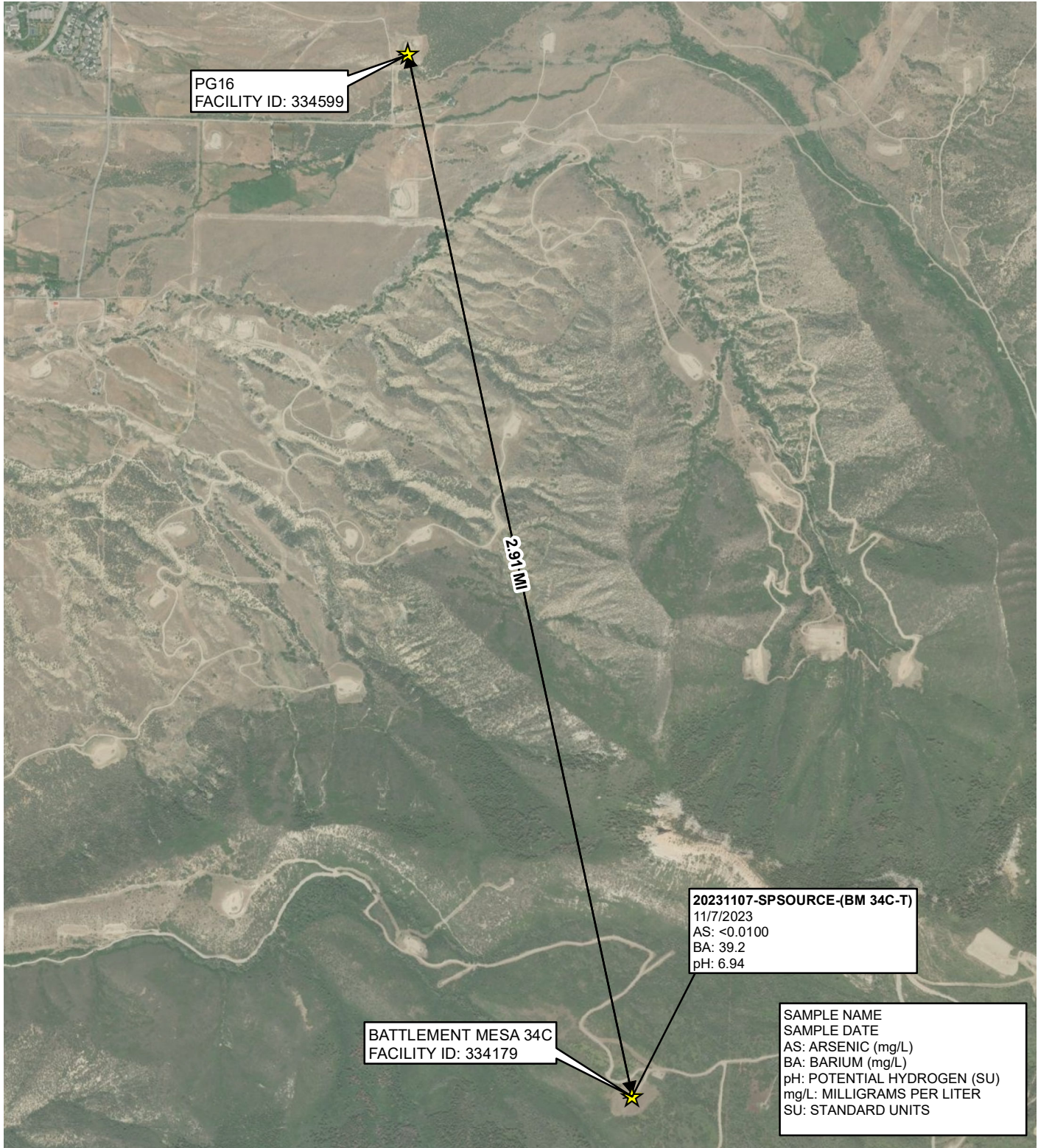


IMAGE COURTESY OF ESRI/USGS

LEGEND

★ FACILITY LOCATION

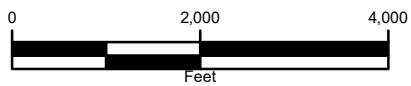


FIGURE 5
GEOGRAPHIC PROXIMITY LOCATION MAP
 PG16
 SWNE SEC 16 T7S R95W
 GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC



TABLES

TABLE 1

SOIL ANALYTICAL RESULTS
 PG 16
 GARFIELD COUNTY, COLORADO
 CAERUS PICEANCE LLC

PARAMETER	ECMC RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATIONS	ECMC PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATIONS	UNITS	CONFIRMATION SOIL SAMPLE
				20240201-PG16-(POR)@7
Sample Date				2/1/2024
Sample Depth (feet)				7
Sample Type				Confirmation
Arsenic	0.68	0.29 (M)	mg/kg	12.2
Barium	15,000	82 (M)	mg/kg	783
Boron	2	2	mg/l	0.861
Cadmium	71	0.38 (M)	mg/kg	<1.00
Chromium (VI)	0.3	0.0067 (R)	mg/kg	<1.00
Copper	3,100	46 (M)	mg/kg	15.9
Lead	400	14 (M)	mg/kg	13.7
Nickel	1,500	26 (R)	mg/kg	17.5
Selenium	390	0.26 (M)	mg/kg	<2.50
Silver	390	0.8 (R)	mg/kg	<0.500
Zinc	23,000	370 (R)	mg/kg	58.2
EC	<4	<4	mmhos/cm	3.360
pH	6 - 8.3	6 - 8.3	SU	8.45
SAR	<6	<6	unitless	81.7
TPH-GRO			mg/kg	7,840
TPH-DRO			mg/kg	669
TPH-ORO			mg/kg	<40.0
TPH	500	500	mg/kg	8,509
Benzene	1.2	0.0026 (M)	mg/kg	19.0
Toluene	490	0.69 (M)	mg/kg	198
Ethylbenzene	5.8	0.78 (M)	mg/kg	40.9
Total Xylenes	58	9.9 (M)	mg/kg	421
1,2,4-trimethylbenzene	30	0.0081 (R)	mg/kg	90.7
1,3,5-trimethylbenzene	27	0.0087 (R)	mg/kg	83.3
Acenaphthene	360	0.55 (R)	mg/kg	<0.00600
Anthracene	1,800	5.8 (R)	mg/kg	<0.00600
Benzo(A)anthracene	1.1	0.011 (R)	mg/kg	<0.00600
Benzo(B)fluoranthene	1.1	0.3 (R)	mg/kg	<0.00600
Benzo(K)fluoranthene	11	2.9 (R)	mg/kg	<0.00600
Benzo(A)pyrene	0.11	0.24 (M)	mg/kg	<0.00600
Chrysene	110	9 (R)	mg/kg	<0.00600
Dibenzo(A,H)anthracene	0.11	0.096 (R)	mg/kg	<0.00600
Fluoranthene	240	8.9 (R)	mg/kg	<0.00600
Fluorene	240	0.54 (R)	mg/kg	0.0157
Indeno(1,2,3,c-d)pyrene	1.1	0.98 (R)	mg/kg	<0.00600
1-methylnaphthalene	18	0.006 (R)	mg/kg	0.441
2-methylnaphthalene	24	0.019 (R)	mg/kg	1.28
Naphthalene	2	0.0038 (R)	mg/kg	0.747
Pyrene	180	1.3 (R)	mg/kg	<0.00600

NOTES:
BOLD - indicates result exceeds the ECMC protection of groundwater soil screening level concentrations
 ECMC - Colorado Energy and Carbon Management Commission
 EC - electrical conductivity
 mg/l - milligrams per liter
 mg/kg - milligrams per kilogram
 mmhos/cm - millimhos per centimeter
 SAR - sodium adsorption ratio
 SU - standard unit
 TPH-ORO - total petroleum hydrocarbons- oil range organics
 TPH-GRO - total petroleum hydrocarbons-gasoline range organics
 TPH-DRO - total petroleum hydrocarbons-diesel range organics
 TPH - combination of TPH-GRO, TPH-DRO, and TPH-ORO
 NA - analyte not analyzed
 < - concentration less than the laboratory detectable limit
 R - risk based
 MDL - method detection limit
 MCL - maximum contaminant level (M)
 M- based MCL

TABLE 2

**PRODUCED WATER ANALYTICAL RESULTS
BM 34C
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC**

Analyte			Inorganics (mg/L)									
			Arsenic	Barium	Cadmium	Copper	Lead	Nickel	pH	Selenium	Silver	Zinc
Units			mg/L	mg/L	mg/L	mg/L	mg/L	Nickel	SU	mg/L	mg/L	mg/L
Sample Name	Sample Date	Lab Report										
20231107-SPSOURCE-(BM 34C-T)	11/07/2023	L1675356	< 0.0100	39.2	< 0.00500	0.0409	< 0.0100	0.0103	6.94	< 0.0100	< 0.0100	< 0.125

NOTES:
mg/L - milligram per liter
< - concentration below laboratory detection limit

ENCLOSURE A – SOIL SCREENING PHOTOLOG

PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	3140629.024
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Photo No.	Date	
1	2/2/2024	
<p>HVAC crew daylighting the surrounding area of the point of release (POR).</p> <p>View south</p>		

Photo No.	Date	
2	2/01/2024	
<p>View of the daylighted POR and associated dumpline.</p>		

PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	3140629.024
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Photo No.	Date	
3	2/01/2024	 <p>POR sampling location and associated sample ID 20240201-PG16-(POR)@7.</p> <p>POR release coordinates 39.440244, -108.001082</p> <p>View north</p>

Photo No.	Date	
4	2/01/2024	 <p>POR sampling location sectioned off with caution tape.</p> <p>View northeast</p>

ENCLOSURE B – LABORATORY ANALYTICAL RESULTS

Caerus Oil and Gas

Sample Delivery Group: L1702066
Samples Received: 02/03/2024
Project Number: PG16
Description: PG16 Dumpline Release
Site: PG16
Report To: Jake J. / Brett M. / Blair R. / Andy V.
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



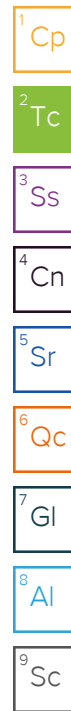
Chris Ward
Project Manager

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.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

20240201-PG16-(POR)@7 L1702066-01 Solid

Collected by: Ben Herrmann
 Collected date/time: 02/01/24 09:55
 Received date/time: 02/03/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2222708	1	02/10/24 11:06	02/10/24 11:06	JTM	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2222612	1	02/08/24 12:05	02/09/24 10:19	SET	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2221518	1	02/07/24 08:33	02/07/24 11:30	KRB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2221914	1	02/07/24 14:09	02/08/24 14:34	BJM	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2222715	1	02/09/24 11:38	02/09/24 18:57	JTM	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2221549	5	02/07/24 11:59	02/08/24 10:50	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2223881	1000	02/07/24 17:24	02/11/24 14:22	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2223772	80	02/07/24 17:24	02/10/24 09:37	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2224657	800	02/07/24 17:24	02/12/24 20:42	KSD	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2221366	10	02/07/24 16:09	02/08/24 10:21	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2221433	1	02/07/24 14:28	02/09/24 02:11	AGW	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

CASE NARRATIVE

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.



Chris Ward
Project Manager

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	81.7		1	02/10/2024 11:06	WG2222708

1 Cp

2 Tc

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	02/09/2024 10:19	WG2222612

3 Ss

4 Cn

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.45	T8	1	02/07/2024 11:30	WG2221518

5 Sr

6 Qc

Sample Narrative:

L1702066-01 WG2221518: 8.45 at 21.8C

7 Gl

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	3360		10.0	1	02/08/2024 14:34	WG2221914

8 Al

Sample Narrative:

L1702066-01 WG2221914: at 25C

9 Sc

Metals (ICP) by Method 6010B-NE493 Ch 2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.861		0.200	1	02/09/2024 18:57	WG2222715

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	12.2		1.00	5	02/08/2024 10:50	WG2221549
Barium	783		2.50	5	02/08/2024 10:50	WG2221549
Cadmium	ND		1.00	5	02/08/2024 10:50	WG2221549
Copper	15.9		5.00	5	02/08/2024 10:50	WG2221549
Lead	13.7		2.00	5	02/08/2024 10:50	WG2221549
Nickel	17.5		2.50	5	02/08/2024 10:50	WG2221549
Selenium	ND		2.50	5	02/08/2024 10:50	WG2221549
Silver	ND		0.500	5	02/08/2024 10:50	WG2221549
Zinc	58.2		25.0	5	02/08/2024 10:50	WG2221549

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	7840		100	1000	02/11/2024 14:22	WG2223881
(S) a, a, a-Trifluorotoluene(FID)	89.8		77.0-120		02/11/2024 14:22	WG2223881

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	19.0		0.0800	80	02/10/2024 09:37	WG2223772
Toluene	198		0.400	80	02/10/2024 09:37	WG2223772
Ethylbenzene	40.9		0.200	80	02/10/2024 09:37	WG2223772
Xylenes, Total	421		5.20	800	02/12/2024 20:42	WG2224657
1,2,4-Trimethylbenzene	90.7		0.400	80	02/10/2024 09:37	WG2223772
1,3,5-Trimethylbenzene	83.3		0.400	80	02/10/2024 09:37	WG2223772
(S) Toluene-d8	96.9		75.0-131		02/10/2024 09:37	WG2223772
(S) Toluene-d8	105		75.0-131		02/12/2024 20:42	WG2224657
(S) 4-Bromofluorobenzene	106		67.0-138		02/10/2024 09:37	WG2223772
(S) 4-Bromofluorobenzene	104		67.0-138		02/12/2024 20:42	WG2224657
(S) 1,2-Dichloroethane-d4	92.1		70.0-130		02/10/2024 09:37	WG2223772
(S) 1,2-Dichloroethane-d4	86.8		70.0-130		02/12/2024 20:42	WG2224657

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	669		40.0	10	02/08/2024 10:21	WG2221366
C28-C36 Motor Oil Range	ND		40.0	10	02/08/2024 10:21	WG2221366
(S) o-Terphenyl	55.7		18.0-148		02/08/2024 10:21	WG2221366

Sample Narrative:

L1702066-01 WG2221366: Dilution due to matrix.

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Anthracene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Benzo(a)anthracene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Benzo(b)fluoranthene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Benzo(k)fluoranthene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Benzo(a)pyrene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Chrysene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Dibenz(a,h)anthracene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Fluoranthene	ND		0.00600	1	02/09/2024 02:11	WG2221433
Fluorene	0.0157		0.00600	1	02/09/2024 02:11	WG2221433
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	02/09/2024 02:11	WG2221433
1-Methylnaphthalene	0.441		0.0200	1	02/09/2024 02:11	WG2221433
2-Methylnaphthalene	1.28		0.0200	1	02/09/2024 02:11	WG2221433
Naphthalene	0.747		0.0200	1	02/09/2024 02:11	WG2221433
Pyrene	ND		0.00600	1	02/09/2024 02:11	WG2221433
(S) p-Terphenyl-d14	77.9		23.0-120		02/09/2024 02:11	WG2221433
(S) Nitrobenzene-d5	0.000	J2	14.0-149		02/09/2024 02:11	WG2221433
(S) 2-Fluorobiphenyl	82.8		34.0-125		02/09/2024 02:11	WG2221433

Sample Narrative:

L1702066-01 WG2221433: Surrogate failure due to matrix interference

Method Blank (MB)

(MB) R4031975-1 02/09/24 10:04

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	0.483	↓	0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1702071-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1702071-03 02/09/24 11:02 • (DUP) R4031975-3 02/09/24 11:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hexavalent Chromium	ND	ND	1	0.000		20

L1703363-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1703363-01 02/09/24 12:16 • (DUP) R4031975-4 02/09/24 12:35

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hexavalent Chromium	ND	ND	1	4.65		20

Laboratory Control Sample (LCS)

(LCS) R4031975-2 02/09/24 10:13

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	11.3	113	80.0-120	

L1703363-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1703363-05 02/09/24 12:47 • (MS) R4031975-5 02/09/24 12:54 • (MSD) R4031975-6 02/09/24 13:00

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	16.3	15.8	79.4	77.0	1	75.0-125			2.99	20

L1703363-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L1703363-05 02/09/24 12:47 • (MS) R4031975-9 02/09/24 13:06

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	651	ND	578	88.7	50	75.0-125	

L1702125-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1702125-01 02/07/24 11:30 • (DUP) R4030806-2 02/07/24 11:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	8.16	8.19	1	0.367		1

Sample Narrative:

OS: 8.16 at 22.4C

DUP: 8.19 at 22C

L1702202-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1702202-01 02/07/24 11:30 • (DUP) R4030806-3 02/07/24 11:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su			%		%
pH	8.08	8.10	1	0.247		1

Sample Narrative:

OS: 8.08 at 21.7C

DUP: 8.1 at 21.7C

Laboratory Control Sample (LCS)

(LCS) R4030806-1 02/07/24 11:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
su	su		%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.02 at 20C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4031478-1 02/08/24 14:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	U		10.0	10.0

Sample Narrative:

BLANK: at 25C

L1702057-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1702057-01 02/08/24 14:34 • (DUP) R4031478-3 02/08/24 14:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	82.0	81.8	1	0.244		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1702075-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1702075-01 02/08/24 14:34 • (DUP) R4031478-4 02/08/24 14:34

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	186	183	1	1.57		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R4031478-2 02/08/24 14:34

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	327	338	103	85.0-115	

Sample Narrative:

LCS: at 25C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4032192-1 02/09/24 18:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hot Water Sol. Boron	U		0.0167	0.200

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

(LCS) R4032192-2 02/09/24 18:30 • (LCSD) R4032192-3 02/09/24 18:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.00	1.04	100	104	80.0-120			4.11	20

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

Method Blank (MB)

(MB) R4031326-1 02/08/24 10:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.100	1.00
Barium	U		0.152	2.50
Cadmium	U		0.0855	1.00
Copper	U		0.133	5.00
Lead	U		0.0990	2.00
Nickel	U		0.197	2.50
Selenium	U		0.180	2.50
Silver	U		0.0865	0.500
Zinc	U		0.740	25.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS)

(LCS) R4031326-2 02/08/24 10:47

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	85.8	85.8	80.0-120	
Barium	100	83.8	83.8	80.0-120	
Cadmium	100	84.5	84.5	80.0-120	
Copper	100	82.4	82.4	80.0-120	
Lead	100	83.3	83.3	80.0-120	
Nickel	100	86.9	86.9	80.0-120	
Selenium	100	85.6	85.6	80.0-120	
Silver	20.0	17.5	87.7	80.0-120	
Zinc	100	83.6	83.6	80.0-120	

⁷Gl

⁸Al

⁹Sc

L1702066-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702066-01 02/08/24 10:50 • (MS) R4031326-5 02/08/24 11:00 • (MSD) R4031326-6 02/08/24 11:03

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	12.2	97.8	109	85.5	96.4	5	75.0-125			10.5	20
Barium	100	783	930	1010	147	228	5	75.0-125	V	V	8.30	20
Cadmium	100	ND	94.8	107	94.3	107	5	75.0-125			12.3	20
Copper	100	15.9	91.8	106	75.9	90.5	5	75.0-125			14.7	20
Lead	100	13.7	101	115	87.6	101	5	75.0-125			12.5	20
Nickel	100	17.5	98.7	115	81.2	97.7	5	75.0-125			15.4	20
Selenium	100	ND	96.4	108	96.1	108	5	75.0-125			11.2	20
Silver	20.0	ND	19.2	21.4	95.8	107	5	75.0-125			11.2	20
Zinc	100	58.2	118	141	60.0	83.1	5	75.0-125	J6		17.8	20

Method Blank (MB)

(MB) R4032653-2 02/10/24 23:21

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
TPH (GC/FID) Low Fraction	2.03	↓	0.543	2.50
(S) a,a,a-Trifluorotoluene(FID)	92.0			77.0-120

Laboratory Control Sample (LCS)

(LCS) R4032653-1 02/10/24 22:04

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
TPH (GC/FID) Low Fraction	5.00	5.57	111	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			104	77.0-120	

L1702492-20 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702492-20 02/11/24 00:16 • (MS) R4032653-3 02/11/24 15:34 • (MSD) R4032653-4 02/11/24 16:09

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
TPH (GC/FID) Low Fraction	145	ND	150	134	107	95.7	27.5	10.0-151			11.3	28
(S) a,a,a-Trifluorotoluene(FID)					103	103		77.0-120				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4032405-3 02/10/24 03:17

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	0.000525	U	0.000467	0.00100
Toluene	U		0.00130	0.00500
Ethylbenzene	U		0.000737	0.00250
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
(S) Toluene-d8	102			75.0-131
(S) 4-Bromofluorobenzene	97.4			67.0-138
(S) 1,2-Dichloroethane-d4	91.4			70.0-130

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

(LCS) R4032405-1 02/10/24 01:42 • (LCSD) R4032405-2 02/10/24 02:01

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	0.112	0.123	89.6	98.4	70.0-123			9.36	20
Toluene	0.125	0.112	0.122	89.6	97.6	75.0-121			8.55	20
Ethylbenzene	0.125	0.108	0.120	86.4	96.0	74.0-126			10.5	20
1,2,4-Trimethylbenzene	0.125	0.112	0.119	89.6	95.2	70.0-126			6.06	20
1,3,5-Trimethylbenzene	0.125	0.110	0.124	88.0	99.2	73.0-127			12.0	20
(S) Toluene-d8				98.6	97.0	75.0-131				
(S) 4-Bromofluorobenzene				96.6	96.6	67.0-138				
(S) 1,2-Dichloroethane-d4				93.8	95.1	70.0-130				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4032945-3 02/12/24 12:06

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Xylenes, Total	U		0.000880	0.00650
(S) Toluene-d8	103			75.0-131
(S) 4-Bromofluorobenzene	104			67.0-138
(S) 1,2-Dichloroethane-d4	96.5			70.0-130

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

(LCS) R4032945-1 02/12/24 10:33 • (LCSD) R4032945-2 02/12/24 10:51

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 %
Xylenes, Total	0.375	0.420	0.423	112	113	72.0-127			0.712	20
(S) Toluene-d8				105	103	75.0-131				
(S) 4-Bromofluorobenzene				109	110	67.0-138				
(S) 1,2-Dichloroethane-d4				98.3	99.6	70.0-130				

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Method Blank (MB)

(MB) R4031271-3 02/08/24 10:16

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-C36 Motor Oil Range	0.708	J	0.274	4.00
<i>(S) o-Terphenyl</i>	72.5			18.0-148

Laboratory Control Sample (LCS)

(LCS) R4031271-4 02/08/24 10:31

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	29.2	58.4	50.0-150	
<i>(S) o-Terphenyl</i>			58.3	18.0-148	

L1702074-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702074-02 02/08/24 07:14 • (MS) R4031271-1 02/08/24 07:28 • (MSD) R4031271-2 02/08/24 07:43

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	50.0	ND	32.4	30.4	60.5	56.5	1	50.0-150			6.37	20
<i>(S) o-Terphenyl</i>					45.0	35.1		18.0-148				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4031543-2 02/07/24 21:28

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00209	0.00600
Anthracene	U		0.00230	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
Pyrene	U		0.00200	0.00600
(S) p-Terphenyl-d14	96.8			23.0-120
(S) Nitrobenzene-d5	92.4			14.0-149
(S) 2-Fluorobiphenyl	96.0			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4031543-1 02/07/24 21:11

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0700	87.5	50.0-120	
Anthracene	0.0800	0.0745	93.1	50.0-126	
Benzo(a)anthracene	0.0800	0.0777	97.1	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0796	99.5	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0729	91.1	49.0-125	
Benzo(a)pyrene	0.0800	0.0656	82.0	42.0-120	
Chrysene	0.0800	0.0797	99.6	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0766	95.8	47.0-125	
Fluoranthene	0.0800	0.0788	98.5	49.0-129	
Fluorene	0.0800	0.0789	98.6	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0755	94.4	46.0-125	
1-Methylnaphthalene	0.0800	0.0765	95.6	51.0-121	
2-Methylnaphthalene	0.0800	0.0745	93.1	50.0-120	
Naphthalene	0.0800	0.0741	92.6	50.0-120	
Pyrene	0.0800	0.0805	101	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R4031543-1 02/07/24 21:11

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
(S) p-Terphenyl-d14			99.3	23.0-120	
(S) Nitrobenzene-d5			96.9	14.0-149	
(S) 2-Fluorobiphenyl			99.4	34.0-125	

L1702121-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702121-01 02/08/24 01:45 • (MS) R4031507-1 02/08/24 02:04 • (MSD) R4031507-2 02/08/24 02:24

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Acenaphthene	0.0784	ND	0.0741	0.0485	94.5	62.2	1	14.0-127		<u>J3</u>	41.8	27
Anthracene	0.0784	ND	0.0542	0.0464	69.1	59.5	1	10.0-145			15.5	30
Benzo(a)anthracene	0.0784	ND	0.0533	0.0540	68.0	69.2	1	10.0-139			1.30	30
Benzo(b)fluoranthene	0.0784	ND	0.0501	0.0504	63.9	64.6	1	10.0-140			0.597	36
Benzo(k)fluoranthene	0.0784	ND	0.0490	0.0501	62.5	64.2	1	10.0-137			2.22	31
Benzo(a)pyrene	0.0784	ND	0.0520	0.0525	66.3	67.3	1	10.0-141			0.957	31
Chrysene	0.0784	ND	0.0600	0.0611	76.5	78.3	1	10.0-145			1.82	30
Dibenz(a,h)anthracene	0.0784	ND	0.0562	0.0571	71.7	73.2	1	10.0-132			1.59	31
Fluoranthene	0.0784	ND	0.0488	0.0453	62.2	58.1	1	10.0-153			7.44	33
Fluorene	0.0784	ND	0.0802	0.0537	102	68.8	1	11.0-130		<u>J3</u>	39.6	29
Indeno(1,2,3-cd)pyrene	0.0784	ND	0.0547	0.0562	69.8	72.1	1	10.0-137			2.71	32
1-Methylnaphthalene	0.0784	ND	0.166	0.0681	194	69.9	1	10.0-142	<u>J5</u>	<u>J3</u>	83.6	28
2-Methylnaphthalene	0.0784	0.0243	0.249	0.0880	287	81.7	1	10.0-137	<u>J5</u>	<u>J3</u>	95.5	28
Naphthalene	0.0784	ND	0.0702	0.0526	84.3	62.1	1	10.0-135		<u>J3</u>	28.7	27
Pyrene	0.0784	ND	0.0547	0.0503	69.8	64.5	1	10.0-148			8.38	35
(S) p-Terphenyl-d14					86.8	75.6		23.0-120				
(S) Nitrobenzene-d5					93.6	81.8		14.0-149				
(S) 2-Fluorobiphenyl					79.2	59.3		34.0-125				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

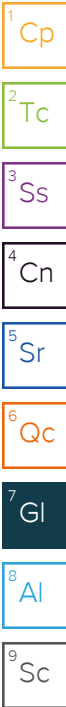
Guide to Reading and Understanding Your Laboratory Report

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

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.
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Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
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.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	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 ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

* 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 Analytical.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas

Sample Delivery Group: L1675356
Samples Received: 11/08/2023
Project Number:
Description: BM 34C Produced Water Sampling
Site: BM 34C
Report To: Jake J. / Brett M. / Blair R. / Andy V.
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:












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.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

20231107-SPSOURCE-(BM 34C-T) L1675356-01 GW

Collected by: Olivia Floyd
 Collected date/time: 11/07/23 10:35
 Received date/time: 11/08/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 7199	WG2167295	1	11/16/23 00:54	11/16/23 00:54	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG2172280	1	11/18/23 13:00	11/18/23 13:00	EPW	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2168466	5	11/14/23 14:32	11/14/23 22:47	LD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2168466	50	11/14/23 14:32	11/14/23 23:16	JPD	Mt. Juliet, TN

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

CASE NARRATIVE

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.



Chris Ward
Project Manager

¹ Cp

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Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND	<u>J6 T8</u>	0.000500	1	11/16/2023 00:54	WG2167295

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.94	<u>T8</u>	1	11/18/2023 13:00	WG2172280

Sample Narrative:

L1675356-01 WG2172280: 6.94 at 19.9C

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	ND		0.0100	5	11/14/2023 22:47	WG2168466
Barium	39.2		0.100	50	11/14/2023 23:16	WG2168466
Boron	4.76		0.150	5	11/14/2023 22:47	WG2168466
Cadmium	ND		0.00500	5	11/14/2023 22:47	WG2168466
Copper	0.0409		0.0250	5	11/14/2023 22:47	WG2168466
Lead	ND		0.0100	5	11/14/2023 22:47	WG2168466
Nickel	0.0103		0.0100	5	11/14/2023 22:47	WG2168466
Selenium	ND		0.0100	5	11/14/2023 22:47	WG2168466
Silver	ND		0.0100	5	11/14/2023 22:47	WG2168466
Zinc	ND		0.125	5	11/14/2023 22:47	WG2168466

1 Cp

2 Tc

3 Ss

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7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4000503-1 11/15/23 23:06

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.000150	0.000500

¹Cp

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L1675517-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1675517-01 11/16/23 02:00 • (DUP) R4000503-5 11/16/23 02:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hexavalent Chromium	0.00230	0.00228	1	0.633		20

L1675844-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1675844-01 11/16/23 03:50 • (DUP) R4000503-7 11/16/23 04:01

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Hexavalent Chromium	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R4000503-2 11/15/23 23:17

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	0.00200	0.00211	105	90.0-110	

L1675356-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1675356-01 11/16/23 00:54 • (MS) R4000503-3 11/16/23 01:27 • (MSD) R4000503-4 11/16/23 01:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	0.0500	ND	0.0341	0.0338	68.2	67.6	1	90.0-110	<u>J6</u>	<u>J6</u>	0.909	20

L1675817-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1675817-01 11/16/23 02:44 • (MS) R4000503-6 11/16/23 02:55

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	0.0500	ND	0.0506	101	1	90.0-110	

L1675356-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1675356-01 11/18/23 13:00 • (DUP) R4001776-2 11/18/23 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	6.94	7.01	1	1.00		1

Sample Narrative:

OS: 6.94 at 19.9C
DUP: 7.01 at 20C

L1676706-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1676706-02 11/18/23 13:00 • (DUP) R4001776-3 11/18/23 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.60	8.62	1	0.232		1

Sample Narrative:

OS: 8.6 at 20.3C
DUP: 8.62 at 20.4C

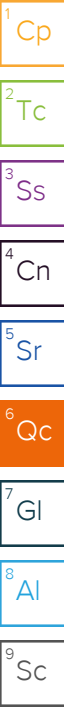
Laboratory Control Sample (LCS)

(LCS) R4001776-1 11/18/23 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 20C



Method Blank (MB)

(MB) R3999874-1 11/14/23 23:31

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Arsenic	U		0.000180	0.00200
Barium	U		0.000381	0.00200
Boron	U		0.00963	0.0300
Cadmium	U		0.000150	0.00100
Copper	U		0.00151	0.00500
Lead	U		0.000849	0.00200
Nickel	U		0.000816	0.00200
Selenium	U		0.000300	0.00200
Silver	U		0.0000700	0.00200
Zinc	U		0.00302	0.0250

¹Cp

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⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3999874-2 11/14/23 23:35

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Arsenic	0.0500	0.0522	104	80.0-120	
Barium	0.0500	0.0466	93.1	80.0-120	
Boron	0.0500	0.0553	111	80.0-120	
Cadmium	0.0500	0.0516	103	80.0-120	
Copper	0.0500	0.0472	94.5	80.0-120	
Lead	0.0500	0.0494	98.9	80.0-120	
Nickel	0.0500	0.0519	104	80.0-120	
Selenium	0.0500	0.0532	106	80.0-120	
Silver	0.0500	0.0474	94.8	80.0-120	
Zinc	0.0500	0.0495	99.0	80.0-120	

L1674624-19 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1674624-19 11/14/23 23:38 • (MS) R3999874-4 11/14/23 23:45 • (MSD) R3999874-5 11/14/23 23:49

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Arsenic	0.0500	0.00342	0.0551	0.0560	103	105	1	75.0-125			1.67	20
Barium	0.0500		0.0906	0.0890	92.4	89.2	1	75.0-125			1.77	20
Boron	0.0500		0.124	0.125	101	102	1	75.0-125			0.517	20
Cadmium	0.0500	ND	0.0525	0.0524	105	105	1	75.0-125			0.233	20
Copper	0.0500		0.0474	0.0472	94.8	94.3	1	75.0-125			0.457	20
Lead	0.0500	ND	0.0498	0.0527	99.6	105	1	75.0-125			5.67	20
Nickel	0.0500		0.0523	0.0528	103	104	1	75.0-125			0.915	20

L1674624-19 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1674624-19 11/14/23 23:38 • (MS) R3999874-4 11/14/23 23:45 • (MSD) R3999874-5 11/14/23 23:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Selenium	0.0500		0.0547	0.0554	109	111	1	75.0-125			1.39	20
Silver	0.0500		0.0486	0.0482	97.2	96.3	1	75.0-125			0.914	20
Zinc	0.0500		0.0515	0.0522	103	104	1	75.0-125			1.32	20

¹Cp

²Tc

³Ss

⁴Cn

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1 Cp

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3 Ss

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5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	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 ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

* 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 Analytical.



