



VIA ELECTRONIC MAIL –

April 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 subsequent subsurface investigative activities following the initial point of release (POR) characterization at the SHORE-67S95W/16SWNE (Facility ID: 334599) (PG16) pad location (Site). Investigative work was completed in response to a release that 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 secondary tank battery containment. The initial spill release characterization information can be referenced under Initial Form 27 Document Number (DN) 403690230. All field characterization work was completed per the State of Colorado Energy and Carbon Management Commission (ECMC) Rule 913.C.(C) *Remediation of Spill and Releases pursuant to Rule 912*. This report of work completed (ROWC) documents subsequent release characterization activities completed at the Site during the second quarter (2Q) of 2024 under Remediation Project Number (RPN) 34378. 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 March 27, 2024, WSP personnel with the assistance of Western Slope Oilfield Services, LLC (WCO) of Rifle, Colorado completed pothole (soil boring) field soil screening and characterization confirmation soil sampling associated with the dumpline point of release (POR) at the Site. A total of four investigative soil borings were advanced using a hydro-vacuum truck (hydro-vac) to total depths ranging from 10 feet below ground surface (bgs) to 14 feet bgs. One soil boring was advanced immediately adjacent to the POR location (SBC) to a total depth of 11.5 feet bgs where hydro-vac refusal was encountered. Three subsequent soil borings were advanced to the west, south, and east cardinal direction of the POR location. Soils from each investigative soil boring were collected, and field screened for the presence or absence of hydrocarbon odor or staining by a geologist at every 5-foot interval including each boring terminus. Collected soil samples were sealed into Ziplock® bags where soil headspaces were field screened using a photo-ionization detector (PID) to screen for the presence of volatile organic compounds (VOCs). The below table summarizes the screened intervals and the associated field screening results.

WSP USA
820 MEGAN AVENUE, UNIT B
RIFLE CO 81650

Tel.: 970-285-9985
wsp.com



Field Soil Screening Results – March 27, 2024

Sample ID	PID (ppm)	Notes	Submitted for Analysis
20240327-PG16-(SBW)@5.5	0.1	No odor/no staining	Not submitted
20240327-PG16-(SBW)@10	1.0	No odor/no staining	Not submitted
20240327-PG16-(SBW)@14	5.2	No odor/no staining	Not submitted
20240327-PG16-(SBC)@6	1,831	Odor and staining	Not submitted
20240327-PG16-(SBC)@10	1,840	Odor and staining	Not submitted
20240327-PG16-(SBC)@11.5	1,764	Odor and staining	Reduced suite
20240327-PG16-(SBS)@5	9.0	No odor/no staining	Not submitted
20240327-PG16-(SBS)@10	10.0	No odor/no staining	Not submitted
20240327-PG16-(SBE)@5	1.1	No odor/no staining	Not submitted
20240327-PG16-(SBE)@10	1.4	No odor/no staining	Not submitted

Key:

PID – photoionization detector

ppm – parts per million

Confirmation soil sample 20240327-PG16-(SBC)@11.5 collected adjacent to the POR location was the only sample submitted for laboratory analysis. As vertical clearance was not encountered at the terminus of the POR soil boring all other samples collected from the three perimeter delineation locations were not submitted. Hydrocarbon odor and milky-grey staining was observed in confirmation soil sample 20240327-PG16-(SBC)@11.5. The investigative soil boring locations and corresponding sample IDs are shown on Figure 2.

Additionally, on March 27, 2024, WSP personnel collected one produced water sample from a production tank at the Site (Tank Number 8195) for site-specific waste characterization per ECMC Rule 915 e.(2).C. This sample was collected from produced water that would have passed through the failed dumpline. With assistance from Caerus personnel produced water sample 20240327-SPSOURCE-(PG16-T) was collected in clean, laboratory prepared containers for laboratory submittal.

All investigative samples collected on March 27, 2024, were submitted to Pace Analytical of Mt. Juliet, Tennessee for laboratory analysis. Confirmation soil sample 20240327-PG16-(SBC)@11.5 was analyzed for constituents listed in the approved reduced suite (ECMC DN 403690230) that included sodium absorption ratio (SAR), total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and total xylenes (BTEX), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2- methylnaphthalene, naphthalene, arsenic, barium, and pH. The produced water sample was analyzed for Table 915-1 metals, pH, boron (water soluble), and chromium (VI). All soil boring locations and the produced water sample location were recorded using a Trimble® R1 global positioning system (GPS) and are shown on Figure 2. A photolog documenting investigative activities completed on March 27, 2024 is included in Enclosure A. The laboratory analytical reports are provided in Enclosure B.

ANALYTICAL RESULTS – PG16 DUMPLINE RELEASE

Laboratory analytical results of the confirmation soil sample collected from the terminus of soil boring location 20240327-PG16-(SBC)@11.5 indicates exceedances of ECMC Table 915-1 Clean-up Concentrations (CCs) and Table 915-1 Protection of Groundwater Soil Screening Level Concentrations (PGSSLCs). The documented soil exceedances are summarized and evaluated under both PGSSLCs and Residential Soil Screening Level Concentrations (RSSLCs) in the table below.



Summary of Confirmation Soil Analytical Exceedances – March 27, 2024

Confirmation Soil Sample ID	ECMC Table 915-1 Contaminants of Concern	Units	ECMC PGSSLCs	ECMC RSSLCs	Confirmation Soil Sample Concentration
20240327-PG16-(SBC)@11.5	SAR	Unitless	<6	<6	83.1
	Arsenic	mg/kg	0.29 (M)	0.68 (M)	4.36
	Barium	mg/kg	82 (M)	15,000 (M)	373
	TPH	mg/kg	500	500	5,740
	Benzene	mg/kg	0.0026 (M)	1.2 (M)	10.3
	Toluene	mg/kg	0.69 (M)	490 (M)	132
	Ethylbenzene	mg/kg	0.78 (M)	5.8 (M)	25.7
	Total Xylenes	mg/kg	9.9 (M)	58 (M)	460
	1,2,4-trimethylbenzene	mg/kg	0.0081 (R)	30 (R)	74.5
	1,3,5-trimethylbenzene	mg/kg	0.0087 (R)	27 (R)	60.8
	1-methylnaphthalene	mg/kg	0.006 (R)	18 (R)	1.61
	2-methylnaphthalene	mg/kg	0.019 (R)	24 (R)	4.89
	Naphthalene	mg/kg	0.0038 (R)	2 (R)	2.12

Key:
 ECMC – Colorado Energy and Carbon Management Commission
 mg/kg – milligram per kilogram
 R – risk based value
 PGSSLC – Protection of Groundwater Soil Screening Level Concentrations
 < – less than M
 M – method based value
BOLD – indicates exceeding ECMC standard
 RSSLC – Residential Soil Screening Level Concentrations

All other analytes were either below the laboratory reporting detection limit (RDL) or within the ECMC Table 915-1 PGSSLCs. The confirmation soil sample results are summarized in Table 1 and on Figure 3. The analytical results of the produced water sample collected on March 27, 2024 at the Site are summarized in Table 2 and on Figure 3. All laboratory analytical reports are included in Enclosure B.

CONCLUSIONS AND RECOMMENDATIONS – PG16 DUMPLINE RELEASE

Based on the analytical data provided herein, there are remaining Table 915-1 exceedances of SAR, arsenic, barium, TPH, BTEX, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene associated with confirmation soil sample 20240327-PG16-(SBC)@11.5 collected adjacent to the POR location.

Please reference ECMC Supplemental Form 27 DN 4033754788 “Remediation Summary” section detailing how Caerus plans to address the above-mentioned exceedances, specifically arsenic and barium. A discussion of relief of arsenic and barium as contaminants of concern (COC) per ECMC Rule 915.e.(2).C (site-specific waste characterization) are included in the “Remediation Summary” section.

Please reference ECMC Supplemental Form 27 DN 4033754788 “Operator Comments” section detailing how Caerus plans to address the pH exceedance observed in POR confirmation soil sample 20240201-PG16-(POR)@7



as a COC per ECMC Rule 915.e.(2).C (site-specific waste characterization). The produced water sample location and associated results are shown on Figure 3. The produced water sample collected the Site is summarized in Table 3 and included in Enclosure B.

Per ECMC Rule 913.b.(2), WSP recommends that Caerus continue delineation efforts using an environmental drill rig equipped with solid-stem auger to determine the vertical and lateral extent of impacts associated with the dumphline release. Once vertical clearance has been achieved, lateral delineation of the release footprint can be more accurately assessed by advancing perimeter soil borings in each cardinal direction of the POR. Perimeter soil borings will be advanced approximately 30 feet from the center borehole (depending on site constraints). All perimeter soil borings will be advanced to the same vertical clearance depth observed at the POR location. If soil impacts are observed in the perimeter borings, contingency borings will be stepped out and advanced a minimum of 15 feet from the original perimeter boring. Soils will be collected, logged, and field screened at 5-foot intervals including the boring terminus. Soil samples will be submitted at every 10-foot interval including each boring terminus. Proposed soil borings are depicted on Figure 4. Prior to the start of additional delineation efforts, WSP recommends Caerus relocate the metal secondary tank containment and associated production tanks to allow access to delineate all impacts. Prior to any additional investigative work, WSP recommends that Caerus requests the Director for a further reduced analytical suite per ECMC Rule 915.e.(2).C that includes SAR, TPH, BTEX, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-methylnaphthalene, 2- methylnaphthalene, and naphthalene.

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,

Dustin Held
Lead Consultant, Environmental Geologist

Parker Coit, P.G.
Lead Consultant, Geologist

Encl.

FIGURES

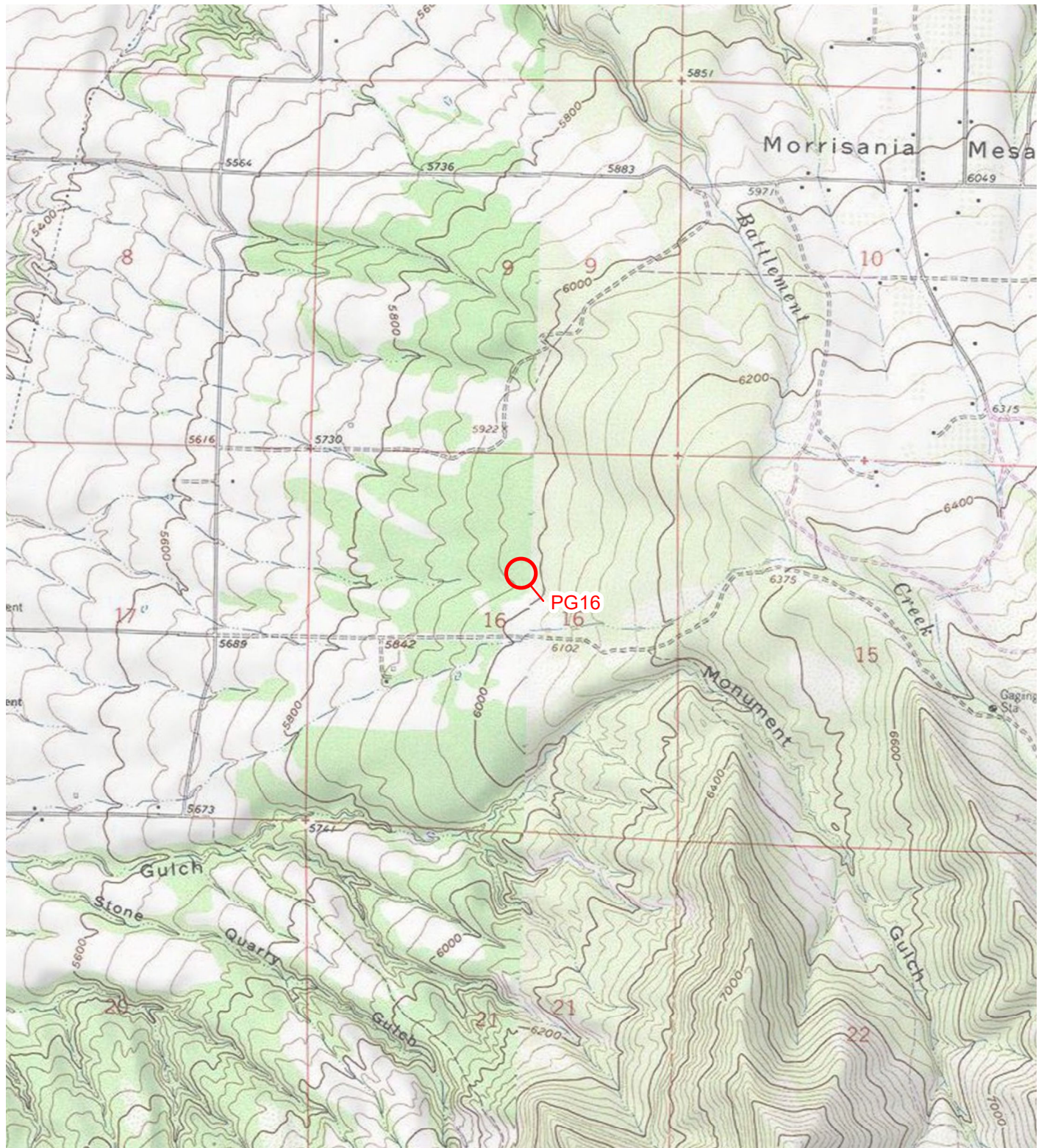


IMAGE COURTESY OF ESRI/USGS

LEGEND

 SITE LOCATION

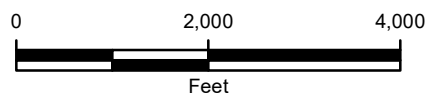





FIGURE 1
SITE LOCATION MAP
PG16
SWNE SEC 16 T7S R95W
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC





BACKGROUND IMAGERY COURTESY OF ESRI

LEGEND

-  POINT OF RELEASE
-  SAMPLE LOCATION
-  PRODUCED WATER SAMPLE LOCATION

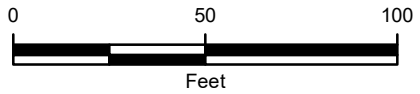
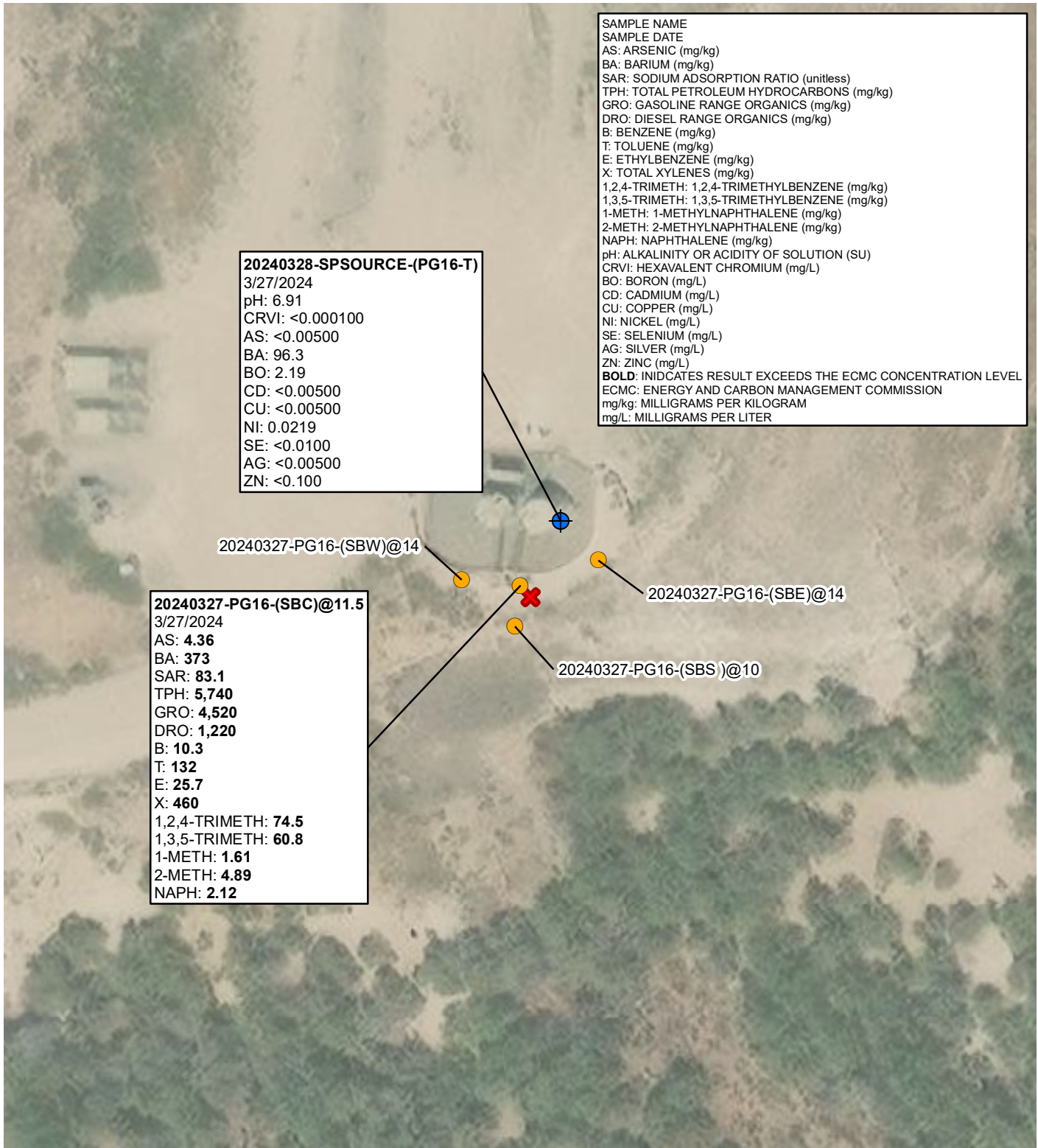


FIGURE 2
 SAMPLE LOCATION MAP
 PG16
 SWNE SEC 16 T7S R95W
 GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC





SAMPLE NAME
 SAMPLE DATE
 AS: ARSENIC (mg/kg)
 BA: BARIUM (mg/kg)
 SAR: SODIUM ADSORPTION RATIO (unitless)
 TPH: TOTAL PETROLEUM HYDROCARBONS (mg/kg)
 GRO: GASOLINE RANGE ORGANICS (mg/kg)
 DRO: DIESEL RANGE ORGANICS (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)
 pH: ALKALINITY OR ACIDITY OF SOLUTION (SU)
 CRVI: HEXAVALENT CHROMIUM (mg/L)
 BO: BORON (mg/L)
 CD: CADMIUM (mg/L)
 CU: COPPER (mg/L)
 NI: NICKEL (mg/L)
 SE: SELENIUM (mg/L)
 AG: SILVER (mg/L)
 ZN: ZINC (mg/L)
BOLD: INDICATES RESULT EXCEEDS THE ECMC CONCENTRATION LEVEL
 ECMC: ENERGY AND CARBON MANAGEMENT COMMISSION
 mg/kg: MILLIGRAMS PER KILOGRAM
 mg/L: MILLIGRAMS PER LITER

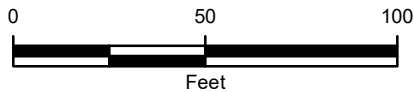
20240328-SPSOURCE-(PG16-T)
 3/27/2024
 pH: 6.91
 CRVI: <0.000100
 AS: <0.00500
 BA: 96.3
 BO: 2.19
 CD: <0.00500
 CU: <0.00500
 NI: 0.0219
 SE: <0.0100
 AG: <0.00500
 ZN: <0.100

20240327-PG16-(SBC)@11.5
 3/27/2024
 AS: **4.36**
 BA: **373**
 SAR: **83.1**
 TPH: **5,740**
 GRO: **4,520**
 DRO: **1,220**
 B: **10.3**
 T: **132**
 E: **25.7**
 X: **460**
 1,2,4-TRIMETH: **74.5**
 1,3,5-TRIMETH: **60.8**
 1-METH: **1.61**
 2-METH: **4.89**
 NAPH: **2.12**

BACKGROUND IMAGERY COURTESY OF ESRI

LEGEND

- POINT OF RELEASE
- SAMPLE LOCATION
- PRODUCED WATER SAMPLE LOCATION



NOTES:
 SOIL SAMPLE EXCEEDANCES BASED ON DATA
 COLLECTED IN THE FIELD AND COMPARED TO THE
 ECMC TABLE 915-1 PROTECTION OF GROUNDWATER
 SOIL SCREENING LEVEL CONCENTRATIONS (PGSSLCs)



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





BACKGROUND IMAGERY COURTESY OF GOOGLE EARTH (2022)

LEGEND

-  POINT OF RELEASE
-  PROPOSED SOIL BORINGS

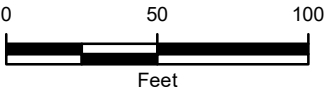


FIGURE 4
PROPOSED SOIL BORING LOCATION MAP
PG16
SWNE SEC 16 T7S R95W
GARFIELD COUNTY, COLORADO
CAERUS PICEANCE LLC



TABLES



TABLE 1

SOIL ANALYTICAL RESULTS
 PG16 DUMPLINE
 GARFIELD COUNTY, COLORADO
 CAERUS PICEANCE LLC

Soil Analytical Results

Analyte			EC	SAR	pH	Boron	Arsenic	Barium	Cadmium	Chromium VI	Copper	Lead	Nickel	Selenium	Silver	Zinc
915-1 PROTECTION OF GW			4000	6	8.3	2	0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
915-1 RESIDENTIAL SOIL			4000	6	8.3	2	0.68	15000	71	0.3	3100	400	1500	390	390	23000
Units			umhos/cm	No Unit	SU	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Lab Report	EC	SAR	pH	Boron	Arsenic	Barium	Cadmium	Chromium VI	Copper	Lead	Nickel	Selenium	Silver	Zinc
20240201-PG16-(POR)@7	02/01/2024	L1702066	3360	81.7	8.45	0.861	12.2	783	< 1.00	< 1.00	15.9	13.7	17.5	< 2.50	< 0.500	58.2
20240327-PG16-(SBC)@11.5	03/27/2024	L1720304	NA	83.1	8.02	NA	4.36	373	NA	NA	NA	NA	NA	NA	NA	NA

Key:

EC - electrical conductivity
 SAR - sodium adsorption ratio
 umhos/cm - micromhos per centimeter
 SU - standard units
 mg/kg - milligram per kilogram
 mg/l - milligram per liter

GRO - gasoline range organics
 DRO - diesel range organics
 ORO - oil range organics
 TMB - trimethylbenzene
 < - less than laboratory minimum detection limit
 NA - not assessed



TABLE 1

SOIL ANALYTICAL RESULTS
 PG16 DUMPLINE
 GARFIELD COUNTY, COLORADO
 CAERUS PICEANCE LLC

Soil Analytical Results

Analyte			GRO	DRO	ORO	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,2,4-TMB	1,3,5-TMB	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Chrysene	Dibenz(a,h)anthracen	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyre	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Pyrene	
915-1 PROTECTION OF GW			500	500	500	0.0026	0.69	0.78	9.9	0.0081	0.0087	0.55	5.8	0.011	0.3	2.9	0.24	9	0.096	5.9	0.54	0.98	0.006	0.019	0.0038	1.3	
915-1 RESIDENTIAL SOIL			500	500	500	1.2	490	5.8	58	30	27	360	1800	1.1	1.1	11	0.11	110	0.11	240	240	1.1	18	24	2	180	
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Lab Report																									
20240201-PG16-(POR)@7	02/01/2024	L1702066	7840	669	< 40.0	19.0	198	40.9	421	90.7	83.3	< 0.00600	< 0.00600	< 0.00600	< 0.00600	< 0.00600	< 0.00600	< 0.00600	< 0.00600	< 0.00600	0.0157	< 0.00600	0.441	1.28	0.747	< 0.00600	
20240327-PG16-(SBC)@11.5	03/27/2024	L1720304	4520	1220	< 20.0	10.3	132	25.7	460	74.5	60.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.61	4.89	2.12	NA	

Key:

EC - electrical conductivity
 SAR - sodium adsorption ratio
 umhos/cm - micromhos per centimeter
 SU - standard units
 mg/kg - milligram per kilogram
 mg/l - milligram per liter

GRO - gasoline
 DRO - diesel ra
 ORO - oil range
 TMB - trimethy,
 < - less than la
 NA - not assess

TABLE 2

PRODUCED WATER ANALYTICAL RESULTS
 PG16 DUMPLINE
 GARFIELD COUNTY, COLORADO
 CAERUS PICEANCE LLC

			Produced Water Results												
			Analyte	PH	HEXAVALENT CHROMIUM	ARSENIC	BARIUM	BORON	CADMIUM	COPPER	LEAD	NICKEL	SELENIUM	SILVER	ZINC
			Units	SU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Same Name	Sample Date	Lab Report													
20240327-SPSOURCE-(PG16-T)	3/27/2024	L1720330		6.91	< 0.000100	< 0.00500	96.3	2.19	< 0.00500	< 0.00500	NA	0.0219	< 0.0100	< 0.00500	< 0.100

NOTES:
 SU - standard units
 mg/l - milligram per liter
 < - concentration below laboratory detection limit
 NA - not assessed

ENCLOSURE A – SOIL SCREENING PHOTOLOG

PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	31403501.6207
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Photo No.	Date	
1	3/27/2024	
Tank 81951 20240327-SPSOURCE-(PG16-T) View south		

Photo No.	Date	
2	3/27/2024	
Potholing location 20240327-PG16-(SBW) View west		

PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	31403501.6207
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Photo No.	Date	
3	3/27/2024	
Hand auger sample 20240327-PG16-(SBW)@14 View east		

Photo No.	Date	
4	3/27/2024	
Potholing location 20240327-PG16-(SBC) View west		

PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	31403501.6207
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Photo No.	Date	
5	3/25/2024	
20240327-PG16-(SBC)@11.5		

Photo No.	Date	
6	3/27/2024	
Potholing location 20240327-PG16-(SBS) View south		



PHOTOGRAPHIC LOG

Caerus Piceance LLC	PG16 – Dumpline Release	31403501.6207
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Photo No.	Date	
Potholing location 20240327-PG16-(SBE) View east	3/27/2024	

ENCLOSURE B – LABORATORY ANALYTICAL RESULTS

Caerus Oil and Gas

Sample Delivery Group: L1720304
Samples Received: 03/29/2024
Project Number: PG16
Description: PG16 Dumpline
Site: PG16
Report To: Jake J. / Brett M. / Blair R. / Andy V.
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



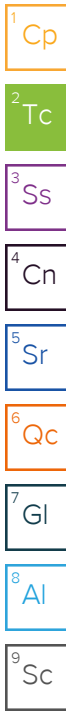
Chris Ward
Project Manager

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

20240327-PG16-(SBC)@11.5 L1720304-01 Solid

Collected by: Ben Hermann
 Collected date/time: 03/27/24 12:45
 Received date/time: 03/29/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2259578	1	04/05/24 10:02	04/05/24 10:02	JTM	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2257551	1	03/31/24 12:12	04/01/24 15:00	BJM	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2257137	5	04/02/24 09:12	04/03/24 12:36	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2260865	500	04/03/24 19:26	04/05/24 00:50	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2260031	40	04/03/24 19:26	04/04/24 09:22	JBE	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2261253	400	04/03/24 19:26	04/05/24 21:56	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2258803	5	04/02/24 14:45	04/03/24 13:52	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2259409	1	04/03/24 15:01	04/04/24 05:57	MKM	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2259409	10	04/03/24 15:01	04/09/24 02:53	JCH	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

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	83.1		1	04/05/2024 10:02	WG2259578

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.02	T8	1	04/01/2024 15:00	WG2257551

Sample Narrative:

L1720304-01 WG2257551: 8.02 at 20.5C

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	4.36		1.00	5	04/03/2024 12:36	WG2257137
Barium	373		2.50	5	04/03/2024 12:36	WG2257137

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	4520		50.0	500	04/05/2024 00:50	WG2260865
(S) a,a,a-Trifluorotoluene(FID)	88.5		77.0-120		04/05/2024 00:50	WG2260865

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	10.3		0.0400	40	04/04/2024 09:22	WG2260031
Toluene	132		2.00	400	04/05/2024 21:56	WG2261253
Ethylbenzene	25.7		0.100	40	04/04/2024 09:22	WG2260031
Xylenes, Total	460		2.60	400	04/05/2024 21:56	WG2261253
1,2,4-Trimethylbenzene	74.5	V	0.200	40	04/04/2024 09:22	WG2260031
1,3,5-Trimethylbenzene	60.8	V	0.200	40	04/04/2024 09:22	WG2260031
(S) Toluene-d8	96.9		75.0-131		04/04/2024 09:22	WG2260031
(S) Toluene-d8	101		75.0-131		04/05/2024 21:56	WG2261253
(S) 4-Bromofluorobenzene	112		67.0-138		04/04/2024 09:22	WG2260031
(S) 4-Bromofluorobenzene	105		67.0-138		04/05/2024 21:56	WG2261253
(S) 1,2-Dichloroethane-d4	90.0		70.0-130		04/04/2024 09:22	WG2260031
(S) 1,2-Dichloroethane-d4	111		70.0-130		04/05/2024 21:56	WG2261253

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	1220		20.0	5	04/03/2024 13:52	WG2258803
C28-C36 Motor Oil Range	ND		20.0	5	04/03/2024 13:52	WG2258803
(S) o-Terphenyl	56.1		18.0-148		04/03/2024 13:52	WG2258803

Sample Narrative:

L1720304-01 WG2258803: Dilution due to matrix.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
1-Methylnaphthalene	1.61		0.0200	1	04/04/2024 05:57	WG2259409
2-Methylnaphthalene	4.89		0.200	10	04/09/2024 02:53	WG2259409
Naphthalene	2.12		0.0200	1	04/04/2024 05:57	WG2259409
(S) p-Terphenyl-d14	84.5		23.0-120		04/09/2024 02:53	WG2259409
(S) p-Terphenyl-d14	106		23.0-120		04/04/2024 05:57	WG2259409
(S) Nitrobenzene-d5	0.000	J2	14.0-149		04/04/2024 05:57	WG2259409
(S) Nitrobenzene-d5	0.000	J2	14.0-149		04/09/2024 02:53	WG2259409
(S) 2-Fluorobiphenyl	80.8		34.0-125		04/04/2024 05:57	WG2259409
(S) 2-Fluorobiphenyl	84.1		34.0-125		04/09/2024 02:53	WG2259409

Sample Narrative:

L1720304-01 WG2259409: Surrogate failure due to matrix interference

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1719919-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1719919-02 04/01/24 15:00 • (DUP) R4052364-2 04/01/24 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	5.98	5.94	1	0.671		1

Sample Narrative:

OS: 5.98 at 20.4C
 DUP: 5.94 at 20.6C

L1720323-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1720323-01 04/01/24 15:00 • (DUP) R4052364-3 04/01/24 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	pH	su		%		%
pH	7.07	7.09	1	0.282		1

Sample Narrative:

OS: 7.07 at 20.5C
 DUP: 7.09 at 20.6C

Laboratory Control Sample (LCS)

(LCS) R4052364-1 04/01/24 15:00

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 at 20.4C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4053235-1 04/03/24 12:13

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

¹Cp

²Tc

³Ss

Laboratory Control Sample (LCS)

(LCS) R4053235-2 04/03/24 12:17

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	101	101	80.0-120	
Barium	100	92.6	92.6	80.0-120	

⁴Cn

⁵Sr

⁶Qc

L1720319-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720319-03 04/03/24 12:20 • (MS) R4053235-5 04/03/24 12:30 • (MSD) R4053235-6 04/03/24 12:33

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	6.18	92.3	90.6	86.1	84.4	5	75.0-125			1.91	20
Barium	100	210	286	283	75.7	72.9	5	75.0-125	J6		0.981	20

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4054405-2 04/04/24 23:45

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.543	2.50
(S) a,a,a-Trifluorotoluene(FID)	96.7			77.0-120

Laboratory Control Sample (LCS)

(LCS) R4054405-1 04/04/24 21:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.00	5.79	116	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			107	77.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4054180-3 04/04/24 05:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Benzene	U		0.000467	0.00100
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	104			75.0-131
(S) 4-Bromofluorobenzene	104			67.0-138
(S) 1,2-Dichloroethane-d4	94.8			70.0-130

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

(LCS) R4054180-1 04/04/24 04:19 • (LCSD) R4054180-2 04/04/24 04:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Benzene	0.125	0.112	0.109	89.6	87.2	70.0-123			2.71	20
Ethylbenzene	0.125	0.119	0.118	95.2	94.4	74.0-126			0.844	20
1,2,4-Trimethylbenzene	0.125	0.128	0.124	102	99.2	70.0-126			3.17	20
1,3,5-Trimethylbenzene	0.125	0.123	0.118	98.4	94.4	73.0-127			4.15	20
(S) Toluene-d8				104	102	75.0-131				
(S) 4-Bromofluorobenzene				106	103	67.0-138				
(S) 1,2-Dichloroethane-d4				97.5	94.9	70.0-130				

L1720304-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720304-01 04/04/24 09:22 • (MS) R4054180-4 04/04/24 12:51 • (MSD) R4054180-5 04/04/24 13:10

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Benzene	5.00	10.3	15.1	15.0	96.0	94.0	40	10.0-149			0.664	37
Ethylbenzene	5.00	25.7	28.4	27.8	54.0	42.0	40	10.0-160			2.14	38
1,2,4-Trimethylbenzene	5.00	74.5	74.3	74.8	0.000	6.00	40	10.0-160	V	V	0.671	36
1,3,5-Trimethylbenzene	5.00	60.8	56.2	56.0	0.000	0.000	40	10.0-160	V	V	0.357	38
(S) Toluene-d8					93.1	93.3		75.0-131				
(S) 4-Bromofluorobenzene					115	106		67.0-138				
(S) 1,2-Dichloroethane-d4					97.1	99.4		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) R4054624-2 04/05/24 13:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Toluene	U		0.00130	0.00500
Xylenes, Total	U		0.000880	0.00650
(S) Toluene-d8	99.7			75.0-131
(S) 4-Bromofluorobenzene	103			67.0-138
(S) 1,2-Dichloroethane-d4	106			70.0-130

Laboratory Control Sample (LCS)

(LCS) R4054624-1 04/05/24 12:28

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Toluene	0.125	0.127	102	75.0-121	
Xylenes, Total	0.375	0.385	103	72.0-127	
(S) Toluene-d8			99.0	75.0-131	
(S) 4-Bromofluorobenzene			104	67.0-138	
(S) 1,2-Dichloroethane-d4			109	70.0-130	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4053176-1 04/03/24 04:11

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	U		0.274	4.00
(S) o-Terphenyl	63.2			18.0-148

Laboratory Control Sample (LCS)

(LCS) R4053176-2 04/03/24 04:24

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	34.6	69.2	50.0-150	
(S) o-Terphenyl			65.3	18.0-148	

L1720434-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720434-05 04/03/24 06:21 • (MS) R4053176-3 04/03/24 06:34 • (MSD) R4053176-4 04/03/24 06:47

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	49.4	ND	34.5	32.3	69.8	65.4	1	50.0-150			6.59	20
(S) o-Terphenyl					56.2	54.1		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) R4054311-2 04/03/24 21:44

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
(S) p-Terphenyl-d14	129	J1		23.0-120
(S) Nitrobenzene-d5	77.3			14.0-149
(S) 2-Fluorobiphenyl	104			34.0-125

Laboratory Control Sample (LCS)

(LCS) R4054311-1 04/03/24 21:26

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
1-Methylnaphthalene	0.0800	0.0816	102	51.0-121	
2-Methylnaphthalene	0.0800	0.0806	101	50.0-120	
Naphthalene	0.0800	0.0742	92.8	50.0-120	
(S) p-Terphenyl-d14			129	23.0-120	J1
(S) Nitrobenzene-d5			83.3	14.0-149	
(S) 2-Fluorobiphenyl			110	34.0-125	

L1720377-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720377-05 04/04/24 06:51 • (MS) R4054306-1 04/04/24 07:08 • (MSD) R4054306-2 04/04/24 07:25

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
1-Methylnaphthalene	0.0803	ND	0.0639	0.0662	79.9	82.8	1	10.0-142			3.54	28
2-Methylnaphthalene	0.0803	ND	0.0633	0.0648	79.1	81.0	1	10.0-137			2.34	28
Naphthalene	0.0803	ND	0.0610	0.0629	76.3	78.6	1	10.0-135			3.07	27
(S) p-Terphenyl-d14					83.5	85.9		23.0-120				
(S) Nitrobenzene-d5					97.0	90.9		14.0-149				
(S) 2-Fluorobiphenyl					72.9	91.1		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.

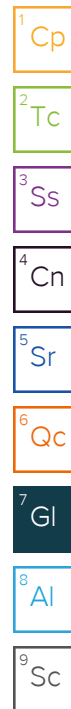
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
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

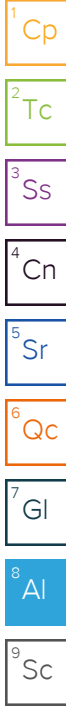
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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.



Caerus Oil and Gas

Sample Delivery Group: L1720330
Samples Received: 03/29/2024
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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Wet Chemistry by Method 4500H+ B-2011	8	
Metals (ICP) by Method 200.7	9	⁶ Qc
Metals (ICPMS) by Method 200.8	10	
Gl: Glossary of Terms	12	⁷ Gl
Al: Accreditations & Locations	13	⁸ Al
Sc: Sample Chain of Custody	14	⁹ Sc

SAMPLE SUMMARY

20240327-SPSOURCE-(PG16-T) L1720330-01 WW

Collected by: Ben Herrmann
 Collected date/time: 03/27/24 09:00
 Received date/time: 03/29/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 3500Cr C-2011	WG2256742	1	04/02/24 23:17	04/02/24 23:17	SET	Mt. Juliet, TN
Wet Chemistry by Method 4500H+ B-2011	WG2259049	1	04/02/24 21:20	04/02/24 21:20	KRB	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG2258601	1	04/02/24 22:24	04/03/24 10:01	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG2258610	10	04/02/24 22:47	04/05/24 10:45	SJM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG2258610	100	04/02/24 22:47	04/05/24 01:01	SJM	Mt. Juliet, TN
Metals (ICPMS) by Method 200.8	WG2258610	5	04/02/24 22:47	04/05/24 00:05	LD	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

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Wet Chemistry by Method 3500Cr C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium-Low Level	ND		0.000100	1	04/02/2024 23:17	WG2256742

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	6.91	T8	1	04/02/2024 21:20	WG2259049

Sample Narrative:

L1720330-01 WG2259049: 6.91 at 19.9C

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Boron	2.19		0.200	1	04/03/2024 10:01	WG2258601

Metals (ICPMS) by Method 200.8

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Antimony	ND		0.0500	10	04/05/2024 10:45	WG2258610
Arsenic	ND		0.00500	5	04/05/2024 00:05	WG2258610
Barium	96.3		0.500	100	04/05/2024 01:01	WG2258610
Cadmium	ND		0.00500	5	04/05/2024 00:05	WG2258610
Copper	ND		0.00500	5	04/05/2024 00:05	WG2258610
Nickel	0.0219		0.0100	5	04/05/2024 00:05	WG2258610
Selenium	ND		0.0100	5	04/05/2024 00:05	WG2258610
Silver	ND		0.00500	5	04/05/2024 00:05	WG2258610
Zinc	ND		0.100	5	04/05/2024 00:05	WG2258610

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4053004-1 04/02/24 16:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hexavalent Chromium-Low Level	U		0.0000400	0.000100

L1721027-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1721027-01 04/02/24 23:25 • (DUP) R4053004-3 04/02/24 23:33

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium-Low Level	ND	ND	1	0.000		20

L1721052-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1721052-08 04/03/24 01:28 • (DUP) R4053004-6 04/03/24 01:36

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium-Low Level	ND	ND	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R4053004-2 04/02/24 22:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium-Low Level	0.00200	0.00211	105	90.0-110	

L1721052-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1721052-01 04/02/24 23:58 • (MS) R4053004-4 04/03/24 00:22 • (MSD) R4053004-5 04/03/24 00:30

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 %
Hexavalent Chromium-Low Level	0.00100	0.000599	0.00168	0.00168	108	108	1	90.0-110			0.0595	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1721052-12 Original Sample (OS) • Matrix Spike (MS)

(OS) L1721052-12 04/03/24 03:01 • (MS) R4053004-7 04/03/24 03:09

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Hexavalent Chromium-Low Level	0.00100	ND	0.00106	106	1	90.0-110	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1720330-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1720330-01 04/02/24 21:20 • (DUP) R4052965-2 04/02/24 21:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	6.91	6.93	1	0.289		1

Sample Narrative:

OS: 6.91 at 19.9C
DUP: 6.93 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R4052965-1 04/02/24 21:20

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 20.4C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4053243-1 04/03/24 09:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Boron	U		0.0396	0.200

¹Cp

²Tc

³Ss

Laboratory Control Sample (LCS)

(LCS) R4053243-2 04/03/24 09:46

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Boron	1.00	1.09	109	85.0-115	

⁴Cn

⁵Sr

L1721045-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1721045-01 04/03/24 09:49 • (MS) R4053243-4 04/03/24 09:55 • (MSD) R4053243-5 04/03/24 09:58

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 %
Boron	1.00	ND	1.12	1.12	112	112	1	70.0-130			0.389	20

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4054024-1 04/04/24 20:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic	U		0.000195	0.00100
Barium	U		0.000476	0.00500
Cadmium	U		0.000160	0.00100
Copper	U		0.000670	0.00100
Nickel	U		0.000514	0.00200
Selenium	U		0.000437	0.00200
Silver	U		0.000144	0.00100
Zinc	U		0.00796	0.0200

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4054147-1 04/05/24 10:05

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Antimony	U		0.00172	0.00500

Laboratory Control Sample (LCS)

(LCS) R4054024-2 04/04/24 20:54

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	0.0500	0.0530	106	85.0-115	
Barium	0.0500	0.0493	98.6	85.0-115	
Cadmium	0.0500	0.0547	109	85.0-115	
Copper	0.0500	0.0529	106	85.0-115	
Nickel	0.0500	0.0559	112	85.0-115	
Selenium	0.0500	0.0509	102	85.0-115	
Silver	0.0500	0.0536	107	85.0-115	
Zinc	0.0500	0.0519	104	85.0-115	

Laboratory Control Sample (LCS)

(LCS) R4054147-2 04/05/24 10:09

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Antimony	0.0500	0.0512	102	85.0-115	

L1720121-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720121-01 04/04/24 20:57 • (MS) R4054024-4 04/04/24 21:04 • (MSD) R4054024-5 04/04/24 21:07

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 %
Arsenic	0.0500	ND	0.0531	0.0514	106	102	1	70.0-130			3.25	20
Barium	0.0500	0.00750	0.0566	0.0541	98.2	93.2	1	70.0-130			4.58	20
Cadmium	0.0500	ND	0.0555	0.0531	111	106	1	70.0-130			4.33	20
Copper	0.0500	0.00263	0.0550	0.0525	105	99.8	1	70.0-130			4.54	20
Nickel	0.0500	ND	0.0553	0.0534	111	107	1	70.0-130			3.48	20
Selenium	0.0500	ND	0.0540	0.0517	105	101	1	70.0-130			4.24	20
Silver	0.0500	ND	0.0525	0.0519	105	104	1	70.0-130			1.16	20
Zinc	0.0500	ND	0.0582	0.0551	116	110	1	70.0-130			5.35	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

L1720723-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720723-01 04/04/24 21:10 • (MS) R4054024-6 04/04/24 21:14 • (MSD) R4054024-7 04/04/24 21:17

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 %
Arsenic	0.0500	0.00104	0.0522	0.0526	102	103	1	70.0-130			0.753	20
Barium	0.0500	0.0638	0.115	0.113	103	98.0	1	70.0-130			2.21	20
Cadmium	0.0500	ND	0.0522	0.0524	104	105	1	70.0-130			0.435	20
Copper	0.0500	0.0141	0.0632	0.0620	98.2	96.0	1	70.0-130			1.79	20
Selenium	0.0500	0.0563	0.103	0.102	92.6	91.1	1	70.0-130			0.745	20
Silver	0.0500	ND	0.0506	0.0511	101	102	1	70.0-130			0.865	20
Zinc	0.0500	0.0489	0.0969	0.132	95.9	166	1	70.0-130		J3 J5	30.6	20

7 Gl

8 Al

9 Sc

L1720121-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720121-01 04/05/24 10:12 • (MS) R4054147-4 04/05/24 10:29 • (MSD) R4054147-5 04/05/24 10:32

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 %
Antimony	0.0500	ND	0.0528	0.0512	106	102	1	70.0-130			2.96	20

L1720723-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1720723-01 04/05/24 10:35 • (MS) R4054147-6 04/05/24 10:39 • (MSD) R4054147-7 04/05/24 10:42

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 %
Antimony	0.0500	ND	0.0525	0.0533	105	107	1	70.0-130			1.45	20
Nickel	0.0500	0.00804	0.0560	0.0572	95.9	98.4	1	70.0-130			2.22	20

GLOSSARY OF TERMS

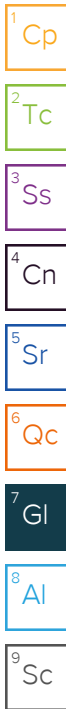
Guide to Reading and Understanding Your Laboratory Report

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.
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
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.
T8	Sample(s) received past/too close to holding time expiration.



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

3/29/24 - NCF L1720330 CAERUSPCO

R5

Time estimate: oh

Time spent: oh

Members

- MS Matthew Shacklock (responsible)
- CW Chris Ward

- Login Clarification needed
- Chain of custody is incomplete
- Please specify Metals requested
- Please specify TCLP requested
- Received additional samples not listed on COC
- Sample IDs on containers do not match IDs on COC
- Client did not "X" analysis
- Chain of Custody is missing
- If no COC: Received by: _____
- If no COC: Date/Time: _____
- If no COC: Temp./Cont.Rec./pH: _____
- If no COC: Carrier: _____
- If no COC: Tracking #: _____
- Client informed by call
- Client informed by Email
- Client informed by Voicemail
- Date/Time: _____
- PM initials: _____
- Client Contact: _____

Comments

- Matthew Shacklock* 29 March 2024 4:44 PM
Didn't receive a bottle for metals
- Chris Ward* 29 March 2024 4:46 PM
Please preserve one of the pH containers
- Matthew Shacklock* 29 March 2024 5:08 PM
What metals are we running

Chris Ward

- AGG
- ASG
- BAG
- CDG
- CR6IC
- CUG
- BICP
- NIG
- PBG
- SEG
- ZNG

Please

29 March 2024 5:10 PM

Matthew Shacklock

Done

1 April 2024 8:55 AM

