



## VIA ELECTRONIC MAIL –

June 25, 2024

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

**Subject: Decommissioning Field Activities  
L9 – Hill 9-12A  
Mamm Creek Field  
Garfield County, Colorado**

Dear Mr. Rollins:

WSP USA Inc. (WSP), on behalf of Caerus Piceance LLC (Caerus), completed excavation oversight, field soil screening, and confirmation soil sampling to address the previously identified soil impacts associated with the decommissioning of production well Hill 9-12A [American Petroleum Institute (API) Number (#) 045-09354] located at the HILL-67S92W9NWSW (Location ID: 334844) (L9) pad location (Site). All associated field decommissioning work was completed in accordance with the State of Colorado Energy and Carbon Management Commission (ECMC) Rule 913.c.(9): *Decommissioning of Oil and Gas Facilities*. Initial decommissioning activities associated with the project can be found in Document Numbers (DNs) 403401892 and 403566692, and under ECMC Remediation Project Number (RPN) 28564. All supplemental decommissioning and Site clean-up activities completed during the second quarter of 2024 can be referenced in DN 403833874. The Site is located in the Caerus' Mamm Creek area of operation in Garfield County, Colorado (Figure 1).

## PRODUCED WATER SAMPLING ACTIVITIES – L9 – HILL 9-12A

On May 22, 2024, with the assistance of Caerus personnel, WSP collected one produced water sample [2020522-MCSOURCE-(L9-T)] from the onsite production tank (Tank Number 265606) which stored production fluids from the same formation as the decommissioned production well. The produced water sample was collected from the bottom loadout valve of the tank for site-specific waste characterization per ECMC Rule 915-2.(2).C. This produced water sample was submitted to Pace Analytical (Pace) of Mt. Juliet, Tennessee for laboratory analysis of Table 915-1 metals, pH, electrical conductivity (EC), pH, and chromium (IV). The sample location is shown on Figure 2.

## CONFIRMATION SOIL SAMPLING ACTIVITIES – L9 – HILL 9-12A

WSP returned to the Site on June 3, 2024, to conducted excavation oversight of the removal of soil impacts observed along the north and west sidewalls associated with confirmation soil sample locations 20230720-L9-(NW-HILL 9-12A)@5 and 20230720-L9-(WW-HILL 9-12A)@5 (referenced in DN 403401892). The former production well footprint was opened to expose the north and west sidewalls in order to remove soil impacts. Energy Field Services, LLC. of Parachute, Colorado, was contracted by Caerus to provide excavation services. As the excavation was advanced the soils that composed all sidewalls and base of the excavation from the former north and west excavation sidewalls were meticulously field screened which dictated the excavation extent. Hydrocarbon odor and staining was present along the north sidewall and the base at 6 feet below ground surface, therefore the north sidewall and base were expanded an additional foot in each direction and confirmation samples were recollected. The soil sampling activities were conducted by a WSP geologist who inspected the soil samples for the presence or absence of petroleum hydrocarbons odor and/or staining. The soils were characterized by visually inspecting the confirmation soil samples and field screening the soil head space using a photo-ionization detector (PID) to monitor

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for the presence or absence of volatile organic compounds (VOCs). A total of five confirmation soil samples were submitted from excavation footprint, one base and four sidewalls. All confirmation soil samples were collected and submitted from areas where the greatest degree of impact was observed. An estimated 37 cubic yards of soil were removed to address the previously observed impacts along the north and west sidewalls. The approximate dimensions of the excavation footprint were 12 ft x 12 ft x 7 ft. The excavation of the former Hill 9-12A [API:045-09354] and the Hill 9-14 [API:045-09356] production wells were completed concurrently on June 3, 2024. The removed soils were compiled into one stockpile from which a five-point composite soil sample was also collected. Soils collected from each aliquot location were evenly and thoroughly mixed to create one representative stockpile soil sample [20240603-L9-(STOCK)]. The field soil screening results of the investigative confirmation soil samples are summarized in the table below.

#### Field Soil Screening Results – June 3, 2024

Sample ID	PID (ppm)	Notes	Submitted for Analysis
20240603-L9-(NW-HILL 9-12A)@7	0.5	No staining or odor	Yes
20240603-L9-(WW-HILL 9-12A)@7	0.2	No staining or odor	Yes
20240603-L9-(EW-HILL 9-12A)@7	0.2	No staining or odor	Yes
20240603-L9-(SW-HILL 9-12A)@7	2.1	Minimal staining, slight odor	Yes
20240603-L9-(BASE-HILL 9-12A)@7	1.3	No staining or odor	Yes
20240603-L9-(STOCK)	0.0	No staining or odor	Yes

Key: PID – photoionization detector ppm – parts per million

All investigative confirmation soil samples associated with the decommissioned production well Hill 9-12A [API:045-09354] and the composite stockpile soil sample were submitted to Pace under a reduced suite of arsenic, barium, cadmium, selenium, total petroleum hydrocarbons (TPH), benzene, 1,2,4-trimethylbenzene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene (DN 403401892). Analytical results will be evaluated under ECMC Protection of Groundwater Soil Screening Level Concentrations (PGSSLCs) and Residential Soil Screening Level Concentrations (RSSLCs). The investigative confirmation soil sample locations and composite stockpile sample aliquot locations for the investigative activities completed on June 3, 2024 are depicted on Figures 3 and 4. A photographic log of the investigative activities conducted at the Site on June 3, 2024 is included in Enclosure A.

## ANALYTICAL RESULTS – L9 – HILL 9-12A

Laboratory analytical results of the five investigative confirmation soil samples and the one composite stockpile soil sample collected at the Site on June 3, 2024 indicate exceedances of ECMC Table 915-1 PGSSLCs. The documented exceedances for each confirmation sample are summarized in the table below.



### Summary of Confirmation Soil Analytical Exceedances – June 3, 2024

Confirmation Soil Sample ID	ECMC Table 915-1 Contaminants of Concern	Units	ECMC PGSSLCs	ECMC RSSLCs	Confirmation Soil Sample Concentration
20240603-L9-(BASE-HILL9-12A)@7	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>6.03</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>2030</b>
20240603-L9-(EW-HILL9-12A)@7	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>7.09</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>1180</b>
	Selenium	mg/kg	0.26	390 (M)	<b>2.21</b>
20240603-L9-(NW-HILL9-12A)@7	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>8.41</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>103</b>
20240603-L9-(SW-HILL9-12A)@7	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>3.80</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>1780</b>
20240603-L9-(WW-HILL9-12A)@7	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>6.67</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>123</b>
20240603-L9-(STOCK)	Arsenic	mg/kg	0.29 (M)	0.68 (M)	<b>5.36</b>
	Barium	mg/kg	82 (M)	15,000 (M)	<b>1830</b>

**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

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 analytical results of the investigative confirmation soil samples collected are summarized on Table 1. A soil analytical exceedances map compared to ECMC Table 915-1 PGSSLCs is shown on Figure 5. The analytical results of the produced water sample collected are summarized in Table 2. The produced water sample results are depicted on Figure 6. The laboratory reports are included in Enclosure B.

## CONCLUSIONS – L9 – HILL 9-12A

Based on the analytical results provided herein, confirmation soil sampling activities completed associated with the decommissioning of production well Hill 9-12A [API:045-09354] and associated infrastructure (flowlines) indicate there are remaining ECMC Table 915-1 PGSSLC exceedances of arsenic, barium, and selenium in subsurface soils.

## RECOMMENDATIONS – L9 – HILL 9-12A

Please see the ECMC Site Investigation and Remediation Workplan DN 403833874 “Remediation Summary and Operator Comments” sections per ECMC Rule 915 e.(2)C. for how Caerus plans to address relief of arsenic as a contaminant of concern (COC) and how Caerus plans to address the evaluation of success for this remediation project through Table 915-1, Footnote 7.



Please reference DN 403401892 for initial and supplementary investigative confirmation soil sampling activities completed in 2023 associated with the decommissioning of production well 9-12A [API:045-09354] and associated production infrastructure (flowlines). The site figures and laboratory analytical results of previous work completed can also be referenced under DNs 403401892 and 403566692.

WSP recommends that Caerus should request the Director for approval to use the soil excavated associated with stockpile 20240603-L9-(STOCK) from the two above mentioned decommissioned production wells to backfill the open excavation footprint associated with decommissioned production well 9-12A [API:045-09354], as analytical results indicate all analytes are within ECMC Table 915-1 RSSLCs or site-specific waste characterization per ECMC Rule 915-2.(2).C. The stockpile soil analytical exceedances compared to PGSSLCs are depicted on the attached Figure 4.

Based on the data provided, WSP recommends that Caerus request the ECMC Director for “No Further Action” and closure of RPN 28564. This recommendation is based on the analytical data provided in this report of work completed and in ECMC DN 403833874.

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 be 'D. Held'.

Dustin Held  
Lead Consultant, Environmental Geologist

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

Parker Coit, P.G.  
Lead Consultant, Geologist

Encl.



## FIGURES

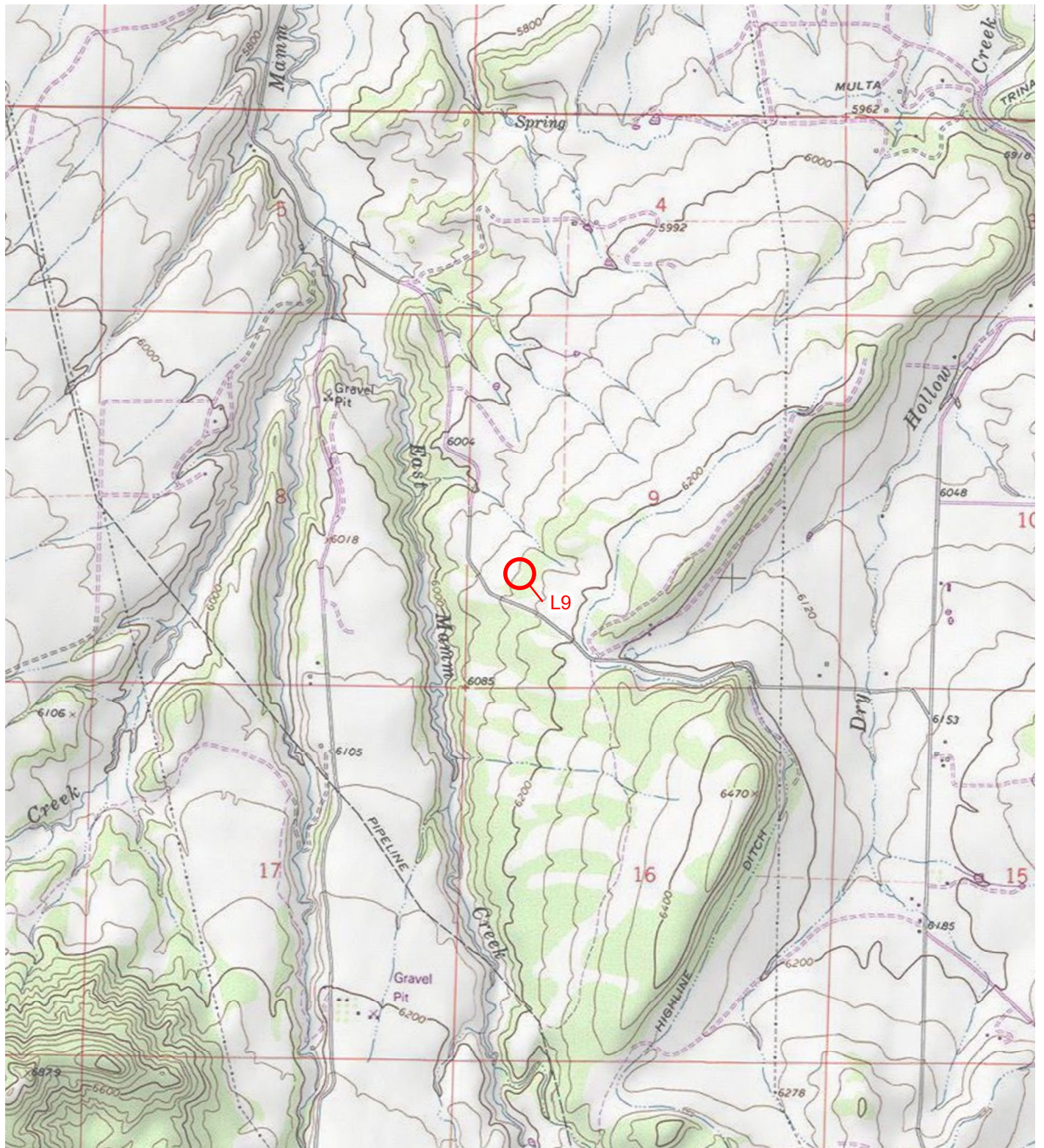
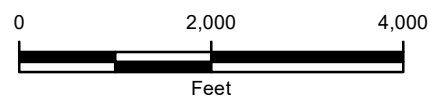
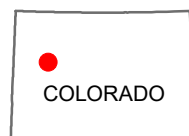


IMAGE COURTESY OF ESRI/USGS

## LEGEND

 SITE LOCATION



**FIGURE 1**  
**SITE LOCATION MAP**  
**L9**  
**NWSW SEC 9-T7S-R92W**  
**GARFIELD COUNTY, COLORADO**  
**CAERUS PICEANCE LLC**







IMAGE COURTESY OF GOOGLE EARTH (2023)

# LEGEND



PRODUCED WATER SAMPLE LOCATION

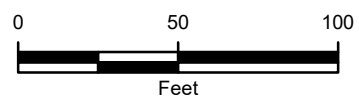


FIGURE 2  
PRODUCED WATER SAMPLE MAP  
L9  
NWSW SEC 9-T7S-R92W  
GARFIELD COUNTY, COLORADO  
CAERUS PICEANCE LLC



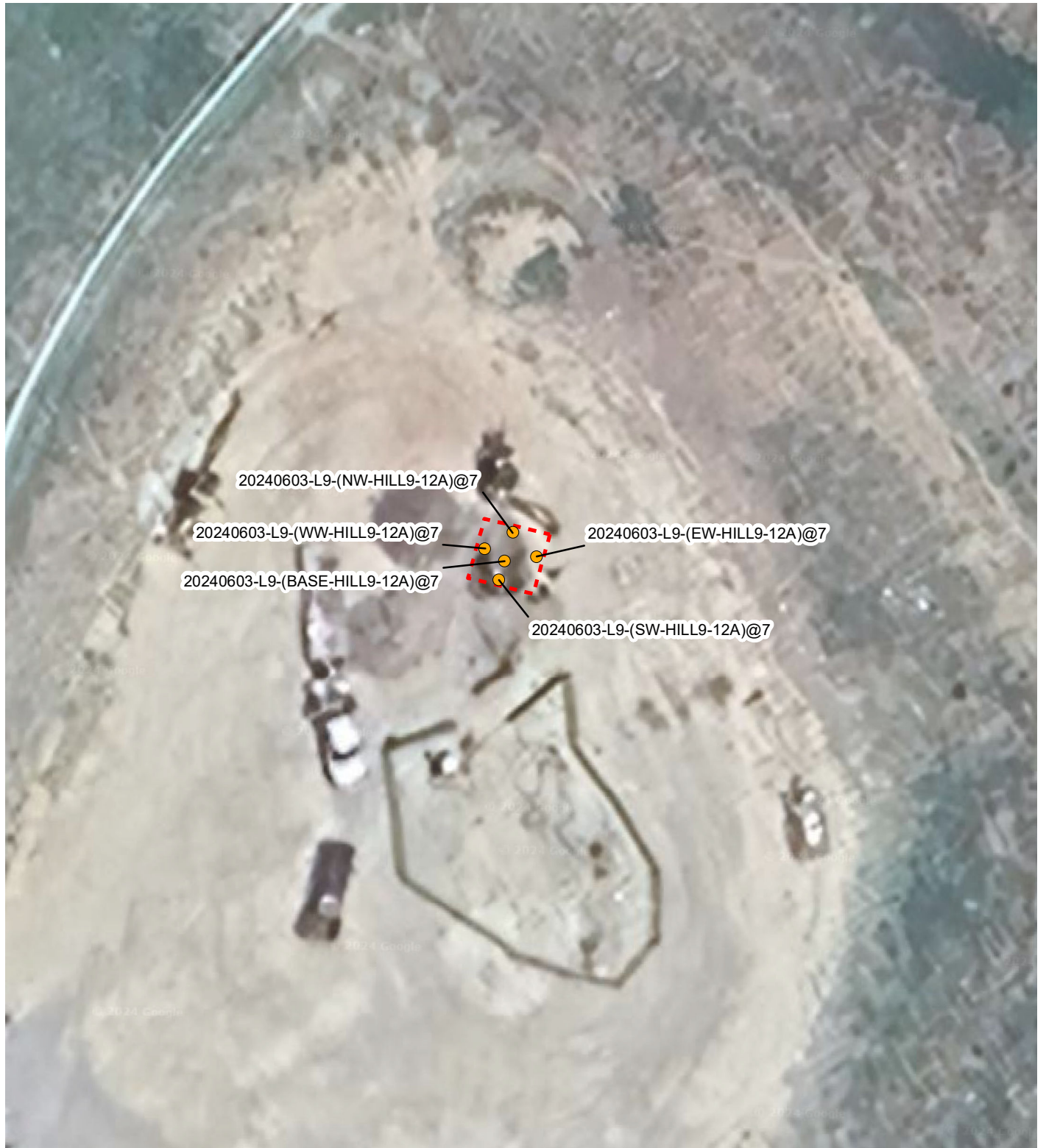
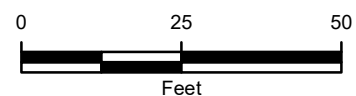


IMAGE COURTESY OF GOOGLE EARTH (2023)

## LEGEND

- SOIL SAMPLE
- EXCAVATION EXTENT (6/3/2024)



**FIGURE 3**  
**EXCAVATION SITE MAP**  
 L9 FC-WH-HILL-9-12A  
 NWSW SEC 9-T7S-R92W  
 GARFIELD COUNTY, COLORADO  
**CAERUS PICEANCE LLC**







IMAGE COURTESY OF GOOGLE EARTH (2023)

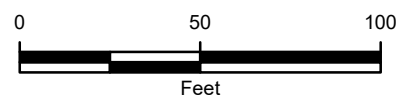
## LEGEND



ALIQUOT SOIL SAMPLE

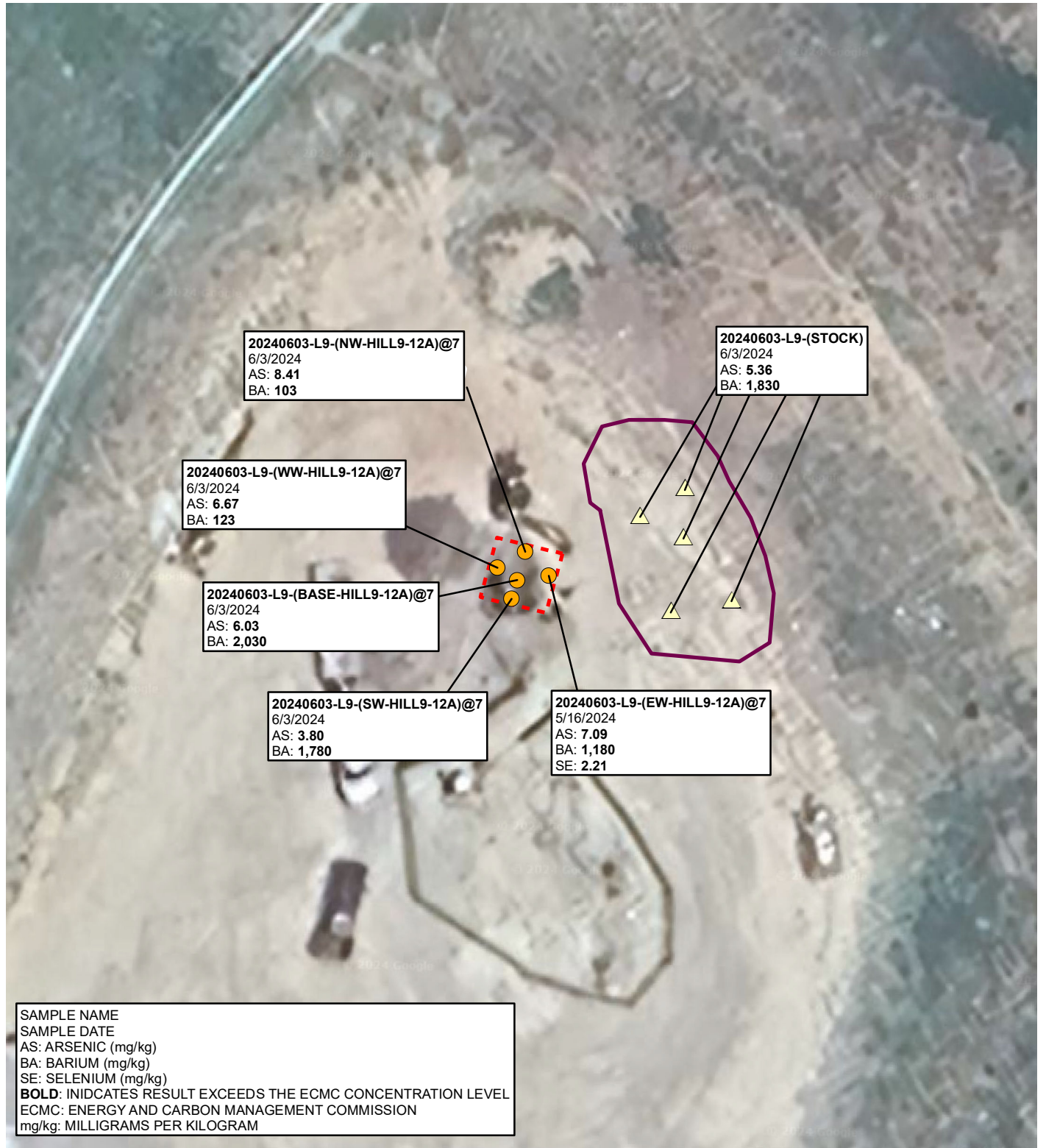


SPOIL PILE (6/3/2024)



**FIGURE 4**  
**STOCKPILE SAMPLE LOCATION MAP**  
**L9**  
**NWSW SEC 9-T7S-R92W**  
**GARFIELD COUNTY, COLORADO**  
**CAERUS PICEANCE LLC**

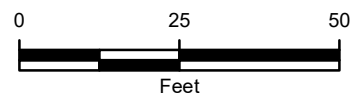




BACKGROUND IMAGERY COURTESY OF GOOGLE EARTH (2023)

#### LEGEND

- ALIQUOT SOIL SAMPLE
- SOIL SAMPLE
- SPOIL PILE (6/3/2024)
- EXCAVATION EXTENT (6/3/2024)



**FIGURE 5**  
**SOIL ANALYTICAL EXCEEDANCE MAP**  
**L9 FC-WH-HILL-9-12A**  
**NWSW SEC 9-T7S-R92W**  
**GARFIELD COUNTY, COLORADO**  
**CAERUS PICEANCE LLC**





SAMPLE NAME  
SAMPLE DATE  
AS: ARSENIC (mg/l)  
CH: HEXAVALENT CHROMIUM (mg/l)  
**BOLD: INIDCATES RESULT EXCEEDS THE ECMC CONCENTRATION LEVEL**  
ECMC: ENERGY AND CARBON MANAGEMENT COMMISSION  
mg/l: MILLIGRAMS PER LITER



IMAGE COURTESY OF GOOGLE EARTH (2023)

## LEGEND



PRODUCED WATER SAMPLE LOCATION

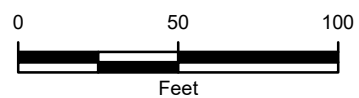


FIGURE 6  
PRODUCED WATER RESULTS MAP  
L9  
NWSW SEC 9-T7S-R92W  
GARFIELD COUNTY, COLORADO  
CAERUS PICEANCE LLC



## TABLES





TABLE 1

SOIL ANALYTICAL RESULTS

L9 - HILL 9-12A

GARFIELD COUNTY, COLORADO

CAERUS PICEANCE LLC

Analyte				Soil Analytical Results																									
				GRO	DRO	ORO	TPH	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)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)Pyre	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Pyrene	
915-1 PROTECTION OF GW							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	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	mg/kg
Sample Name	Sample Type	Sample Date	Lab Report																										
20240603-L9-(BASE-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	0.108	44.0	90.9	135.008	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	NA		
20240603-L9-(EW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	0.115	15.3	37.8	53.215	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	NA		
20240603-L9-(NW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	< 0.100	< 4.00	< 4.00	<4.00	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	NA		
20240603-L9-(SW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	< 0.101	76.9	78.5	155.4	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	NA		
20240603-L9-(VWV-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	< 0.101	6.61	10.5	17.11	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	NA		
20240603-L9-(STOCK)	Facility Closure	06/03/2024	L1743989	0.140	25.2	48.9	74.24	< 0.00100	NA	NA	NA	< 0.00500	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0200	< 0.0200	< 0.0200	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

TPH - combination of TPH-GRO, TPH-DRO, and TPH-ORO

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  
L9- HILL 9-12A  
GARFIELD COUNTY, COLORADO  
CAERUS PICEANCE LLC

Analyte				Soil Analytical Results													
				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 Type	Sample Date	Lab Report														
20240603-L9-(BASE-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	NA	NA	NA	NA	6.03	2030	< 0.500	NA	NA	NA	NA	< 2.00	NA	NA
20240603-L9-(EW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	NA	NA	NA	NA	7.09	1180	< 0.500	NA	NA	NA	NA	2.21	NA	NA
20240603-L9-(NW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	NA	NA	NA	NA	8.41	103	< 0.500	NA	NA	NA	NA	< 2.00	NA	NA
20240603-L9-(SW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	NA	NA	NA	NA	3.80	1780	< 0.500	NA	NA	NA	NA	< 2.00	NA	NA
20240603-L9-(WW-HILL9-12A)@7	Facility Closure	06/03/2024	L1743984	NA	NA	NA	NA	6.67	123	< 0.500	NA	NA	NA	NA	< 2.00	NA	NA
20240603-L9-(STOCK)	Facility Closure	06/03/2024	L1743989	NA	NA	NA	NA	5.36	1830	< 0.500	NA	NA	NA	NA	< 2.00	NA	NA
20230413-L9-(BG1)@0.5-1	Background	04/13/2023	L1605744	0.198	0.237	8.05	0.404	5.31	138	0.232	< 1.00	10.7	11.4	11.4	0.620	< 0.500	45.3
20230413-L9-(BG1)@1.5-2	Background	04/13/2023	L1605744	0.195	0.212	8.05	0.324	7.96	119	0.235	< 1.00	7.90	11.0	9.01	0.539	< 0.500	35.6
20230413-L9-(BG2)@1-1.5	Background	04/13/2023	L1605744	0.143	0.161	8.22	0.406	6.08	124	0.166	< 1.00	9.00	10.6	9.30	0.574	< 0.500	35.0
20230413-L9-(BG2)@2-2.5	Background	04/13/2023	L1605744	0.108	0.358	8.22	0.283	4.17	85.8	0.183	< 1.00	11.1	11.7	9.91	0.555	< 0.500	41.9

Key:  
EC - electrical conductivity  
SAR - sodium adsorption ratio  
umhos/cm - micromhos per centimeter  
SU - standard units  
mg/kg - miligram 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



PRODUCED WATER ANALYTICAL RESULTS  
TABLE 2  
L9  
GARFIELD COUNTY, COLORADO  
CAERUS PICEANCE LLC

Analyte			Produced Water Results												
			PH	SPECIFIC CONDUCTIVITY	HEXAVALENT CHROMIUM	SELENIUM	ARSENIC	BARIUM	CADMIUM	COPPER	LEAD	NICKEL	SELENIUM	SILVER	ZINC
Units			SU	umhos/cm	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													
20240522-MCSOURCE-(L9-T)	PW	L1739722	8.55 T8	21600	< 0.000500	< 0.00200 U	< 0.0200 U	36.3	< 0.00100 U	< 0.0500 U	< 0.00200 U	0.0240	< 0.00200 U	< 0.00200 U	< 0.250 U

NOTES:  
SU - standard units  
umhos - microhmos per centimeter  
mg/l - milligram per liter  
< - concentration below laboratory detection limit

## ENCLOSURE A – SOIL SCREENING PHOTOLOG



PHOTOGRAPHIC LOG

Caerus Piceance LLC	L9 Hill 9-12A - P&A Well Closure	31403501.5189
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Photo No.	Date	
1	June 3, 2024	
L9 excavation overviews wells Hill 9-12A and Hill 9-14 View east		

Photo No.	Date	
2	June 3, 2024	
Hill 9-12A excavation overview View east		





PHOTOGRAPHIC LOG

Caerus Piceance LLC	L9 Hill 9-12A - P&A Well Closure	31403501.5189
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Photo No.	Date	
4	June 3, 2024	
20240603-L9-(EW-HILL9-12A)@7 View east		


Photo No.	Date	
5	June 3, 2024	
20240603-L9-(SW-HILL9-12A)@7 View south		



# PHOTOGRAPHIC LOG

Caerus Piceance LLC	L9 Hill 9-12A - P&A Well Closure	31403501.5189
---------------------	----------------------------------	---------------

Photo No.	Date	
6	June 3, 2024	
20240603-L9-(WW-HILL9-12A)@7 View west		

Photo No.	Date	
7	June 3, 2024	
20240603-L9-(NW-HILL9-12A)@7 View north		





PHOTOGRAPHIC LOG

Caerus Piceance LLC	L9 Hill 9-12A - P&A Well Closure	31403501.5189
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Photo No.	Date	
8	June 3, 2024	
20240603-L9-(BASE-HILL9-12A)@7 View east		



## ENCLOSURE B – LABORATORY ANALYTICAL RESULTS

**Caerus Oil and Gas**

Sample Delivery Group: L1743984  
Samples Received: 06/06/2024  
Project Number: L9  
Description: L9 Facility Decommissioning  
Site: L9  
Report To: Jake J. / Brett M. / Blair R. / Andy V.  
143 Diamond Avenue  
Parachute, CO 81635

Entire Report Reviewed By:



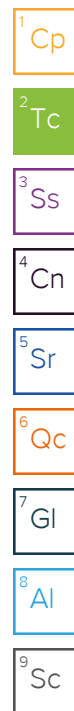
Chris Ward  
Project Manager

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**Pace Analytical National**12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [mydata.pacelabs.com](https://mydata.pacelabs.com)

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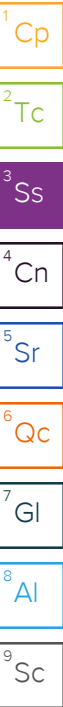


# SAMPLE SUMMARY

## 20240603-L9-(NW-HILL9-12A)@7 L1743984-01 Solid

Collected by Logan Permenter  
Collected date/time 06/03/24 13:00  
Received date/time 06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300673	1	06/12/24 18:30	06/13/24 12:25	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 16:58	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2303152	1	06/09/24 18:21	06/12/24 00:30	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303033	1	06/09/24 18:21	06/11/24 18:48	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 01:31	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2303233	1	06/13/24 06:34	06/13/24 13:55	JCH	Mt. Juliet, TN



## 20240603-L9-(WW-HILL9-12A)@7 L1743984-02 Solid

Collected by Logan Permenter  
Collected date/time 06/03/24 15:10  
Received date/time 06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300673	1	06/12/24 18:30	06/13/24 12:26	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 17:15	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2303152	1.01	06/09/24 18:21	06/12/24 00:51	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303033	1	06/09/24 18:21	06/11/24 19:07	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 02:23	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2303233	1	06/13/24 06:34	06/13/24 11:33	JCH	Mt. Juliet, TN

## 20240603-L9-(EW-HILL9-12A)@7 L1743984-03 Solid

Collected by Logan Permenter  
Collected date/time 06/03/24 15:20  
Received date/time 06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300673	1	06/12/24 18:30	06/13/24 12:28	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 17:18	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2303152	1	06/09/24 18:21	06/12/24 01:13	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303033	1	06/09/24 18:21	06/11/24 19:26	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 12:34	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2303233	1	06/13/24 06:34	06/13/24 11:52	JCH	Mt. Juliet, TN

## 20240603-L9-(SW-HILL9-12A)@7 L1743984-04 Solid

Collected by Logan Permenter  
Collected date/time 06/03/24 15:15  
Received date/time 06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300673	1	06/12/24 18:30	06/13/24 12:30	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 17:21	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2303152	1.01	06/09/24 18:21	06/12/24 01:34	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303033	1	06/09/24 18:21	06/11/24 19:45	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 03:55	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2303233	1	06/13/24 06:34	06/13/24 12:10	JCH	Mt. Juliet, TN

## 20240603-L9-(BASE-HILL9-12A)@7 L1743984-05 Solid

Collected by Logan Permenter  
Collected date/time 06/03/24 14:25  
Received date/time 06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300673	1	06/12/24 18:30	06/13/24 11:42	DJS	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 17:32	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2303152	1	06/09/24 18:21	06/12/24 01:56	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303033	1	06/09/24 18:21	06/11/24 20:04	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 05:13	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2303233	1	06/13/24 06:34	06/13/24 12:28	JCH	Mt. Juliet, TN

# 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

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	103		0.500	1	06/13/2024 12:25	<a href="#">WG2300673</a>
Cadmium	ND		0.500	1	06/13/2024 12:25	<a href="#">WG2300673</a>
Selenium	ND		2.00	1	06/13/2024 12:25	<a href="#">WG2300673</a>

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	8.41		1.00	5	06/14/2024 16:58	<a href="#">WG2305014</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	06/12/2024 00:30	<a href="#">WG2303152</a>
(S) a,a,a-Trifluorotoluene(FID)	99.8		77.0-120		06/12/2024 00:30	<a href="#">WG2303152</a>

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	06/11/2024 18:48	<a href="#">WG2303033</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/11/2024 18:48	<a href="#">WG2303033</a>
(S) Toluene-d8	100		75.0-131		06/11/2024 18:48	<a href="#">WG2303033</a>
(S) 4-Bromofluorobenzene	101		67.0-138		06/11/2024 18:48	<a href="#">WG2303033</a>
(S) 1,2-Dichloroethane-d4	102		70.0-130		06/11/2024 18:48	<a href="#">WG2303033</a>

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	ND		4.00	1	06/14/2024 01:31	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	ND		4.00	1	06/14/2024 01:31	<a href="#">WG2303237</a>
(S) o-Terphenyl	66.4		18.0-148		06/14/2024 01:31	<a href="#">WG2303237</a>

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	ND		0.0200	1	06/13/2024 13:55	<a href="#">WG2303233</a>
2-Methylnaphthalene	ND		0.0200	1	06/13/2024 13:55	<a href="#">WG2303233</a>
Naphthalene	ND		0.0200	1	06/13/2024 13:55	<a href="#">WG2303233</a>
(S) p-Terphenyl-d14	50.0		23.0-120		06/13/2024 13:55	<a href="#">WG2303233</a>
(S) Nitrobenzene-d5	34.9		14.0-149		06/13/2024 13:55	<a href="#">WG2303233</a>
(S) 2-Fluorobiphenyl	48.7		34.0-125		06/13/2024 13:55	<a href="#">WG2303233</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Barium	123		0.500	1	06/13/2024 12:26	<a href="#">WG2300673</a>
Cadmium	ND		0.500	1	06/13/2024 12:26	<a href="#">WG2300673</a>
Selenium	ND		2.00	1	06/13/2024 12:26	<a href="#">WG2300673</a>

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	6.67		1.00	5	06/14/2024 17:15	<a href="#">WG2305014</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TPH (GC/FID) Low Fraction	ND		0.101	1.01	06/12/2024 00:51	<a href="#">WG2303152</a>
(S) a,a,a-Trifluorotoluene(FID)	99.3		77.0-120		06/12/2024 00:51	<a href="#">WG2303152</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.00100	1	06/11/2024 19:07	<a href="#">WG2303033</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/11/2024 19:07	<a href="#">WG2303033</a>
(S) Toluene-d8	101		75.0-131		06/11/2024 19:07	<a href="#">WG2303033</a>
(S) 4-Bromofluorobenzene	99.3		67.0-138		06/11/2024 19:07	<a href="#">WG2303033</a>
(S) 1,2-Dichloroethane-d4	101		70.0-130		06/11/2024 19:07	<a href="#">WG2303033</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	6.61		4.00	1	06/14/2024 02:23	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	10.5		4.00	1	06/14/2024 02:23	<a href="#">WG2303237</a>
(S) o-Terphenyl	73.6		18.0-148		06/14/2024 02:23	<a href="#">WG2303237</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
1-Methylnaphthalene	ND		0.0200	1	06/13/2024 11:33	<a href="#">WG2303233</a>
2-Methylnaphthalene	ND		0.0200	1	06/13/2024 11:33	<a href="#">WG2303233</a>
Naphthalene	ND		0.0200	1	06/13/2024 11:33	<a href="#">WG2303233</a>
(S) p-Terphenyl-d14	73.0		23.0-120		06/13/2024 11:33	<a href="#">WG2303233</a>
(S) Nitrobenzene-d5	74.9		14.0-149		06/13/2024 11:33	<a href="#">WG2303233</a>
(S) 2-Fluorobiphenyl	72.4		34.0-125		06/13/2024 11:33	<a href="#">WG2303233</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Barium	1180		0.500	1	06/13/2024 12:28	<a href="#">WG2300673</a>
Cadmium	ND		0.500	1	06/13/2024 12:28	<a href="#">WG2300673</a>
Selenium	2.21		2.00	1	06/13/2024 12:28	<a href="#">WG2300673</a>

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	7.09		1.00	5	06/14/2024 17:18	<a href="#">WG2305014</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.115	<a href="#">B</a>	0.100	1	06/12/2024 01:13	<a href="#">WG2303152</a>
(S) a,a,a-Trifluorotoluene(FID)	98.6		77.0-120		06/12/2024 01:13	<a href="#">WG2303152</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.00100	1	06/11/2024 19:26	<a href="#">WG2303033</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/11/2024 19:26	<a href="#">WG2303033</a>
(S) Toluene-d8	98.9		75.0-131		06/11/2024 19:26	<a href="#">WG2303033</a>
(S) 4-Bromofluorobenzene	98.8		67.0-138		06/11/2024 19:26	<a href="#">WG2303033</a>
(S) 1,2-Dichloroethane-d4	105		70.0-130		06/11/2024 19:26	<a href="#">WG2303033</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	15.3		4.00	1	06/14/2024 12:34	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	37.8		4.00	1	06/14/2024 12:34	<a href="#">WG2303237</a>
(S) o-Terphenyl	54.7		18.0-148		06/14/2024 12:34	<a href="#">WG2303237</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
1-Methylnaphthalene	ND		0.0200	1	06/13/2024 11:52	<a href="#">WG2303233</a>
2-Methylnaphthalene	ND		0.0200	1	06/13/2024 11:52	<a href="#">WG2303233</a>
Naphthalene	ND		0.0200	1	06/13/2024 11:52	<a href="#">WG2303233</a>
(S) p-Terphenyl-d14	72.0		23.0-120		06/13/2024 11:52	<a href="#">WG2303233</a>
(S) Nitrobenzene-d5	78.6		14.0-149		06/13/2024 11:52	<a href="#">WG2303233</a>
(S) 2-Fluorobiphenyl	74.2		34.0-125		06/13/2024 11:52	<a href="#">WG2303233</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Barium	1780		0.500	1	06/13/2024 12:30	<a href="#">WG2300673</a>
Cadmium	ND		0.500	1	06/13/2024 12:30	<a href="#">WG2300673</a>
Selenium	ND		2.00	1	06/13/2024 12:30	<a href="#">WG2300673</a>

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	3.80		1.00	5	06/14/2024 17:21	<a href="#">WG2305014</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TPH (GC/FID) Low Fraction	ND		0.101	1.01	06/12/2024 01:34	<a href="#">WG2303152</a>
(S) a,a,a-Trifluorotoluene(FID)	101		77.0-120		06/12/2024 01:34	<a href="#">WG2303152</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.00100	1	06/11/2024 19:45	<a href="#">WG2303033</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/11/2024 19:45	<a href="#">WG2303033</a>
(S) Toluene-d8	101		75.0-131		06/11/2024 19:45	<a href="#">WG2303033</a>
(S) 4-Bromofluorobenzene	102		67.0-138		06/11/2024 19:45	<a href="#">WG2303033</a>
(S) 1,2-Dichloroethane-d4	99.9		70.0-130		06/11/2024 19:45	<a href="#">WG2303033</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	76.9		4.00	1	06/14/2024 03:55	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	78.5		4.00	1	06/14/2024 03:55	<a href="#">WG2303237</a>
(S) o-Terphenyl	74.5		18.0-148		06/14/2024 03:55	<a href="#">WG2303237</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
1-Methylnaphthalene	ND		0.0200	1	06/13/2024 12:10	<a href="#">WG2303233</a>
2-Methylnaphthalene	ND		0.0200	1	06/13/2024 12:10	<a href="#">WG2303233</a>
Naphthalene	ND		0.0200	1	06/13/2024 12:10	<a href="#">WG2303233</a>
(S) p-Terphenyl-d14	70.2		23.0-120		06/13/2024 12:10	<a href="#">WG2303233</a>
(S) Nitrobenzene-d5	83.9		14.0-149		06/13/2024 12:10	<a href="#">WG2303233</a>
(S) 2-Fluorobiphenyl	71.4		34.0-125		06/13/2024 12:10	<a href="#">WG2303233</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Barium	2030		0.500	1	06/13/2024 11:42	<a href="#">WG2300673</a>
Cadmium	ND		0.500	1	06/13/2024 11:42	<a href="#">WG2300673</a>
Selenium	ND		2.00	1	06/13/2024 11:42	<a href="#">WG2300673</a>

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	6.03		1.00	5	06/14/2024 17:32	<a href="#">WG2305014</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.108	<a href="#">B</a>	0.100	1	06/12/2024 01:56	<a href="#">WG2303152</a>
(S) a,a,a-Trifluorotoluene(FID)	98.9		77.0-120		06/12/2024 01:56	<a href="#">WG2303152</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.00100	1	06/11/2024 20:04	<a href="#">WG2303033</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/11/2024 20:04	<a href="#">WG2303033</a>
(S) Toluene-d8	100		75.0-131		06/11/2024 20:04	<a href="#">WG2303033</a>
(S) 4-Bromofluorobenzene	98.0		67.0-138		06/11/2024 20:04	<a href="#">WG2303033</a>
(S) 1,2-Dichloroethane-d4	101		70.0-130		06/11/2024 20:04	<a href="#">WG2303033</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	44.0		4.00	1	06/14/2024 05:13	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	90.9		4.00	1	06/14/2024 05:13	<a href="#">WG2303237</a>
(S) o-Terphenyl	71.4		18.0-148		06/14/2024 05:13	<a href="#">WG2303237</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
1-Methylnaphthalene	ND		0.0200	1	06/13/2024 12:28	<a href="#">WG2303233</a>
2-Methylnaphthalene	ND		0.0200	1	06/13/2024 12:28	<a href="#">WG2303233</a>
Naphthalene	ND		0.0200	1	06/13/2024 12:28	<a href="#">WG2303233</a>
(S) p-Terphenyl-d14	73.6		23.0-120		06/13/2024 12:28	<a href="#">WG2303233</a>
(S) Nitrobenzene-d5	84.7		14.0-149		06/13/2024 12:28	<a href="#">WG2303233</a>
(S) 2-Fluorobiphenyl	77.0		34.0-125		06/13/2024 12:28	<a href="#">WG2303233</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081333-1 06/13/24 11:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.174	J	0.0852	0.500
Cadmium	U		0.0471	0.500
Selenium	U		0.764	2.00

Laboratory Control Sample (LCS)

(LCS) R4081333-2 06/13/24 11:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	105	105	80.0-120	
Cadmium	100	98.8	98.8	80.0-120	
Selenium	100	98.2	98.2	80.0-120	

L1743593-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743593-02 06/13/24 11:58 • (MS) R4081333-5 06/13/24 12:03 • (MSD) R4081333-6 06/13/24 12:04

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 %
Barium	100	80.6	201	213	120	132	1	75.0-125		J5	5.88	20
Cadmium	100	ND	89.5	89.5	89.5	89.5	1	75.0-125			0.00780	20
Selenium	100	2.11	101	103	98.5	101	1	75.0-125			2.12	20

1  
Cp

2  
Tc

3  
Ss

4  
Cn

5  
Sr

6  
Qc

7  
Gl

8  
Al

9  
Sc

Method Blank (MB)

(MB) R4081997-1 06/14/24 16:51

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.100	1.00

Laboratory Control Sample (LCS)

(LCS) R4081997-2 06/14/24 16:54

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Arsenic	100	107	107	80.0-120	

L1743984-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743984-01 06/14/24 16:58 • (MS) R4081997-5 06/14/24 17:08 • (MSD) R4081997-6 06/14/24 17:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	100	8.41	119	113	110	105	5	75.0-125			4.88	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081246-2 06/12/24 00:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0293	⬇	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	102			77.0-120

Laboratory Control Sample (LCS)

(LCS) R4081246-1 06/11/24 23:08

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.00	4.99	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			97.3	77.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4080604-2 06/11/24 10:31

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
1,2,4-Trimethylbenzene	U		0.00158	0.00500
(S) Toluene-d8	98.9			75.0-131
(S) 4-Bromofluorobenzene	101			67.0-138
(S) 1,2-Dichloroethane-d4	112			70.0-130

Laboratory Control Sample (LCS)

(LCS) R4080604-1 06/11/24 09:14

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.115	92.0	70.0-123	
1,2,4-Trimethylbenzene	0.125	0.106	84.8	70.0-126	
(S) Toluene-d8			96.5	75.0-131	
(S) 4-Bromofluorobenzene			99.8	67.0-138	
(S) 1,2-Dichloroethane-d4			120	70.0-130	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081602-1 06/13/24 22:38

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	0.395	J	0.274	4.00
(S) o-Terphenyl	86.9			18.0-148

Laboratory Control Sample (LCS)

(LCS) R4081602-2 06/13/24 23:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	39.1	78.2	50.0-150	
(S) o-Terphenyl			89.8	18.0-148	

L1743982-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743982-02 06/14/24 02:36 • (MS) R4081602-3 06/14/24 02:49 • (MSD) R4081602-4 06/14/24 03:03

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 %
C10-C28 Diesel Range	50.0	14.2	30.1	26.0	31.8	23.6	1	50.0-150	J6	J6	14.6	20
(S) o-Terphenyl					60.7	52.0		18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081389-2 06/13/24 10:56

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL 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	67.6			23.0-120
(S) Nitrobenzene-d5	53.0			14.0-149
(S) 2-Fluorobiphenyl	68.9			34.0-125

Laboratory Control Sample (LCS)

(LCS) R4081389-1 06/13/24 10:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
1-Methylnaphthalene	0.0800	0.0559	69.9	51.0-121	
2-Methylnaphthalene	0.0800	0.0584	73.0	50.0-120	
Naphthalene	0.0800	0.0574	71.8	50.0-120	
(S) p-Terphenyl-d14			77.9	23.0-120	
(S) Nitrobenzene-d5			65.8	14.0-149	
(S) 2-Fluorobiphenyl			81.4	34.0-125	

L1743986-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743986-05 06/13/24 13:57 • (MS) R4081421-1 06/13/24 14:14 • (MSD) R4081421-2 06/13/24 14:32

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 %
1-Methylnaphthalene	0.0780	ND	0.0622	0.0591	79.7	76.6	1	10.0-142			5.11	28
2-Methylnaphthalene	0.0780	ND	0.0694	0.0643	81.0	75.3	1	10.0-137			7.63	28
Naphthalene	0.0780	ND	0.0580	0.0549	74.4	71.1	1	10.0-135			5.49	27
(S) p-Terphenyl-d14					75.4	76.8		23.0-120				
(S) Nitrobenzene-d5					88.2	90.2		14.0-149				
(S) 2-Fluorobiphenyl					80.6	81.6		34.0-125				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



# 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.

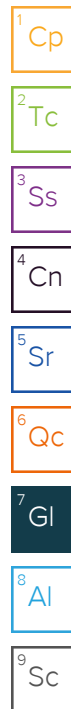
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
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.



# 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 <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1 6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

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

\* 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: L1743989  
Samples Received: 06/06/2024  
Project Number: L9  
Description: L9 Facility Decommissioning  
Site: L9  
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 National**12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [mydata.pacelabs.com](https://mydata.pacelabs.com)

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

# SAMPLE SUMMARY

20240603-L9-(STOCK) L1743989-01 Solid

Collected by  
Logan Permenter

Collected date/time  
06/03/24 15:55

Received date/time  
06/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG2300644	1	06/07/24 17:27	06/09/24 10:27	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2305014	5	06/14/24 11:12	06/14/24 17:35	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2302839	1	06/09/24 19:01	06/11/24 20:32	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2303615	1	06/09/24 19:01	06/12/24 16:04	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2303237	1	06/13/24 09:00	06/14/24 04:34	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2302933	1	06/11/24 21:02	06/12/24 07:36	JRM	Mt. Juliet, TN

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



# 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

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Barium	1830		0.500	1	06/09/2024 10:27	<a href="#">WG2300644</a>
Cadmium	ND		0.500	1	06/09/2024 10:27	<a href="#">WG2300644</a>
Selenium	ND		2.00	1	06/09/2024 10:27	<a href="#">WG2300644</a>

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	5.36		1.00	5	06/14/2024 17:35	<a href="#">WG2305014</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TPH (GC/FID) Low Fraction	0.140		0.100	1	06/11/2024 20:32	<a href="#">WG2302839</a>
(S) a,a,a-Trifluorotoluene(FID)	105		77.0-120		06/11/2024 20:32	<a href="#">WG2302839</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Benzene	ND		0.00100	1	06/12/2024 16:04	<a href="#">WG2303615</a>
1,2,4-Trimethylbenzene	ND		0.00500	1	06/12/2024 16:04	<a href="#">WG2303615</a>
(S) Toluene-d8	113		75.0-131		06/12/2024 16:04	<a href="#">WG2303615</a>
(S) 4-Bromofluorobenzene	97.2		67.0-138		06/12/2024 16:04	<a href="#">WG2303615</a>
(S) 1,2-Dichloroethane-d4	99.6		70.0-130		06/12/2024 16:04	<a href="#">WG2303615</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
C10-C28 Diesel Range	25.2		4.00	1	06/14/2024 04:34	<a href="#">WG2303237</a>
C28-C36 Motor Oil Range	48.9		4.00	1	06/14/2024 04:34	<a href="#">WG2303237</a>
(S) o-Terphenyl	67.9		18.0-148		06/14/2024 04:34	<a href="#">WG2303237</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
1-Methylnaphthalene	ND		0.0200	1	06/12/2024 07:36	<a href="#">WG2302933</a>
2-Methylnaphthalene	ND		0.0200	1	06/12/2024 07:36	<a href="#">WG2302933</a>
Naphthalene	ND		0.0200	1	06/12/2024 07:36	<a href="#">WG2302933</a>
(S) p-Terphenyl-d14	105		23.0-120		06/12/2024 07:36	<a href="#">WG2302933</a>
(S) Nitrobenzene-d5	84.8		14.0-149		06/12/2024 07:36	<a href="#">WG2302933</a>
(S) 2-Fluorobiphenyl	112		34.0-125		06/12/2024 07:36	<a href="#">WG2302933</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R4079247-1 06/09/24 09:54

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Selenium	U		0.764	2.00

Laboratory Control Sample (LCS)

(LCS) R4079247-2 06/09/24 09:55

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	99.2	99.2	80.0-120	
Cadmium	100	94.6	94.6	80.0-120	
Selenium	100	93.6	93.6	80.0-120	

L1743967-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743967-07 06/09/24 09:57 • (MS) R4079247-5 06/09/24 10:02 • (MSD) R4079247-6 06/09/24 10:04

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 %
Barium	100	116	218	221	103	106	1	75.0-125			1.36	20
Cadmium	100	ND	95.7	96.1	95.7	96.1	1	75.0-125			0.357	20
Selenium	100	ND	92.1	90.1	92.1	90.1	1	75.0-125			2.20	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081997-1 06/14/24 16:51

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.100	1.00

Laboratory Control Sample (LCS)

(LCS) R4081997-2 06/14/24 16:54

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Arsenic	100	107	107	80.0-120	

L1743984-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743984-01 06/14/24 16:58 • (MS) R4081997-5 06/14/24 17:08 • (MSD) R4081997-6 06/14/24 17:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	100	8.41	119	113	110	105	5	75.0-125			4.88	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081247-3 06/11/24 12:26

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	110			77.0-120

Laboratory Control Sample (LCS)

(LCS) R4081247-2 06/11/24 11:40

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.00	4.98	99.6	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			118	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) R4080743-2 06/12/24 11:44

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
1,2,4-Trimethylbenzene	U		0.00158	0.00500
(S) Toluene-d8	111			75.0-131
(S) 4-Bromofluorobenzene	95.3			67.0-138
(S) 1,2-Dichloroethane-d4	103			70.0-130

Laboratory Control Sample (LCS)

(LCS) R4080743-1 06/12/24 10:23

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.125	0.119	95.2	70.0-123	
1,2,4-Trimethylbenzene	0.125	0.135	108	70.0-126	
(S) Toluene-d8			108	75.0-131	
(S) 4-Bromofluorobenzene			95.3	67.0-138	
(S) 1,2-Dichloroethane-d4			111	70.0-130	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4081602-1 06/13/24 22:38

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	0.395	J	0.274	4.00
(S) o-Terphenyl	86.9			18.0-148

Laboratory Control Sample (LCS)

(LCS) R4081602-2 06/13/24 23:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	39.1	78.2	50.0-150	
(S) o-Terphenyl			89.8	18.0-148	

L1743982-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743982-02 06/14/24 02:36 • (MS) R4081602-3 06/14/24 02:49 • (MSD) R4081602-4 06/14/24 03:03

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 %
C10-C28 Diesel Range	50.0	14.2	30.1	26.0	31.8	23.6	1	50.0-150	J6	J6	14.6	20
(S) o-Terphenyl					60.7	52.0		18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4080933-2 06/12/24 03:07

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL 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	101			23.0-120
(S) Nitrobenzene-d5	83.6			14.0-149
(S) 2-Fluorobiphenyl	110			34.0-125

Laboratory Control Sample (LCS)

(LCS) R4080933-1 06/12/24 02:49

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
1-Methylnaphthalene	0.0800	0.0830	104	51.0-121	
2-Methylnaphthalene	0.0800	0.0824	103	50.0-120	
Naphthalene	0.0800	0.0813	102	50.0-120	
(S) p-Terphenyl-d14			116	23.0-120	
(S) Nitrobenzene-d5			92.4	14.0-149	
(S) 2-Fluorobiphenyl			122	34.0-125	

L1743747-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1743747-03 06/12/24 06:06 • (MS) R4080933-3 06/12/24 06:24 • (MSD) R4080933-4 06/12/24 06:42

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 %
1-Methylnaphthalene	0.0784	ND	0.0597	0.0611	76.1	76.8	1	10.0-142			2.32	28
2-Methylnaphthalene	0.0784	ND	0.0598	0.0617	76.3	77.5	1	10.0-137			3.13	28
Naphthalene	0.0784	ND	0.0592	0.0605	75.5	76.0	1	10.0-135			2.17	27
(S) p-Terphenyl-d14					83.5	80.8		23.0-120				
(S) Nitrobenzene-d5					66.5	66.1		14.0-149				
(S) 2-Fluorobiphenyl					86.5	84.3		34.0-125				

# 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.

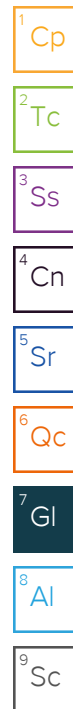
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.



# ACCREDITATIONS & LOCATIONS

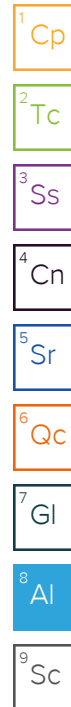
## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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 <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1,6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1,4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

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

\* 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.





[illegible]

## Caerus Oil and Gas

Sample Delivery Group: L1605744  
Samples Received: 04/15/2023  
Project Number: L9  
Description: L9 Facility Decommissioning  
Site: L9  
Report To: Brett M. , Jake J. , Blair R.  
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 National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [www.pacenational.com](http://www.pacenational.com)

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# SAMPLE SUMMARY

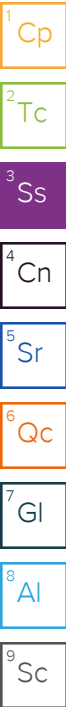
## 20230413-L9-(BG1)@0.5-1 L1605744-01 Solid

Collected by  
Kevin Fletcher

Collected date/time  
04/13/23 14:30

Received date/time  
04/15/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2043100	1	04/21/23 15:43	04/21/23 15:43	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2044448	1	04/19/23 02:54	04/20/23 03:06	SET	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2043721	1	04/18/23 08:57	04/18/23 14:11	DB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2044560	1	04/20/23 11:30	04/20/23 14:07	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2043095	1	04/18/23 08:29	04/20/23 00:54	ABL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	10	04/18/23 15:16	04/19/23 14:39	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	5	04/18/23 15:16	04/19/23 13:46	JPD	Mt. Juliet, TN



## 20230413-L9-(BG1)@1.5-2 L1605744-02 Solid

Collected by  
Kevin Fletcher

Collected date/time  
04/13/23 14:35

Received date/time  
04/15/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2043100	1	04/21/23 15:46	04/21/23 15:46	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2044448	1	04/19/23 02:54	04/20/23 03:34	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2043721	1	04/18/23 08:57	04/18/23 14:11	DB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2044560	1	04/20/23 11:30	04/20/23 14:07	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2043095	1	04/18/23 08:29	04/20/23 00:57	ABL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	10	04/18/23 15:16	04/19/23 14:22	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	5	04/18/23 15:16	04/19/23 13:10	JPD	Mt. Juliet, TN

## 20230413-L9-(BG2)@1-1.5 L1605744-03 Solid

Collected by  
Kevin Fletcher

Collected date/time  
04/13/23 14:55

Received date/time  
04/15/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2043100	1	04/21/23 15:57	04/21/23 15:57	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2044448	1	04/19/23 02:54	04/20/23 03:39	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2043721	1	04/18/23 08:57	04/18/23 14:11	DB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2040784	1	04/19/23 09:00	04/19/23 11:36	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2043095	1	04/18/23 08:29	04/20/23 00:59	ABL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	10	04/18/23 15:16	04/19/23 14:42	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	5	04/18/23 15:16	04/19/23 13:49	JPD	Mt. Juliet, TN

## 20230413-L9-(BG2)@2-2.5 L1605744-04 Solid

Collected by  
Kevin Fletcher

Collected date/time  
04/13/23 15:00

Received date/time  
04/15/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2043100	1	04/21/23 15:49	04/21/23 15:49	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2044448	1	04/19/23 02:54	04/20/23 03:44	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2043721	1	04/18/23 08:57	04/18/23 14:11	DB	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2044560	1	04/20/23 11:30	04/20/23 14:07	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2043095	1	04/18/23 08:29	04/19/23 23:54	ABL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2043643	5	04/18/23 15:16	04/19/23 13:53	JPD	Mt. Juliet, TN

# 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

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.237		1	04/21/2023 15:43	WG2043100

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U	J6	0.255	1.00	1	04/20/2023 03:06	WG2044448

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.05	T8	1	04/18/2023 14:11	WG2043721

Sample Narrative:

L1605744-01 WG2043721: 8.05 at 19.4C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	198		10.0	1	04/20/2023 14:07	WG2044560

Sample Narrative:

L1605744-01 WG2044560: at 25C

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

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.404		0.0167	0.200	1	04/20/2023 00:54	WG2043095

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	5.31		0.100	1.00	5	04/19/2023 13:46	WG2043643
Barium	138		0.304	5.00	10	04/19/2023 14:39	WG2043643
Cadmium	0.232	J	0.0855	1.00	5	04/19/2023 13:46	WG2043643
Copper	10.7		0.132	5.00	5	04/19/2023 13:46	WG2043643
Lead	11.4		0.0990	2.00	5	04/19/2023 13:46	WG2043643
Nickel	11.4		0.197	2.50	5	04/19/2023 13:46	WG2043643
Selenium	0.620	J	0.180	2.50	5	04/19/2023 13:46	WG2043643
Silver	U		0.0865	0.500	5	04/19/2023 13:46	WG2043643
Zinc	45.3		0.740	25.0	5	04/19/2023 13:46	WG2043643

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.212		1	04/21/2023 15:46	WG2043100

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U		0.255	1.00	1	04/20/2023 03:34	<a href="#">WG2044448</a>

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.05	<a href="#">T8</a>	1	04/18/2023 14:11	<a href="#">WG2043721</a>

Sample Narrative:

L1605744-02 WG2043721: 8.05 at 19.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	195		10.0	1	04/20/2023 14:07	<a href="#">WG2044560</a>

Sample Narrative:

L1605744-02 WG2044560: at 25C

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

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.324		0.0167	0.200	1	04/20/2023 00:57	<a href="#">WG2043095</a>

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.96	<a href="#">O1</a>	0.100	1.00	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Barium	119		0.304	5.00	10	04/19/2023 14:22	<a href="#">WG2043643</a>
Cadmium	0.235	<a href="#">J</a>	0.0855	1.00	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Copper	7.90	<a href="#">O1</a>	0.132	5.00	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Lead	11.0	<a href="#">O1</a>	0.0990	2.00	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Nickel	9.01	<a href="#">O1</a>	0.197	2.50	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Selenium	0.539	<a href="#">J</a>	0.180	2.50	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Silver	U		0.0865	0.500	5	04/19/2023 13:10	<a href="#">WG2043643</a>
Zinc	35.6	<a href="#">O1</a>	0.740	25.0	5	04/19/2023 13:10	<a href="#">WG2043643</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.161		1	04/21/2023 15:57	WG2043100

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U		0.255	1.00	1	04/20/2023 03:39	<a href="#">WG2044448</a>

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.22	<a href="#">T8</a>	1	04/18/2023 14:11	<a href="#">WG2043721</a>

Sample Narrative:  
L1605744-03 WG2043721: 8.22 at 19.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	143		10.0	1	04/19/2023 11:36	<a href="#">WG2040784</a>

Sample Narrative:  
L1605744-03 WG2040784: at 25C

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

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.406		0.0167	0.200	1	04/20/2023 00:59	<a href="#">WG2043095</a>

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.08		0.100	1.00	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Barium	124		0.304	5.00	10	04/19/2023 14:42	<a href="#">WG2043643</a>
Cadmium	0.166	<a href="#">J</a>	0.0855	1.00	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Copper	9.00		0.132	5.00	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Lead	10.6		0.0990	2.00	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Nickel	9.30		0.197	2.50	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Selenium	0.574	<a href="#">J</a>	0.180	2.50	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Silver	U		0.0865	0.500	5	04/19/2023 13:49	<a href="#">WG2043643</a>
Zinc	35.0		0.740	25.0	5	04/19/2023 13:49	<a href="#">WG2043643</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.358		1	04/21/2023 15:49	WG2043100

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U		0.255	1.00	1	04/20/2023 03:44	<a href="#">WG2044448</a>

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.22	<a href="#">T8</a>	1	04/18/2023 14:11	<a href="#">WG2043721</a>

Sample Narrative:

L1605744-04 WG2043721: 8.22 at 19.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	108		10.0	1	04/20/2023 14:07	<a href="#">WG2044560</a>

Sample Narrative:

L1605744-04 WG2044560: at 25C

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

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.283		0.0167	0.200	1	04/19/2023 23:54	<a href="#">WG2043095</a>

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	4.17		0.100	1.00	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Barium	85.8		0.152	2.50	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Cadmium	0.183	<a href="#">J</a>	0.0855	1.00	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Copper	11.1		0.132	5.00	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Lead	11.7		0.0990	2.00	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Nickel	9.91		0.197	2.50	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Selenium	0.555	<a href="#">J</a>	0.180	2.50	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Silver	U		0.0865	0.500	5	04/19/2023 13:53	<a href="#">WG2043643</a>
Zinc	41.9		0.740	25.0	5	04/19/2023 13:53	<a href="#">WG2043643</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3915197-1 04/20/23 02:49

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Hexavalent Chromium	U		0.255	1.00

L1606413-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1606413-02 04/20/23 04:26 • (DUP) R3915197-7 04/20/23 04:31

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

L1606422-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1606422-07 04/20/23 05:33 • (DUP) R3915197-8 04/20/23 05:39

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

Laboratory Control Sample (LCS)

(LCS) R3915197-2 04/20/23 02:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Hexavalent Chromium	10.0	9.57	95.7	80.0-120	

L1605744-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1605744-01 04/20/23 03:06 • (MS) R3915197-4 04/20/23 03:19 • (MSD) R3915197-5 04/20/23 03:24

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Hexavalent Chromium	20.0	U	11.4	12.7	56.8	63.3	1	75.0-125	J6	J6	10.9	20

L1605744-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1605744-01 04/20/23 03:06 • (MS) R3915197-6 04/20/23 03:29

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Hexavalent Chromium	648	U	688	106	50	75.0-125	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1605649-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1605649-04 04/18/23 14:11 • (DUP) R3914447-2 04/18/23 14:11

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	pH	su		%		%
pH	7.95	7.92	1	0.378		1

Sample Narrative:  
OS: 7.95 at 20.5C  
DUP: 7.92 at 20.5C

L1605649-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1605649-05 04/18/23 14:11 • (DUP) R3914447-3 04/18/23 14:11

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	pH	su		%		%
pH	8.19	8.17	1	0.244		1

Sample Narrative:  
OS: 8.19 at 19.7C  
DUP: 8.17 at 19.9C

Laboratory Control Sample (LCS)

(LCS) R3914447-1 04/18/23 14:11

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

Sample Narrative:  
LCS: 9.99 at 19.2C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3914860-1 04/19/23 11:36

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

Sample Narrative:

BLANK: at 25C

L1605450-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1605450-02 04/19/23 11:36 • (DUP) R3914860-3 04/19/23 11:36

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	13.6	11.2	1	18.7		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1605744-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1605744-03 04/19/23 11:36 • (DUP) R3914860-4 04/19/23 11:36

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	143	141	1	1.55		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3914860-2 04/19/23 11:36

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1120	100	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3915449-1 04/20/23 14:07

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

Sample Narrative:

BLANK: at 25C

L1605710-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1605710-07 04/20/23 14:07 • (DUP) R3915449-3 04/20/23 14:07

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	1140	1140	1	0.0876		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1606425-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1606425-04 04/20/23 14:07 • (DUP) R3915449-4 04/20/23 14:07

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	57.3	57.0	1	0.525		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3915449-2 04/20/23 14:07

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1090	97.7	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3915185-1 04/20/23 00:02

Analyte	MB Result mg/l	<u>MB Qualifier</u>	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) R3915185-2 04/20/23 00:05 • (LCSD) R3915185-3 04/20/23 00:08

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.05	1.07	105	107	80.0-120			2.24	20

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Method Blank (MB)

(MB) R3914947-1 04/19/23 13:04

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.100	1.00
Barium	0.574	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

Laboratory Control Sample (LCS)

(LCS) R3914947-2 04/19/23 13:07

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	95.3	95.3	80.0-120	
Barium	100	98.6	98.6	80.0-120	
Cadmium	100	99.4	99.4	80.0-120	
Copper	100	95.5	95.5	80.0-120	
Lead	100	95.9	95.9	80.0-120	
Nickel	100	97.0	97.0	80.0-120	
Selenium	100	110	110	80.0-120	
Silver	20.0	20.0	100	80.0-120	
Zinc	100	95.9	95.9	80.0-120	

L1605744-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1605744-02 04/19/23 13:10 • (MS) R3914947-5 04/19/23 13:20 • (MSD) R3914947-6 04/19/23 13:23

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	7.96	92.3	104	84.3	96.0	5	75.0-125			11.9	20
Barium	100	119	218	227	98.6	108	5	75.0-125	E	E	4.13	20
Cadmium	100	0.235	91.5	95.1	91.3	94.9	5	75.0-125			3.80	20
Copper	100	7.90	93.5	99.8	85.6	91.9	5	75.0-125			6.55	20
Lead	100	11.0	99.8	107	88.9	95.6	5	75.0-125			6.57	20
Nickel	100	9.01	94.4	101	85.4	92.3	5	75.0-125			7.12	20
Selenium	100	0.539	104	108	103	108	5	75.0-125			4.22	20
Silver	20.0	U	18.8	19.4	93.8	97.0	5	75.0-125			3.38	20
Zinc	100	35.6	120	130	84.1	94.8	5	75.0-125			8.54	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

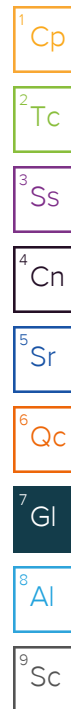
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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.
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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
O1	The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
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 <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1 6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1 4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	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 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

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

\* 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.



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