



January 13, 2023
Kleinfelder Project No. 20231065.001A

Mr. Blair Rollins
Caerus Piceance, LLC
1001 17th Street #1600
Denver, Colorado 80202

**SUBJECT: Site Investigation Report
 Caerus Piceance, LLC
 Plug And Abandonment Closure
 Remediation Project # 24106
 Benzel 36-13A (K36B Pad)
 Garfield County, Colorado**

Dear Mr. Rollins:

Kleinfelder Inc. (Kleinfelder) performed soil sampling activities at the Benzel 36-13A wellhead (K36B Pad) in Garfield County, Colorado under contract by Caerus Piceance LLC (Caerus). Enclosed is the site investigation report for this effort.

Please do not hesitate to contact me at (303) 319-2456 or by email at VDeCianne@kleinfelder.com should you have questions or concerns.

Respectfully submitted,
KLEINFELDER, INC.

A handwritten signature in black ink, appearing to read "Vince DeCianne", is written over a horizontal line.

Vince DeCianne
VP, Senior Principal Professional



**SITE INVESTIGATION REPORT
CAERUS PICEANCE, LLC
PLUG AND ABANDONMENT CLOSURE
REMEDIATION PROJECT # 24106
BENZEL 36-13A (K36B PAD)
GARFIELD COUNTY, COLORADO**

KLEINFELDER PROJECT NO. 20231065.001A

January 13, 2023

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REPORT WAS PREPARED.**



A Report Prepared for:

Caerus Piceance, LLC
1001 17th Street #1600
Denver, CO 80202

**SITE INVESTIGATION REPORT
CAERUS PICEANCE, LLC
PLUG AND ABANDONMENT CLOSURE
REMEDIATION PROJECT # 24106
BENZEL 36-13A (K36B PAD)
GARFIELD COUNTY, COLORADO**

Prepared by:

Tristan Schmalz
Staff Professional I

Reviewed by:

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VP, Senior Principal Professional

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January 13, 2023
Kleinfelder Project No. 20231065.001A

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**SITE INVESTIGATION REPORT
CAERUS PICEANCE, LLC
PLUG AND ABANDONMENT CLOSURE
REMEDICATION PROJECT # 24106
BENZEL 36-13A (K36B PAD)
GARFIELD COUNTY, COLORADO**

1 INTRODUCTION

This document was prepared by Kleinfelder Inc. (Kleinfelder) on behalf of Caerus Piceance, LLC (Caerus) to provide documentation of recent sampling support services conducted at the K36B Pad (site) located in Garfield County, Colorado (**Figure 1**).

Kleinfelder has been contracted by Caerus to perform soil sampling support services to provide necessary information to complete the Colorado Oil and Gas Conservation Commission (COGCC) Form 27 for their upstream oil and gas production facilities located in the Piceance Basin. Caerus is proceeding with the plugging and abandonment (P&A) and removal of the Benzel 36-13A natural gas well and associated flowline to the separator on the location.

Caerus proposed to visually inspect and field screen the excavations directly adjacent to the cut and capped Benzel 36-13A well and separator flowline tie in to determine extent of impacts, if any. Additionally, Caerus proposed soil sampling to characterize the areas exhibiting the highest degree of impact, or in the absence of apparent impacts, Caerus proposed collection of a sample from the base of the excavations adjacent to the cut and capped well and separator flowline tie in, see approved COGCC Form 27 Site Investigation and Remediation Workplan Initial Form (document # 403066651) (**Appendix B**). Caerus also proposed the collection of soil samples from any tailing's piles associated with the excavations from the P&A project. Kleinfelder collected the samples. Samples were analyzed by Pace Analytical National (Pace) laboratory and results are reported herein.

2 SITE LOCATION AND GEOLOGIC SETTING

The K36B Pad is located within the Piceance Basin in Garfield County, northwestern Colorado (NESW, Section 36, Township 6 South, Range 93 West) (**Figure 1**). The Piceance Basin is a geologic structural basin consisting of sandstones and siltstones, containing reserves of coal, natural gas, and oil shale.

No surface water or groundwater were encountered during Kleinfelder's soil sampling activities. Adjacent land was observed to be rangeland. The general soil type within the wellhead plug and abandonment and flowline removal area was classified using the Unified Soil Classification System (USCS) as inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity. Topographical information is provided in **Figure 1**.

3 FIELD ACTIVITIES

Kleinfelder performed the following field activities at the K36B Pad on **October 31, 2022**, and **November 29, 2022**:

October 31, 2022

- Collected one (1) soil sample from the base of the excavation adjacent to the separator flowline tie in.
- Collected one (1) 5-point composite soil sample from the tailings pile that originated from the separator flowline tie in.
- Collected one (1) soil sample from the base of the excavation adjacent to the Benzel 36-13A well.
- Collected one (1) 5-point composite soil sample from the tailings pile that originated from the wellhead excavation.
- Shipped site soil samples to Pace to analyze for the contaminants of concern listed within COGCC Table 915-1.

November 29, 2022

- Collected one (1) produced water sample from the tank associated with the Benzel 36-13A well.
- Shipped the produced water sample to Pace to analyze for pH only.

Prior to Kleinfelder's soil screening and sampling activities, Caerus had previously excavated soil around the separator flowline tie in to disconnect the flowline (Excavation #1). Caerus had also excavated soil around the wellhead to remove and cap it (Excavation #2). Kleinfelder collected one (1) soil sample from the base of Excavation #1 at 4 feet below ground surface (bgs), and one (1) soil sample from Excavation #2 within one (1) foot (horizontally) of the well from the base of the excavation at 5 feet bgs. One 5-point composite soil sample was collected from two separate tailings piles, which contained soil from Excavation's #1 and #2, for a total of two (2) composite soil samples. Each composite soil sample was individually homogenized using stainless steel equipment prior to placing into sample jars. A produced water sample was collected, with the aid of a Caerus pumper, from the tank associated with the Benzel 36-13A well. Kleinfelder used an EOS Arrow 100 Submeter GNSS receiver to record latitude and longitude of the sample locations. Sample locations are shown on **Figure 2**.

Soil samples were collected from a stainless-steel hand auger bucket or stainless-steel hand trowel and placed into two laboratory-supplied, 9-ounce jars with Teflon lids per sample. Each sample was collected directly from the hand auger or hand trowel, from the appropriate depth, and placed into the glass jars. The produced water sample was collected, with the aid of a Caerus pumper, directly from the tank loadout valve into a laboratory-supplied, 1-liter unpreserved polyethylene collection bottle. The samples were immediately placed on ice in a cooler. Standard chain-of-custody (COC) procedures were used during sampling and transportation to Pace in Mount Juliet, Tennessee (via FEDEX).

Site soil samples were analyzed for contaminants of concern listed in COGCC Table 915-1. The produced water sample was analyzed for pH.

Sampling equipment (i.e., hand auger cutter head, soil sampler, etc.) was washed with a solution of Liquinox[®] detergent, rinsed with tap water, and then distilled water between samples.

During soil sampling activities, Kleinfelder documented staining and/or odor observations, if any, and screened the soil with a photoionization detector (PID). Kleinfelder placed the soil into a Ziploc[®] plastic bag directly from the hand auger for screening with the PID. The PID is a MiniRAE 3000[®], which is owned and maintained by Caerus. Prior to use, Kleinfelder calibrated the PID, which passed calibration. Soil sample conditions and locations are provided in **Table 1**.

4 RESULTS

Kleinfelder observed soil conditions within the well plugging and abandonment excavation area during the soil sampling activities. Hydrocarbon odors and soil staining were not observed at any sample location. PID readings were all below 15 parts per million (PPM). **Table 1** summarizes the samples and associated field observations.

Except for arsenic and pH, the sample analytical results did not exceed the COGCC Table 915-1 Residential Soil Screening Level cleanup levels (**see Table 2**).

- Arsenic was detected at concentrations above the Table 915-1 cleanup concentration; however, all site sample results were within the range of or less than background levels originating from the nearby D12 Pad for arsenic concentrations (4.24-33.7 mg/kg).
- The pH results for three samples marginally exceeded Table 915-1 value, however, the pH result from the Benzel 36-13A well-associated tank produced fluids sample (**Appendix A**) was lower than that of the three samples.

Analytical results are summarized in **Table 2** and per request from Caerus were compared to COGCC Table 915-1 Residential Soil Screening Level Cleanup Concentrations. Site specific and background laboratory reports are provided in **Appendix A**. Sample locations are provided in **Figure 2**.

5 CONCLUSIONS AND RECOMMENDATIONS

The pH results for three samples exceeded Table 915-1 Residential Soil Screening Level Cleanup Concentrations (**Table 2**), however, the pH result from the Benzel 36-13A well-associated tank produced fluids sample (**Appendix A**) was lower than that of the three samples. Therefore, it is likely that the exceedance for pH in the soil samples is natural and is not a result of a possible release. Caerus provided an Operator Knowledge statement regarding naturally elevated pH concentrations of soils within the project area and is attached as **Appendix C**.

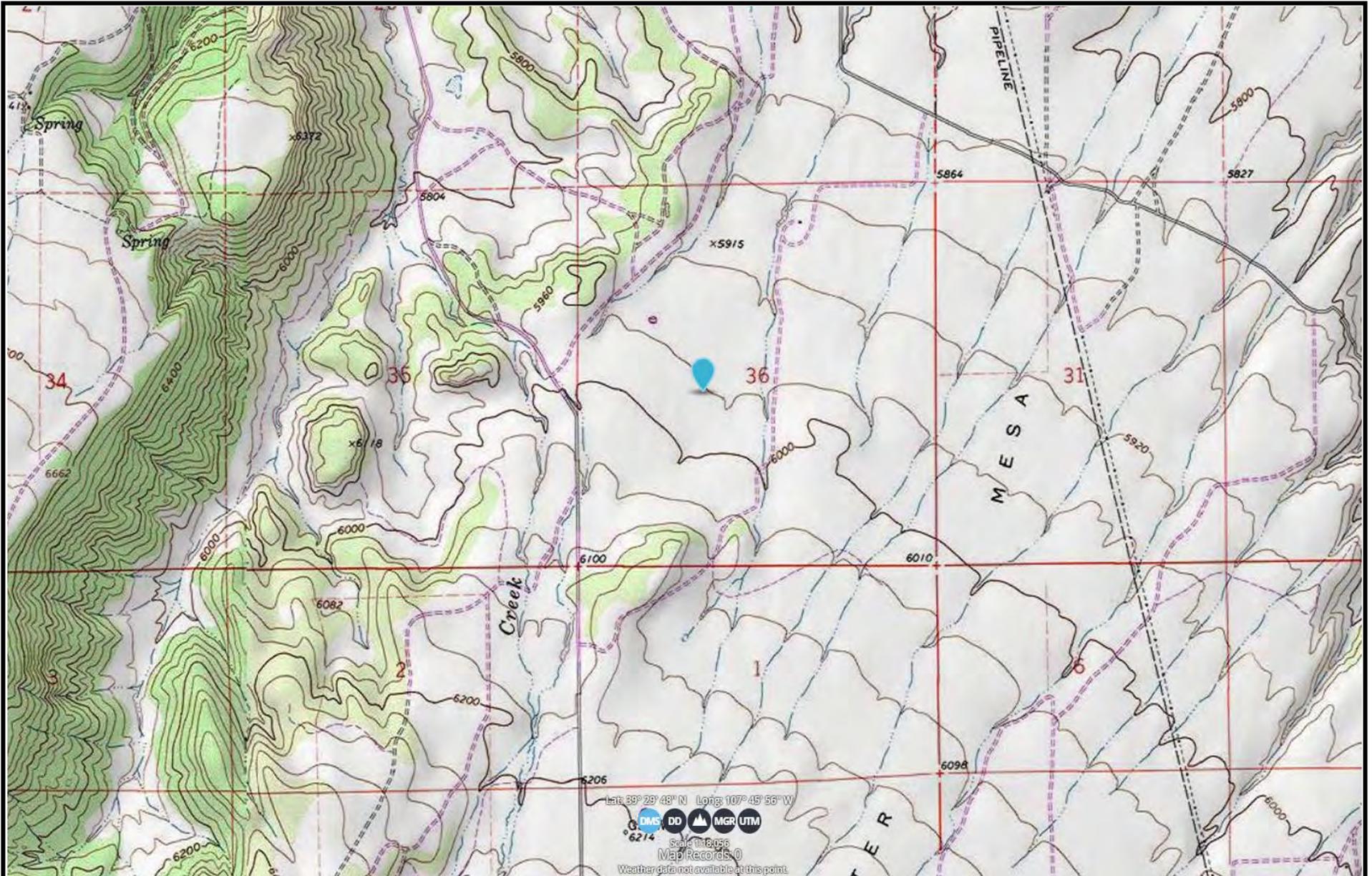
Kleinfelder recommends no additional site investigation or remediation activities associated with the Benzel 36-13A well and flowline abandonment at the K36B Pad.

6 LIMITATIONS

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. It should be recognized that definition and evaluation of geologic and environmental conditions are a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service that provide adequate information for their purposes at acceptable levels of risk. More extensive studies, including subsurface studies or field tests, should be performed to reduce uncertainties. Acceptance of this report will indicate that Caerus has reviewed the document and determined that it does not need or want a greater level of service than provided.

During the course of the performance of Kleinfelder's services, hazardous materials may have been discovered. Kleinfelder assumes no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury that results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials. Nothing contained in this report should be construed or interpreted as requiring Kleinfelder to assume the status of an owner, operator, or generator, or person who arranges for disposal, transport, storage, or treatment of hazardous materials within the meaning of any governmental statute, regulation, or order. Caerus is solely responsible for directing notification of all governmental agencies, and the public at large, of the existence, release, treatment, or disposal of any hazardous materials observed at the project site, either before or during performance of Kleinfelder's services. Caerus is responsible for directing all arrangements to lawfully store, treat, recycle, dispose, or otherwise handle hazardous materials, including cuttings and samples resulting from Kleinfelder's services.

FIGURES



Benzel 36-13A Site Investigation
 Caerus Piceance, LLC
 NESW Sec. 36 T6S R93W
 Garfield County, Colorado

Figure
1

PN 20231065.001A



Benzel 36-13A Site Investigation
 Caerus Piceance, LLC
 NESW Sec. 36 T6S R93W
 Garfield County, Colorado

Figure

2

PN 20231065.001A

TABLES



Table 1
COGCC Soil Sampling
by **Tristan Schmalz** on **10/31/2022** and
11/29/2022
for **Caerus Benzel 36-13A Site Assessment**

Caerus - 2022 Sampling Support
Services
20231065.001A
DeCianne, Vincent G. (Vince)

Sample Register

Sample ID	Sample Type	Date	Time	Depth	PID (ppmv)	Odor	Staining	Comments
20221031_Benzel 36-13A_SEPFL@ 4ft	Other	10/31/2022	10:18 AM	4 to 4	0	N	N	
20221031_Benzel 36-13A_SEPFLTP _COMP	Tailings Pile	10/31/2022	10:27 AM	0 to 0	0.2	N	N	
20221031_Benzel 36-13A_WH@5ft	Wellhead	10/31/2022	10:39 AM	5 to 5	1.1	N	N	
20221031_Benzel 36-13A_WHTP__ COMP	Tailings Pile	10/31/2022	10:50 AM	0 to 0	14.6	N	N	
20221129_Benzel 36-13A_PW01	Other	11/29/2022	11:22 AM	0 to 0	0	N	N	Produced water

.....
Kleinfelder Representative *Signature*

Table 2 - Soil Analytical Results Summary

Contaminant of Concern	Cleanup Concentration (mg/kg unless otherwise noted)	D12 (Background)				Benzel 36-13A (K368)				20221129_Benzel 36-13A_PW01 (Collected from well-associated tank onsite)
		10/12/2022				10/31/2022				
		20221012_D12_B601@1ft	20221012_D12_B602@1ft	20221012_D12_B603@1ft	20221012_D12_B604@1ft	20221031_BENZEL 36-13A_SEPFL@4ft	20221031_BENZEL 36-13A_SEPFL_COMP	20221031_BENZEL 36-13A_WH@5ft	20221031_BENZEL 36-13A_WH@5ft_COMP	
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500	NM	NM	NM	NM	407.255	4.763	ND	5.76	NM
TPH Low Fraction GHD (C6-C10)		NM	NM	NM	NM	0.255	0.443	ND	ND	NM
DRO (C10-C36)		NM	NM	NM	NM	116	1.32	ND	ND	NM
MRO (C28-C36)		NM	NM	NM	NM	291		ND	5.76	NM
Soils and Groundwater - liquid hydrocarbons including condensate and oil	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	Below Visual Detection Limits	N/A
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm	0.235	0.175	0.893	0.180	0.295	0.245	0.228	0.210	NM
Sodium adsorption ratio (SAR) (by saturated paste method)	<6 SAR units	0.215	0.0542	0.391	0.178	0.515	0.139	0.257	2.82	NM
pH (by saturated paste method)	6-8.3 pH units	7.9478	7.9178	7.5678	8.0678	8.5578	8.1578	8.6178	8.6878	7.7378
Boron (hot water soluble soil extract)	2 mg/L	0.402	0.481	1.39	0.307	0.214	0.272	0.210	0.205	NM
Organic Compounds in Soils	Residential Soil Screening Level Concentrations									
benzene	1.2	NM	NM	NM	NM	ND	ND	ND	ND	NM
toluene	490	NM	NM	NM	NM	ND	0.00563	ND	ND	NM
ethylbenzene	5.8	NM	NM	NM	NM	ND	ND	ND	ND	NM
xylene (sum of p-, m- and o- isomers = total xylenes)	58	NM	NM	NM	NM	0.00936	0.0251	ND	ND	NM
1,2,4-trimethylbenzene	30	NM	NM	NM	NM	ND	0.00913	ND	ND	NM
1,3,5-trimethylbenzene	27	NM	NM	NM	NM	0.00485	0.0421	ND	ND	NM
acenaphthene	360	NM	NM	NM	NM	ND	ND	ND	ND	NM
anthracene	1800	NM	NM	NM	NM	ND	ND	ND	ND	NM
benz(a)anthracene	1.1	NM	NM	NM	NM	ND	ND	ND	ND	NM
benzo(b)fluoranthene	1.1	NM	NM	NM	NM	ND	ND	ND	ND	NM
benzo(k)fluoranthene	11	NM	NM	NM	NM	ND	ND	ND	ND	NM
benzo(a)pyrene	0.11	NM	NM	NM	NM	ND	ND	ND	ND	NM
chrysene	140	NM	NM	NM	NM	ND	ND	ND	ND	NM
dibenz(a,h)anthracene	0.15	NM	NM	NM	NM	ND	ND	ND	ND	NM
fluoranthene	240	NM	NM	NM	NM	ND	ND	ND	ND	NM
fluorene	240	NM	NM	NM	NM	ND	ND	ND	ND	NM
indeno(1,2,3-cd)pyrene	1.1	NM	NM	NM	NM	ND	ND	ND	ND	NM
pyrene	180	NM	NM	NM	NM	ND	ND	ND	ND	NM
1-methylnaphthalene	18	NM	NM	NM	NM	0.0250	ND	ND	ND	NM
2-methylnaphthalene	24	NM	NM	NM	NM	0.0415	ND	ND	ND	NM
naphthalene	2	NM	NM	NM	NM	ND	ND	ND	ND	NM
Metals in Soils	Residential Soil Screening Level Concentrations									
arsenic	0.68	6.67	33.7	9.64	4.24	6.18	4.97	4.59	3.86	NM
barium	15000	203	176	404.13 V	150	2320	1090	301	300	NM
cadmium	71	ND	0.763	ND	ND	ND	ND	ND	ND	NM
chromium (VI)	0.3	ND	ND	ND	ND	ND	ND	ND	ND	NM
copper	3100	16.0	14.8	11.2	16.9	14.5	13.4	12.3	11.1	NM
lead	400	11.6	14.6	12.8	10.3	9.82	8.83	8.99	7.77	NM
nickel	1500	20.0	14.1	12.61	15.9	13.5	12.8	13.4	11.3	NM
selenium	390	ND	ND	ND	ND	ND	ND	ND	ND	NM
silver	390	ND	ND	ND	ND	ND	ND	ND	ND	NM
zinc	23000	53.9	54.6	50.0	48.9	42.4	38.9	38.6	33.1	NM

NOTES:

- Greater than Table 915-1 Residential Soil Screening Level Concentrations
- Greater than Table 915-1 Standards, but less than adjusted standards (Highest background level is the adjusted standard for inorganics; 1.25X highest background level for metals)
- Greater than Table 915-1 Standards and greater than site specific produced water fluid results.

BG = background sample
 C = carbon range
 COGCC = Colorado Oil and Gas Conservation Commission
 ft bgs = feet below ground surface
 GC/FID = gas chromatography with flame ionization detector
 IQ = The associated batch quality control was outside the established quality control range for precursor
 MCL = maximum contaminant level
 mg/kg = milligram per kilogram
 mg/L = milligram per liter
 mmhos/cm = millimhos per centimeter
 N/A = Not applicable. No COGCC cleanup concentration provided
 ND = Not detected at the Reporting Limit (or MDL where applicable)
 O1 = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference
 T8 = Samples received past/loose to holding time expiration
 V = The sample concentration is too high to evaluate accurate spike recoveries.
 WH = wellhead

APPENDIX A
LABORATORY ANALYTICAL RESULTS

Caerus Oil and Gas

Sample Delivery Group: L1552295
Samples Received: 11/01/2022
Project Number:
Description: Benzel 36-13A P&A Assessment
Site: K36B PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



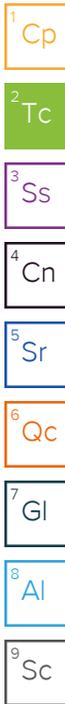
Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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SAMPLE SUMMARY

20221031_BENZEL 36-13A_SEPFL @ 4FT L1552295-01 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/31/22 10:18
 Received date/time: 11/01/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1953997	1	11/07/22 07:43	11/07/22 07:43	ABL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1953541	1	11/03/22 18:02	11/08/22 05:25	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1954024	1	11/05/22 12:00	11/05/22 14:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1953673	1	11/09/22 08:00	11/09/22 10:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1954829	1	11/11/22 09:37	11/12/22 13:19	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1953601	1	11/03/22 10:54	11/09/22 22:46	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1954828	5	11/11/22 09:38	11/12/22 14:59	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/01/22 16:59	11/04/22 16:15	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1954080	1	11/01/22 16:59	11/04/22 18:52	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1952487	1	11/01/22 18:38	11/02/22 07:06	KAP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1952487	10	11/01/22 18:38	11/02/22 10:52	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1953631	1	11/03/22 21:53	11/04/22 15:39	JMB	Mt. Juliet, TN

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

20221031_BENZEL 36-13A_SEPFLTP_COMP L1552295-02 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/31/22 10:27
 Received date/time: 11/01/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1953997	1	11/07/22 07:46	11/07/22 07:46	ABL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1953541	1	11/03/22 18:02	11/08/22 05:45	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1954024	1	11/05/22 12:00	11/05/22 14:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1953673	1	11/09/22 08:00	11/09/22 10:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1954829	1	11/11/22 09:37	11/12/22 13:22	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1953601	1	11/03/22 10:54	11/09/22 22:49	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1954828	5	11/11/22 09:38	11/12/22 15:03	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/01/22 16:59	11/04/22 16:36	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1954080	1	11/01/22 16:59	11/04/22 19:11	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1952487	1	11/01/22 18:38	11/02/22 04:43	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1955848	1	11/08/22 04:07	11/08/22 10:38	AMM	Mt. Juliet, TN

20221031_BENZEL 36-13A_WH @ 5FT L1552295-03 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/31/22 10:39
 Received date/time: 11/01/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1953997	1	11/07/22 07:49	11/07/22 07:49	ABL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1953541	1	11/03/22 18:02	11/08/22 05:51	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1954024	1	11/05/22 12:00	11/05/22 14:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1953673	1	11/09/22 08:00	11/09/22 10:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1954829	1	11/11/22 09:37	11/12/22 13:25	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1953601	1	11/03/22 10:54	11/09/22 22:52	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1954828	5	11/11/22 09:38	11/12/22 15:06	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/01/22 16:59	11/04/22 16:56	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1954080	1	11/01/22 16:59	11/04/22 19:30	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1952487	1	11/01/22 18:38	11/02/22 06:40	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1953631	1	11/03/22 21:53	11/04/22 12:42	JMB	Mt. Juliet, TN

20221031_BENZEL 36-13A_WHTP_COMP L1552295-04 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/31/22 10:50
 Received date/time: 11/01/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1953997	1	11/07/22 07:52	11/07/22 07:52	ABL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1953541	1	11/03/22 18:02	11/08/22 05:56	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1954024	1	11/05/22 12:00	11/05/22 14:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1953673	1	11/09/22 08:00	11/09/22 10:00	NTG	Mt. Juliet, TN

SAMPLE SUMMARY

20221031_BENZEL 36-13A_WHTP_COMP L1552295-04 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/31/22 10:50
 Received date/time: 11/01/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B	WG1954829	1	11/11/22 09:37	11/12/22 13:28	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1953601	1	11/03/22 10:54	11/09/22 22:55	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1954828	5	11/11/22 09:38	11/12/22 15:10	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/01/22 16:59	11/04/22 17:17	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1954080	1	11/01/22 16:59	11/04/22 19:49	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1952487	1	11/01/22 18:38	11/02/22 10:39	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1953631	1	11/03/22 21:53	11/04/22 13:01	JMB	Mt. Juliet, TN

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

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.515		1	11/07/2022 07:43	WG1953997

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/08/2022 05:25	WG1953541

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.55	<u>T8</u>	1	11/05/2022 14:00	WG1954024

Sample Narrative:

L1552295-01 WG1954024: 8.55 at 20.5C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	295		10.0	1	11/09/2022 10:00	WG1953673

Sample Narrative:

L1552295-01 WG1953673: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	2320		0.500	1	11/12/2022 13:19	WG1954829
Cadmium	ND		0.500	1	11/12/2022 13:19	WG1954829
Copper	14.5		2.00	1	11/12/2022 13:19	WG1954829
Lead	9.82		0.500	1	11/12/2022 13:19	WG1954829
Nickel	13.5		2.00	1	11/12/2022 13:19	WG1954829
Selenium	ND		2.00	1	11/12/2022 13:19	WG1954829
Silver	ND		1.00	1	11/12/2022 13:19	WG1954829
Zinc	42.4		5.00	1	11/12/2022 13:19	WG1954829

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.214		0.200	1	11/09/2022 22:46	WG1953601

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	6.18		1.00	5	11/12/2022 14:59	WG1954828

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.255		0.100	1	11/04/2022 16:15	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	92.9		77.0-120		11/04/2022 16:15	WG1954412

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/04/2022 18:52	WG1954080
Toluene	ND		0.00500	1	11/04/2022 18:52	WG1954080
Ethylbenzene	ND		0.00250	1	11/04/2022 18:52	WG1954080
Xylenes, Total	0.00936		0.00650	1	11/04/2022 18:52	WG1954080
1,2,4-Trimethylbenzene	ND		0.00500	1	11/04/2022 18:52	WG1954080
1,3,5-Trimethylbenzene	0.0685		0.00500	1	11/04/2022 18:52	WG1954080
(S) Toluene-d8	108		75.0-131		11/04/2022 18:52	WG1954080
(S) 4-Bromofluorobenzene	99.6		67.0-138		11/04/2022 18:52	WG1954080
(S) 1,2-Dichloroethane-d4	87.4		70.0-130		11/04/2022 18:52	WG1954080

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

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	116		4.00	1	11/02/2022 07:06	WG1952487
C28-C36 Motor Oil Range	291		40.0	10	11/02/2022 10:52	WG1952487
(S) o-Terphenyl	50.0		18.0-148		11/02/2022 10:52	WG1952487
(S) o-Terphenyl	44.1		18.0-148		11/02/2022 07:06	WG1952487

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Anthracene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Benzo(a)anthracene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Benzo(b)fluoranthene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Benzo(k)fluoranthene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Benzo(a)pyrene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Chrysene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Dibenz(a,h)anthracene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Fluoranthene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Fluorene	ND		0.00600	1	11/04/2022 15:39	WG1953631
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/04/2022 15:39	WG1953631
1-Methylnaphthalene	0.0250		0.0200	1	11/04/2022 15:39	WG1953631
2-Methylnaphthalene	0.0415		0.0200	1	11/04/2022 15:39	WG1953631
Naphthalene	ND		0.0200	1	11/04/2022 15:39	WG1953631
Pyrene	ND		0.00600	1	11/04/2022 15:39	WG1953631
(S) p-Terphenyl-d14	72.9		23.0-120		11/04/2022 15:39	WG1953631
(S) Nitrobenzene-d5	86.7		14.0-149		11/04/2022 15:39	WG1953631
(S) 2-Fluorobiphenyl	76.9		34.0-125		11/04/2022 15:39	WG1953631

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.139		1	11/07/2022 07:46	WG1953997

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/08/2022 05:45	WG1953541

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.15	<u>T8</u>	1	11/05/2022 14:00	WG1954024

Sample Narrative:

L1552295-02 WG1954024: 8.15 at 20.7C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	245		10.0	1	11/09/2022 10:00	WG1953673

Sample Narrative:

L1552295-02 WG1953673: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	1090		0.500	1	11/12/2022 13:22	WG1954829
Cadmium	ND		0.500	1	11/12/2022 13:22	WG1954829
Copper	13.4		2.00	1	11/12/2022 13:22	WG1954829
Lead	8.83		0.500	1	11/12/2022 13:22	WG1954829
Nickel	12.8		2.00	1	11/12/2022 13:22	WG1954829
Selenium	ND		2.00	1	11/12/2022 13:22	WG1954829
Silver	ND		1.00	1	11/12/2022 13:22	WG1954829
Zinc	38.9		5.00	1	11/12/2022 13:22	WG1954829

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.272		0.200	1	11/09/2022 22:49	WG1953601

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	4.97		1.00	5	11/12/2022 15:03	WG1954828

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.443		0.100	1	11/04/2022 16:36	WG1954412
(S) <i>a, a, a</i> -Trifluorotoluene(FID)	91.7		77.0-120		11/04/2022 16:36	WG1954412

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/04/2022 19:11	WG1954080
Toluene	0.00563		0.00500	1	11/04/2022 19:11	WG1954080
Ethylbenzene	ND		0.00250	1	11/04/2022 19:11	WG1954080
Xylenes, Total	0.0251		0.00650	1	11/04/2022 19:11	WG1954080
1,2,4-Trimethylbenzene	0.00913		0.00500	1	11/04/2022 19:11	WG1954080
1,3,5-Trimethylbenzene	0.0421		0.00500	1	11/04/2022 19:11	WG1954080
(S) Toluene-d8	105		75.0-131		11/04/2022 19:11	WG1954080
(S) 4-Bromofluorobenzene	106		67.0-138		11/04/2022 19:11	WG1954080
(S) 1,2-Dichloroethane-d4	90.4		70.0-130		11/04/2022 19:11	WG1954080

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

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	11/02/2022 04:43	WG1952487
C28-C36 Motor Oil Range	4.32		4.00	1	11/02/2022 04:43	WG1952487
(S) o-Terphenyl	24.1		18.0-148		11/02/2022 04:43	WG1952487

6 Qc

7 Gl

8 Al

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Anthracene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Benzo(a)anthracene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Benzo(b)fluoranthene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Benzo(k)fluoranthene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Benzo(a)pyrene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Chrysene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Dibenz(a,h)anthracene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Fluoranthene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Fluorene	ND		0.00600	1	11/08/2022 10:38	WG1955848
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/08/2022 10:38	WG1955848
1-Methylnaphthalene	ND		0.0200	1	11/08/2022 10:38	WG1955848
2-Methylnaphthalene	ND		0.0200	1	11/08/2022 10:38	WG1955848
Naphthalene	ND		0.0200	1	11/08/2022 10:38	WG1955848
Pyrene	ND		0.00600	1	11/08/2022 10:38	WG1955848
(S) p-Terphenyl-d14	82.3		23.0-120		11/08/2022 10:38	WG1955848
(S) Nitrobenzene-d5	95.8		14.0-149		11/08/2022 10:38	WG1955848
(S) 2-Fluorobiphenyl	87.5		34.0-125		11/08/2022 10:38	WG1955848

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.257		1	11/07/2022 07:49	WG1953997

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/08/2022 05:51	WG1953541

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.61	<u>T8</u>	1	11/05/2022 14:00	WG1954024

Sample Narrative:

L1552295-03 WG1954024: 8.61 at 20.8C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	228		10.0	1	11/09/2022 10:00	WG1953673

Sample Narrative:

L1552295-03 WG1953673: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	301		0.500	1	11/12/2022 13:25	WG1954829
Cadmium	ND		0.500	1	11/12/2022 13:25	WG1954829
Copper	12.3		2.00	1	11/12/2022 13:25	WG1954829
Lead	8.99		0.500	1	11/12/2022 13:25	WG1954829
Nickel	13.4		2.00	1	11/12/2022 13:25	WG1954829
Selenium	ND		2.00	1	11/12/2022 13:25	WG1954829
Silver	ND		1.00	1	11/12/2022 13:25	WG1954829
Zinc	38.6		5.00	1	11/12/2022 13:25	WG1954829

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.210		0.200	1	11/09/2022 22:52	WG1953601

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	4.59		1.00	5	11/12/2022 15:06	WG1954828

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2022 16:56	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	95.1		77.0-120		11/04/2022 16:56	WG1954412

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/04/2022 19:30	WG1954080
Toluene	ND		0.00500	1	11/04/2022 19:30	WG1954080
Ethylbenzene	ND		0.00250	1	11/04/2022 19:30	WG1954080
Xylenes, Total	ND		0.00650	1	11/04/2022 19:30	WG1954080
1,2,4-Trimethylbenzene	ND		0.00500	1	11/04/2022 19:30	WG1954080
1,3,5-Trimethylbenzene	ND		0.00500	1	11/04/2022 19:30	WG1954080
(S) Toluene-d8	105		75.0-131		11/04/2022 19:30	WG1954080
(S) 4-Bromofluorobenzene	97.2		67.0-138		11/04/2022 19:30	WG1954080
(S) 1,2-Dichloroethane-d4	90.8		70.0-130		11/04/2022 19:30	WG1954080

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	11/02/2022 06:40	WG1952487
C28-C36 Motor Oil Range	ND		4.00	1	11/02/2022 06:40	WG1952487
(S) o-Terphenyl	46.2		18.0-148		11/02/2022 06:40	WG1952487

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Anthracene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Benzo(a)anthracene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Benzo(b)fluoranthene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Benzo(k)fluoranthene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Benzo(a)pyrene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Chrysene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Dibenz(a,h)anthracene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Fluoranthene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Fluorene	ND		0.00600	1	11/04/2022 12:42	WG1953631
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/04/2022 12:42	WG1953631
1-Methylnaphthalene	ND		0.0200	1	11/04/2022 12:42	WG1953631
2-Methylnaphthalene	ND		0.0200	1	11/04/2022 12:42	WG1953631
Naphthalene	ND		0.0200	1	11/04/2022 12:42	WG1953631
Pyrene	ND		0.00600	1	11/04/2022 12:42	WG1953631
(S) p-Terphenyl-d14	47.0		23.0-120		11/04/2022 12:42	WG1953631
(S) Nitrobenzene-d5	74.3		14.0-149		11/04/2022 12:42	WG1953631
(S) 2-Fluorobiphenyl	52.2		34.0-125		11/04/2022 12:42	WG1953631

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.82		1	11/07/2022 07:52	WG1953997

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/08/2022 05:56	WG1953541

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.69	<u>T8</u>	1	11/05/2022 14:00	WG1954024

Sample Narrative:

L1552295-04 WG1954024: 8.69 at 20.6C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	210		10.0	1	11/09/2022 10:00	WG1953673

Sample Narrative:

L1552295-04 WG1953673: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	300		0.500	1	11/12/2022 13:28	WG1954829
Cadmium	ND		0.500	1	11/12/2022 13:28	WG1954829
Copper	11.1		2.00	1	11/12/2022 13:28	WG1954829
Lead	7.77		0.500	1	11/12/2022 13:28	WG1954829
Nickel	11.3		2.00	1	11/12/2022 13:28	WG1954829
Selenium	ND		2.00	1	11/12/2022 13:28	WG1954829
Silver	ND		1.00	1	11/12/2022 13:28	WG1954829
Zinc	33.1		5.00	1	11/12/2022 13:28	WG1954829

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.205		0.200	1	11/09/2022 22:55	WG1953601

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	3.86		1.00	5	11/12/2022 15:10	WG1954828

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	11/04/2022 17:17	WG1954412
(S) <i>a, a, a</i> -Trifluorotoluene(FID)	94.9		77.0-120		11/04/2022 17:17	WG1954412

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	11/04/2022 19:49	WG1954080
Toluene	ND		0.00500	1	11/04/2022 19:49	WG1954080
Ethylbenzene	ND		0.00250	1	11/04/2022 19:49	WG1954080
Xylenes, Total	ND		0.00650	1	11/04/2022 19:49	WG1954080
1,2,4-Trimethylbenzene	ND		0.00500	1	11/04/2022 19:49	WG1954080
1,3,5-Trimethylbenzene	ND		0.00500	1	11/04/2022 19:49	WG1954080
(S) Toluene-d8	103		75.0-131		11/04/2022 19:49	WG1954080
(S) 4-Bromofluorobenzene	98.9		67.0-138		11/04/2022 19:49	WG1954080
(S) 1,2-Dichloroethane-d4	88.4		70.0-130		11/04/2022 19:49	WG1954080

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	11/02/2022 10:39	WG1952487
C28-C36 Motor Oil Range	5.76		4.00	1	11/02/2022 10:39	WG1952487
(S) o-Terphenyl	63.4		18.0-148		11/02/2022 10:39	WG1952487

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Anthracene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Benzo(a)anthracene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Benzo(b)fluoranthene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Benzo(k)fluoranthene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Benzo(a)pyrene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Chrysene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Dibenz(a,h)anthracene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Fluoranthene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Fluorene	ND		0.00600	1	11/04/2022 13:01	WG1953631
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/04/2022 13:01	WG1953631
1-Methylnaphthalene	ND		0.0200	1	11/04/2022 13:01	WG1953631
2-Methylnaphthalene	ND		0.0200	1	11/04/2022 13:01	WG1953631
Naphthalene	ND		0.0200	1	11/04/2022 13:01	WG1953631
Pyrene	ND		0.00600	1	11/04/2022 13:01	WG1953631
(S) p-Terphenyl-d14	50.4		23.0-120		11/04/2022 13:01	WG1953631
(S) Nitrobenzene-d5	66.4		14.0-149		11/04/2022 13:01	WG1953631
(S) 2-Fluorobiphenyl	57.3		34.0-125		11/04/2022 13:01	WG1953631

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3858216-1 11/08/22 04:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1552295-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1552295-01 11/08/22 05:25 • (DUP) R3858216-3 11/08/22 05:30

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

L1552296-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1552296-01 11/08/22 06:01 • (DUP) R3858216-4 11/08/22 06:06

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

Laboratory Control Sample (LCS)

(LCS) R3858216-2 11/08/22 04:48

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	9.92	99.2	80.0-120	

L1552299-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1552299-01 11/08/22 06:11 • (MS) R3858216-6 11/08/22 06:22 • (MSD) R3858216-7 11/08/22 06:27

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	19.1	18.4	95.3	92.0	1	75.0-125			3.49	20

L1552299-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1552299-01 11/08/22 06:11 • (MS) R3858216-8 11/08/22 06:32

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	643	ND	689	107	50	75.0-125	

L1552614-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1552614-02 11/05/22 14:00 • (DUP) R3857370-2 11/05/22 14:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.71	7.72	1	0.130		1

Sample Narrative:

OS: 7.71 at 20.3C
DUP: 7.72 at 20.4C

L1552903-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1552903-02 11/05/22 14:00 • (DUP) R3857370-3 11/05/22 14:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	10.2	10.2	1	0.000		1

Sample Narrative:

OS: 10.21 at 20.2C
DUP: 10.21 at 20.2C

Laboratory Control Sample (LCS)

(LCS) R3857370-1 11/05/22 14:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 19.8C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3858745-1 11/09/22 10:00

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

L1552295-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1552295-01 11/09/22 10:00 • (DUP) R3858745-3 11/09/22 10:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	295	289	1	1.88		20

Sample Narrative:

OS: at 25C
DUP: at 25C

L1553043-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1553043-07 11/09/22 10:00 • (DUP) R3858745-4 11/09/22 10:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	3050	3070	1	0.654		20

Sample Narrative:

OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3858745-2 11/09/22 10:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1120	99.9	85.0-115	

Sample Narrative:

LCS: at 25C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3860368-1 11/12/22 12:46

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
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3860368-2 11/12/22 12:49

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	90.4	90.4	80.0-120	
Cadmium	100	86.5	86.5	80.0-120	
Copper	100	89.2	89.2	80.0-120	
Lead	100	87.1	87.1	80.0-120	
Nickel	100	86.2	86.2	80.0-120	
Selenium	100	88.1	88.1	80.0-120	
Silver	20.0	17.0	85.1	80.0-120	
Zinc	100	85.3	85.3	80.0-120	

L1552299-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1552299-01 11/12/22 12:51 • (MS) R3860368-5 11/12/22 12:59 • (MSD) R3860368-6 11/12/22 13:02

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	81.5	171	173	89.4	91.2	1	75.0-125			1.03	20
Cadmium	100	ND	98.0	92.5	97.8	92.3	1	75.0-125			5.79	20
Copper	100	9.00	112	105	103	95.7	1	75.0-125			6.63	20
Lead	100	10.4	109	103	98.2	92.6	1	75.0-125			5.35	20
Nickel	100	10.9	109	104	98.0	93.1	1	75.0-125			4.60	20
Selenium	100	ND	101	95.6	101	95.6	1	75.0-125			5.89	20
Silver	20.0	ND	19.4	18.3	97.0	91.7	1	75.0-125			5.57	20
Zinc	100	40.6	130	125	89.7	84.9	1	75.0-125			3.81	20

Method Blank (MB)

(MB) R3859194-1 11/09/22 22:29

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

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

(LCS) R3859194-2 11/09/22 22:32 • (LCSD) R3859194-3 11/09/22 22:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.05	1.05	105	105	80.0-120			0.0290	20

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

Method Blank (MB)

(MB) R3860320-1 11/12/22 14:19

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

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3860320-2 11/12/22 14:22

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	97.4	97.4	80.0-120	

4 Cn

5 Sr

L1552299-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1552299-01 11/12/22 14:25 • (MS) R3860320-5 11/12/22 14:36 • (MSD) R3860320-6 11/12/22 14:39

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	5.25	95.9	90.5	90.6	85.2	5	75.0-125			5.81	20

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3858214-2 11/04/22 13:04

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)	96.6			77.0-120

Laboratory Control Sample (LCS)

(LCS) R3858214-1 11/04/22 12:23

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.95	108	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			112	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) R3857218-2 11/04/22 11:39

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Benzene	U		0.000467	0.00100
Toluene	U		0.00130	0.00500
Ethylbenzene	U		0.000737	0.00250
Xylenes, Total	U		0.000880	0.00650
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
(S) Toluene-d8	103			75.0-131
(S) 4-Bromofluorobenzene	102			67.0-138
(S) 1,2-Dichloroethane-d4	90.3			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3857218-1 11/04/22 10:29

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Benzene	0.125	0.128	102	70.0-123	
Toluene	0.125	0.122	97.6	75.0-121	
Ethylbenzene	0.125	0.118	94.4	74.0-126	
Xylenes, Total	0.375	0.356	94.9	72.0-127	
1,2,4-Trimethylbenzene	0.125	0.123	98.4	70.0-126	
1,3,5-Trimethylbenzene	0.125	0.120	96.0	73.0-127	
(S) Toluene-d8			102	75.0-131	
(S) 4-Bromofluorobenzene			99.4	67.0-138	
(S) 1,2-Dichloroethane-d4			99.4	70.0-130	

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3855867-1 11/02/22 01:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C36 Motor Oil Range	U		0.274	4.00
<i>(S) o-Terphenyl</i>	68.9			18.0-148

Laboratory Control Sample (LCS)

(LCS) R3855867-2 11/02/22 01:14

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
C10-C28 Diesel Range	50.0	34.4	68.8	50.0-150	
<i>(S) o-Terphenyl</i>			84.8	18.0-148	

L1552078-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1552078-01 11/02/22 04:56 • (MS) R3855867-3 11/02/22 05:09 • (MSD) R3855867-4 11/02/22 05:22

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
C10-C28 Diesel Range	48.0	51.8	132	146	167	194	1	50.0-150	J5	J5	10.1	20
<i>(S) o-Terphenyl</i>					86.6	54.6		18.0-148				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3857653-2 11/04/22 10:23

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00209	0.00600
Anthracene	U		0.00230	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
Pyrene	U		0.00200	0.00600
(S) p-Terphenyl-d14	109			23.0-120
(S) Nitrobenzene-d5	108			14.0-149
(S) 2-Fluorobiphenyl	106			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3857653-1 11/04/22 10:04

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0573	71.6	50.0-120	
Anthracene	0.0800	0.0592	74.0	50.0-126	
Benzo(a)anthracene	0.0800	0.0638	79.8	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0541	67.6	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0552	69.0	49.0-125	
Benzo(a)pyrene	0.0800	0.0538	67.3	42.0-120	
Chrysene	0.0800	0.0619	77.4	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0502	62.8	47.0-125	
Fluoranthene	0.0800	0.0602	75.3	49.0-129	
Fluorene	0.0800	0.0596	74.5	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0531	66.4	46.0-125	
1-Methylnaphthalene	0.0800	0.0565	70.6	51.0-121	
2-Methylnaphthalene	0.0800	0.0587	73.4	50.0-120	
Naphthalene	0.0800	0.0578	72.3	50.0-120	
Pyrene	0.0800	0.0584	73.0	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3857653-1 11/04/22 10:04

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			85.4	23.0-120	
(S) Nitrobenzene-d5			93.9	14.0-149	
(S) 2-Fluorobiphenyl			88.1	34.0-125	

L1552835-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1552835-01 11/04/22 14:40 • (MS) R3857653-3 11/04/22 15:00 • (MSD) R3857653-4 11/04/22 15:20

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.0796	ND	0.0432	0.0404	54.3	50.8	1	14.0-127			6.70	27
Anthracene	0.0796	ND	0.0350	0.0385	44.0	48.4	1	10.0-145			9.52	30
Benzo(a)anthracene	0.0796	ND	0.0357	0.0402	44.8	50.5	1	10.0-139			11.9	30
Benzo(b)fluoranthene	0.0796	ND	0.0343	0.0382	43.1	48.0	1	10.0-140			10.8	36
Benzo(k)fluoranthene	0.0796	ND	0.0337	0.0377	42.3	47.4	1	10.0-137			11.2	31
Benzo(a)pyrene	0.0796	ND	0.0357	0.0401	44.8	50.4	1	10.0-141			11.6	31
Chrysene	0.0796	ND	0.0383	0.0434	48.1	54.5	1	10.0-145			12.5	30
Dibenz(a,h)anthracene	0.0796	ND	0.0301	0.0339	37.8	42.6	1	10.0-132			11.9	31
Fluoranthene	0.0796	ND	0.0354	0.0401	44.5	50.4	1	10.0-153			12.5	33
Fluorene	0.0796	ND	0.0418	0.0397	52.5	49.9	1	11.0-130			5.15	29
Indeno(1,2,3-cd)pyrene	0.0796	ND	0.0305	0.0342	38.3	43.0	1	10.0-137			11.4	32
1-Methylnaphthalene	0.0796	ND	0.0457	0.0437	57.4	54.9	1	10.0-142			4.47	28
2-Methylnaphthalene	0.0796	ND	0.0681	0.0447	85.6	56.2	1	10.0-137		J3	41.5	28
Naphthalene	0.0796	ND	0.204	0.0448	256	56.3	1	10.0-135	J5	J3	128	27
Pyrene	0.0796	ND	0.0378	0.0426	47.5	53.5	1	10.0-148			11.9	35
(S) p-Terphenyl-d14					47.5	60.1		23.0-120				
(S) Nitrobenzene-d5					49.2	64.5		14.0-149				
(S) 2-Fluorobiphenyl					50.2	62.7		34.0-125				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3858427-2 11/08/22 10:20

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00209	0.00600
Anthracene	U		0.00230	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
Pyrene	U		0.00200	0.00600
(S) p-Terphenyl-d14	88.1			23.0-120
(S) Nitrobenzene-d5	98.9			14.0-149
(S) 2-Fluorobiphenyl	91.8			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3858427-1 11/08/22 10:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0707	88.4	50.0-120	
Anthracene	0.0800	0.0716	89.5	50.0-126	
Benzo(a)anthracene	0.0800	0.0745	93.1	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0625	78.1	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0593	74.1	49.0-125	
Benzo(a)pyrene	0.0800	0.0706	88.3	42.0-120	
Chrysene	0.0800	0.0720	90.0	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0628	78.5	47.0-125	
Fluoranthene	0.0800	0.0759	94.9	49.0-129	
Fluorene	0.0800	0.0733	91.6	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0638	79.8	46.0-125	
1-Methylnaphthalene	0.0800	0.0714	89.3	51.0-121	
2-Methylnaphthalene	0.0800	0.0730	91.3	50.0-120	
Naphthalene	0.0800	0.0703	87.9	50.0-120	
Pyrene	0.0800	0.0653	81.6	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3858427-1 11/08/22 10:02

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			91.5	23.0-120	
(S) Nitrobenzene-d5			114	14.0-149	
(S) 2-Fluorobiphenyl			101	34.0-125	

L1554066-14 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1554066-14 11/08/22 13:52 • (MS) R3858427-3 11/08/22 14:10 • (MSD) R3858427-4 11/08/22 14:28

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.0792	ND	0.0481	0.0530	60.7	66.9	1	14.0-127			9.69	27
Anthracene	0.0792	ND	0.0441	0.0485	55.7	61.2	1	10.0-145			9.50	30
Benzo(a)anthracene	0.0792	ND	0.0468	0.0495	59.1	62.5	1	10.0-139			5.61	30
Benzo(b)fluoranthene	0.0792	ND	0.0455	0.0489	57.4	61.7	1	10.0-140			7.20	36
Benzo(k)fluoranthene	0.0792	ND	0.0495	0.0516	62.5	65.2	1	10.0-137			4.15	31
Benzo(a)pyrene	0.0792	ND	0.0499	0.0524	63.0	66.2	1	10.0-141			4.89	31
Chrysene	0.0792	ND	0.0556	0.0574	70.2	72.5	1	10.0-145			3.19	30
Dibenz(a,h)anthracene	0.0792	ND	0.0487	0.0501	61.5	63.3	1	10.0-132			2.83	31
Fluoranthene	0.0792	ND	0.0497	0.0553	62.8	69.8	1	10.0-153			10.7	33
Fluorene	0.0792	ND	0.0489	0.0537	61.7	67.8	1	11.0-130			9.36	29
Indeno(1,2,3-cd)pyrene	0.0792	ND	0.0478	0.0499	60.4	63.0	1	10.0-137			4.30	32
1-Methylnaphthalene	0.0792	ND	0.0484	0.0536	61.1	67.7	1	10.0-142			10.2	28
2-Methylnaphthalene	0.0792	ND	0.0477	0.0530	60.2	66.9	1	10.0-137			10.5	28
Naphthalene	0.0792	ND	0.0470	0.0521	59.3	65.8	1	10.0-135			10.3	27
Pyrene	0.0792	ND	0.0500	0.0547	63.1	69.1	1	10.0-148			8.98	35
(S) p-Terphenyl-d14					85.0	80.0		23.0-120				
(S) Nitrobenzene-d5					87.0	81.2		14.0-149				
(S) 2-Fluorobiphenyl					89.5	82.6		34.0-125				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier Description

J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas
 143 Diamond Avenue
 Parachute, CO 81635

Billing Information:
SAME AS LEFT

Pres
 Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



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



Report to:
Blair Rollins
 Email To:
brollins@caerusoilandgas.com

Project Description:
Benzel 36-13A P&A Assessment
 City/State Collected: **Piceance Crk, CO**
 Please Circle: PT MT CT ET

Phone: **(970) 640-6919**
 Client Project # _____ Lab Project # _____

Collected by (print):
Tristan Schmalz
 Site/Facility ID # **K36B Pad**
 P.O. # _____

Collected by (signature):
Tristan Schmalz
 Immediately
 Packed on Ice N ___ Y X
 Rush? (Lab MUST Be Notified)
 ___ Same Day ___ Five Day
 ___ Next Day ___ 5 Day (Rad Only)
 ___ Two Day ___ 10 Day (Rad Only)
 ___ Three Day
 Quote # _____
 Date Results Needed
Standard TAT
 No. of Cntrs _____

SDG # **L1552295**
D020

Acctnum:
 Template:
 Prelogin:
 PM:
 PB:
 Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs						
20221031_Benzel36-13A_SEFFL@Uct	GRAB	SS	4ft	10/31/2022	10:18	2	X					
20221031_Benzel36-13A_SEFFLTP_COMP	COMP	SS	GS	10/31/2022	10:27	2	X					
20221031_Benzel36-13A_WH@Bft	GRAB	SS	8ft	10/31/2022	10:39	2	X					
20221031_Benzel36-13A_WATP_COMP	COMP	BSS	GS	10/31/2022	10:50	2	X					

COGCC Table 915-1

EC, pH, SAR

Arsenic, Boron

COGCC Table 910-1

Remarks	Sample # (lab only)
	-01
	-02
	-03
	-04

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

Remarks:
 Samples returned via:
 ___ UPS ___ FedEx ___ Courier

pH _____ Temp _____
 Flow _____ Other _____

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

Relinquished by: (Signature)
Tristan Schmalz
 Date: **10/31/2022** Time: **13:00**
 Relinquished by: (Signature)
[Signature]
 Date: **10/31/22** Time: **1500**
 Relinquished by: (Signature)
 Date: _____ Time: _____

Tracking # **5755 8085 1360**
 Received by: (Signature)
[Signature]
 Trip Blank Received: Yes No
 HCL / MeOH
 TBR
 Received by: (Signature)
[Signature]
 Temp: **JAAT °C** Bottles Received: **8**
1.940 = 1.9
 Received for lab by: (Signature)
[Signature]
 Date: **11.9.22** Time: **0900**

If preservation required by Login: Date/Time
 Hold:
 Condition:
 NCF / OK

Caerus Oil and Gas

Sample Delivery Group: L1562522
Samples Received: 11/30/2022
Project Number:
Description: Benzel 36-13A P+A Assessment
Site: K36 B PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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Wet Chemistry by Method 4500H+ B-2011	6	
Gl: Glossary of Terms	7	
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SAMPLE SUMMARY

20221129_BENZEL 36-13A_PW01 L1562522-01 WW

Collected by Tristan Schmalz
Collected date/time 11/29/22 11:22
Received date/time 11/30/22 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500H+ B-2011	WG1967837	1	12/02/22 10:30	12/02/22 10:30	KAD	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Wet Chemistry by Method 4500H+ B-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.73	<u>T8</u>	1	12/02/2022 10:30	WG1967837

Sample Narrative:

L1562522-01 WG1967837: 7.73 at 19.8C

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

L1562522-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1562522-01 12/02/22 10:30 • (DUP) R3867408-2 12/02/22 10:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su	su		%		%
pH	7.73	7.76	1	0.387		1

Sample Narrative:

OS: 7.73 at 19.8C
DUP: 7.76 at 19.7C

L1562912-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1562912-01 12/02/22 10:30 • (DUP) R3867408-3 12/02/22 10:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
su	su	su		%		%
pH	7.37	7.37	1	0.000		1

Sample Narrative:

OS: 7.37 at 18.9C
DUP: 7.37 at 18.7C

Laboratory Control Sample (LCS)

(LCS) R3867408-1 12/02/22 10:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
su	su	su	%	%	
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 20.6C



GLOSSARY OF TERMS

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Abbreviations and Definitions

Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
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.
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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.
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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

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

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

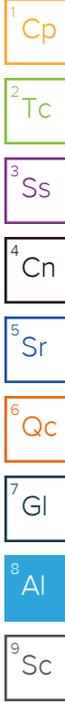
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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



Caerus Oil and Gas
 143 Diamond Avenue
 Parachute, CO 81635

Billing Information:
SAME AS LEFT

Pres
 Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



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



Report to:
Blair Rollins

Email To:
brollins@caerusoilandgas.com

Project Description:
Benzel 36-13A R+A Assessment

City/State
 Collected: **Piceance Crk, CO**

Please Circle:
 PT MT CT ET

Phone: **(970) 640-6919**

Client Project #
 Lab Project #

Collected by (print):
Tristan Schmalz

Site/Facility ID #
K30 B Pad

P.O. #

Collected by (signature):
Tristan Schmalz

Rush? (Lab MUST Be Notified)
 Same Day Five Day
 Next Day 5 Day (Rad Only)
 Two Day 10 Day (Rad Only)
 Three Day

Quote #

Immediatly Packed on Ice N ___ Y X

Date Results Needed
Standard TAT

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs
-----------	-----------	---------	-------	------	------	--------------

COGCC Table 915-1
 EC, pH, SAR
 Arsenic, Boron
 COGCC Table 910-1
 PH

SDG # **1562522**
D160

Acctnum:
 Template:
 Prelogin:
 PM:
 PB:
 Shipped Via:
 Remarks Sample # (lab only)

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	PH	Remarks	Sample # (lab only)
2022129_Benzel 36-13A_PW01	Grab	OT	—	11/29/22	11:22	1					X		-01
<i>Tristan Schmalz</i>													

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

Remarks:
 Samples returned via:
 ___ UPS ___ FedEx ___ Courier ___
 Tracking # **9126 6537 5489**
 pH ___ Temp ___
 Flow ___ Other ___

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

Relinquished by: (Signature) <i>Tristan Schmalz</i>	Date: 11/29/2022	Time: 12:00	Received by: (Signature) <i>[Signature]</i>	Trip Blank Received: Yes/No <input checked="" type="checkbox"/> HCL/MeOH TBR	Bottles Received: 1	If preservation required by Login: Date/Time
Relinquished by: (Signature) <i>[Signature]</i>	Date: 11/29/22	Time: 1400	Received by: (Signature)	Temp: 18.6°C 4.4 to 4.4		
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11/30/22	Time: 0930	Hold: Condition: NCF / <input checked="" type="checkbox"/> OK

Caerus Oil and Gas

Sample Delivery Group: L1546420
Samples Received: 10/14/2022
Project Number:
Description: D12 P+A Assessment
Site: 012 PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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SAMPLE SUMMARY

20221012_D12_BG03@1FT L1546420-01 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/12/22 10:27
 Received date/time: 10/14/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1946284	1	10/28/22 21:58	10/28/22 21:58	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1944317	1	10/19/22 00:25	10/23/22 08:41	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1945484	1	10/19/22 13:27	10/20/22 14:30	AAS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1944008	1	10/17/22 14:00	10/22/22 09:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1946592	1	10/26/22 17:17	10/29/22 00:40	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1945916	1	10/20/22 12:51	10/24/22 22:28	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1946591	5	10/26/22 17:10	10/27/22 20:59	LD	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.391		1	10/28/2022 21:58	WG1946284

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	10/23/2022 08:41	WG1944317

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.56	T8	1	10/20/2022 14:30	WG1945484

Sample Narrative:

L1546420-01 WG1945484: 7.56 at 20C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	893		10.0	1	10/22/2022 09:00	WG1944008

Sample Narrative:

L1546420-01 WG1944008: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	404	J3 V	0.500	1	10/29/2022 00:40	WG1946592
Cadmium	ND		0.500	1	10/29/2022 00:40	WG1946592
Copper	11.2		2.00	1	10/29/2022 00:40	WG1946592
Lead	12.8		0.500	1	10/29/2022 00:40	WG1946592
Nickel	12.6	O1	2.00	1	10/29/2022 00:40	WG1946592
Selenium	ND		2.00	1	10/29/2022 00:40	WG1946592
Silver	ND		1.00	1	10/29/2022 00:40	WG1946592
Zinc	50.0		5.00	1	10/29/2022 00:40	WG1946592

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	1.39		0.200	1	10/24/2022 22:28	WG1945916

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	9.64		1.00	5	10/27/2022 20:59	WG1946591

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3852155-1 10/23/22 07:58

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1546205-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546205-01 10/23/22 08:10 • (DUP) R3852155-3 10/23/22 08:15

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

L1546441-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1546441-05 10/23/22 09:18 • (DUP) R3852155-4 10/23/22 09:23

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

Laboratory Control Sample (LCS)

(LCS) R3852155-2 10/23/22 08:05

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	9.72	97.2	80.0-120	

L1546441-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546441-06 10/23/22 09:28 • (MS) R3852155-5 10/23/22 09:33 • (MSD) R3852155-6 10/23/22 09:38

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	18.2	19.0	90.8	95.2	1	75.0-125			4.78	20

L1546441-06 Original Sample (OS) • Matrix Spike (MS)

(OS) L1546441-06 10/23/22 09:28 • (MS) R3852155-7 10/23/22 09:44

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	643	ND	618	96.1	50	75.0-125	

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/20/22 14:30 • (DUP) R3851015-2 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	7.94	7.89	1	0.632		1

Sample Narrative:

OS: 7.94 at 20.2C
DUP: 7.89 at 20.2C

L1546441-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1546441-07 10/20/22 14:30 • (DUP) R3851015-3 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.41	8.36	1	0.596		1

Sample Narrative:

OS: 8.41 at 19.2C
DUP: 8.36 at 19.4C

Laboratory Control Sample (LCS)

(LCS) R3851015-1 10/20/22 14:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	9.92	99.2	99.0-101	

Sample Narrative:

LCS: 9.92 at 19.3C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3851656-1 10/22/22 09:00

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

Sample Narrative:

BLANK: at 25C

L1546437-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1546437-04 10/22/22 09:00 • (DUP) R3851656-3 10/22/22 09:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	ND	ND	1	0.000		20

Sample Narrative:

OS: at 25C
DUP: at 25C

L1546441-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1546441-08 10/22/22 09:00 • (DUP) R3851656-4 10/22/22 09:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	1250	1250	1	0.240		20

Sample Narrative:

OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3851656-2 10/22/22 09:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	1120	1150	103	85.0-115	

Sample Narrative:

LCS: at 25C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3854684-1 10/29/22 00:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3854684-2 10/29/22 00:37

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Barium	100	107	107	80.0-120	
Cadmium	100	105	105	80.0-120	
Copper	100	103	103	80.0-120	
Lead	100	106	106	80.0-120	
Nickel	100	108	108	80.0-120	
Selenium	100	105	105	80.0-120	
Silver	20.0	20.0	100	80.0-120	
Zinc	100	106	106	80.0-120	

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/29/22 00:40 • (MS) R3854684-5 10/29/22 00:47 • (MSD) R3854684-6 10/29/22 00:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Barium	100	404	325	533	0.000	128	1	75.0-125	V	J3 V	48.3	20
Cadmium	100	ND	116	113	116	113	1	75.0-125			2.41	20
Copper	100	11.2	126	128	114	116	1	75.0-125			1.52	20
Lead	100	12.8	128	129	115	116	1	75.0-125			0.629	20
Nickel	100	12.6	129	132	117	120	1	75.0-125			2.01	20
Selenium	100	ND	116	113	116	113	1	75.0-125			2.13	20
Silver	20.0	ND	22.7	22.2	113	111	1	75.0-125			2.01	20
Zinc	100	50.0	149	165	98.7	115	1	75.0-125			10.2	20

Method Blank (MB)

(MB) R3852457-1 10/24/22 22:19

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

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

(LCS) R3852457-2 10/24/22 22:22 • (LCSD) R3852457-3 10/24/22 22:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.04	1.06	104	106	80.0-120			1.27	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3854032-1 10/27/22 20:52

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

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3854032-2 10/27/22 20:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	92.9	92.9	80.0-120	

4 Cn

5 Sr

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/27/22 20:59 • (MS) R3854032-4 10/27/22 21:09 • (MSD) R3854032-5 10/27/22 21:12

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	9.64	112	115	102	105	5	75.0-125			2.65	20

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
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.
V	The sample concentration is too high to evaluate accurate spike recoveries.



ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas
 143 Diamond Avenue
 Parachute, CO 81635

Billing Information:

SAME AS LEFT

Pres
 Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



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



SDG # **L1346420**
 Tag # **J075**
 Acctnum:
 Template:
 Prelogin:
 PM:
 PB:
 Shipped Via:

Remarks Sample # (lab only)

-01

Report to:
Blair Rollins

Email To:
brollins@caerusoilandgas.com

Project Description:
D12 P+H Assessment

City/State Collected: **Piceance Crk, CO**

Please Circle:
 PT **(M)** CT ET

Phone: **(970) 640-6919**

Client Project #

Lab Project #

Collected by (print):
Tristan Schmalz

Site/Facility ID #
D12 Pod

P.O. #

Collected by (signature):
Tristan Schmalz

Rush? (Lab MUST Be Notified)
 ___ Same Day ___ Five Day
 ___ Next Day ___ 5 Day (Rad Only)
 ___ Two Day ___ 10 Day (Rad Only)
 ___ Three Day

Quote #
 Date Results Needed
Standard TAT

Immediately Packed on Ice N ___ Y **X**

No. of
 Cntrs

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs
20221012 D12_B0103@1ft	Grab	SS	1ft	10/12/2022	10:27	2
<i>Tristan Schmalz</i>						
10/12/2022						

COGCC Table 915-1 Minus Orpivis

EC, pH, SAR

Arsenic, Boron

COGCC Table 910-1

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

Remarks:

Samples returned via:
 ___ UPS ___ FedEx ___ Courier

Tracking # **0755 8085 0904**

pH ___ Temp ___
 Flow ___ Other ___

Sample Receipt Checklist

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

Relinquished by: (Signature)
Tristan Schmalz

Date: **10/12/2022**

Time: **12:30**

Received by: (Signature)
[Signature]

Trip Blank Received: Yes / No
 HCL / MeOH
 TBR
U

Relinquished by: (Signature)
[Signature]

Date: **10/12/22**

Time: **1700**

Received by: (Signature)
[Signature]

Temp: °C
094009

Bottles Received: **2**
 If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)
[Signature]

Date: **10/13/22** Time: **9:00**

Hold: Condition: **NCF / (OK)**

Caerus Oil and Gas

Sample Delivery Group: L1546423
Samples Received: 10/13/2022
Project Number:
Description: D12 P+A Assessment
Site: D12 PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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SAMPLE SUMMARY

20221012_D12_BG04@1FT L1546423-01 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/12/22 10:40
 Received date/time: 10/13/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1946284	1	10/28/22 22:01	10/28/22 22:01	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1944316	1	10/18/22 13:29	10/19/22 09:29	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1944858	1	10/18/22 14:30	10/20/22 15:30	AAS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1943406	1	10/15/22 15:09	10/17/22 13:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1949906	1	10/27/22 23:12	10/30/22 20:21	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1943554	1	10/16/22 14:17	10/24/22 10:39	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1946587	5	10/25/22 19:10	10/26/22 19:54	LD	Mt. Juliet, TN

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

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.178		1	10/28/2022 22:01	WG1946284

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	10/19/2022 09:29	WG1944316

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.06	<u>T8</u>	1	10/20/2022 15:30	WG1944858

Sample Narrative:

L1546423-01 WG1944858: 8.06 at 19.5C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	180		10.0	1	10/17/2022 13:00	WG1943406

Sample Narrative:

L1546423-01 WG1943406: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	150		0.500	1	10/30/2022 20:21	WG1949906
Cadmium	ND		0.500	1	10/30/2022 20:21	WG1949906
Copper	16.9		2.00	1	10/30/2022 20:21	WG1949906
Lead	10.3		0.500	1	10/30/2022 20:21	WG1949906
Nickel	15.9		2.00	1	10/30/2022 20:21	WG1949906
Selenium	ND		2.00	1	10/30/2022 20:21	WG1949906
Silver	ND		1.00	1	10/30/2022 20:21	WG1949906
Zinc	48.9		5.00	1	10/30/2022 20:21	WG1949906

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.307		0.200	1	10/24/2022 10:39	WG1943554

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	4.24		1.00	5	10/26/2022 19:54	WG1946587

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3853641-1 10/19/22 08:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/19/22 09:40 • (DUP) R3853641-7 10/19/22 09:50

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

L1546439-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1546439-06 10/19/22 10:32 • (DUP) R3853641-8 10/19/22 10:37

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

Laboratory Control Sample (LCS)

(LCS) R3853641-2 10/19/22 08:58

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	9.67	96.7	80.0-120	

L1546213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-4 10/19/22 09:14 • (MSD) R3853641-5 10/19/22 09:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	15.0	16.2	75.1	80.9	1	75.0-125			7.46	20

L1546213-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-6 10/19/22 09:24

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	646	ND	642	99.4	50	75.0-125	

L1546304-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1546304-03 10/20/22 15:30 • (DUP) R3851062-2 10/20/22 15:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.63	7.62	1	0.131		1

Sample Narrative:

OS: 7.63 at 19.6C
DUP: 7.62 at 19.7C

L1546306-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1546306-04 10/20/22 15:30 • (DUP) R3851062-3 10/20/22 15:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.49	7.50	1	0.133		1

Sample Narrative:

OS: 7.49 at 19.3C
DUP: 7.5 at 19.4C

Laboratory Control Sample (LCS)

(LCS) R3851062-1 10/20/22 15:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.92	99.2	99.0-101	

Sample Narrative:

LCS: 9.92 at 19.3C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3849327-1 10/17/22 13:00

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

Sample Narrative:

BLANK: at 25C

L1545780-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1545780-01 10/17/22 13:00 • (DUP) R3849327-3 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	241	239	1	0.751		20

Sample Narrative:

OS: at 25C
DUP: at 25C

L1546431-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546431-01 10/17/22 13:00 • (DUP) R3849327-4 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	175	174	1	0.172		20

Sample Narrative:

OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3849327-2 10/17/22 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	1120	1100	98.4	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3854780-1 10/30/22 19:39

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

Laboratory Control Sample (LCS)

(LCS) R3854780-2 10/30/22 19:42

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Barium	100	96.9	96.9	80.0-120	
Cadmium	100	93.1	93.1	80.0-120	
Copper	100	93.7	93.7	80.0-120	
Lead	100	94.4	94.4	80.0-120	
Nickel	100	94.4	94.4	80.0-120	
Selenium	100	93.2	93.2	80.0-120	
Silver	20.0	17.9	89.5	80.0-120	
Zinc	100	90.5	90.5	80.0-120	

⁷ Gl

⁸ Al

⁹ Sc

L1545775-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1545775-02 10/30/22 19:44 • (MS) R3854780-5 10/30/22 19:52 • (MSD) R3854780-6 10/30/22 19:54

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Barium	100	468	399	379	0.000	0.000	1	75.0-125	<u>V</u>	<u>V</u>	5.05	20
Cadmium	100	ND	90.8	92.5	90.4	92.1	1	75.0-125			1.88	20
Copper	100	12.1	106	106	93.4	93.8	1	75.0-125			0.297	20
Lead	100	59.0	138	137	79.3	78.0	1	75.0-125			0.961	20
Nickel	100	7.15	102	103	94.5	96.1	1	75.0-125			1.60	20
Selenium	100	ND	90.6	92.2	90.6	92.2	1	75.0-125			1.77	20
Silver	20.0	ND	16.9	17.2	84.3	85.9	1	75.0-125			1.89	20
Zinc	100	99.5	298	162	199	62.0	1	75.0-125	<u>J5</u>	<u>J3 J6</u>	59.5	20

Method Blank (MB)

(MB) R3852218-1 10/24/22 10:11

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

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

(LCS) R3852218-2 10/24/22 10:14 • (LCSD) R3852218-3 10/24/22 10:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.01	1.03	101	103	80.0-120			1.95	20

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

Method Blank (MB)

(MB) R3853455-1 10/26/22 19:01

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

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3853455-2 10/26/22 19:04

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

4 Cn

5 Sr

L1545775-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1545775-05 10/26/22 19:08 • (MS) R3853455-5 10/26/22 19:17 • (MSD) R3853455-6 10/26/22 19:21

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	3.82	101	93.7	96.8	89.8	5	75.0-125			7.18	20

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

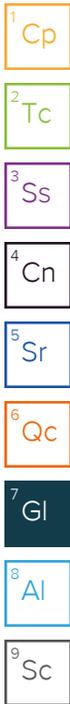
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

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

Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.



ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas
 143 Diamond Avenue
 Parachute, CO 81635

Billing Information:
SAME AS LEFT

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



Pace Analytical
 National Center for Testing & Innovation

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



Report to:
Blair Rollins

Email To:
brollins@caerusoilandgas.com

Project Description:
DIA P&A Assessment

City/State Collected: **Piceance Crk, CO**

Please Circle:
 PT MT CT ET

Phone: **(970) 640-6919**

Client Project #

Lab Project #

Collected by (print):
Tristan Schmalz

Site/Facility ID #
DIA Pad

P.O. #

Collected by (signature):
Tristan Schmalz

Rush? (Lab MUST Be Notified)
 ___ Same Day ___ Five Day
 ___ Next Day ___ 5 Day (Rad Only)
 ___ Two Day ___ 10 Day (Rad Only)
 ___ Three Day

Quote #
 Date Results Needed
Standard TAT

Immediately Packed on Ice N ___ Y X

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs
20221012 DIA-BG04@1A	Grab	SS	1ft	10/12/22	10:40	2
<i>Tristan Schmalz</i>						
10/12/22						

COGCC Table 915-1	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1																	

SDG # **L1546423**

J077

Acctnum:
 Template:
 Prelogin:
 PM:
 PB:
 Shipped Via:

Remarks Sample # (lab only)
 -01

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

Remarks:

Samples returned via:
 ___ UPS ___ FedEx ___ Courier

Tracking # **5755 8085 0904**

pH ___ Temp ___
 Flow ___ Other ___

Sample Receipt Checklist

COC Seal Present/Intact: NP Y N
 COC Signed/Accurate: Y Y N
 Bottles arrive intact: Y Y N
 Correct bottles used: Y Y N
 Sufficient volume sent: Y Y N

If Applicable

VOA Zero Headspace: Y Y N
 Preservation Correct/Checked: Y Y N
 RAD Screen <0.5 mR/hr: Y Y N

Relinquished by: (Signature)
Tristan Schmalz

Date: **10/12/2022**

Time: **12:30**

Received by: (Signature)
AK

Date: **10/12/22**

Time: **1:00**

Received for lab by: (Signature)
[Signature]

Date: **10/13/22**

Time: **9:00**

Trip Blank Received: Yes / No
 HCL / MeOH TBR

Temp: °C
U.9 W=U.S

Bottles Received: **2**

If preservation required by Login: Date/Time

Hold:

Condition:
 NCF OK

Caerus Oil and Gas

Sample Delivery Group: L1546429
Samples Received: 10/13/2022
Project Number:
Description: D12 P+A Assessment
Site: D12 PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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SAMPLE SUMMARY

20221012_D12_BG01@1FT L1546429-01 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/12/22 09:49
 Received date/time: 10/13/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1946284	1	10/28/22 22:07	10/28/22 22:07	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1944316	1	10/18/22 13:29	10/19/22 09:40	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1945484	1	10/19/22 13:27	10/20/22 14:30	AAS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1943406	1	10/15/22 15:09	10/17/22 13:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1946592	1	10/26/22 17:17	10/29/22 00:24	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1943554	1	10/16/22 14:17	10/24/22 10:51	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1946591	5	10/26/22 17:10	10/27/22 21:45	LD	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.215		1	10/28/2022 22:07	WG1946284

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	10/19/2022 09:40	WG1944316

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.94	<u>T8</u>	1	10/20/2022 14:30	WG1945484

Sample Narrative:

L1546429-01 WG1945484: 7.94 at 20.2C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	235		10.0	1	10/17/2022 13:00	WG1943406

Sample Narrative:

L1546429-01 WG1943406: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	201		0.500	1	10/29/2022 00:24	WG1946592
Cadmium	ND		0.500	1	10/29/2022 00:24	WG1946592
Copper	16.0		2.00	1	10/29/2022 00:24	WG1946592
Lead	11.6		0.500	1	10/29/2022 00:24	WG1946592
Nickel	20.0		2.00	1	10/29/2022 00:24	WG1946592
Selenium	ND		2.00	1	10/29/2022 00:24	WG1946592
Silver	ND		1.00	1	10/29/2022 00:24	WG1946592
Zinc	53.9		5.00	1	10/29/2022 00:24	WG1946592

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.402		0.200	1	10/24/2022 10:51	WG1943554

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	6.67		1.00	5	10/27/2022 21:45	WG1946591

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3853641-1 10/19/22 08:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/19/22 09:40 • (DUP) R3853641-7 10/19/22 09:50

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

L1546439-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1546439-06 10/19/22 10:32 • (DUP) R3853641-8 10/19/22 10:37

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

Laboratory Control Sample (LCS)

(LCS) R3853641-2 10/19/22 08:58

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	9.67	96.7	80.0-120	

L1546213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-4 10/19/22 09:14 • (MSD) R3853641-5 10/19/22 09:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	15.0	16.2	75.1	80.9	1	75.0-125			7.46	20

L1546213-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-6 10/19/22 09:24

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	646	ND	642	99.4	50	75.0-125	

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/20/22 14:30 • (DUP) R3851015-2 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	7.94	7.89	1	0.632		1

Sample Narrative:

OS: 7.94 at 20.2C
DUP: 7.89 at 20.2C

L1546441-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1546441-07 10/20/22 14:30 • (DUP) R3851015-3 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.41	8.36	1	0.596		1

Sample Narrative:

OS: 8.41 at 19.2C
DUP: 8.36 at 19.4C

Laboratory Control Sample (LCS)

(LCS) R3851015-1 10/20/22 14:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	9.92	99.2	99.0-101	

Sample Narrative:

LCS: 9.92 at 19.3C



Method Blank (MB)

(MB) R3849327-1 10/17/22 13:00

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

Sample Narrative:

BLANK: at 25C

L1545780-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1545780-01 10/17/22 13:00 • (DUP) R3849327-3 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	241	239	1	0.751		20

Sample Narrative:

OS: at 25C
DUP: at 25C

L1546431-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546431-01 10/17/22 13:00 • (DUP) R3849327-4 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	175	174	1	0.172		20

Sample Narrative:

OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3849327-2 10/17/22 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	1120	1100	98.4	85.0-115	

Sample Narrative:

LCS: at 25C



Method Blank (MB)

(MB) R3854684-1 10/29/22 00:35

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
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS)

(LCS) R3854684-2 10/29/22 00:37

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	107	107	80.0-120	
Cadmium	100	105	105	80.0-120	
Copper	100	103	103	80.0-120	
Lead	100	106	106	80.0-120	
Nickel	100	108	108	80.0-120	
Selenium	100	105	105	80.0-120	
Silver	20.0	20.0	100	80.0-120	
Zinc	100	106	106	80.0-120	

⁷Gl

⁸Al

⁹Sc

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/29/22 00:40 • (MS) R3854684-5 10/29/22 00:47 • (MSD) R3854684-6 10/29/22 00:50

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	404	325	533	0.000	128	1	75.0-125	V	J3 V	48.3	20
Cadmium	100	ND	116	113	116	113	1	75.0-125			2.41	20
Copper	100	11.2	126	128	114	116	1	75.0-125			1.52	20
Lead	100	12.8	128	129	115	116	1	75.0-125			0.629	20
Nickel	100	12.6	129	132	117	120	1	75.0-125			2.01	20
Selenium	100	ND	116	113	116	113	1	75.0-125			2.13	20
Silver	20.0	ND	22.7	22.2	113	111	1	75.0-125			2.01	20
Zinc	100	50.0	149	165	98.7	115	1	75.0-125			10.2	20

Method Blank (MB)

(MB) R3852218-1 10/24/22 10:11

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

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

(LCS) R3852218-2 10/24/22 10:14 • (LCSD) R3852218-3 10/24/22 10:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.01	1.03	101	103	80.0-120			1.95	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3854032-1 10/27/22 20:52

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

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3854032-2 10/27/22 20:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	92.9	92.9	80.0-120	

4 Cn

5 Sr

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/27/22 20:59 • (MS) R3854032-4 10/27/22 21:09 • (MSD) R3854032-5 10/27/22 21:12

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	9.64	112	115	102	105	5	75.0-125			2.65	20

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.
Qualifier	Description
J3	The associated batch QC was outside the established quality control range for precision.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

October 31, 2022

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Caerus Oil and Gas

Sample Delivery Group: L1546431
Samples Received: 10/13/2022
Project Number:
Description: D12 P+A Assessment
Site: D12 PAD
Report To: Brett Middleton
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:



Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

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

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SAMPLE SUMMARY

20221012_D12_BG02@1FT L1546431-01 Solid

Collected by: Tristan Schmalz
 Collected date/time: 10/12/22 10:16
 Received date/time: 10/13/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1946222	1	10/26/22 01:32	10/26/22 01:32	CCE	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1944316	1	10/18/22 13:29	10/19/22 10:01	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1945484	1	10/19/22 13:27	10/20/22 14:30	AAS	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1943406	1	10/15/22 15:09	10/17/22 13:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1946592	1	10/26/22 17:17	10/29/22 00:26	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1943554	1	10/16/22 14:17	10/24/22 10:53	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1946591	5	10/26/22 17:10	10/27/22 21:49	LD	Mt. Juliet, TN

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

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.0542		1	10/26/2022 01:32	WG1946222

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	10/19/2022 10:01	WG1944316

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.91	<u>T8</u>	1	10/20/2022 14:30	WG1945484

Sample Narrative:

L1546431-01 WG1945484: 7.91 at 20C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	175		10.0	1	10/17/2022 13:00	WG1943406

Sample Narrative:

L1546431-01 WG1943406: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	176		0.500	1	10/29/2022 00:26	WG1946592
Cadmium	0.763		0.500	1	10/29/2022 00:26	WG1946592
Copper	14.8		2.00	1	10/29/2022 00:26	WG1946592
Lead	14.6		0.500	1	10/29/2022 00:26	WG1946592
Nickel	14.1		2.00	1	10/29/2022 00:26	WG1946592
Selenium	ND		2.00	1	10/29/2022 00:26	WG1946592
Silver	ND		1.00	1	10/29/2022 00:26	WG1946592
Zinc	54.6		5.00	1	10/29/2022 00:26	WG1946592

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.481		0.200	1	10/24/2022 10:53	WG1943554

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Arsenic	33.7		1.00	5	10/27/2022 21:49	WG1946591

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3853641-1 10/19/22 08:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Hexavalent Chromium	U		0.255	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/19/22 09:40 • (DUP) R3853641-7 10/19/22 09:50

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

L1546439-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1546439-06 10/19/22 10:32 • (DUP) R3853641-8 10/19/22 10:37

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

Laboratory Control Sample (LCS)

(LCS) R3853641-2 10/19/22 08:58

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Hexavalent Chromium	10.0	9.67	96.7	80.0-120	

L1546213-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-4 10/19/22 09:14 • (MSD) R3853641-5 10/19/22 09:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Hexavalent Chromium	20.0	ND	15.0	16.2	75.1	80.9	1	75.0-125			7.46	20

L1546213-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1546213-01 10/19/22 09:03 • (MS) R3853641-6 10/19/22 09:24

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Hexavalent Chromium	646	ND	642	99.4	50	75.0-125	

L1546429-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546429-01 10/20/22 14:30 • (DUP) R3851015-2 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	7.94	7.89	1	0.632		1

Sample Narrative:

OS: 7.94 at 20.2C
DUP: 7.89 at 20.2C

L1546441-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1546441-07 10/20/22 14:30 • (DUP) R3851015-3 10/20/22 14:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.41	8.36	1	0.596		1

Sample Narrative:

OS: 8.41 at 19.2C
DUP: 8.36 at 19.4C

Laboratory Control Sample (LCS)

(LCS) R3851015-1 10/20/22 14:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	9.92	99.2	99.0-101	

Sample Narrative:

LCS: 9.92 at 19.3C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3849327-1 10/17/22 13:00

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

Sample Narrative:

BLANK: at 25C

L1545780-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1545780-01 10/17/22 13:00 • (DUP) R3849327-3 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	241	239	1	0.751		20

Sample Narrative:

OS: at 25C
DUP: at 25C

L1546431-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1546431-01 10/17/22 13:00 • (DUP) R3849327-4 10/17/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	175	174	1	0.172		20

Sample Narrative:

OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3849327-2 10/17/22 13:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	1120	1100	98.4	85.0-115	

Sample Narrative:

LCS: at 25C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3854684-1 10/29/22 00:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/kg		mg/kg	mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS)

(LCS) R3854684-2 10/29/22 00:37

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/kg	mg/kg	%	%	
Barium	100	107	107	80.0-120	
Cadmium	100	105	105	80.0-120	
Copper	100	103	103	80.0-120	
Lead	100	106	106	80.0-120	
Nickel	100	108	108	80.0-120	
Selenium	100	105	105	80.0-120	
Silver	20.0	20.0	100	80.0-120	
Zinc	100	106	106	80.0-120	

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/29/22 00:40 • (MS) R3854684-5 10/29/22 00:47 • (MSD) R3854684-6 10/29/22 00:50

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Barium	100	404	325	533	0.000	128	1	75.0-125	V	J3 V	48.3	20
Cadmium	100	ND	116	113	116	113	1	75.0-125			2.41	20
Copper	100	11.2	126	128	114	116	1	75.0-125			1.52	20
Lead	100	12.8	128	129	115	116	1	75.0-125			0.629	20
Nickel	100	12.6	129	132	117	120	1	75.0-125			2.01	20
Selenium	100	ND	116	113	116	113	1	75.0-125			2.13	20
Silver	20.0	ND	22.7	22.2	113	111	1	75.0-125			2.01	20
Zinc	100	50.0	149	165	98.7	115	1	75.0-125			10.2	20

Method Blank (MB)

(MB) R3852218-1 10/24/22 10:11

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

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

(LCS) R3852218-2 10/24/22 10:14 • (LCSD) R3852218-3 10/24/22 10:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.01	1.03	101	103	80.0-120			1.95	20

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

Method Blank (MB)

(MB) R3854032-1 10/27/22 20:52

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

1 Cp

2 Tc

3 Ss

Laboratory Control Sample (LCS)

(LCS) R3854032-2 10/27/22 20:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	92.9	92.9	80.0-120	

4 Cn

5 Sr

L1546420-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1546420-01 10/27/22 20:59 • (MS) R3854032-4 10/27/22 21:09 • (MSD) R3854032-5 10/27/22 21:12

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	9.64	112	115	102	105	5	75.0-125			2.65	20

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier Description

J3	The associated batch QC was outside the established quality control range for precision.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas
 143 Diamond Avenue
 Parachute, CO 81635

Billing Information:
SAME AS LEFT

Pres
 Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



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



SDG # **L1546431**
J079

Acctnum:
 Template:
 Prelogin:
 PM:
 PB:

Shipped Via:
 Remarks Sample # (lab only)

Report to:
Blair Rollins

Email To:
brollins@caerusoilandgas.com

Project Description:
D12 P&A Assessment

City/State Collected: **Piceance Crk, CO**
 Please Circle: PT MT CT ET

Phone: **(970) 640-6919**

Client Project #

Lab Project #

Collected by (print):
Tristan Schmalz

Site/Facility ID #
D12 Pad

P.O. #

Collected by (signature):
Tristan Schmalz

Rush? (Lab MUST Be Notified)
 Same Day ___ Five Day ___
 Next Day ___ 5 Day (Rad Only) ___
 Two Day ___ 10 Day (Rad Only) ___
 Three Day ___

Quote #
 Date Results Needed
Standard TAT

No. of Cntrs

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Analysis	Container	Preservative	Remarks	Sample # (lab only)
20221012_D12_BOD@K+	Grab	SS	1ft	10/12/22	10:16	2	X				01
<i>Tristan Schmalz</i> 10/12/2022											

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

Remarks:
 Samples returned via:
 ___ UPS ___ FedEx ___ Courier ___

Tracking # **5755 8085 0904**
 pH ___ Temp ___
 Flow ___ Other ___

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

Relinquished by: (Signature)
Tristan Schmalz

Date: **10/12/2022**
 Time: **12:30**

Received by: (Signature)
[Signature]

Trip Blank Received: Yes / (No) HCL / MeOH TBR

Temp: °C **29.0 = 2.9** Bottles Received: **2**

If preservation required by Login: Date/Time

Relinquished by: (Signature)
[Signature]

Date: **10/12/22**
 Time: **1700**

Received by: (Signature)
[Signature]

Received for lab by: (Signature)
[Signature]

Date: **10/13/22** Time: **9:00**

Hold: Condition: **OK**



APPENDIX B
APPROVED COGCC FORM 27 SITE INVESTIGATION AND REMEDIATION WORKPLAN (INITIAL FORM)

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109



Document Number:
403066651
Receive Date:
06/30/2022

Report taken by:
Steven Arauza

Site Investigation and Remediation Workplan (Initial Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by COGCC is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27. This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: CAERUS PICEANCE LLC	Operator No: 10456	Phone Numbers
Address: 1001 17TH STREET #1600		Phone: (970) 285-2925
City: DENVER State: CO Zip: 80202		Mobile: (970) 640-6919
Contact Person: Blair Rollins	Email: brollins@caerusoilandgas.com	

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 24106 Initial Form 27 Document #: 403066651

PURPOSE INFORMATION

- Rule 913.c.(1): Pit or Cuttings Trench closure.
- Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- Rule 913.g: Changes of Operator.
- Rule 915.b: Request to leave elevated inorganics in situ.
- Other: WELL AND FLOWLINE ABANDONMENT FOR THE BENZEL 36-13A

SITE INFORMATION

Yes Multiple Facilities

Facility Type: WELL	Facility ID: _____	API #: 045-08178	County Name: GARFIELD
Facility Name: BENZEL 36-13A (K36B)	Latitude: 39.482550	Longitude: -107.727000	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NESW	Sec: 36	Twp: 6S	Range: 93W Meridian: 6 Sensitive Area? Yes

Facility Type: FLOWLINE	Facility ID: 334899	API #: _____	County Name: GARFIELD
Facility Name: BENZEL-66S93W 36NESW	Latitude: 39.482550	Longitude: -107.727000	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: NESW	Sec: 36	Twp: 6S	Range: 93W Meridian: 6 Sensitive Area? No

SITE CONDITIONS

General soil type - USCS Classifications ML _____

Most Sensitive Adjacent Land Use Grazing/Rangeland _____

Is domestic water well within 1/4 mile? No _____

Is surface water within 1/4 mile? No _____

Is groundwater less than 20 feet below ground surface? No _____

Other Potential Receptors within 1/4 mile

[Empty box for other potential receptors]

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- E&P Waste
- Other E&P Waste
- Non-E&P Waste
- Produced Water
- Workover Fluids
- Oil
- Tank Bottoms
- Condensate
- Pigging Waste
- Drilling Fluids
- Rig Wash
- Drill Cuttings
- Spent Filters
- Pit Bottoms
- Other (as described by EPA) To impacts have been identified

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
UNDETERMINED	SOILS	To be determined	Laboratory analysis

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

Caerus is providing this Form 27 as an initial notification for the plug and abandonment of the Benzel 36-13A natural gas well and associated flowline on the location.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

Caerus will follow the COGCC Rule 911.a.(4) Operator Guidance document to photo-document, field screen and soil sample, the P&A process of both the well head and flowline.

Proposed Groundwater Sampling

Will groundwater samples be collected as part of this investigation? (Number, analyses, and locations of samples):

Caerus does not anticipate encountering groundwater associated with the well head and flowline P&A process. If groundwater is encountered, Caerus will notify the COGCC and attempt to collect a representative sample for analysis.

Proposed Surface Water Sampling

Will surface water samples be collected as part of this investigation? (Number, analyses, and locations of samples):

[Empty box for surface water sampling details]

Additional Investigative Actions

Additional alternative investigative actions described in attached Site Investigation Plan (summary):

[Empty box for additional investigative actions]

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected 0
Number of soil samples exceeding 915-1
Was the areal and vertical extent of soil contamination delineated?
Approximate areal extent (square feet)

NA / ND

NA Highest concentration of TPH (mg/kg)
NA Highest concentration of SAR
BTEX > 915-1
Vertical Extent > 915-1 (in feet)

Groundwater

Number of groundwater samples collected 0
Was extent of groundwater contaminated delineated? No
Depth to groundwater (below ground surface, in feet)
Number of groundwater monitoring wells installed
Number of groundwater samples exceeding 915-1

NA Highest concentration of Benzene (µg/l)
NA Highest concentration of Toluene (µg/l)
NA Highest concentration of Ethylbenzene (µg/l)
NA Highest concentration of Xylene (µg/l)
NA Highest concentration of Methane (mg/l)

Surface Water

 0 Number of surface water samples collected
 Number of surface water samples exceeding 915-1
If surface water is impacted, other agency notification may be required.

OTHER INVESTIGATION INFORMATION

Were impacts to adjacent property or offsite impacts identified?

Were background samples collected as part of this site investigation?

Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards) Volume of liquid waste (barrels)

Is further site investigation required?

REMEDIAL ACTION PLAN

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

No source of impact has been identified to date for the proposed activities. If impacts are identified and confirmed through laboratory analysis, Caerus will provide this information to the COGCC with plans for source removal.

REMEDIATION SUMMARY

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

No source of impact has been identified to date for the proposed activities. If impacts are identified and confirmed through laboratory analysis, Caerus will provide this information to the COGCC with plans for source removal.

Soil Remediation Summary

In Situ

Ex Situ

Bioremediation (or enhanced bioremediation)
 Chemical oxidation
 Air sparge / Soil vapor extraction
 Natural Attenuation
 Other _____

Excavate and offsite disposal
If Yes: Estimated Volume (Cubic Yards) _____
Name of Licensed Disposal Facility or COGCC Facility ID # _____
 Excavate and onsite remediation
 Land Treatment
 Bioremediation (or enhanced bioremediation)
 Chemical oxidation
 Other _____

Groundwater Remediation Summary

No Bioremediation (or enhanced bioremediation)
No Chemical oxidation
No Air sparge / Soil vapor extraction
No Natural Attenuation
No Other _____

GROUNDWATER MONITORING

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

Groundwater is not expected to be encountered at the site. If groundwater is identified, Caerus will attempt to collect a sample for analysis and will provide these results to the COGCC under Supplemental eForm 27.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

Quarterly Semi-Annually Annually Other

Request Alternative Reporting Schedule:

Semi-Annually Annually Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

Report Type: Groundwater Monitoring Land Treatment Progress Report O&M Report
 Other _____

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Plug and Abandonment costs associated with this P&A Form 27 would be covered under Caerus' active Plugging Insurance (Surety ID 20190099).

Operator anticipates the remaining cost for this project to be: \$ _____

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? _____

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

Volume of E&P Waste (solid) in cubic yards _____

E&P waste (solid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

Volume of E&P Waste (liquid) in barrels _____

E&P waste (liquid) description _____

COGCC Disposal Facility ID #, if applicable: _____

Non-COGCC Disposal Facility: _____

RECLAMATION PLAN

RECLAMATION PLANNING

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing.

Caerus plans to return the disturbed area to the active working surface of the well pad for continued operation.

Is the described reclamation complete? No _____

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

Interim Final

Did the Surface Owner provide the seed mix? Yes _____

If YES, does the seed mix comply with local soil conservation district recommendations? Yes _____

Did the local soil conservation district provide the seed mix? Yes _____

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. _____

Proposed date of completion of Reclamation. _____

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. _____

Actual Spill or Release date, or date of discovery. _____

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 06/17/2022

Proposed site investigation commencement. _____

Proposed completion of site investigation. _____

REMEDIAL ACTION DATES

Proposed start date of Remediation. _____

Proposed date of completion of Remediation. _____

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

OPERATOR COMMENT

--

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Jordan Veith

Title: Staff Professional 1

Submit Date: 06/30/2022

Email: jveith@kleinfelder.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Steven Arauza

Date: 07/20/2022

Remediation Project Number: 24106

Condition of Approval**COA Type****Description**

	Comply with COGCC Rule 1105 flowline abandonment requirements, including notification and verification requirements.
	Comply with Rule 912 for any historical impacts that are discovered.
	Provide a revised Implementation Schedule with proposed start and completion dates for Site Investigation and Remediation on the next Supplemental Form 27, per Rule 913.d
	Operator shall collect an appropriate number of representative soil samples to delineate the horizontal and vertical extents of contamination, per Rule 915.e.(2).B.
	Operator shall collect sample(s) from comparable, nearby non-impacted native soil for purposes of establishing background soil conditions including pH, electrical conductivity (EC) and sodium adsorption ratio (SAR), per Rule 915.e.(2).D.
	Per Rule 913.b.(2), the Operator will conduct sampling and analysis of soil, and groundwater--if encountered, to determine the horizontal and vertical extent of any contamination in excess of the cleanup concentrations in Table 915-1 for soil and groundwater. The Operator shall analyze samples for the complete Table 915-1 list and shall delineate the extent of impacts using the Table 915-1 Protection of Groundwater Soil Screening Level Concentrations.

6 COAs

Attachment Check List

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

Att Doc Num**Name**

403066651	FORM 27-INITIAL-SUBMITTED
403067578	SOIL SAMPLE LOCATION MAP

Total Attach: 2 Files

General Comments**User Group****Comment****Comment Date**

		Stamp Upon Approval
--	--	---------------------

Total: 0 comment(s)



APPENDIX C
CAERUS OPERATOR KNOWLEDGE STATEMENT

K36B Remediation Project (REM # 24106)
Produced Water Analysis – Operator Knowledge



On the K36B well pad, produced water is transported through pipelines from the well through the separator unit and then ultimately to the production tanks for storage. Caerus has collected a produced water sample from the production tank to characterize the pH of the produced water being produced from the K36B well pad:

Sample Name	Sample Date	Sample Type	pH
Benzel 36-13A_PW01	11/29/2022	Production tank	7.73

It is the Operators knowledge that the most likely source for impacts around the well head and separator flowline would be due to produced water spills. Based on the laboratory analytical results of the produced water sample collected from the K36B production tanks, Caerus believes that the pH exceedance found in the remediation project excavations are not due to oil and natural gas production activities, but are rather naturally occurring background concentrations within the area.