February 23, 2023
Kleinfelder Project No. 20234315.001A

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 # 24192
H15 Pad
Garfield County, Colorado

Dear Mr. Rollins:

Kleinfelder Inc. (Kleinfelder) performed soil sampling activities at the H15 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.

Vince DeCianne
VP, Senior Principal Professional

KLEINFELDER 707 17th Street, Suite 3000, Denver, CO 80202 p | 303.237.6601 f | 303.237.6602

SITE INVESTIGATION REPORT
CAERUS PICEANCE, LLC
PLUG AND ABANDONMENT CLOSURE
REMEDIATION PROJECT # 24192
H15 PAD
GARFIELD COUNTY, COLORADO

KLEINFELDER PROJECT NO. 20234315.001A

February 23, 2023

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 # 24192
H15 PAD
GARFIELD COUNTY, COLORADO

Prepared by:

Tristan Schmalz
Staff Professional I

Reviewed by:

Vince DeCianne
VP, Senior Principal Professional

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Denver, Colorado 80202
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February 23, 2023
Kleinfelder Project No. 20234315.001A

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SITE INVESTIGATION REPORT
CAERUS PICEANCE, LLC
PLUG AND ABANDONMENT CLOSURE
REMEDIATION PROJECT # 24192
H15 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 H15 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 NPR 22C-15-596 natural gas well and associated flowlines to the separator and gas lift on the location.

Caerus proposed to visually inspect and field screen the excavations directly adjacent to the cut and capped NPR 22C-15-596 well, separator flowline tie-in, and the gas lift flowline tie-in. 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 soil sample from the base of the excavations adjacent to the cut and capped well, separator flowline tie-in, and gas lift flowline tie-in; see approved COGCC Form 27 Site Investigation and Remediation Workplan Initial Form (document # 403100885) (**Appendix B**). Caerus also proposed the collection of soil samples from any tailing's piles associated with the excavations from the P&A project. Additionally, Caerus proposed soil sampling of native undisturbed areas adjacent to the H15 Pad to be used as site-specific background samples Kleinfelder collected the samples. Samples were analyzed by Pace Analytical National (Pace) laboratory and results are reported herein.

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2 SITE LOCATION AND GEOLOGIC SETTING

The H15 Pad is located within the Piceance Basin in Garfield County, northwestern Colorado (SENE, Section 15, Township 5 South, Range 96 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 P&A and flowline removal area was classified using the Unified Soil Classification System (USCS) as clayey gravels, gravel-sand-clay mixtures. Topographical information is provided in **Figure 1**.

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3 FIELD ACTIVITIES

Kleinfelder performed the following field activities at the H15 Pad on **November 2, 2022,** and **November 16, 2022**:

November 2, 2022

- Collected one (1) soil sample from the base of the excavation adjacent to the NPR 22C-15-596 gas lift flowline tie-in,
- Collected one (1) 5-point composite soil sample from the tailings pile that originated from the gas lift flowline tie-in excavation,
- Collected one (1) soil sample from the base of the excavation adjacent to the NPR 22C-15-596 separator flowline tie-in,
- Collected one (1) 5-point composite soil sample from the tailings pile that originated from the separator flowline tie-in excavation, and
- Shipped site soil samples to Pace to analyze for the contaminants of concern listed within COGCC Table 915-1.

November 16, 2022

- Collected four (4) background soil samples from locations north, east, south, and west of the H15 Pad,
- Collected one (1) soil sample from the base of the excavation adjacent to the NPR 22C-15-596 well,
- Collected one (1) 5-point composite soil sample from the tailings pile that originated from the wellhead excavation,
- Shipped the site and background soil samples to Pace to analyze for the applicable contaminants of concern listed within COGCC Table 915-1.

Prior to Kleinfelder's soil screening and sampling activities, Caerus had previously excavated soil around the gas lift flowline tie-in to disconnect the flowline (Excavation #1), excavated soil around the separator flowline tie-in to disconnect the flowline (Excavation #2), and excavated soil around the NPR 22C-15-596 wellhead to cut and cap it (Excavation #3). On November 2nd, Kleinfelder collected one soil sample from the base of Excavation's #1 and #2 at 4 feet below ground surface (bgs), for a total of two (2) soil samples.

One (1) 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.

On November 16th, one soil sample was collected from the base of Excavation #3 within one (1) foot (horizontally) of the well at 6 feet bgs. One (1) 5-point composite soil sample was collected from the tailings pile, which contained soil from Excavation #3. Each composite soil sample was individually homogenized using stainless steel equipment prior to placing into sample jars. Additionally, Kleinfelder collected four (4) background soil samples from 1 ft bgs in native undisturbed soil located north, east, south, and west of the H15 Pad. Kleinfelder used an EOS Arrow 100 Submeter GNSS receiver to record latitude and longitude of the sample locations. Sample locations are shown on **Figures 2a and 2b**.

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 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. Background soil samples were analyzed for contaminants of concern listed in COGCC Table 915-1, excluding organics.

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**.

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4 RESULTS

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

Excluding total petroleum hydrocarbons (TPH), sodium adsorption ratio (SAR), pH, and arsenic, the sample analytical results did not exceed the COGCC Table 915-1 Residential Soil Screening Levels (RSSLs) (**see Table 2**).

- TPH was detected at concentrations above the Table 915-1 RSSLs at the wellhead sample location (WH).
- SAR was detected at concentrations above the Table 915-1 RSSLs at the wellhead and wellhead tailings pile sample locations (WH and WHTP).
- pH was detected at a concentration above the Table 915-1 RSSLs at the following sample locations: GLTP, SEPFL, SEPFLTP, WHTP, and WH.
- Arsenic was detected at concentrations above the Table 915-1 RSSLs; however, all site sample results were within the range of or less than 1.25 times site specific background levels for arsenic concentrations (4.91-20.5 mg/kg).

Analytical results are summarized in **Table 2** and per request from Caerus were compared to COGCC Table 915-1 RSSLs. Site specific and background laboratory reports are provided in **Appendix A**. Sample locations are provided in **Figures 2a and 2b**.

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5 CONCLUSIONS AND RECOMMENDATIONS

Since SAR and pH were detected at concentrations above the Table 915-1 RSSLs in the tailings pile samples (**Table 2**), Kleinfelder recommends all three tailing piles be removed from the site and hauled to a disposal facility and the additional soil sampling activities for vertical and horizontal contamination delineation:

- Collect one (1) soil sample adjacent to the NPR 22C-15-596 wellhead to a depth of 8 feet bgs, which is 2 feet deeper than Excavation #1, for vertical delineation,
- Collect four (4) soil samples 5 horizontal feet from the wellhead in the four cardinal directions (north, south, east, and west) to a depth of 8 feet bgs for horizontal delineation,

See **Figure 3** for proposed sample locations. Each sample location will be field screened. If potential impacts are discovered (i.e., elevated PID readings, hydrocarbon odors), the pothole will be deepened in two-foot intervals until a confirmation sample can be collected.

Additionally, Kleinfelder recommends the collection of a site-specific produced fluid sample to address the pH exceedances. Kleinfelder also recommends reduced analyte suite of TPH and SAR for the additional delineation sampling. Should the collection of a site-specific produced fluid sample be infeasible or the results not beneficial in addressing the pH exceedances, the reduced analyte suite would be for TPH, SAR, and pH and further delineation would be needed adjacent to the separator flowline tie-in.

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.

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FIGURES

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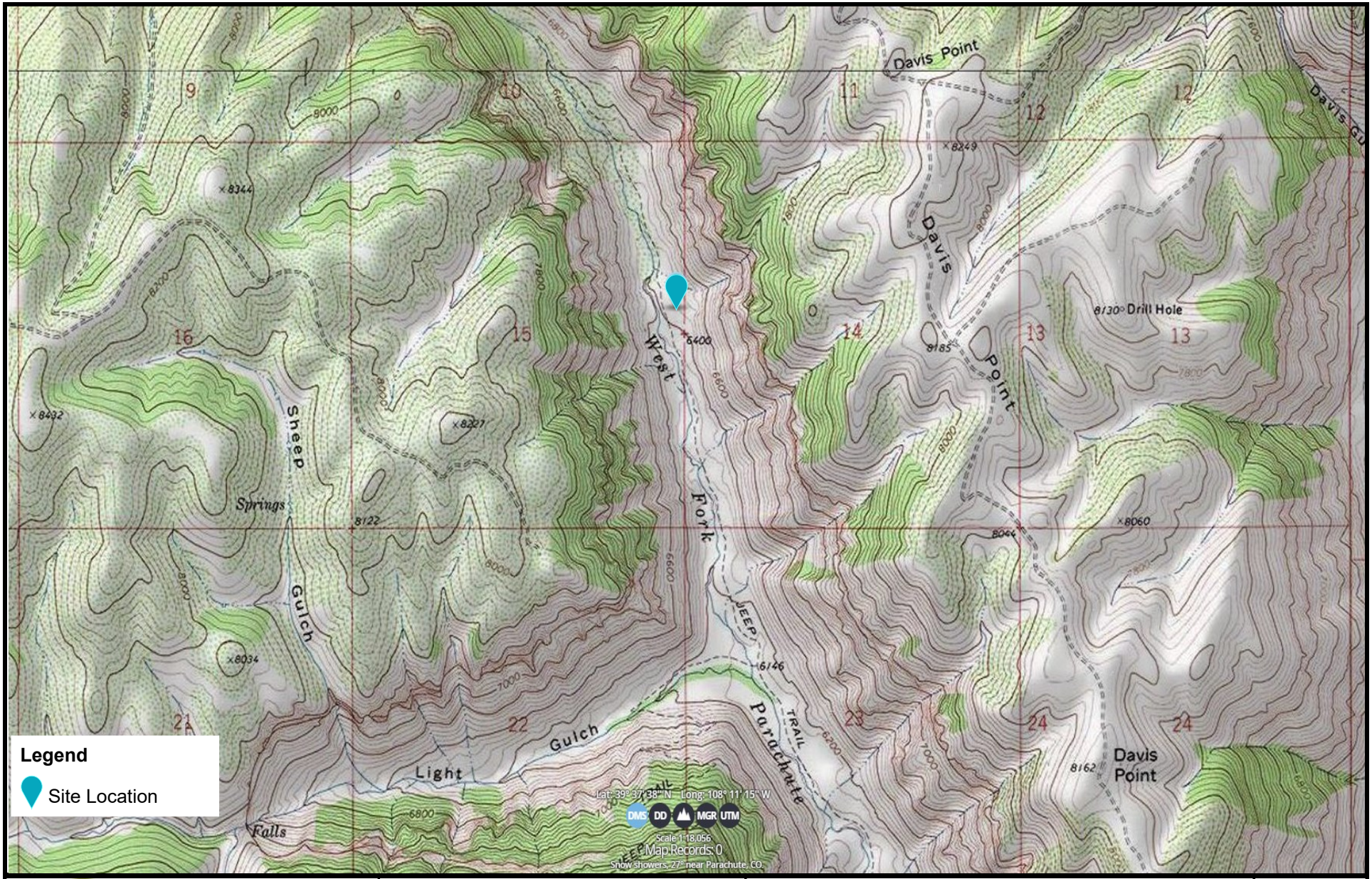

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PROJECT NO.	20234315.001A
DRAWN:	2/23/2023
DRAWN BY:	T. Schmalz
CHECKED BY:	J. Veith
FILE NAME:	H15 (22C Well)_Figure 1_Topo.pub

Topographical Map

Caerus Piceance, LLC
Remediation Project #24192
H15 Pad
SENE Sec. 15 T5S R96W
Garfield County, Colorado

FIGURE

1

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FILE NAME:	H15 (22C Well)_Figure 2a.pub

Site Sample Location Map

Caerus Piceance, LLC
Remediation Project #24192
H15 Pad
SENE Sec. 15 T5S R96W
Garfield County, Colorado

FIGURE

2a

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FILE NAME:	H15 (22C Well)_Figure 2b.pub

Background Sample Location Map

Caerus Piceance, LLC
Remediation Project #24192
H15 Pad
SENE Sec. 15 T5S R96W
Garfield County, Colorado

FIGURE

2b

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DRAWN:	2/23/2023
DRAWN BY:	T. Schmalz
CHECKED BY:	J. Veith
FILE NAME:	H15 (22C Well)_Figure 3.pub

Proposed Sample Location Map

Caerus Piceance, LLC
Remediation Project #24192
H15 Pad
SENE Sec. 15 T5S R96W
Garfield County, Colorado

FIGURE

3

TABLES

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Table 1

COGCC Soil Sampling

by **Tristan Schmalz** on **11/2/2022 and 11/16/2022** for **Caerus H15 Site Assessment**

Caerus - 2022 Sampling Support Services
20234315.001A
DeCianne, Vincent G. (Vince)

Sample Register

Sample ID	Sample Type	Date	Time	Depth	PID (ppmv)	Odor	Staining	Comments
20221102_H15_22C-GL@4ft	Other	11/02/2022	11:24 AM	4 to 4	0	N	N	
20221102_H15_22C-GLTP_COMP	Tailings Pile	11/02/2022	11:47 AM	0 to 0	0	N	N	
20221102_H15_22C-SEPFL@4ft	Other	11/02/2022	12:14 PM	4 to 4	0	N	N	
20221102_H15_22C-SEPFLTP_COMP	Tailings Pile	11/02/2022	12:19 PM	0 to 0	0	N	N	
20221116_H15_BG01@1ft	Background	11/16/2022	11:31 AM	1 to 1	0	N	N	
20221116_H15_BG02@1ft	Background	11/16/2022	11:48 AM	1 to 1	0	N	N	
20221116_H15_BG03@1ft	Background	11/16/2022	12:10 PM	1 to 1	0	N	N	
20221116_H15_BG04@1ft	Background	11/16/2022	12:20 PM	1 to 1	0	N	N	
20221116_H15_22C-WH@6ft	Wellhead	11/16/2022	01:11 PM	6 to 6	0.1	N	N	
20221116_H15_22C-WHTP_COMP	Tailings Pile	11/16/2022	01:20 PM	0 to 0	0	N	N	

Kleinfelder Representative *Signature*

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Table 2 - Soil Analytical Results
Caerus Piceance, LLC
Remediation Project # 24192
H15 Pad
Garfield County, Colorado

		Location ID	**H15_BG01**	**H15_BG02**	**H15_BG03**	**H15_BG04**	**H15_22C-GL**	**H15_22C-GLTP**	**H15_22C-SEPFL**	**H15_22C-SEPFLTP**	**H15_22C-WHTP**	**H15_22C-WH**
		Sample Date	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**	**11/16/2022**
		Sample ID	**20221116_H15_BG01@1ft**	**20221116_H15_BG02@1ft**	**20221116_H15_BG03@1ft**	**20221116_H15_BG04@1ft**	**20221102_H15_22C-GL@4ft**	**20221102_H15_22C-GLTP_COMP**	**20221102_H15_22C-SEPFL@4ft**	**20221102_H15_22C-SEPFLTP_COMP**	**20221116_H15_22C-WHTP_COMP**	**20221116_H15_22C-WH@6ft**
		Sample Depth (ft bgs)	**1**	**1**	**1**	**1**	**4**	**GS**	**4**	**GS**	**GS**	**6**
Contaminant of Concern	**Cleanup Concentration (mg/kg unless otherwise noted)**											
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500		NM	NM	NM	NM	266.167	277.503	252.697	318.652	447	1724.165
TPH Low Fraction GRO (C6-C10)			NM	NM	NM	NM	0.467	0.203	0.297	0.152	<0.100	0.165
DRO (C10-C28)			NM	NM	NM	NM	64.7	63.3	67.4	76.5	154	704
MRO (C28-C36)			NM	NM	NM	NM	201	214	185	242	293	1020
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	Below Visual Detection Limits	Below Visual Detection Limits
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm		0.188	0.356	0.333	0.151	0.151	0.231	0.345	0.280	0.747	1.300
Sodium adsorption ratio (SAR) (by saturated paste method)	<6 SAR units		0.0881	0.113	0.609	0.173	0.685	0.975	1.27	1.14	6.24	8.60
pH (by saturated paste method)	6–8.3 pH units		7.85 T8	7.50 T8	7.79 T8	8.15 T8	8.29 T8	8.33 T8	8.34 T8	8.36 T8	8.76 T8	10.4 T8
Boron (hot water soluble soil extract)	2 mg/L		0.866	1.19	0.894	0.334	0.267	0.821	0.869	0.845	0.853	0.823
Organic Compounds in Soils	**Residential Soil Screening Level Concentrations**	**Protection of Groundwater Soil Screening Level Concentrations Risk Based and MCL Based**										
benzene	1.2	0.0026	NM	NM	NM	NM	<0.00100	<0.00100	<0.00100	<0.00100	0.00420	0.0167
toluene	490	0.69	NM	NM	NM	NM	0.0115	<0.00500	0.00633	<0.00500	0.0137	0.0732
ethylbenzene	5.8	0.78	NM	NM	NM	NM	<0.00250	<0.00250	<0.00250	<0.00250	0.00322	0.0216
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9	NM	NM	NM	NM	<0.00650	<0.00650	<0.00650	<0.00650	0.0190	0.0847
1,2,4-trimethylbenzene	30	0.0081	NM	NM	NM	NM	<0.00500	<0.00500	<0.00500	<0.00500	0.00810	0.0703
1,3,5-trimethylbenzene	27	0.0087	NM	NM	NM	NM	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.0171
acenaphthene	360	0.55	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
anthracene	1800	5.8	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	0.00888	<0.00600
benz(a)anthracene	1.1	0.011	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
benzo(b)fluoranthene	1.1	0.3	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
benzo(k)fluoranthene	11	2.9	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
benzo(a)pyrene	0.11	0.24	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
chrysene	110	9	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	0.00918
dibenz(a,h)anthracene	0.11	0.096	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
fluoranthene	240	8.9	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	0.00796
fluorene	240	0.54	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	0.0286
indeno(1,2,3-cd)pyrene	1.1	0.98	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600
pyrene	180	1.3	NM	NM	NM	NM	<0.00600	<0.00600	<0.00600	<0.00600	0.00670	0.0378
1-methylnaphthalene	18	0.006	NM	NM	NM	NM	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.105
2-methylnaphthalene	24	0.019	NM	NM	NM	NM	0.0243	<0.0200	<0.0200	0.0202	0.0280	0.179
naphthalene	2	0.0038	NM	NM	NM	NM	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0838
Metals in Soils	**Residential Soil Screening Level Concentrations**	**Protection of Groundwater Soil Screening Level Concentrations Risk Based and MCL Based**										
arsenic	0.68	0.29	20.5	18.2	4.91	12.5	7.87	17.6	18.3	22.6	19.3	16.9
barium	15000	82	246	295	235	227	363	681	1260	1080	2210	10800
cadmium	71	0.38	0.504	0.525	<0.500	<0.500	<0.500	<0.500	1.96	<0.500	<0.500	<0.500
chromium (VI)	0.3	0.00067	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
copper	3100	46	28.6	27.4	12.2	15.0	14.0	30.6	28.1	25.5	44.2	153
lead	400	14	17.2	17.6	7.60	13.2	8.64	18.8	17.5	15.4	22.0	15.1
nickel	1500	26	19.3	15.7	11.0	15.0	14.2	22.2	23.4	19.9	19.3	18.8
selenium	390	0.26	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
silver	390	0.8	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
zinc	23000	370	59.5	59.1	34.6	42.7	37.2	62.4	88.2	61.6	360	143

NOTES:

Greater than Table 915-1 Residential Soil Screening Level Concentrations.
Greater than Table 915-1 Protection of Groundwater Soil Screening Level Concentrations Risk Based and MCL Based, but less 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).

ft bgs = feet below ground surface
GS = Ground sruface
MCL = maximum contaminant level
mg/kg = milligram per kilogram
mg/L = milligram per liter
mmhos/cm = millimhos per centimeter
NM = Not Measured
T8 = Samples received past/too close to holding time expiration.

APPENDIX A
LABORATORY ANALYTICAL RESULTS

KLEINFELDER 707 17th Street, Suite 3000, Denver, CO 80202 p | 303.237.6601

ANALYTICAL REPORT

December 01, 2022

Caerus Oil and Gas

Sample Delivery Group:	L1553453
Samples Received:	11/03/2022
Project Number:	
Description:	H15 22C P&A Investigation
Site:	H15 PAD
Report To:	Brett Middleton 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager

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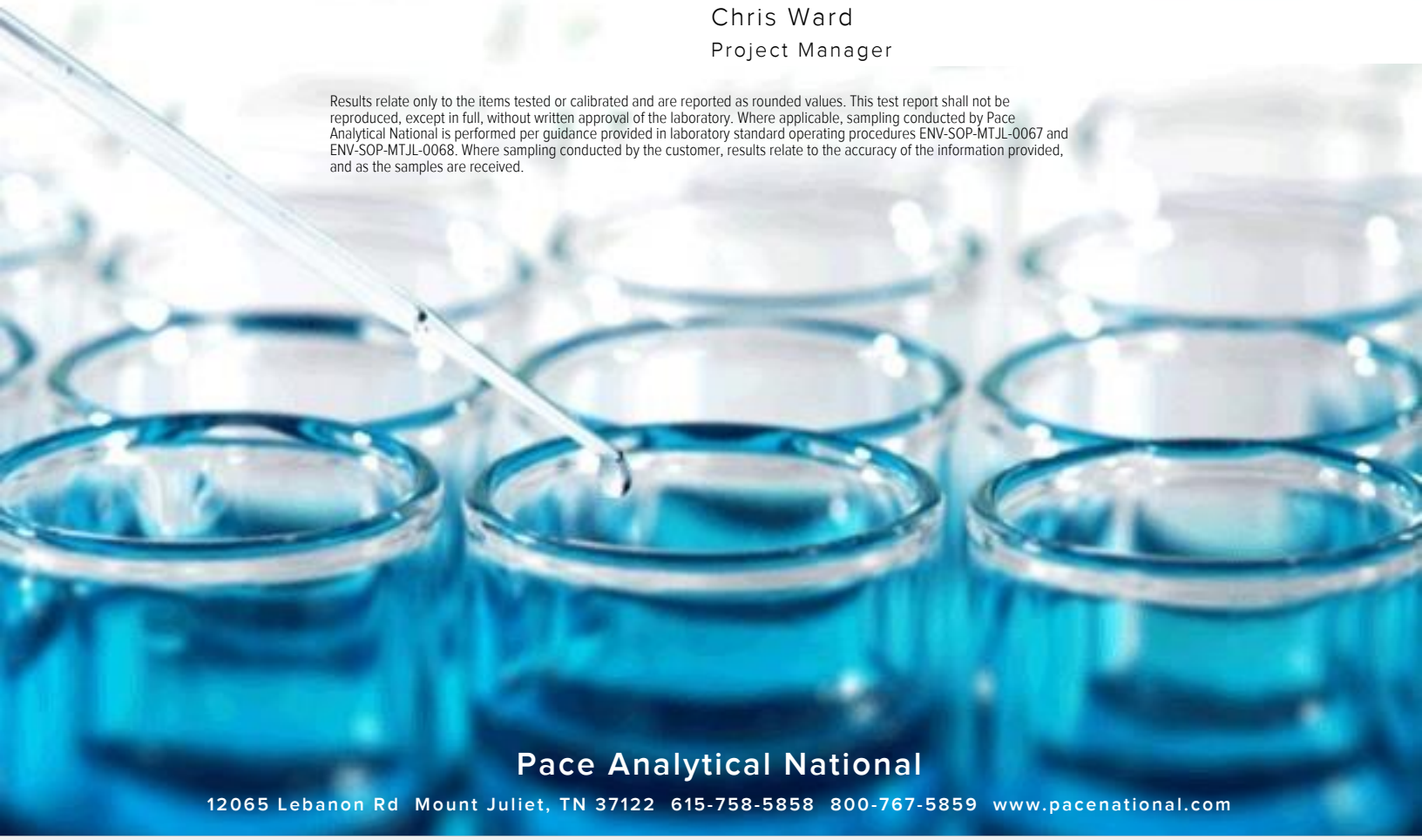

Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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20221102_H15_22C-GL @ 4FT L1553453-01 Solid

Collected by: Tristan Schmalz | Collected date/time: 11/02/22 11:24 | Received date/time: 11/03/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1955963	1	11/10/22 16:23	11/10/22 16:23	ZSA	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1954225	1	11/08/22 10:24	11/09/22 11:07	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1955644	1	11/08/22 11:00	11/08/22 13:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1958133	1	11/11/22 13:42	11/12/22 09:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1960566	1	11/21/22 10:05	11/21/22 21:03	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1954269	1	11/04/22 09:32	11/09/22 10:02	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1959814	5	11/15/22 18:01	11/16/22 18:33	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/03/22 18:40	11/04/22 19:40	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1955579	1	11/03/22 18:40	11/08/22 02:40	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1955311	5	11/07/22 10:00	11/08/22 17:51	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1955256	1	11/07/22 04:36	11/07/22 18:50	AMM	Mt. Juliet, TN

20221102_H15_22C-GLTP_COMP L1553453-02 Solid

Collected by: Tristan Schmalz | Collected date/time: 11/02/22 11:47 | Received date/time: 11/03/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:22	11/25/22 09:22	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1954225	1	11/08/22 10:24	11/09/22 11:13	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1955644	1	11/08/22 11:00	11/08/22 13:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1958133	1	11/11/22 13:42	11/12/22 09:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1960566	1	11/21/22 10:05	11/21/22 21:06	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1954269	1	11/04/22 09:32	11/09/22 10:05	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1959814	5	11/15/22 18:01	11/16/22 18:50	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/03/22 18:40	11/04/22 20:00	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1955579	1	11/03/22 18:40	11/08/22 02:59	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1955311	5	11/07/22 10:00	11/08/22 18:04	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1955256	1	11/07/22 04:36	11/07/22 19:09	AMM	Mt. Juliet, TN

20221102_H15_22C-SEPFL @ 4FT L1553453-03 Solid

Collected by: Tristan Schmalz | Collected date/time: 11/02/22 12:14 | Received date/time: 11/03/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:25	11/25/22 09:25	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1954225	1	11/08/22 10:24	11/09/22 11:23	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1955644	1	11/08/22 11:00	11/08/22 13:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1958133	1	11/11/22 13:42	11/12/22 09:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1960566	1	11/21/22 10:05	11/21/22 21:09	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1954269	1	11/04/22 09:32	11/09/22 10:08	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1959814	5	11/15/22 18:01	11/16/22 18:53	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/03/22 18:40	11/04/22 20:21	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1955579	1	11/03/22 18:40	11/08/22 03:18	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1955311	5	11/07/22 10:00	11/08/22 18:42	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1955256	1	11/07/22 04:36	11/07/22 19:29	AMM	Mt. Juliet, TN

20221102_H15_22C-SEPFLTP_COMP L1553453-04 Solid

Collected by: Tristan Schmalz | Collected date/time: 11/02/22 12:19 | Received date/time: 11/03/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:28	11/25/22 09:28	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1954225	1	11/08/22 10:24	11/09/22 11:28	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1955644	1	11/08/22 11:00	11/08/22 13:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1958133	1	11/11/22 13:42	11/12/22 09:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1960566	1	11/21/22 10:05	11/21/22 21:12	ZSA	Mt. Juliet, TN

SAMPLE SUMMARY

20221102_H15_22C-SEPFLTP_COMP L1553453-04 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/02/22 12:19
Received date/time: 11/03/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1954269	1	11/04/22 09:32	11/09/22 10:10	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1959814	5	11/15/22 18:01	11/16/22 18:56	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1954412	1	11/03/22 18:40	11/04/22 20:41	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1955579	1	11/03/22 18:40	11/08/22 03:37	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1955311	5	11/07/22 10:00	11/08/22 18:16	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1955256	1	11/07/22 04:36	11/07/22 19:49	AMM	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.685		1	11/10/2022 16:23	WG1955963

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/09/2022 11:07	WG1954225

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	8.29	T8	1	11/08/2022 13:00	WG1955644

Sample Narrative:

L1553453-01 WG1955644: 8.29 at 20.4C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	151		10.0	1	11/12/2022 09:00	WG1958133

Sample Narrative:

L1553453-01 WG1958133: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	363		0.500	1	11/21/2022 21:03	WG1960566
Cadmium	ND		0.500	1	11/21/2022 21:03	WG1960566
Copper	14.0		2.00	1	11/21/2022 21:03	WG1960566
Lead	8.64		0.500	1	11/21/2022 21:03	WG1960566
Nickel	14.2		2.00	1	11/21/2022 21:03	WG1960566
Selenium	ND		2.00	1	11/21/2022 21:03	WG1960566
Silver	ND		1.00	1	11/21/2022 21:03	WG1960566
Zinc	37.2		5.00	1	11/21/2022 21:03	WG1960566

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.267		0.200	1	11/09/2022 10:02	WG1954269

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	7.87		1.00	5	11/16/2022 18:33	WG1959814

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
TPH (GC/FID) Low Fraction	0.467		0.100	1	11/04/2022 19:40	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	*95.3*		*77.0-120*		*11/04/2022 19:40*	WG1954412

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	11/08/2022 02:40	WG1955579
Toluene	0.0115		0.00500	1	11/08/2022 02:40	WG1955579
Ethylbenzene	ND		0.00250	1	11/08/2022 02:40	WG1955579
Xylenes, Total	ND		0.00650	1	11/08/2022 02:40	WG1955579
1,2,4-Trimethylbenzene	ND		0.00500	1	11/08/2022 02:40	WG1955579
1,3,5-Trimethylbenzene	ND		0.00500	1	11/08/2022 02:40	WG1955579
(S) Toluene-d8	*105*		*75.0-131*		*11/08/2022 02:40*	WG1955579
(S) 4-Bromofluorobenzene	*99.9*		*67.0-138*		*11/08/2022 02:40*	WG1955579
(S) 1,2-Dichloroethane-d4	*80.0*		*70.0-130*		*11/08/2022 02:40*	WG1955579

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	64.7		20.0	5	11/08/2022 17:51	WG1955311
C28-C36 Motor Oil Range	201		20.0	5	11/08/2022 17:51	WG1955311
(S) o-Terphenyl	*95.4*		*18.0-148*		*11/08/2022 17:51*	WG1955311

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	11/07/2022 18:50	WG1955256
Anthracene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Benzo(a)anthracene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Benzo(b)fluoranthene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Benzo(k)fluoranthene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Benzo(a)pyrene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Chrysene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Dibenz(a,h)anthracene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Fluoranthene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Fluorene	ND		0.00600	1	11/07/2022 18:50	WG1955256
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/07/2022 18:50	WG1955256
1-Methylnaphthalene	ND		0.0200	1	11/07/2022 18:50	WG1955256
2-Methylnaphthalene	0.0243		0.0200	1	11/07/2022 18:50	WG1955256
Naphthalene	ND		0.0200	1	11/07/2022 18:50	WG1955256
Pyrene	ND		0.00600	1	11/07/2022 18:50	WG1955256
(S) p-Terphenyl-d14	*81.5*		*23.0-120*		*11/07/2022 18:50*	WG1955256
(S) Nitrobenzene-d5	*76.1*		*14.0-149*		*11/07/2022 18:50*	WG1955256
(S) 2-Fluorobiphenyl	*81.7*		*34.0-125*		*11/07/2022 18:50*	WG1955256

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.975		1	11/25/2022 09:22	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/09/2022 11:13	WG1954225

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	8.33	T8	1	11/08/2022 13:00	WG1955644

Sample Narrative:

L1553453-02 WG1955644: 8.33 at 20.5C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	231		10.0	1	11/12/2022 09:00	WG1958133

Sample Narrative:

L1553453-02 WG1958133: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	681		0.500	1	11/21/2022 21:06	WG1960566
Cadmium	ND		0.500	1	11/21/2022 21:06	WG1960566
Copper	30.6		2.00	1	11/21/2022 21:06	WG1960566
Lead	18.8		0.500	1	11/21/2022 21:06	WG1960566
Nickel	22.2		2.00	1	11/21/2022 21:06	WG1960566
Selenium	ND		2.00	1	11/21/2022 21:06	WG1960566
Silver	ND		1.00	1	11/21/2022 21:06	WG1960566
Zinc	62.4		5.00	1	11/21/2022 21:06	WG1960566

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.821		0.200	1	11/09/2022 10:05	WG1954269

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	17.6		1.00	5	11/16/2022 18:50	WG1959814

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
TPH (GC/FID) Low Fraction	0.203		0.100	1	11/04/2022 20:00	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	*93.3*		*77.0-120*		*11/04/2022 20:00*	WG1954412

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	11/08/2022 02:59	WG1955579
Toluene	ND		0.00500	1	11/08/2022 02:59	WG1955579
Ethylbenzene	ND		0.00250	1	11/08/2022 02:59	WG1955579
Xylenes, Total	ND		0.00650	1	11/08/2022 02:59	WG1955579
1,2,4-Trimethylbenzene	ND		0.00500	1	11/08/2022 02:59	WG1955579
1,3,5-Trimethylbenzene	ND		0.00500	1	11/08/2022 02:59	WG1955579
(S) Toluene-d8	*107*		*75.0-131*		*11/08/2022 02:59*	WG1955579
(S) 4-Bromofluorobenzene	*99.8*		*67.0-138*		*11/08/2022 02:59*	WG1955579
(S) 1,2-Dichloroethane-d4	*83.4*		*70.0-130*		*11/08/2022 02:59*	WG1955579

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	63.3		20.0	5	11/08/2022 18:04	WG1955311
C28-C36 Motor Oil Range	214		20.0	5	11/08/2022 18:04	WG1955311
(S) o-Terphenyl	*94.6*		*18.0-148*		*11/08/2022 18:04*	WG1955311

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	11/07/2022 19:09	WG1955256
Anthracene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Benzo(a)anthracene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Benzo(b)fluoranthene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Benzo(k)fluoranthene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Benzo(a)pyrene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Chrysene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Dibenz(a,h)anthracene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Fluoranthene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Fluorene	ND		0.00600	1	11/07/2022 19:09	WG1955256
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/07/2022 19:09	WG1955256
1-Methylnaphthalene	ND		0.0200	1	11/07/2022 19:09	WG1955256
2-Methylnaphthalene	ND		0.0200	1	11/07/2022 19:09	WG1955256
Naphthalene	ND		0.0200	1	11/07/2022 19:09	WG1955256
Pyrene	ND		0.00600	1	11/07/2022 19:09	WG1955256
(S) p-Terphenyl-d14	*91.8*		*23.0-120*		*11/07/2022 19:09*	WG1955256
(S) Nitrobenzene-d5	*94.1*		*14.0-149*		*11/07/2022 19:09*	WG1955256
(S) 2-Fluorobiphenyl	*93.0*		*34.0-125*		*11/07/2022 19:09*	WG1955256

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.27		1	11/25/2022 09:25	WG1963636

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/09/2022 11:23	WG1954225

Wet Chemistry by Method 9045D

Analyte	Result pH	Qualifier	Dilution	Analysis date / time	Batch
pH	8.34	T8	1	11/08/2022 13:00	WG1955644

Sample Narrative:

L1553453-03 WG1955644: 8.34 at 20.5C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	345		10.0	1	11/12/2022 09:00	WG1958133

Sample Narrative:

L1553453-03 WG1958133: at 25C

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	1260		0.500	1	11/21/2022 21:09	WG1960566
Cadmium	1.96		0.500	1	11/21/2022 21:09	WG1960566
Copper	28.1		2.00	1	11/21/2022 21:09	WG1960566
Lead	17.5		0.500	1	11/21/2022 21:09	WG1960566
Nickel	23.4		2.00	1	11/21/2022 21:09	WG1960566
Selenium	ND		2.00	1	11/21/2022 21:09	WG1960566
Silver	ND		1.00	1	11/21/2022 21:09	WG1960566
Zinc	88.2		5.00	1	11/21/2022 21:09	WG1960566

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.869		0.200	1	11/09/2022 10:08	WG1954269

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	18.3		1.00	5	11/16/2022 18:53	WG1959814

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.297		0.100	1	11/04/2022 20:21	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	*82.5*		*77.0-120*		*11/04/2022 20:21*	WG1954412

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	11/08/2022 03:18	WG1955579
Toluene	0.00633		0.00500	1	11/08/2022 03:18	WG1955579
Ethylbenzene	ND		0.00250	1	11/08/2022 03:18	WG1955579
Xylenes, Total	ND		0.00650	1	11/08/2022 03:18	WG1955579
1,2,4-Trimethylbenzene	ND		0.00500	1	11/08/2022 03:18	WG1955579
1,3,5-Trimethylbenzene	ND		0.00500	1	11/08/2022 03:18	WG1955579
(S) Toluene-d8	*106*		*75.0-131*		*11/08/2022 03:18*	WG1955579
(S) 4-Bromofluorobenzene	*98.4*		*67.0-138*		*11/08/2022 03:18*	WG1955579
(S) 1,2-Dichloroethane-d4	*84.5*		*70.0-130*		*11/08/2022 03:18*	WG1955579

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	67.4		20.0	5	11/08/2022 18:42	WG1955311
C28-C36 Motor Oil Range	185		20.0	5	11/08/2022 18:42	WG1955311
(S) o-Terphenyl	*109*		*18.0-148*		*11/08/2022 18:42*	WG1955311

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	11/07/2022 19:29	WG1955256
Anthracene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Benzo(a)anthracene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Benzo(b)fluoranthene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Benzo(k)fluoranthene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Benzo(a)pyrene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Chrysene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Dibenz(a,h)anthracene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Fluoranthene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Fluorene	ND		0.00600	1	11/07/2022 19:29	WG1955256
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/07/2022 19:29	WG1955256
1-Methylnaphthalene	ND		0.0200	1	11/07/2022 19:29	WG1955256
2-Methylnaphthalene	ND		0.0200	1	11/07/2022 19:29	WG1955256
Naphthalene	ND		0.0200	1	11/07/2022 19:29	WG1955256
Pyrene	ND		0.00600	1	11/07/2022 19:29	WG1955256
(S) p-Terphenyl-d14	*95.9*		*23.0-120*		*11/07/2022 19:29*	WG1955256
(S) Nitrobenzene-d5	*97.2*		*14.0-149*		*11/07/2022 19:29*	WG1955256
(S) 2-Fluorobiphenyl	*96.1*		*34.0-125*		*11/07/2022 19:29*	WG1955256

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	1.14		1	11/25/2022 09:28	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/09/2022 11:28	WG1954225

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	8.36	T8	1	11/08/2022 13:00	WG1955644

Sample Narrative:

L1553453-04 WG1955644: 8.36 at 20.7C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	280		10.0	1	11/12/2022 09:00	WG1958133

Sample Narrative:

L1553453-04 WG1958133: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	1080		0.500	1	11/21/2022 21:12	WG1960566
Cadmium	ND		0.500	1	11/21/2022 21:12	WG1960566
Copper	25.5		2.00	1	11/21/2022 21:12	WG1960566
Lead	15.4		0.500	1	11/21/2022 21:12	WG1960566
Nickel	19.9		2.00	1	11/21/2022 21:12	WG1960566
Selenium	ND		2.00	1	11/21/2022 21:12	WG1960566
Silver	ND		1.00	1	11/21/2022 21:12	WG1960566
Zinc	61.6		5.00	1	11/21/2022 21:12	WG1960566

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.845		0.200	1	11/09/2022 10:10	WG1954269

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	22.6		1.00	5	11/16/2022 18:56	WG1959814

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
TPH (GC/FID) Low Fraction	0.152		0.100	1	11/04/2022 20:41	WG1954412
(S) a,a,a-Trifluorotoluene(FID)	*91.9*		*77.0-120*		*11/04/2022 20:41*	WG1954412

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	11/08/2022 03:37	WG1955579
Toluene	ND		0.00500	1	11/08/2022 03:37	WG1955579
Ethylbenzene	ND		0.00250	1	11/08/2022 03:37	WG1955579
Xylenes, Total	ND		0.00650	1	11/08/2022 03:37	WG1955579
1,2,4-Trimethylbenzene	ND		0.00500	1	11/08/2022 03:37	WG1955579
1,3,5-Trimethylbenzene	ND		0.00500	1	11/08/2022 03:37	WG1955579
(S) Toluene-d8	*106*		*75.0-131*		*11/08/2022 03:37*	WG1955579
(S) 4-Bromofluorobenzene	*98.2*		*67.0-138*		*11/08/2022 03:37*	WG1955579
(S) 1,2-Dichloroethane-d4	*86.0*		*70.0-130*		*11/08/2022 03:37*	WG1955579

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	76.5		20.0	5	11/08/2022 18:16	WG1955311
C28-C36 Motor Oil Range	242		20.0	5	11/08/2022 18:16	WG1955311
(S) o-Terphenyl	*112*		*18.0-148*		*11/08/2022 18:16*	WG1955311

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	11/07/2022 19:49	WG1955256
Anthracene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Benzo(a)anthracene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Benzo(b)fluoranthene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Benzo(k)fluoranthene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Benzo(a)pyrene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Chrysene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Dibenz(a,h)anthracene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Fluoranthene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Fluorene	ND		0.00600	1	11/07/2022 19:49	WG1955256
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/07/2022 19:49	WG1955256
1-Methylnaphthalene	ND		0.0200	1	11/07/2022 19:49	WG1955256
2-Methylnaphthalene	0.0202		0.0200	1	11/07/2022 19:49	WG1955256
Naphthalene	ND		0.0200	1	11/07/2022 19:49	WG1955256
Pyrene	ND		0.00600	1	11/07/2022 19:49	WG1955256
(S) p-Terphenyl-d14	*89.1*		*23.0-120*		*11/07/2022 19:49*	WG1955256
(S) Nitrobenzene-d5	*92.7*		*14.0-149*		*11/07/2022 19:49*	WG1955256
(S) 2-Fluorobiphenyl	*89.2*		*34.0-125*		*11/07/2022 19:49*	WG1955256

Method Blank (MB)

(MB) R3858840-1 11/09/22 09:47

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

L1553453-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1553453-02 11/09/22 11:13 • (DUP) R3858840-7 11/09/22 11:18

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

L1553463-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1553463-03 11/09/22 11:54 • (DUP) R3858840-8 11/09/22 11:59

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium	ND	ND	1	200	P1	20

Laboratory Control Sample (LCS)

(LCS) R3858840-2 11/09/22 09:55

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	9.68	96.8	80.0-120	

L1553180-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1553180-11 11/09/22 10:26 • (MS) R3858840-3 11/09/22 10:31 • (MSD) R3858840-4 11/09/22 10:36

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 %
Hexavalent Chromium	20.0	12.5	29.0	30.9	82.3	91.7	1	75.0-125			6.32	20

L1553180-11 Original Sample (OS) • Matrix Spike (MS)

(OS) L1553180-11 11/09/22 10:26 • (MS) R3858840-6 11/09/22 10:57

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	638	12.5	617	96.7	50	75.0-125	

L1553778-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1553778-01 11/08/22 13:00 • (DUP) R3858303-3 11/08/22 13:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.83	7.81	1	0.256		1

Sample Narrative:

OS: 7.83 at 20.2C

DUP: 7.81 at 20.3C

Laboratory Control Sample (LCS)

(LCS) R3858303-1 11/08/22 13:00

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 20C

Method Blank (MB)

(MB) R3860256-1 11/12/22 09:00

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

L1553031-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1553031-06 11/12/22 09:00 • (DUP) R3860256-3 11/12/22 09:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2420	2420	1	0.124		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1553653-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1553653-04 11/12/22 09:00 • (DUP) R3860256-4 11/12/22 09:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	84.2	83.5	1	0.835		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3860256-2 11/12/22 09:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1120	99.6	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3863696-1 11/21/22 20:27

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

Laboratory Control Sample (LCS)

(LCS) R3863696-2 11/21/22 20:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	103	103	80.0-120	
Cadmium	100	98.4	98.4	80.0-120	
Copper	100	96.3	96.3	80.0-120	
Lead	100	97.8	97.8	80.0-120	
Nickel	100	98.1	98.1	80.0-120	
Selenium	100	99.7	99.7	80.0-120	
Silver	20.0	18.5	92.6	80.0-120	
Zinc	100	96.0	96.0	80.0-120	

L1553653-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1553653-05 11/21/22 20:32 • (MS) R3863696-5 11/21/22 20:41 • (MSD) R3863696-6 11/21/22 20:44

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	174	263	270	89.2	96.2	1	75.0-125			2.63	20
Cadmium	100	ND	104	102	103	102	1	75.0-125			1.28	20
Copper	100	14.4	117	117	103	102	1	75.0-125			0.584	20
Lead	100	7.39	107	107	100	99.6	1	75.0-125			0.337	20
Nickel	100	17.8	124	123	107	105	1	75.0-125			1.32	20
Selenium	100	ND	102	104	102	104	1	75.0-125			1.01	20
Silver	20.0	ND	19.3	18.9	96.4	94.6	1	75.0-125			1.97	20
Zinc	100	38.3	131	136	92.4	98.0	1	75.0-125			4.18	20

Method Blank (MB)

(MB) R3858966-1 11/09/22 08:53

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) R3858966-2 11/09/22 08:56 • (LCSD) R3858966-3 11/09/22 09:24

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	1.10	1.13	110	113	80.0-120			2.14	20

Method Blank (MB)

(MB) R3861898-1 11/16/22 18:26

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

Laboratory Control Sample (LCS)

(LCS) R3861898-2 11/16/22 18:30

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	97.9	97.9	80.0-120	

L1553453-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1553453-01 11/16/22 18:33 • (MS) R3861898-5 11/16/22 18:43 • (MSD) R3861898-6 11/16/22 18:46

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	100	7.87	102	108	93.9	100	5	75.0-125			6.21	20

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*	

Method Blank (MB)

(MB) R3859011-3 11/07/22 21:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL 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	*105*			*75.0-131*
(S) 4-Bromofluorobenzene	*102*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*81.0*			*70.0-130*

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

(LCS) R3859011-1 11/07/22 20:17 • (LCSD) R3859011-2 11/07/22 20:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.125	0.135	0.131	108	105	70.0-123			3.01	20
Toluene	0.125	0.145	0.135	116	108	75.0-121			7.14	20
Ethylbenzene	0.125	0.138	0.132	110	106	74.0-126			4.44	20
Xylenes, Total	0.375	0.427	0.393	114	105	72.0-127			8.29	20
1,2,4-Trimethylbenzene	0.125	0.134	0.129	107	103	70.0-126			3.80	20
1,3,5-Trimethylbenzene	0.125	0.136	0.126	109	101	73.0-127			7.63	20
(S) Toluene-d8				*106*	*103*	*75.0-131*				
(S) 4-Bromofluorobenzene				*101*	*102*	*67.0-138*				
(S) 1,2-Dichloroethane-d4				*90.1*	*90.7*	*70.0-130*				

Method Blank (MB)

(MB) R3858827-2 11/08/22 13:42

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C36 Motor Oil Range	U		0.274	4.00
(S) o-Terphenyl	*74.2*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3858827-1 11/08/22 13:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	36.2	72.4	50.0-150	
(S) o-Terphenyl			*73.7*	*18.0-148*	

L1553428-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1553428-03 11/08/22 15:14 • (MS) R3858827-3 11/08/22 15:27 • (MSD) R3858827-4 11/08/22 15:40

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	49.4	12.3	40.5	37.8	57.1	51.0	1	50.0-150			6.90	20
(S) o-Terphenyl					*41.3*	*44.7*		*18.0-148*				

Sample Narrative:

OS: Sample does not resemble laboratory standards.

Method Blank (MB)

(MB) R3858338-2 11/07/22 16:13

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	*97.4*			*23.0-120*
(S) Nitrobenzene-d5	*94.5*			*14.0-149*
(S) 2-Fluorobiphenyl	*101*			*34.0-125*

Laboratory Control Sample (LCS)

(LCS) R3858338-1 11/07/22 15:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0611	76.4	50.0-120	
Anthracene	0.0800	0.0665	83.1	50.0-126	
Benzo(a)anthracene	0.0800	0.0737	92.1	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0662	82.8	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0659	82.4	49.0-125	
Benzo(a)pyrene	0.0800	0.0619	77.4	42.0-120	
Chrysene	0.0800	0.0707	88.4	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0656	82.0	47.0-125	
Fluoranthene	0.0800	0.0717	89.6	49.0-129	
Fluorene	0.0800	0.0717	89.6	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0712	89.0	46.0-125	
1-Methylnaphthalene	0.0800	0.0685	85.6	51.0-121	
2-Methylnaphthalene	0.0800	0.0726	90.8	50.0-120	
Naphthalene	0.0800	0.0648	81.0	50.0-120	
Pyrene	0.0800	0.0685	85.6	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3858338-1 11/07/22 15:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			*93.0*	*23.0-120*	
(S) Nitrobenzene-d5			*93.6*	*14.0-149*	
(S) 2-Fluorobiphenyl			*99.2*	*34.0-125*	

L1553466-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1553466-02 11/07/22 22:06 • (MS) R3858338-3 11/07/22 22:26 • (MSD) R3858338-4 11/07/22 22:46

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.0796	ND	0.0406	0.0492	51.0	62.1	1	14.0-127			19.2	27
Anthracene	0.0796	ND	0.0445	0.0557	55.9	70.3	1	10.0-145			22.4	30
Benzo(a)anthracene	0.0796	ND	0.0508	0.0623	63.8	78.7	1	10.0-139			20.3	30
Benzo(b)fluoranthene	0.0796	ND	0.0428	0.0547	53.8	69.1	1	10.0-140			24.4	36
Benzo(k)fluoranthene	0.0796	ND	0.0418	0.0507	52.5	64.0	1	10.0-137			19.2	31
Benzo(a)pyrene	0.0796	ND	0.0479	0.0591	60.2	74.6	1	10.0-141			20.9	31
Chrysene	0.0796	ND	0.0480	0.0617	60.3	77.9	1	10.0-145			25.0	30
Dibenz(a,h)anthracene	0.0796	ND	0.0406	0.0505	51.0	63.8	1	10.0-132			21.7	31
Fluoranthene	0.0796	ND	0.0510	0.0619	64.1	78.2	1	10.0-153			19.3	33
Fluorene	0.0796	ND	0.0478	0.0584	60.1	73.7	1	11.0-130			20.0	29
Indeno(1,2,3-cd)pyrene	0.0796	ND	0.0451	0.0561	56.7	70.8	1	10.0-137			21.7	32
1-Methylnaphthalene	0.0796	ND	0.0507	0.0601	63.7	75.9	1	10.0-142			17.0	28
2-Methylnaphthalene	0.0796	ND	0.0540	0.0645	53.3	66.8	1	10.0-137			17.7	28
Naphthalene	0.0796	ND	0.0480	0.0563	60.3	71.1	1	10.0-135			15.9	27
Pyrene	0.0796	ND	0.0475	0.0580	59.7	73.2	1	10.0-148			19.9	35
(S) p-Terphenyl-d14					*73.7*	*75.9*		*23.0-120*				
(S) Nitrobenzene-d5					*78.4*	*82.7*		*14.0-149*				
(S) 2-Fluorobiphenyl					*76.1*	*81.8*		*34.0-125*				

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier	Description
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	Sample(s) received past/too close to holding time expiration.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
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**

Report to: **Blair Rollins**

Email To: **brollins@caerusoilandgas.com**

Project Description: HIS 22C PHA Investigation

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 #: HIS 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**

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

Chain of Custody Page ___ of ___

SDG # L1553453

D084

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

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	Remarks	Sample # (lab only)
20221102_HIS_22C-GRAB@4FT	Grab	SS	4Ft	11/2/2022	11:24	2	X					-01
20221102_HIS_22C-GRAB_COMP	COMP	SS	GS	11/2/2022	11:47	2	X					-02
20221102_HIS_22C-SEEP@4FT	Grab	SS	4Ft	11/2/2022	12:14	2	X					-03
20221102_HIS_22C-SEEP_COMP	COMP	SS	[redacted] GS	11/2/2022	12:19	2	X					-04

Tristan Schmalz 11/2/2022

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 5755 6085 1337

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Tristan Schmalz	11/2/2022	14:00	
Relinquished by : (Signature)	Date: 11/2/22	Time: 1500	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 6.0-0.2=6.0 °C 0.8+0=0.8 Bottles Received: 8

Date: 11.03.22 Time: 0900

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

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

ANALYTICAL REPORT

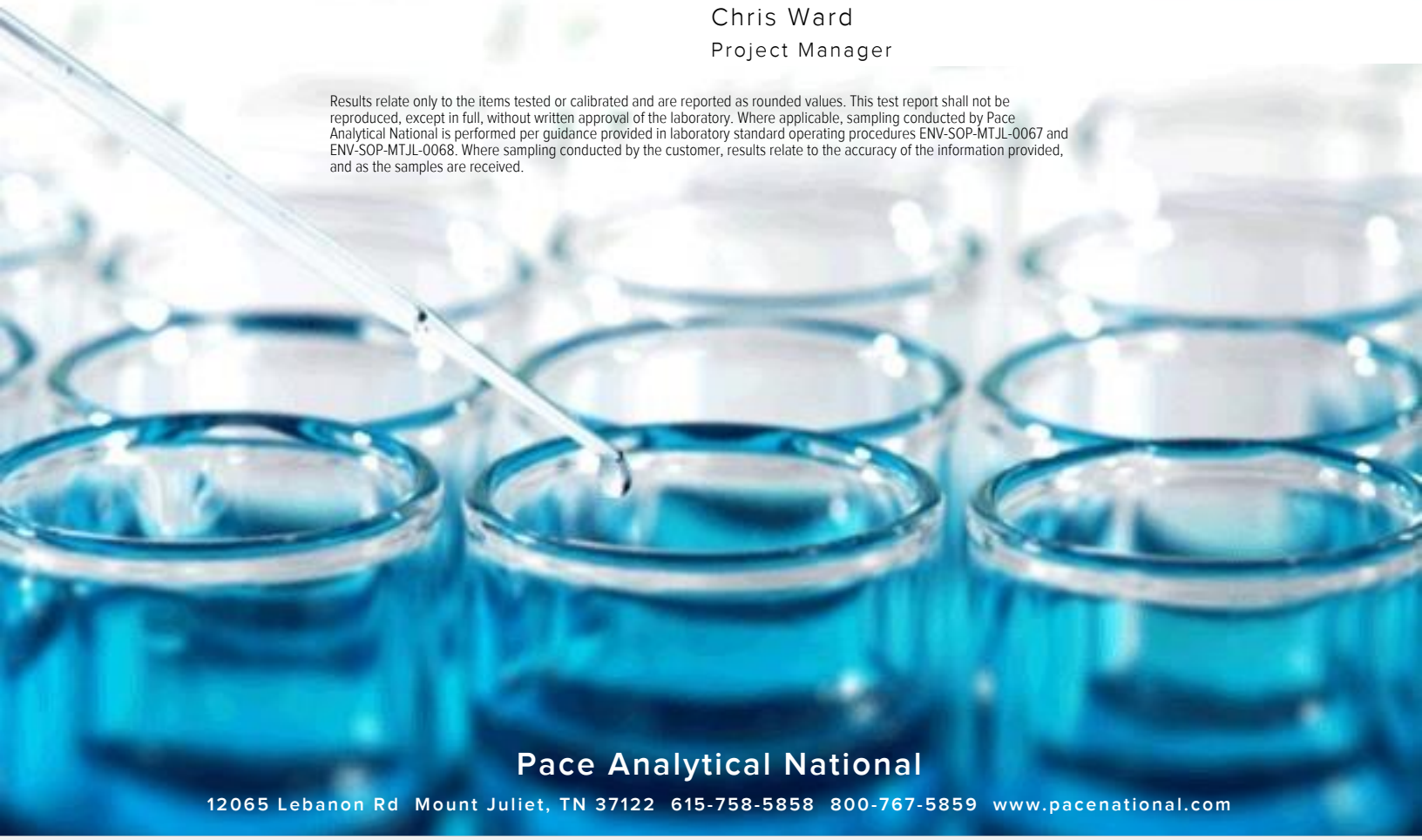
December 05, 2022

Caerus Oil and Gas

Sample Delivery Group:	L1559345
Samples Received:	11/17/2022
Project Number:	
Description:	H15 P&A Assessment-22C Wellhead
Site:	H15 PAD
Report To:	Brett Middleton 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

20221116_H15_22C-WHTP_COMP L1559345-01 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 13:20
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 10:03	11/25/22 10:03	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 16:17	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1963919	1	11/23/22 08:38	11/23/22 10:38	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1960857	1	11/19/22 11:00	11/19/22 15:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:32	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 18:16	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 21:46	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1965180	1	11/18/22 16:57	11/26/22 21:01	BAM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1964278	1	11/18/22 16:57	11/23/22 17:54	JHH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1963441	20	11/22/22 06:56	11/22/22 13:45	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1962886	1	11/22/22 07:51	11/23/22 16:36	JRM	Mt. Juliet, TN

20221116_H15_22C-WH @ 6 FT L1559345-02 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 13:11
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 10:06	11/25/22 10:06	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 16:37	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1963919	1	11/23/22 08:38	11/23/22 10:38	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1963663	1	11/26/22 10:34	11/27/22 08:45	ARD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:35	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	5	11/30/22 18:05	12/04/22 09:27	ABL	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 18:18	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 21:50	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1965180	1	11/18/22 16:57	11/26/22 21:21	BAM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1963842	1	11/18/22 16:57	11/22/22 18:35	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1963441	20	11/22/22 06:56	11/22/22 14:11	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1962886	1	11/22/22 07:51	11/23/22 17:35	JRM	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.24		1	11/25/2022 10:03	WG1963636

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	11/22/2022 16:17	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result pH	Qualifier	Dilution	Analysis date / time	Batch
pH	8.76	T8	1	11/23/2022 10:38	WG1963919

Sample Narrative:
L1559345-01 WG1963919: 8.76 at 20C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	747		10.0	1	11/19/2022 15:00	WG1960857

Sample Narrative:
L1559345-01 WG1960857: at 25C

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	2210		0.500	1	12/02/2022 18:32	WG1963031
Cadmium	ND		0.500	1	12/02/2022 18:32	WG1963031
Copper	44.2		2.00	1	12/02/2022 18:32	WG1963031
Lead	22.0		0.500	1	12/02/2022 18:32	WG1963031
Nickel	19.3		2.00	1	12/02/2022 18:32	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:32	WG1963031
Silver	ND		1.00	1	12/02/2022 18:32	WG1963031
Zinc	360		5.00	1	12/02/2022 18:32	WG1963031

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	0.853		0.200	1	11/29/2022 18:16	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	19.3		1.00	5	12/01/2022 21:46	WG1963033

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	11/26/2022 21:01	WG1965180
(S) a,a,a-Trifluorotoluene(FID)	*91.2*		*77.0-120*		*11/26/2022 21:01*	WG1965180

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.00420		0.00100	1	11/23/2022 17:54	WG1964278
Toluene	0.0137		0.00500	1	11/23/2022 17:54	WG1964278
Ethylbenzene	0.00322		0.00250	1	11/23/2022 17:54	WG1964278
Xylenes, Total	0.0190		0.00650	1	11/23/2022 17:54	WG1964278
1,2,4-Trimethylbenzene	0.00810		0.00500	1	11/23/2022 17:54	WG1964278
1,3,5-Trimethylbenzene	ND		0.00500	1	11/23/2022 17:54	WG1964278
(S) Toluene-d8	*102*		*75.0-131*		*11/23/2022 17:54*	WG1964278
(S) 4-Bromofluorobenzene	*92.0*		*67.0-138*		*11/23/2022 17:54*	WG1964278
(S) 1,2-Dichloroethane-d4	*96.9*		*70.0-130*		*11/23/2022 17:54*	WG1964278

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	154		80.0	20	11/22/2022 13:45	WG1963441
C28-C36 Motor Oil Range	293		80.0	20	11/22/2022 13:45	WG1963441
(S) o-Terphenyl	*0.000*	J7	*18.0-148*		*11/22/2022 13:45*	WG1963441

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	11/23/2022 16:36	WG1962886
Anthracene	0.00888		0.00600	1	11/23/2022 16:36	WG1962886
Benzo(a)anthracene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Benzo(b)fluoranthene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Benzo(k)fluoranthene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Benzo(a)pyrene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Chrysene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Dibenz(a,h)anthracene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Fluoranthene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Fluorene	ND		0.00600	1	11/23/2022 16:36	WG1962886
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/23/2022 16:36	WG1962886
1-Methylnaphthalene	ND		0.0200	1	11/23/2022 16:36	WG1962886
2-Methylnaphthalene	0.0280		0.0200	1	11/23/2022 16:36	WG1962886
Naphthalene	ND		0.0200	1	11/23/2022 16:36	WG1962886
Pyrene	0.00670		0.00600	1	11/23/2022 16:36	WG1962886
(S) p-Terphenyl-d14	*84.8*		*23.0-120*		*11/23/2022 16:36*	WG1962886
(S) Nitrobenzene-d5	*97.6*		*14.0-149*		*11/23/2022 16:36*	WG1962886
(S) 2-Fluorobiphenyl	*80.8*		*34.0-125*		*11/23/2022 16:36*	WG1962886

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	8.60		1	11/25/2022 10:06	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/22/2022 16:37	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	10.4	T8	1	11/23/2022 10:38	WG1963919

Sample Narrative:

L1559345-02 WG1963919: 10.39 at 20C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	1300		10.0	1	11/27/2022 08:45	WG1963663

Sample Narrative:

L1559345-02 WG1963663: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	10800		2.50	5	12/04/2022 09:27	WG1963031
Cadmium	ND		0.500	1	12/02/2022 18:35	WG1963031
Copper	153		2.00	1	12/02/2022 18:35	WG1963031
Lead	15.1		0.500	1	12/02/2022 18:35	WG1963031
Nickel	18.8		2.00	1	12/02/2022 18:35	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:35	WG1963031
Silver	ND		1.00	1	12/02/2022 18:35	WG1963031
Zinc	143		5.00	1	12/02/2022 18:35	WG1963031

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.823		0.200	1	11/29/2022 18:18	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	16.9		1.00	5	12/01/2022 21:50	WG1963033

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
TPH (GC/FID) Low Fraction	0.165		0.100	1	11/26/2022 21:21	WG1965180
(S) a,a,a-Trifluorotoluene(FID)	*90.1*		*77.0-120*		*11/26/2022 21:21*	WG1965180

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.0167		0.00100	1	11/22/2022 18:35	WG1963842
Toluene	0.0732		0.00500	1	11/22/2022 18:35	WG1963842
Ethylbenzene	0.0216		0.00250	1	11/22/2022 18:35	WG1963842
Xylenes, Total	0.0847		0.00650	1	11/22/2022 18:35	WG1963842
1,2,4-Trimethylbenzene	0.0703		0.00500	1	11/22/2022 18:35	WG1963842
1,3,5-Trimethylbenzene	0.0171		0.00500	1	11/22/2022 18:35	WG1963842
(S) Toluene-d8	*109*		*75.0-131*		*11/22/2022 18:35*	WG1963842
(S) 4-Bromofluorobenzene	*105*		*67.0-138*		*11/22/2022 18:35*	WG1963842
(S) 1,2-Dichloroethane-d4	*68.8*	J2	*70.0-130*		*11/22/2022 18:35*	WG1963842

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	704		80.0	20	11/22/2022 14:11	WG1963441
C28-C36 Motor Oil Range	1020		80.0	20	11/22/2022 14:11	WG1963441
(S) o-Terphenyl	*0.000*	J7	*18.0-148*		*11/22/2022 14:11*	WG1963441

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	11/23/2022 17:35	WG1962886
Anthracene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Benzo(a)anthracene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Benzo(b)fluoranthene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Benzo(k)fluoranthene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Benzo(a)pyrene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Chrysene	0.00918		0.00600	1	11/23/2022 17:35	WG1962886
Dibenz(a,h)anthracene	ND		0.00600	1	11/23/2022 17:35	WG1962886
Fluoranthene	0.00796		0.00600	1	11/23/2022 17:35	WG1962886
Fluorene	0.0286		0.00600	1	11/23/2022 17:35	WG1962886
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	11/23/2022 17:35	WG1962886
1-Methylnaphthalene	0.105		0.0200	1	11/23/2022 17:35	WG1962886
2-Methylnaphthalene	0.179		0.0200	1	11/23/2022 17:35	WG1962886
Naphthalene	0.0838		0.0200	1	11/23/2022 17:35	WG1962886
Pyrene	0.0378		0.00600	1	11/23/2022 17:35	WG1962886
(S) p-Terphenyl-d14	*79.2*		*23.0-120*		*11/23/2022 17:35*	WG1962886
(S) Nitrobenzene-d5	*79.5*		*14.0-149*		*11/23/2022 17:35*	WG1962886
(S) 2-Fluorobiphenyl	*77.7*		*34.0-125*		*11/23/2022 17:35*	WG1962886

Method Blank (MB)

(MB) R3864988-1 11/22/22 14:30

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

L1559341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559341-01 11/22/22 15:56 • (DUP) R3864988-8 11/22/22 16:01

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

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/22/22 16:17 • (DUP) R3864988-9 11/22/22 16:22

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

Laboratory Control Sample (LCS)

(LCS) R3864988-2 11/22/22 14:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.4	104	80.0-120	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-3 11/22/22 14:59 • (MSD) R3864988-5 11/22/22 15:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	17.0	13.4	85.1	67.2	1	75.0-125		J3 J6	23.5	20

Sample Narrative:

OS: Sample is an oxidizer.

L1559319-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-7 11/22/22 15:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	643	ND	685	107	50	75.0-125	

Sample Narrative:

OS: Sample is an oxidizer.

L1559442-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559442-01 11/23/22 10:38 • (DUP) R3864418-2 11/23/22 10:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.23	8.20	1	0.365		1

Sample Narrative:

OS: 8.23 at 20.2C

DUP: 8.2 at 20C

L1559681-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1559681-03 11/23/22 10:38 • (DUP) R3864418-3 11/23/22 10:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.02	7.03	1	0.142		1

Sample Narrative:

OS: 7.02 at 19.4C

DUP: 7.03 at 19.5C

Laboratory Control Sample (LCS)

(LCS) R3864418-1 11/23/22 10:38

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 20.8C

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

Method Blank (MB)

(MB) R3863069-1 11/19/22 15:00

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

L1557999-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1557999-02 11/19/22 15:00 • (DUP) R3863069-3 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	177	175	1	0.739		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/19/22 15:00 • (DUP) R3863069-4 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	747	752	1	0.667		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3863069-2 11/19/22 15:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1060	94.5	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3865285-1 11/27/22 08:45

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

L1559352-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1559352-02 11/27/22 08:45 • (DUP) R3865285-3 11/27/22 08:45

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	427	407	1	4.80		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1560987-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1560987-02 11/27/22 08:45 • (DUP) R3865285-4 11/27/22 08:45

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2710	2780	1	2.52		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3865285-2 11/27/22 08:45

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1120	99.6	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3867699-1 12/02/22 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.150	J	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

Laboratory Control Sample (LCS)

(LCS) R3867699-2 12/02/22 17:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	89.8	89.8	80.0-120	
Cadmium	100	85.4	85.4	80.0-120	
Copper	100	86.6	86.6	80.0-120	
Lead	100	84.6	84.6	80.0-120	
Nickel	100	85.3	85.3	80.0-120	
Selenium	100	85.4	85.4	80.0-120	
Silver	20.0	16.2	80.8	80.0-120	
Zinc	100	83.8	83.8	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/02/22 17:39 • (MS) R3867699-5 12/02/22 17:47 • (MSD) R3867699-6 12/02/22 17:50

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	6940	7280	8140	337	1190	1	75.0-125	E V	E V	11.1	20
Cadmium	100	ND	92.8	93.7	92.8	93.7	1	75.0-125			0.954	20
Copper	100	19.2	120	124	100	104	1	75.0-125			3.28	20
Lead	100	19.9	129	112	109	92.1	1	75.0-125			14.0	20
Nickel	100	9.14	103	107	93.5	98.3	1	75.0-125			4.60	20
Selenium	100	ND	92.9	94.2	92.9	94.2	1	75.0-125			1.39	20
Silver	20.0	ND	17.9	18.2	89.4	90.9	1	75.0-125			1.60	20
Zinc	100	145	241	235	96.3	90.3	1	75.0-125			2.51	20

Method Blank (MB)

(MB) R3866274-1 11/29/22 17:38

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) R3866274-2 11/29/22 17:41 • (LCSD) R3866274-3 11/29/22 17:43

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	1.02	101	102	80.0-120			0.459	20

Method Blank (MB)

(MB) R3867276-1 12/01/22 20:39

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

Laboratory Control Sample (LCS)

(LCS) R3867276-2 12/01/22 20:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	98.2	98.2	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/01/22 20:46 • (MS) R3867276-5 12/01/22 20:56 • (MSD) R3867276-6 12/01/22 20:59

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	4.50	107	108	102	104	5	75.0-125			1.04	20

Method Blank (MB)

(MB) R3865639-2 11/26/22 20:15

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)	*96.9*			*77.0-120*

Laboratory Control Sample (LCS)

(LCS) R3865639-1 11/26/22 18:52

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	4.43	80.5	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			*102*	*77.0-120*	

Method Blank (MB)

(MB) R3864295-3 11/22/22 11:30

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL 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	*108*			*75.0-131*
(S) 4-Bromofluorobenzene	*100*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*71.8*			*70.0-130*

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

(LCS) R3864295-1 11/22/22 10:05 • (LCSD) R3864295-2 11/22/22 10:26

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.125	0.112	0.119	89.6	95.2	70.0-123			6.06	20
Toluene	0.125	0.128	0.130	102	104	75.0-121			1.55	20
Ethylbenzene	0.125	0.132	0.145	106	116	74.0-126			9.39	20
Xylenes, Total	0.375	0.381	0.414	102	110	72.0-127			8.30	20
1,2,4-Trimethylbenzene	0.125	0.114	0.121	91.2	96.8	70.0-126			5.96	20
1,3,5-Trimethylbenzene	0.125	0.109	0.115	87.2	92.0	73.0-127			5.36	20
(S) Toluene-d8				*110*	*110*	*75.0-131*				
(S) 4-Bromofluorobenzene				*104*	*111*	*67.0-138*				
(S) 1,2-Dichloroethane-d4				*93.4*	*96.4*	*70.0-130*				

Method Blank (MB)

(MB) R3864960-3 11/23/22 11:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL 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	*93.1*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*96.0*			*70.0-130*

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

(LCS) R3864960-1 11/23/22 09:44 • (LCSD) R3864960-2 11/23/22 10:03

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.125	0.127	0.124	102	99.2	70.0-123			2.39	20
Toluene	0.125	0.122	0.114	97.6	91.2	75.0-121			6.78	20
Ethylbenzene	0.125	0.110	0.112	88.0	89.6	74.0-126			1.80	20
Xylenes, Total	0.375	0.323	0.308	86.1	82.1	72.0-127			4.75	20
1,2,4-Trimethylbenzene	0.125	0.115	0.114	92.0	91.2	70.0-126			0.873	20
1,3,5-Trimethylbenzene	0.125	0.116	0.113	92.8	90.4	73.0-127			2.62	20
(S) Toluene-d8				*98.8*	*96.4*	*75.0-131*				
(S) 4-Bromofluorobenzene				*98.1*	*94.6*	*67.0-138*				
(S) 1,2-Dichloroethane-d4				*108*	*108*	*70.0-130*				

Method Blank (MB)

(MB) R3864156-2 11/22/22 10:05

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C36 Motor Oil Range	U		0.274	4.00
(S) o-Terphenyl	*57.5*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3864156-1 11/22/22 09:52

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	33.3	66.6	50.0-150	
(S) o-Terphenyl			*77.6*	*18.0-148*	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 12:15 • (MS) R3864156-3 11/22/22 12:27 • (MSD) R3864156-4 11/22/22 12:40

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	49.7	200	78.2	162	0.000	0.000	1	50.0-150	V	J3 J6	69.8	20
(S) o-Terphenyl					*49.4*	*73.2*		*18.0-148*				

Method Blank (MB)

(MB) R3864668-2 11/23/22 10:58

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	*106*			*23.0-120*
(S) Nitrobenzene-d5	*90.6*			*14.0-149*
(S) 2-Fluorobiphenyl	*96.4*			*34.0-125*

Laboratory Control Sample (LCS)

(LCS) R3864668-1 11/23/22 10:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0709	88.6	50.0-120	
Anthracene	0.0800	0.0751	93.9	50.0-126	
Benzo(a)anthracene	0.0800	0.0870	109	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0734	91.8	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0734	91.8	49.0-125	
Benzo(a)pyrene	0.0800	0.0673	84.1	42.0-120	
Chrysene	0.0800	0.0813	102	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0714	89.3	47.0-125	
Fluoranthene	0.0800	0.0767	95.9	49.0-129	
Fluorene	0.0800	0.0757	94.6	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0787	98.4	46.0-125	
1-Methylnaphthalene	0.0800	0.0729	91.1	51.0-121	
2-Methylnaphthalene	0.0800	0.0754	94.3	50.0-120	
Naphthalene	0.0800	0.0724	90.5	50.0-120	
Pyrene	0.0800	0.0759	94.9	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3864668-1 11/23/22 10:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			*99.8*	*23.0-120*	
(S) Nitrobenzene-d5			*93.3*	*14.0-149*	
(S) 2-Fluorobiphenyl			*95.3*	*34.0-125*	

L1558787-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1558787-11 11/23/22 15:16 • (MS) R3864668-3 11/23/22 15:36 • (MSD) R3864668-4 11/23/22 15:56

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	0.0788	ND	0.0618	0.0581	78.4	73.7	1	14.0-127			6.17	27
Anthracene	0.0788	ND	0.0676	0.0634	85.8	80.5	1	10.0-145			6.41	30
Benzo(a)anthracene	0.0788	ND	0.0822	0.0752	101	91.7	1	10.0-139			8.89	30
Benzo(b)fluoranthene	0.0788	ND	0.0589	0.0543	69.9	64.0	1	10.0-140			8.13	36
Benzo(k)fluoranthene	0.0788	ND	0.0575	0.0531	73.0	67.4	1	10.0-137			7.96	31
Benzo(a)pyrene	0.0788	ND	0.0691	0.0637	87.7	80.8	1	10.0-141			8.13	31
Chrysene	0.0788	ND	0.0704	0.0638	85.9	77.5	1	10.0-145			9.84	30
Dibenz(a,h)anthracene	0.0788	ND	0.0580	0.0535	73.6	67.9	1	10.0-132			8.07	31
Fluoranthene	0.0788	ND	0.0710	0.0665	82.9	77.2	1	10.0-153			6.55	33
Fluorene	0.0788	ND	0.0663	0.0621	84.1	78.8	1	11.0-130			6.54	29
Indeno(1,2,3-cd)pyrene	0.0788	ND	0.0649	0.0600	79.7	73.5	1	10.0-137			7.85	32
1-Methylnaphthalene	0.0788	ND	0.0651	0.0622	82.6	78.9	1	10.0-142			4.56	28
2-Methylnaphthalene	0.0788	ND	0.0676	0.0649	85.8	82.4	1	10.0-137			4.08	28
Naphthalene	0.0788	ND	0.0660	0.0651	83.8	82.6	1	10.0-135			1.37	27
Pyrene	0.0788	ND	0.0669	0.0610	78.7	71.2	1	10.0-148			9.23	35
(S) p-Terphenyl-d14					*79.8*	*82.7*		*23.0-120*				
(S) Nitrobenzene-d5					*91.7*	*93.7*		*14.0-149*				
(S) 2-Fluorobiphenyl					*77.8*	*79.3*		*34.0-125*				

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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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.

ANALYTICAL REPORT

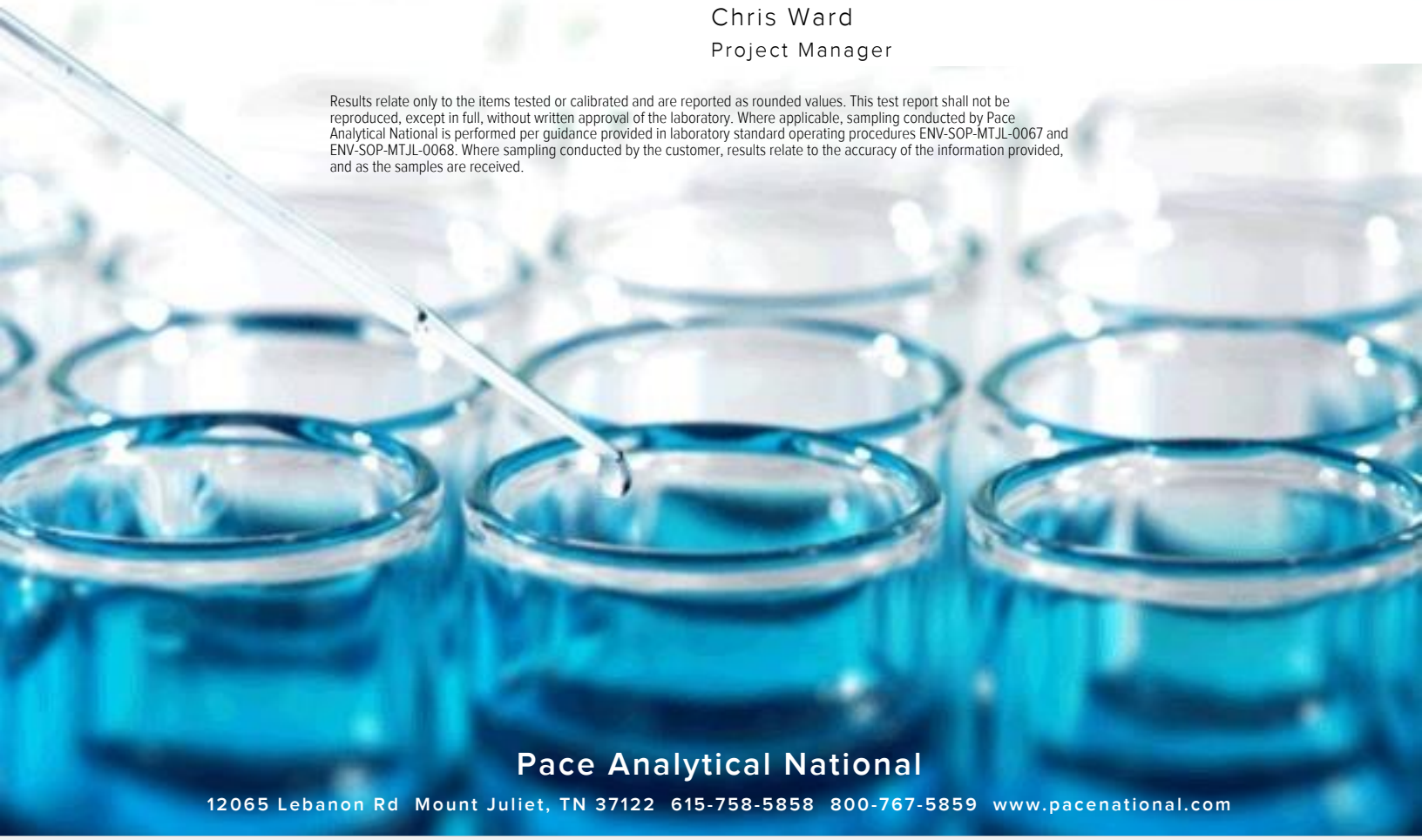
December 05, 2022

Caerus Oil and Gas

Sample Delivery Group:	L1559342
Samples Received:	11/17/2022
Project Number:	
Description:	H15 P&A Assessment
Site:	H15 PAD
Report To:	Brett Middleton 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By:

Chris Ward
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

20221116_H15_BG01 @ 1 FT L1559342-01 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 11:31
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:57	11/25/22 09:57	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 16:06	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1962476	1	11/23/22 12:00	11/23/22 14:11	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1960857	1	11/19/22 11:00	11/19/22 15:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:26	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 18:10	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 21:40	LD	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.0881		1	11/25/2022 09:57	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/22/2022 16:06	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	7.85	T8	1	11/23/2022 14:11	WG1962476

Sample Narrative:

L1559342-01 WG1962476: 7.85 at 19C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	188		10.0	1	11/19/2022 15:00	WG1960857

Sample Narrative:

L1559342-01 WG1960857: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	246		0.500	1	12/02/2022 18:26	WG1963031
Cadmium	0.504		0.500	1	12/02/2022 18:26	WG1963031
Copper	28.6		2.00	1	12/02/2022 18:26	WG1963031
Lead	17.2		0.500	1	12/02/2022 18:26	WG1963031
Nickel	19.3		2.00	1	12/02/2022 18:26	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:26	WG1963031
Silver	ND		1.00	1	12/02/2022 18:26	WG1963031
Zinc	59.5		5.00	1	12/02/2022 18:26	WG1963031

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.866		0.200	1	11/29/2022 18:10	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	20.5		1.00	5	12/01/2022 21:40	WG1963033

Method Blank (MB)

(MB) R3864988-1 11/22/22 14:30

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

L1559341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559341-01 11/22/22 15:56 • (DUP) R3864988-8 11/22/22 16:01

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

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/22/22 16:17 • (DUP) R3864988-9 11/22/22 16:22

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

Laboratory Control Sample (LCS)

(LCS) R3864988-2 11/22/22 14:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.4	104	80.0-120	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-3 11/22/22 14:59 • (MSD) R3864988-5 11/22/22 15:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	17.0	13.4	85.1	67.2	1	75.0-125		J3 J6	23.5	20

Sample Narrative:

OS: Sample is an oxidizer.

L1559319-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-7 11/22/22 15:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	643	ND	685	107	50	75.0-125	

Sample Narrative:

OS: Sample is an oxidizer.

L1558860-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1558860-01 11/23/22 14:11 • (DUP) R3864576-2 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.61	7.57	1	0.527		1

Sample Narrative:

OS: 7.61 at 19.6C

DUP: 7.57 at 19.6C

L1559342-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559342-01 11/23/22 14:11 • (DUP) R3864576-3 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	pH	su		%		%
pH	7.85	7.90	1	0.635		1

Sample Narrative:

OS: 7.85 at 19C

DUP: 7.9 at 19.1C

Laboratory Control Sample (LCS)

(LCS) R3864576-1 11/23/22 14:11

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 19C

Method Blank (MB)

(MB) R3863069-1 11/19/22 15:00

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

L1557999-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1557999-02 11/19/22 15:00 • (DUP) R3863069-3 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	177	175	1	0.739		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/19/22 15:00 • (DUP) R3863069-4 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	747	752	1	0.667		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3863069-2 11/19/22 15:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1060	94.5	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3867699-1 12/02/22 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.150	J	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

Laboratory Control Sample (LCS)

(LCS) R3867699-2 12/02/22 17:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	89.8	89.8	80.0-120	
Cadmium	100	85.4	85.4	80.0-120	
Copper	100	86.6	86.6	80.0-120	
Lead	100	84.6	84.6	80.0-120	
Nickel	100	85.3	85.3	80.0-120	
Selenium	100	85.4	85.4	80.0-120	
Silver	20.0	16.2	80.8	80.0-120	
Zinc	100	83.8	83.8	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/02/22 17:39 • (MS) R3867699-5 12/02/22 17:47 • (MSD) R3867699-6 12/02/22 17:50

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	6940	7280	8140	337	1190	1	75.0-125	E V	E V	11.1	20
Cadmium	100	ND	92.8	93.7	92.8	93.7	1	75.0-125			0.954	20
Copper	100	19.2	120	124	100	104	1	75.0-125			3.28	20
Lead	100	19.9	129	112	109	92.1	1	75.0-125			14.0	20
Nickel	100	9.14	103	107	93.5	98.3	1	75.0-125			4.60	20
Selenium	100	ND	92.9	94.2	92.9	94.2	1	75.0-125			1.39	20
Silver	20.0	ND	17.9	18.2	89.4	90.9	1	75.0-125			1.60	20
Zinc	100	145	241	235	96.3	90.3	1	75.0-125			2.51	20

QUALITY CONTROL SUMMARY

L1559342-01

Method Blank (MB)

(MB) R3866274-1 11/29/22 17:38

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) R3866274-2 11/29/22 17:41 • (LCSD) R3866274-3 11/29/22 17:43

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	1.02	101	102	80.0-120			0.459	20

Method Blank (MB)

(MB) R3867276-1 12/01/22 20:39

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

Laboratory Control Sample (LCS)

(LCS) R3867276-2 12/01/22 20:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	98.2	98.2	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/01/22 20:46 • (MS) R3867276-5 12/01/22 20:56 • (MSD) R3867276-6 12/01/22 20:59

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	4.50	107	108	102	104	5	75.0-125			1.04	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
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	LAO000356
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 ___

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: (TS) ~~Jake Janicek~~ Blair Rollins

Email To: brollins@caerusoilandgas.com
(TS) ~~jjanicek@caerusoilandgas.com~~

Project Description:
HIS P+A Assessment

City/State Collected: Piceance Crk, CO

Please Circle: PT (MT) CT ET

Phone: ~~(970) 778-2314~~ (TS)
970-640-6919

Client Project #

Lab Project #

SDG # L1559342

E049

Collected by (print):
Tristan Schmalz

Site/Facility ID #
HIS Pad

P.O. #

Acctnum:

Template:

Prelogin:

PM:

PB:

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

Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1 Minus Organics	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	Remarks	Sample # (lab only)
20221116_HIS_BG01@1ft	Grab	SS	1ft	11/16/22	11:31	2	X					-01

Tristan Schmalz

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 5755 8085 2252

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)	Date:	Time:	Received by: (Signature)
Tristan Schmalz	11/16/22	15:00	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	11/16/22	1700	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			Tatyana Hallen

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

Temp: 4.7 °C Bottles Received:
5.7+0=5.7 2

If preservation required by Login: Date/Time

Date: 11-17-22 Time: 1100

Hold:

Condition: NCF / (OK)

ANALYTICAL REPORT

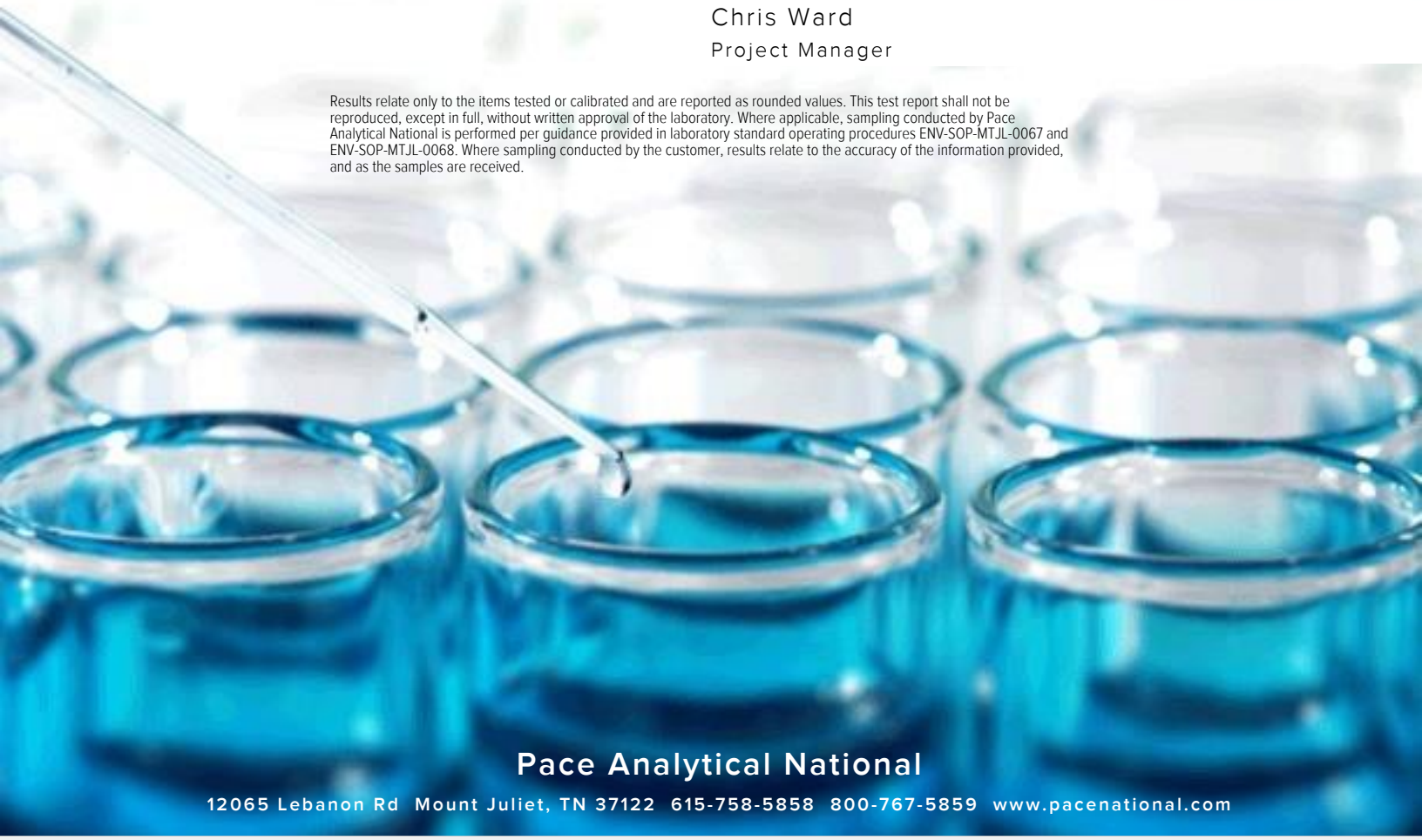
December 05, 2022

Caerus Oil and Gas

Sample Delivery Group:	L1559340
Samples Received:	11/17/2022
Project Number:	
Description:	H15 P&A Assessment
Site:	H15 PAD
Report To:	Brett Middleton 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

20221116_H15_BG02 @ 1 FT L1559340-01 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 11:48
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:46	11/25/22 09:46	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 15:51	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1962476	1	11/23/22 12:00	11/23/22 14:11	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1960857	1	11/19/22 11:00	11/19/22 15:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:20	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 17:59	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 21:33	LD	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.113		1	11/25/2022 09:46	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/22/2022 15:51	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	7.50	T8	1	11/23/2022 14:11	WG1962476

Sample Narrative:

L1559340-01 WG1962476: 7.5 at 19.2C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	356		10.0	1	11/19/2022 15:00	WG1960857

Sample Narrative:

L1559340-01 WG1960857: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	295		0.500	1	12/02/2022 18:20	WG1963031
Cadmium	0.525		0.500	1	12/02/2022 18:20	WG1963031
Copper	27.4		2.00	1	12/02/2022 18:20	WG1963031
Lead	17.6		0.500	1	12/02/2022 18:20	WG1963031
Nickel	15.7		2.00	1	12/02/2022 18:20	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:20	WG1963031
Silver	ND		1.00	1	12/02/2022 18:20	WG1963031
Zinc	59.1		5.00	1	12/02/2022 18:20	WG1963031

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	1.19		0.200	1	11/29/2022 17:59	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	18.2		1.00	5	12/01/2022 21:33	WG1963033

Method Blank (MB)

(MB) R3864988-1 11/22/22 14:30

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

L1559341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559341-01 11/22/22 15:56 • (DUP) R3864988-8 11/22/22 16:01

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

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/22/22 16:17 • (DUP) R3864988-9 11/22/22 16:22

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

Laboratory Control Sample (LCS)

(LCS) R3864988-2 11/22/22 14:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.4	104	80.0-120	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-3 11/22/22 14:59 • (MSD) R3864988-5 11/22/22 15:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	17.0	13.4	85.1	67.2	1	75.0-125		J3 J6	23.5	20

Sample Narrative:

OS: Sample is an oxidizer.

L1559319-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-7 11/22/22 15:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	643	ND	685	107	50	75.0-125	

Sample Narrative:

OS: Sample is an oxidizer.

L1558860-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1558860-01 11/23/22 14:11 • (DUP) R3864576-2 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.61	7.57	1	0.527		1

Sample Narrative:

OS: 7.61 at 19.6C

DUP: 7.57 at 19.6C

L1559342-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559342-01 11/23/22 14:11 • (DUP) R3864576-3 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	pH	su		%		%
pH	7.85	7.90	1	0.635		1

Sample Narrative:

OS: 7.85 at 19C

DUP: 7.9 at 19.1C

Laboratory Control Sample (LCS)

(LCS) R3864576-1 11/23/22 14:11

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 19C

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

Method Blank (MB)

(MB) R3863069-1 11/19/22 15:00

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

L1557999-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1557999-02 11/19/22 15:00 • (DUP) R3863069-3 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	177	175	1	0.739		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/19/22 15:00 • (DUP) R3863069-4 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	747	752	1	0.667		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3863069-2 11/19/22 15:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1060	94.5	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3867699-1 12/02/22 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.150	J	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

Laboratory Control Sample (LCS)

(LCS) R3867699-2 12/02/22 17:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	89.8	89.8	80.0-120	
Cadmium	100	85.4	85.4	80.0-120	
Copper	100	86.6	86.6	80.0-120	
Lead	100	84.6	84.6	80.0-120	
Nickel	100	85.3	85.3	80.0-120	
Selenium	100	85.4	85.4	80.0-120	
Silver	20.0	16.2	80.8	80.0-120	
Zinc	100	83.8	83.8	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/02/22 17:39 • (MS) R3867699-5 12/02/22 17:47 • (MSD) R3867699-6 12/02/22 17:50

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	6940	7280	8140	337	1190	1	75.0-125	E V	E V	11.1	20
Cadmium	100	ND	92.8	93.7	92.8	93.7	1	75.0-125			0.954	20
Copper	100	19.2	120	124	100	104	1	75.0-125			3.28	20
Lead	100	19.9	129	112	109	92.1	1	75.0-125			14.0	20
Nickel	100	9.14	103	107	93.5	98.3	1	75.0-125			4.60	20
Selenium	100	ND	92.9	94.2	92.9	94.2	1	75.0-125			1.39	20
Silver	20.0	ND	17.9	18.2	89.4	90.9	1	75.0-125			1.60	20
Zinc	100	145	241	235	96.3	90.3	1	75.0-125			2.51	20

Method Blank (MB)

(MB) R3866274-1 11/29/22 17:38

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) R3866274-2 11/29/22 17:41 • (LCSD) R3866274-3 11/29/22 17:43

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	1.02	101	102	80.0-120			0.459	20

Method Blank (MB)

(MB) R3867276-1 12/01/22 20:39

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

Laboratory Control Sample (LCS)

(LCS) R3867276-2 12/01/22 20:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	98.2	98.2	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/01/22 20:46 • (MS) R3867276-5 12/01/22 20:56 • (MSD) R3867276-6 12/01/22 20:59

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	4.50	107	108	102	104	5	75.0-125			1.04	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
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	LAO000356
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

Report to: **Blair Rollins**

Email To: **brollins@caerusoilandgas.com**

Project Description: HIS 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 #: HIS 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**

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

SDG # L1559340

E047

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

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1 Minus Organics	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	Remarks	Sample # (lab only)
20221116_HIS_BG02@1Ft	Grab	SS	1 ft	11/16/22	11:48	2	X					-01

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 5755 8085 2252

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)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Tristan Schmalz	11/16/22	15:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 5.7 °C 5.7+0=5.7	Bottles Received: 2
	11/16/22	1700			
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11-17-22	Time: 1100

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

ANALYTICAL REPORT

December 05, 2022

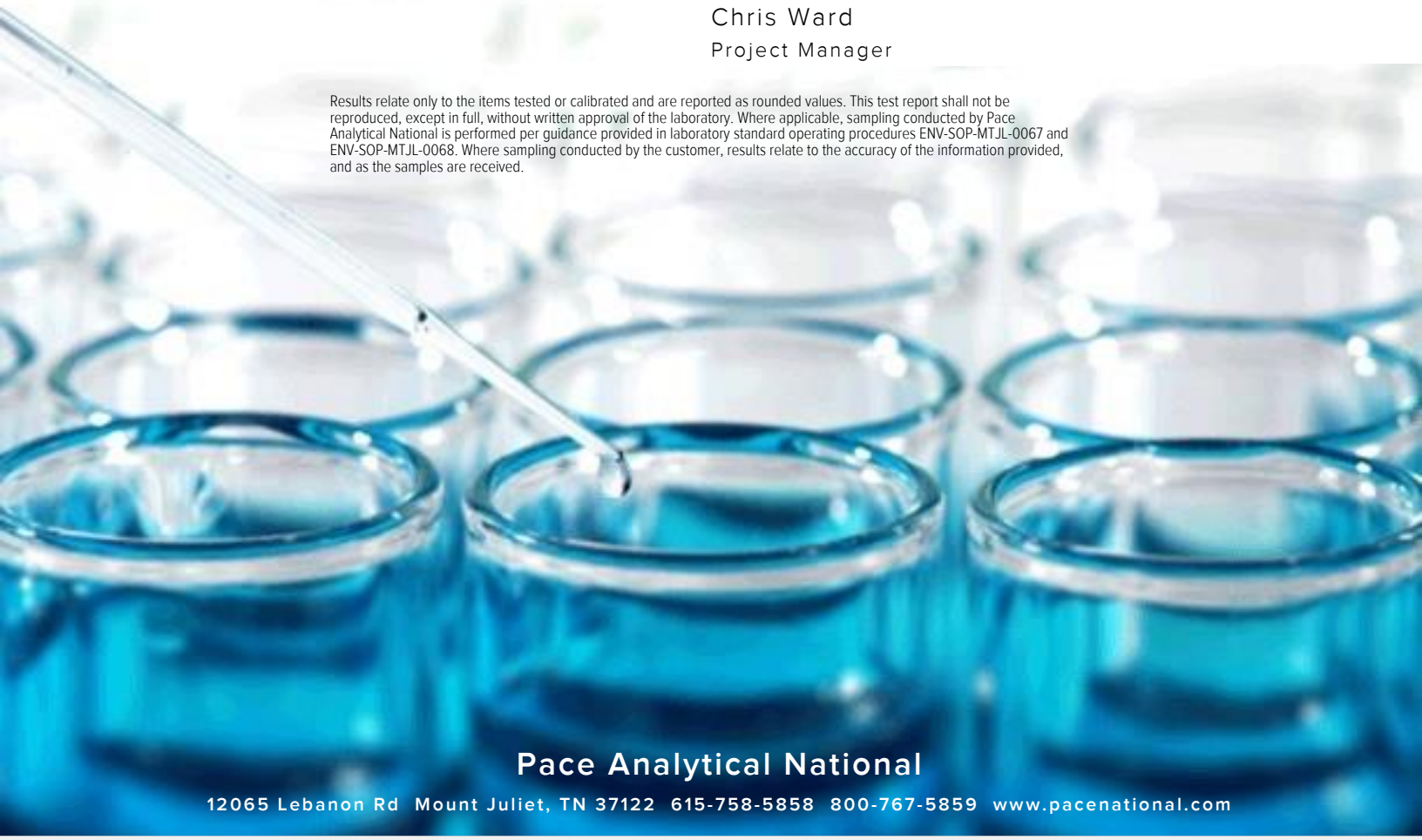
Caerus Oil and Gas

Sample Delivery Group:	L1559349
Samples Received:	11/17/2022
Project Number:	
Description:	H15 P&A Assessment
Site:	H15 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 National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

20221116_H15_BG03 @ 1 FT L1559349-01 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 12:10
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 10:15	11/25/22 10:15	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 16:53	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1962476	1	11/23/22 12:00	11/23/22 14:11	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1960857	1	11/19/22 11:00	11/19/22 15:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:49	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 18:27	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 22:08	LD	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.609		1	11/25/2022 10:15	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/22/2022 16:53	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	7.79	T8	1	11/23/2022 14:11	WG1962476

Sample Narrative:

L1559349-01 WG1962476: 7.79 at 19C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	333		10.0	1	11/19/2022 15:00	WG1960857

Sample Narrative:

L1559349-01 WG1960857: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	235		0.500	1	12/02/2022 18:49	WG1963031
Cadmium	ND		0.500	1	12/02/2022 18:49	WG1963031
Copper	12.2		2.00	1	12/02/2022 18:49	WG1963031
Lead	7.60		0.500	1	12/02/2022 18:49	WG1963031
Nickel	11.0		2.00	1	12/02/2022 18:49	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:49	WG1963031
Silver	ND		1.00	1	12/02/2022 18:49	WG1963031
Zinc	34.6		5.00	1	12/02/2022 18:49	WG1963031

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.894		0.200	1	11/29/2022 18:27	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	4.91		1.00	5	12/01/2022 22:08	WG1963033

Method Blank (MB)

(MB) R3864988-1 11/22/22 14:30

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

L1559341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559341-01 11/22/22 15:56 • (DUP) R3864988-8 11/22/22 16:01

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

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/22/22 16:17 • (DUP) R3864988-9 11/22/22 16:22

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

Laboratory Control Sample (LCS)

(LCS) R3864988-2 11/22/22 14:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.4	104	80.0-120	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-3 11/22/22 14:59 • (MSD) R3864988-5 11/22/22 15:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	17.0	13.4	85.1	67.2	1	75.0-125		J3 J6	23.5	20

Sample Narrative:

OS: Sample is an oxidizer.

L1559319-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-7 11/22/22 15:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	643	ND	685	107	50	75.0-125	

Sample Narrative:

OS: Sample is an oxidizer.

L1558860-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1558860-01 11/23/22 14:11 • (DUP) R3864576-2 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.61	7.57	1	0.527		1

Sample Narrative:

OS: 7.61 at 19.6C

DUP: 7.57 at 19.6C

L1559342-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559342-01 11/23/22 14:11 • (DUP) R3864576-3 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	pH	su		%		%
pH	7.85	7.90	1	0.635		1

Sample Narrative:

OS: 7.85 at 19C

DUP: 7.9 at 19.1C

Laboratory Control Sample (LCS)

(LCS) R3864576-1 11/23/22 14:11

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 19C

Method Blank (MB)

(MB) R3863069-1 11/19/22 15:00

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

L1557999-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1557999-02 11/19/22 15:00 • (DUP) R3863069-3 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	177	175	1	0.739		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/19/22 15:00 • (DUP) R3863069-4 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	747	752	1	0.667		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3863069-2 11/19/22 15:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1060	94.5	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3867699-1 12/02/22 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.150	J	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

Laboratory Control Sample (LCS)

(LCS) R3867699-2 12/02/22 17:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	89.8	89.8	80.0-120	
Cadmium	100	85.4	85.4	80.0-120	
Copper	100	86.6	86.6	80.0-120	
Lead	100	84.6	84.6	80.0-120	
Nickel	100	85.3	85.3	80.0-120	
Selenium	100	85.4	85.4	80.0-120	
Silver	20.0	16.2	80.8	80.0-120	
Zinc	100	83.8	83.8	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/02/22 17:39 • (MS) R3867699-5 12/02/22 17:47 • (MSD) R3867699-6 12/02/22 17:50

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	6940	7280	8140	337	1190	1	75.0-125	E V	E V	11.1	20
Cadmium	100	ND	92.8	93.7	92.8	93.7	1	75.0-125			0.954	20
Copper	100	19.2	120	124	100	104	1	75.0-125			3.28	20
Lead	100	19.9	129	112	109	92.1	1	75.0-125			14.0	20
Nickel	100	9.14	103	107	93.5	98.3	1	75.0-125			4.60	20
Selenium	100	ND	92.9	94.2	92.9	94.2	1	75.0-125			1.39	20
Silver	20.0	ND	17.9	18.2	89.4	90.9	1	75.0-125			1.60	20
Zinc	100	145	241	235	96.3	90.3	1	75.0-125			2.51	20

Method Blank (MB)

(MB) R3866274-1 11/29/22 17:38

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) R3866274-2 11/29/22 17:41 • (LCSD) R3866274-3 11/29/22 17:43

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	1.02	101	102	80.0-120			0.459	20

Method Blank (MB)

(MB) R3867276-1 12/01/22 20:39

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

Laboratory Control Sample (LCS)

(LCS) R3867276-2 12/01/22 20:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	98.2	98.2	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/01/22 20:46 • (MS) R3867276-5 12/01/22 20:56 • (MSD) R3867276-6 12/01/22 20:59

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	4.50	107	108	102	104	5	75.0-125			1.04	20

GLOSSARY OF TERMS

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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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
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	LAO000356
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

Report to: **Blair Rollins**

Email To: **brollins@caerusoilandgas.com**

Project Description: HIS 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 #: HIS 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**

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1 Minus Organics	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	Remarks	Sample # (lab only)
20221116_HIS_BG03@1ft	Grab	SS	1ft	11/16/22	12:10	2	X					-01

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

SDG # L1559349

E054

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

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 6755 8085 2252

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)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Tristan Schmalz	11/16/22	15:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 5.7 °C Bottles Received: 5.7+0=5.7 2	
	11/16/22	1700			
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11-17-22 Time: 1100	Hold: / Condition: NCF / OK

ANALYTICAL REPORT

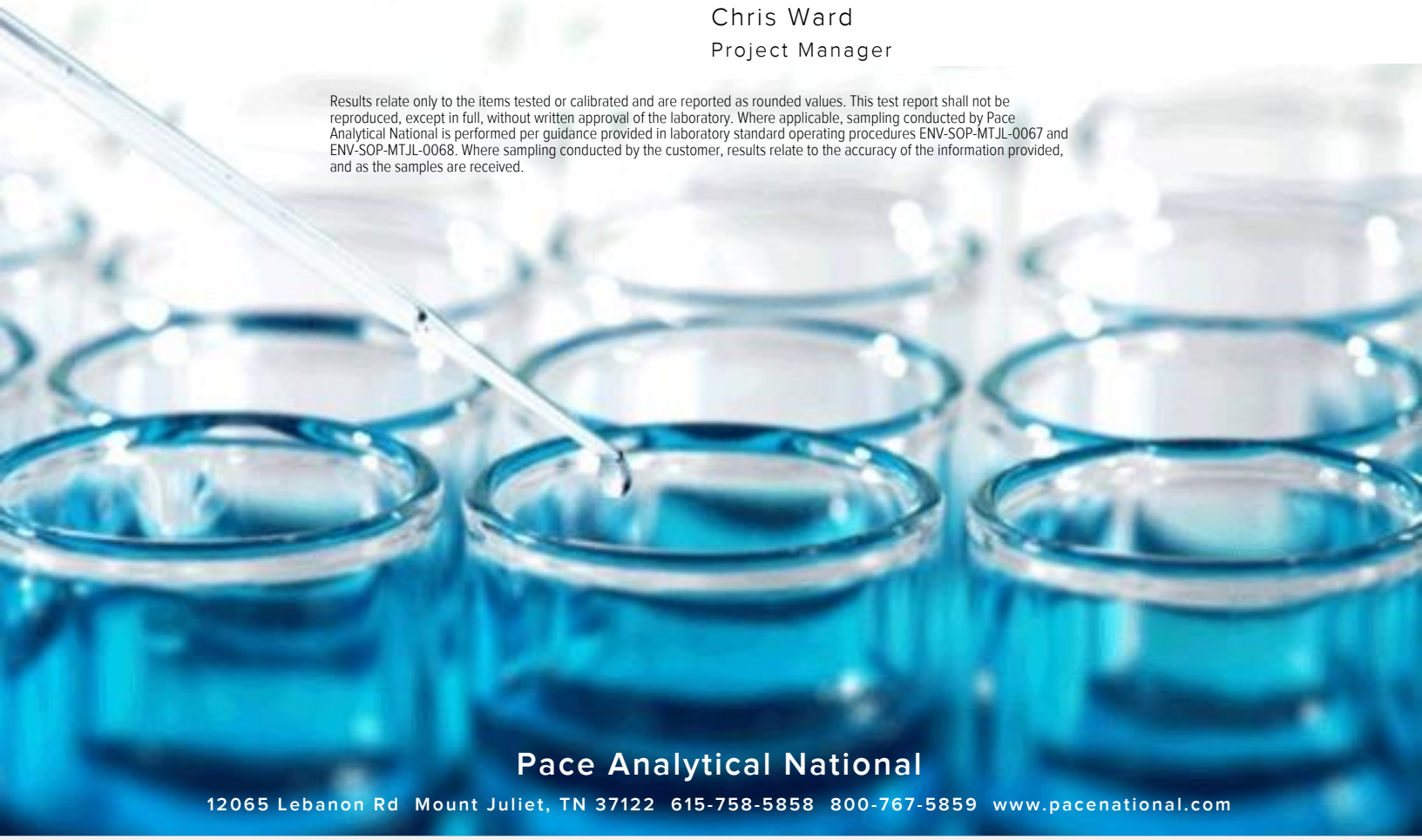
December 05, 2022

Caerus Oil and Gas

Sample Delivery Group:	L1559341
Samples Received:	11/17/2022
Project Number:	
Description:	H15 P&A Assessment
Site:	H15 PAD
Report To:	Brett Middleton 143 Diamond Avenue Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

Chris Ward
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

20221116_H15_BG04 @ 1 FT L1559341-01 Solid

Collected by: Tristan Schmalz
Collected date/time: 11/16/22 12:20
Received date/time: 11/17/22 11:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1963636	1	11/25/22 09:54	11/25/22 09:54	KMG	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1962223	1	11/18/22 23:16	11/22/22 15:56	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1962476	1	11/23/22 12:00	11/23/22 14:11	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1960857	1	11/19/22 11:00	11/19/22 15:00	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1963031	1	11/30/22 18:05	12/02/22 18:23	KMG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1962685	1	11/20/22 13:04	11/29/22 18:02	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1963033	5	11/30/22 18:13	12/01/22 21:37	LD	Mt. Juliet, TN

CASE NARRATIVE

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

Chris Ward
Project Manager

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	SAR				
Sodium Adsorption Ratio	0.173		1	11/25/2022 09:54	WG1963636

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	11/22/2022 15:56	WG1962223

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	8.15	T8	1	11/23/2022 14:11	WG1962476

Sample Narrative:

L1559341-01 WG1962476: 8.15 at 19.1C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	151		10.0	1	11/19/2022 15:00	WG1960857

Sample Narrative:

L1559341-01 WG1960857: at 25C

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Barium	227		0.500	1	12/02/2022 18:23	WG1963031
Cadmium	ND		0.500	1	12/02/2022 18:23	WG1963031
Copper	15.0		2.00	1	12/02/2022 18:23	WG1963031
Lead	13.2		0.500	1	12/02/2022 18:23	WG1963031
Nickel	15.0		2.00	1	12/02/2022 18:23	WG1963031
Selenium	ND		2.00	1	12/02/2022 18:23	WG1963031
Silver	ND		1.00	1	12/02/2022 18:23	WG1963031
Zinc	42.7		5.00	1	12/02/2022 18:23	WG1963031

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hot Water Sol. Boron	0.334		0.200	1	11/29/2022 18:02	WG1962685

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	12.5		1.00	5	12/01/2022 21:37	WG1963033

Method Blank (MB)

(MB) R3864988-1 11/22/22 14:30

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

L1559341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559341-01 11/22/22 15:56 • (DUP) R3864988-8 11/22/22 16:01

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

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/22/22 16:17 • (DUP) R3864988-9 11/22/22 16:22

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

Laboratory Control Sample (LCS)

(LCS) R3864988-2 11/22/22 14:38

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.4	104	80.0-120	

L1559319-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-3 11/22/22 14:59 • (MSD) R3864988-5 11/22/22 15:04

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	17.0	13.4	85.1	67.2	1	75.0-125		J3 J6	23.5	20

Sample Narrative:

OS: Sample is an oxidizer.

L1559319-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559319-01 11/22/22 14:54 • (MS) R3864988-7 11/22/22 15:14

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	643	ND	685	107	50	75.0-125	

Sample Narrative:

OS: Sample is an oxidizer.

L1558860-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1558860-01 11/23/22 14:11 • (DUP) R3864576-2 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.61	7.57	1	0.527		1

Sample Narrative:

OS: 7.61 at 19.6C

DUP: 7.57 at 19.6C

L1559342-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559342-01 11/23/22 14:11 • (DUP) R3864576-3 11/23/22 14:11

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	pH	su		%		%
pH	7.85	7.90	1	0.635		1

Sample Narrative:

OS: 7.85 at 19C

DUP: 7.9 at 19.1C

Laboratory Control Sample (LCS)

(LCS) R3864576-1 11/23/22 14:11

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 19C

Method Blank (MB)

(MB) R3863069-1 11/19/22 15:00

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

L1557999-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1557999-02 11/19/22 15:00 • (DUP) R3863069-3 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	177	175	1	0.739		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1559345-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1559345-01 11/19/22 15:00 • (DUP) R3863069-4 11/19/22 15:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	747	752	1	0.667		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3863069-2 11/19/22 15:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1060	94.5	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3867699-1 12/02/22 17:33

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	0.150	J	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

Laboratory Control Sample (LCS)

(LCS) R3867699-2 12/02/22 17:36

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	89.8	89.8	80.0-120	
Cadmium	100	85.4	85.4	80.0-120	
Copper	100	86.6	86.6	80.0-120	
Lead	100	84.6	84.6	80.0-120	
Nickel	100	85.3	85.3	80.0-120	
Selenium	100	85.4	85.4	80.0-120	
Silver	20.0	16.2	80.8	80.0-120	
Zinc	100	83.8	83.8	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/02/22 17:39 • (MS) R3867699-5 12/02/22 17:47 • (MSD) R3867699-6 12/02/22 17:50

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	6940	7280	8140	337	1190	1	75.0-125	E V	E V	11.1	20
Cadmium	100	ND	92.8	93.7	92.8	93.7	1	75.0-125			0.954	20
Copper	100	19.2	120	124	100	104	1	75.0-125			3.28	20
Lead	100	19.9	129	112	109	92.1	1	75.0-125			14.0	20
Nickel	100	9.14	103	107	93.5	98.3	1	75.0-125			4.60	20
Selenium	100	ND	92.9	94.2	92.9	94.2	1	75.0-125			1.39	20
Silver	20.0	ND	17.9	18.2	89.4	90.9	1	75.0-125			1.60	20
Zinc	100	145	241	235	96.3	90.3	1	75.0-125			2.51	20

Method Blank (MB)

(MB) R3866274-1 11/29/22 17:38

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) R3866274-2 11/29/22 17:41 • (LCSD) R3866274-3 11/29/22 17:43

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	1.02	101	102	80.0-120			0.459	20

Method Blank (MB)

(MB) R3867276-1 12/01/22 20:39

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

Laboratory Control Sample (LCS)

(LCS) R3867276-2 12/01/22 20:43

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	98.2	98.2	80.0-120	

L1559352-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559352-02 12/01/22 20:46 • (MS) R3867276-5 12/01/22 20:56 • (MSD) R3867276-6 12/01/22 20:59

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	4.50	107	108	102	104	5	75.0-125			1.04	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
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RPD	Relative Percent Difference.
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Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
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Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
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	LAO000356
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

Report to: **Blair Rollins**

Email To: **brollins@caerusoilandgas.com**

Project Description: H15 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 #: H15 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**

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	COGCC Table 915-1 Minus Organics	EC, pH, SAR	Arsenic, Boron	COGCC Table 910-1	Remarks	Sample # (lab only)
20221116_H15_BG04@1ft	Grab	SS	1ft	11/16/22	12:20	2	X					-01

Tristan Schmalz

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

SDG # L559341

E048

Acctnum:

Template:

Prelogin:

PM:

PB:

Shipped Via:

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 5755 8085 2252

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)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Tristan Schmalz	11/16/22	15:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.5 °C 5.7+0=5.7	Bottles Received: 2
	11/16/22	1700			If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11-17-22	Time: 1100
				Hold:	Condition: NCF / OK

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

KLEINFELDER 707 17th Street, Suite 3000, Denver, CO 80202 p | 303.237.6601

FORM 27 Rev 5/22

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: 403087304
Receive Date: 07/01/2022
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 INFORMATON

Name of Operator: CAERUS PICEANCE LLC Operator No: 10456
Address: 1001 17TH STREET #1600
City: DENVER State: CO Zip: 80202
Contact Person: Blair Rollins

Phone Numbers
Phone: (970) 285-2925
Mobile: (970) 640-6919
Email: brollins@caerusoilandgas.com

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 24192 Initial Form 27 Document #: 403087304

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.
- [X] 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:

SITE INFORMATION

Yes Multiple Facilities

Facility Type: FLOWLINE Facility ID: 425805 API #: County Name: GARFIELD
Facility Name: NPR H15-596 Latitude: 39.616619 Longitude: -108.146697
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: SENE Sec: 15 Twp: 5S Range: 96W Meridian: 6 Sensitive Area? Yes

Facility Type: WELL Facility ID: API #: 045-21089 County Name: GARFIELD
Facility Name: NPR 22C-15-596 Latitude: 39.615945 Longitude: -108.146357
** correct Lat/Long if needed: Latitude: Longitude:
QtrQtr: SENE Sec: 15 Twp: 5S Range: 96W Meridian: 6 Sensitive Area? Yes

SITE CONDITIONS

General soil type - USCS Classifications GC

Most Sensitive Adjacent Land Use Riparian Area

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? Yes

Is groundwater less than 20 feet below ground surface? No

Other Potential Receptors within 1/4 mile

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- [ ] **E&P Waste**
  - [ ] Produced Water
  - [ ] Oil
  - [ ] Condensate
  - [ ] Drilling Fluids
  - [ ] Drill Cuttings
- [X] **Other E&P Waste**
  - [ ] Workover Fluids
  - [ ] Tank Bottoms
  - [ ] Pigging Waste
  - [ ] Rig Wash
  - [ ] Spent Filters
  - [ ] Pit Bottoms
  - [X] Other (as described by EPA) Impacts associated with this P&A have not been identified
- [ ] **Non-E&P Waste**

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 H15 22C-15-596 natural gas well and associated flowlines to the separator and gaslift skid on the location.

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

[X] 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):

Additional Investigative Actions

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

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

Number of soil samples collected: 0

Number of soil samples exceeeding 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): 75

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 purposed 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 purposed 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 thes 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).

Proposed site investigation commencement. 07/15/2022

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: Environmental Scientist

Submit Date: 07/01/2022 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: 07/26/2022

Remediation Project Number: 24192

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 soil samples from areas most likely to be impacted and 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 compare analytical results for site investigation samples to both the Table 915-1 Residential Soil Screening Level Concentrations and the Protection of Groundwater Soil Screening Level Concentrations. Submit an assessment of potential pathways to groundwater via a Supplemental Form 27.
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
403087304	FORM 27-INITIAL-SUBMITTED
403087305	SOIL SAMPLE LOCATION MAP

Total Attach: 2 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)