June 13, 2023

Mr. Blair Rollins
Environmental Specialist
Caerus Oil and Gas LLC
143 Diamond Ave
Parachute, CO 81635

Via Email

RE: Report of Work Completed
YCF 1-41-1 SWD - Facility ID: 159378
COGCC Inspection Number: 698100284
Rio Blanco County, Colorado

Mr. Rollins,

Entrada Consulting Group, Inc. (Entrada) has prepared this Report of Work Completed for Caerus Oil and Gas LLC (Caerus) to summarize continued work in response to a small oily waste spill observed outside of the northwest corner of the tank battery during a routine COGCC inspection at the Yellow Creek Field 1-41-1 SWD (Site). The Site is in the southwest quarter of the northeast quarter of Section 1, Township 1S, Range 98W of the 6th Principal Meridian in Rio Blanco County, Colorado. The observed spill location was at approximately 40.003467 latitude and -108.338007 longitude. The Site location is shown on **Figure 1**. The following narrative provides Site information and presents the results of soil sampling activities conducted on April 6 and 21, 2023.

BACKGROUND

On March 7, 2023, during a joint inspection conducted by COGCC Environmental Protection Specialist and Reclamation Specialist a localized accumulation of oily waste (impacted snow and soil) believed to be less than 1 barrel (bbl), was observed outside of the northwest corner of the tank battery in the filter pot area. The COGCC verbally notified Caerus personnel and requested that the oily waste and impacted soil be removed and disposed of following Rule 912 cleanup requirements. COGCC also requested that Caerus submit documentation of cleanup on a field inspection report resolution (FIRR) form per Rule 912.a.(5).

PATHWAY TO GROUNDWATER EVALUATION

There are two unnamed drainages approximately 45 feet to the north and 300 feet to the south of the Site at an elevation of approximately 6,130 feet. Yellow Creek is approximately 2,500 feet west of the Site at an elevation of approximately 6,100 feet. Both Yellow Creek and the unnamed drainages are ephemeral, with surface water present only during snowmelt or after significant precipitation, therefore it can be inferred that groundwater is typically well below the elevation of their beds.

The nearest water well (Permit #307411) is located approximately 2.5 miles north of the Site at an elevation of 6,055 feet. The well was drilled to 100 feet in October of 2017. The static water level in the well was not

recorded in the permit documents and is assumed to be more than 50 feet below ground surface at the location.

The elevation at the point of release is approximately 6,150 feet. Based on the available information presented above, Entrada asserts that depth to groundwater at the site is at least 100 feet below ground level and that there is no direct path to groundwater at the site.

SOIL SAMPLING AND ANALYSIS

An Entrada representative conducted soil sampling activities at the Site on April 6 and 21, 2023. Prior to collection, each sample location was visually examined for evidence of potential environmental impacts (e.g., petroleum staining or odor) and field-screened for volatile organic compounds (VOCs) using a photoionization detector (PID).

On April 6, 2023, one (1) soil sample was collected from the pad surface approximately five feet west of the south-west wall of the containment. A strong odor was noted in the area and PID screening of the sample showed VOCs at 199.8 parts per million (ppm).

On April 21, 2023, one (1) follow-up soil sample was collected from approximately the same surface location at 1 foot below ground surface (ft-bgs) after impacted soil had been removed via additional hydroexcavation. PID screening of the sample showed VOCs at 0.7 ppm.

All soil samples were collected in 9 oz glass jars, sealed, labeled, and placed into an ice-filled cooler for preservation. Samples were submitted to Pace Analytical in Mt. Juliet, TN and analyzed for the following reduced analyte suite:

- Total Petroleum Hydrocarbons – diesel range organics (TPH-DRO [C10-C28]) and Total Petroleum Hydrocarbons – oil range organics (TPH-ORO [C28-C36]) by U.S. Environmental Protection Agency (EPA) Method 8015M
- TPH – gasoline range organics (TPH-GRO [C6-C10]) by EPA Method 8015D/GRO
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene by EPA Method 8260B
- Polycyclic aromatic Hydrocarbons (PAHs)(COGCC Table 915-1) by EPA Method 8270C-SIM
- pH by EPA Method 9045D
- Metals (COGCC Table 915-1) by EPA Method 6010B
    - Hexavalent chromium by EPA Method 7199A
    - Hot-water soluble Boron by EPA Method 6010B-NE493, Ch 2
    - Arsenic by EPA Method 6020
- Electrical Conductivity (EC) by EPA Method 9050AMod
- Sodium adsorption ratio (SAR) by USDA Method H60

SOIL ANALYTICAL RESULTS

Soil analytical results have been reported for two (2) samples from pad surface adjacent to the tank containment. Analytical results are presented in **Tables 1 & 2**. The table includes COGCC Table 915-1 Residential Soil Screening Levels (RSSLs) and Soil Suitability for Reclamation standards for comparison. Confirmation soil sample results in exceedance of Table 915-1 RSSLs or Soil Suitability for Reclamation standards are summarized below:

- pH was reported outside the Soil Suitability for Reclamation range of 6 to 8.3 in the initial sample 20230406-YCF1411-(CONT)@0-6" with a value of 8.48, however the confirmation of cleanup sample 20230421-YCF1411-(CONT)@0-1’ pH value of 8.01 was within the allowable soil suitability for reclamation range.

- Arsenic was reported in exceedance of the RSSL of 0.68 mg/kg in sample 20230406-YCF1411-(CONT)@0-6" at 3.91 mg/kg and sample 20230421-YCF1411-(CONT)0-1' at 2.01, however both samples were below the area background concentration of 8.44 mg/kg in sample 20220505-YCF 1-41-1WD (BG-W2)@2'.

All remaining soil analytical results were below applicable COGCC Table 915-1 standards. Laboratory analysis reports and chain-of-custody documentation are included as an **Attachment**.

CONCLUSIONS AND RECOMMENDATIONS

Soil analytical results from the confirmation of cleanup sample at the Site on April 21, 2023, indicated no exceedances of the Table 915-1 RSSL or soil suitability for reclamation standards.

Based on soil sampling activities completed at the Site and laboratory analytical data presented herein, Caerus should request closure of this inspection action item.

We appreciate the opportunity to assist Caerus Oil and Gas LLC. Please contact me (970) 270-2986 if you have any questions.

Sincerely,

ENTRADA CONSULTING GROUP

Christopher Mace
Senior Geologist

Tim Dobransky
Principal Scientist

Attachments:

Figure 1 – Site Map
Table 1 – Soil Data Summary
Photographic Log
Laboratory Analytical Reports

FIGURES

LEGEND

Soil Sample Location Release Area

0 50 100 Feet

1 inch = 50 ft

N W E S

Project No:	023-021
Map By:	NDB
Date:	4/18/2023

Containment Spill Diagram
Yellow Creek Field 1-41-1
Caerus Oil and Gas LLC
Lot 6, Section 01, T1S R98W, 6th PM
Rio Blanco County, Colorado

ENTRADA CONSULTING GROUP
330 Grand Avenue, Unit C
Grand Junction, CO 81501
970-549-1015

Figure
1

TABLES

TABLE 1

CAERUS OPERATING LLC
YELLOW CREEK FIELD 1-41-1 CONTAINMENT SPILL
SOIL ANALYTICAL RESULTS
RIO BLANCO COUNTY, COLORADO

			Contaminants of Concern				Organic Compounds in Soil																					
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)			500 mg/Kg				0.0026	0.69	0.78	9.9	0.0081	0.0087	0.55	5.8	0.011	0.3	2.9	0.24	9	0.096	5.9	0.54	0.98	0.006	0.019	0.0038	1.3
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)							1.2	490	5.8	58	30	27	360	1800	1.1	1.1	11	0.11	110	0.11	240	240	1.1	18	24	2	180
Location	Project	Sample ID	TPH (total volatile [C$_6$ - C$_{10}$] and extractable [C$_{10}$ - C$_{36}$] hydrocarbons)	TPH - GRO [C6 - C10] Low Fraction	TPH - DRO [C10 - C28] High Fraction	TPH - ORO [C28 - C36] Oil Fraction	Benzene	Toluene	Ethylbenzene	Xylenes (sum of o-, m- and p-isomers = total) xylenes	1, 2, 4-trimethylbenzene	1, 3, 5-trimethylbenzene	Acenaphthene	Anthracene	Benz(a)anthracene	Benzo (b) fluoranthene	Benzo (k)fluoranthene	Benzo (a) pyrene	Chrysene	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1, 2, 3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Pyrene
YCF 1-41-1 SWD	Background	20220505-YCF 1-41-1 SWD (BG-W2)@2'	<10.44	<0.100	2.88	7.46	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
YCF 1-41-1 SWD	Containment	20230406-YCF1411-(CONT)@0-5'	**784.8**	67.8	235	482	0.0183	0.913	0.23	7.14	1.9	1.68	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.0200	<0.0200	<0.0200	<0.00600
YCF 1-41-1 SWD	Containment	20230421-YCF1411-(CONT)@0-1'	<11.041	0.241	<4.00	6.8	<0.00100	0.00523	<0.00250	0.109	0.0438	0.0624	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.00600	<0.0200	<0.0200	<0.0200	<0.00600

Notes:

mg/kg - milligrams per kilogran
mmhos/cm - millimhos per centimete
mg/L - milligrams per lite
TPH - total petroleum hydrocarbons
< - indicates result is below the laboratory minimum reporting lin
BLACK - indicates result is above the applicable Table 915-1 Residential Soil Screening Level

TABLE 2

CAERUS OPERATING LLC
YELLOW CREEK FIELD 1-41-1 CONTAINMENT SPILL
SOIL ANALYTICAL RESULTS

			Soil Suitability for Reclamation				Metals in Soil									
PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)			<4.0 mmhos/cm	<6	6 – 8.3	2 mg/L	0.29	82	0.38	0.00067	46	14	26	0.26	0.8	370
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)							0.68	15000	71	0.3	3100	400	1500	390	390	23000
Location	Project	Sample ID	Electrical Conductivity (EC) (by saturated paste method)	Sodium Adsorption Ratio (SAR) by saturated paste method)	pH (by saturated paste method)	Boron (hot water soluble soil extract)	Arsenic	Barium	Cadmium	Chromium (VI)	Copper	Lead	Nickel	Selenium	Silver	Zinc
YCF 1-41-1 SWD	Background	20220505-YCF 1-41-1 SWD (BG-W2)@2'	0.159	0.147	**8.36**	0.278	**8.44**	NT	NT	NT	NT	NT	NT	NT	NT	NT
YCF 1-41-1 SWD	Containment	20230406-YCF1411-(CONT)@0-6"	0.0984	0.322	**8.48**	<0.200	**3.91**	380	<1.00	<1.00	10.8	5.39	19.9	<2.50	<0.500	32.2
YCF 1-41-1 SWD	Containment	20230421-YCF1411-(CONT)@0-1'	0.113	5.5	8.01	<0.200	**2.01**	87	<1.00	<1.00	<5.00	2	7.1	<2.50	<0.500	<25.0

Notes:

mg/kg - milligrams per kilogram
mmhos/cm - millimhos per centimeter
mg/L - milligrams per liter
TPH - total petroleum hydrocarbons
< - indicates result is below the laboratory minimum reporting lim
BLACK - indicates result is above the applicable Table 915-1 Residential Soil Screening Leve

PHOTOGRAPHIC LOG

PHOTOGRAPHIC LOG

Project Name: YCF 1-41-1 CONT ~~Spill~~	**Site Location:** Yellow Creek Facility 1-41-1	**Project Number:** 023-021

Facility:
YCF 1-41-1

Area:
POR

Description:
Spill release area. Soil sample location. View Northeast

Facility:
YCF 1-41-1

Area:
YCF Containment Spill

Description:
Spill release area. Soil sample location. View Northeast

Project Name: YCF 1-41-1 Spill	**Site Location:** Yellow Creek Facility 1-41-1	**Project Number:** 023-021

Facility:
YCF 1-41-1

Area:
YCF Containment Spill

Description:
Soil sample location. View North

Facility:
YCF 1-41-1

Area:
YCF Containment Spill

Description:
Spill release area View North

Project Name: YCF 1-41-1 Spill	**Site Location:** Yellow Creek Facility 1-41-1	**Project Number:** 023-021

Facility:
YCF 1-41-1

Area:
Containment
Excavation

Description:
Spill release area. Excavation and soil sampling location.
View East

Facility:
YCF 1-41-1

Area:
Containment

Description:
Soil sample location
View North

SOIL LABORATORY ANALYTICAL REPORTS

ANALYTICAL REPORT

April 17, 2023

Caerus Oil and Gas

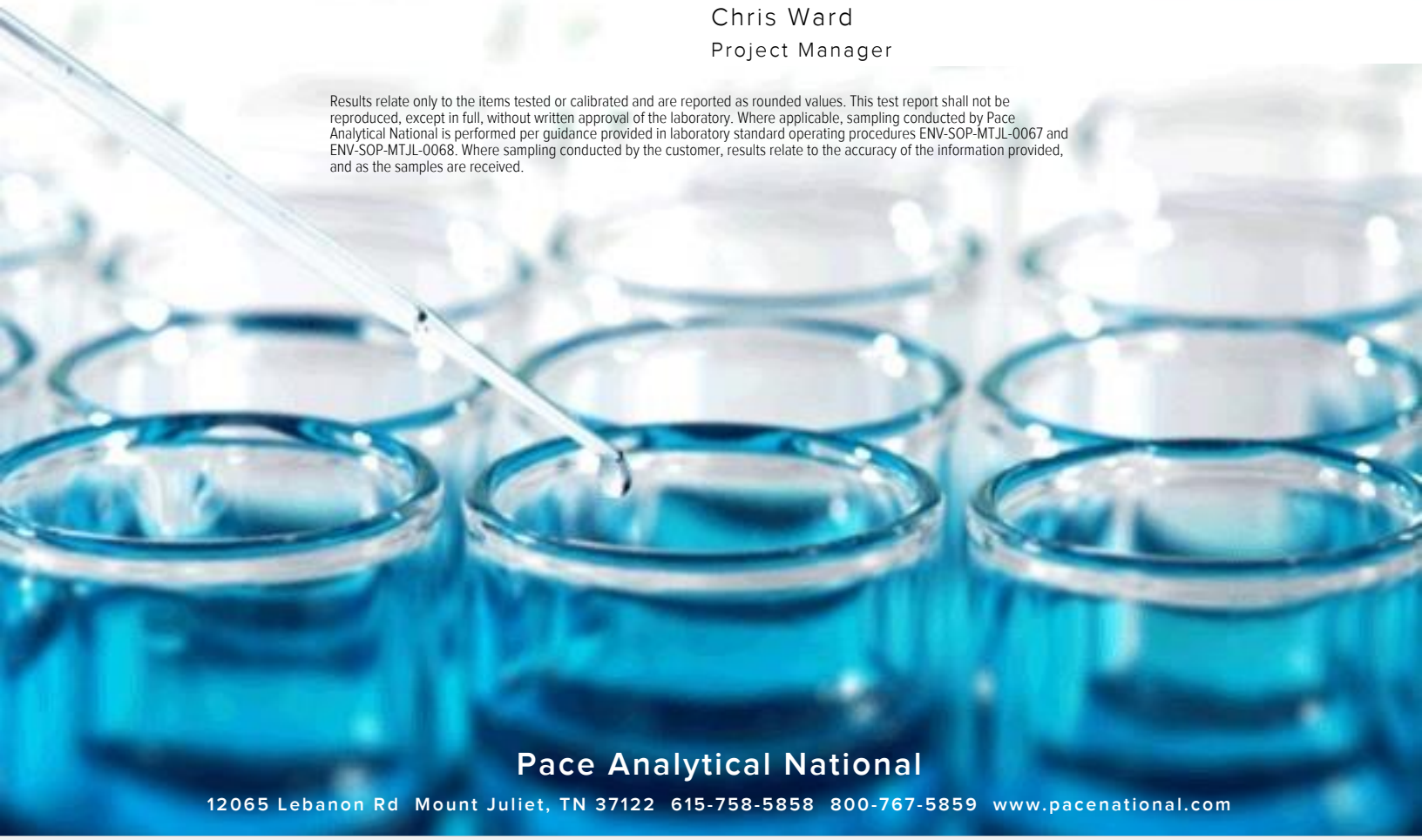
Sample Delivery Group:	L1603511
Samples Received:	04/08/2023
Project Number:	
Description:	YCF 1-41-1 Spill

Report To: Brett M. , Jake J. , Blair R.
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By: Chris Ward

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

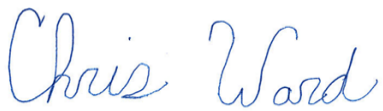
20230406-YCF1411(CONT)@0-6' L1603511-01 Solid

Collected by: MS
Collected date/time: 04/06/23 13:15
Received date/time: 04/08/23 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2038950	1	04/13/23 16:19	04/13/23 16:19	SPL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2039946	1	04/12/23 04:29	04/13/23 01:26	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2039936	1	04/11/23 17:00	04/11/23 19:10	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2040003	1	04/13/23 11:50	04/13/23 15:07	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2038941	1	04/11/23 10:54	04/13/23 12:36	ABL	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2040219	5	04/12/23 06:24	04/12/23 17:08	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2041824	25	04/13/23 09:44	04/14/23 14:31	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2042351	4	04/13/23 09:44	04/14/23 18:36	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2039488	1	04/12/23 10:37	04/13/23 02:19	KAP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2039488	5	04/12/23 10:37	04/13/23 08:54	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2040269	1	04/12/23 13:12	04/13/23 01:30	DLH	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	0.322		1	04/13/2023 16:19	WG2038950

Wet Chemistry by Method 7199

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Hexavalent Chromium	ND		1.00	1	04/13/2023 01:26	WG2039946

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	pH				
pH	8.48	T8	1	04/11/2023 19:10	WG2039936

Sample Narrative:

L1603511-01 WG2039936: 8.48 at 21.6C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	umhos/cm		umhos/cm			
Specific Conductance	98.4		10.0	1	04/13/2023 15:07	WG2040003

Sample Narrative:

L1603511-01 WG2040003: at 25C

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	ND		0.200	1	04/13/2023 12:36	WG2038941

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	3.91		1.00	5	04/12/2023 17:08	WG2040219
Barium	380		2.50	5	04/12/2023 17:08	WG2040219
Cadmium	ND		1.00	5	04/12/2023 17:08	WG2040219
Copper	10.8		5.00	5	04/12/2023 17:08	WG2040219
Lead	5.39		2.00	5	04/12/2023 17:08	WG2040219
Nickel	19.9		2.50	5	04/12/2023 17:08	WG2040219
Selenium	ND		2.50	5	04/12/2023 17:08	WG2040219
Silver	ND		0.500	5	04/12/2023 17:08	WG2040219
Zinc	32.2		25.0	5	04/12/2023 17:08	WG2040219

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	67.8		2.50	25	04/14/2023 14:31	WG2041824
(S) a,a,a-Trifluorotoluene(FID)	*84.7*		*77.0-120*		*04/14/2023 14:31*	WG2041824

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.0183		0.00400	4	04/14/2023 18:36	WG2042351
Toluene	0.913		0.0200	4	04/14/2023 18:36	WG2042351
Ethylbenzene	0.230		0.0100	4	04/14/2023 18:36	WG2042351
Xylenes, Total	7.14		0.0260	4	04/14/2023 18:36	WG2042351
1,2,4-Trimethylbenzene	1.90		0.0200	4	04/14/2023 18:36	WG2042351
1,3,5-Trimethylbenzene	1.68		0.0200	4	04/14/2023 18:36	WG2042351
(S) Toluene-d8	*106*		*75.0-131*		*04/14/2023 18:36*	WG2042351
(S) 4-Bromofluorobenzene	*110*		*67.0-138*		*04/14/2023 18:36*	WG2042351
(S) 1,2-Dichloroethane-d4	*105*		*70.0-130*		*04/14/2023 18:36*	WG2042351

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	235		4.00	1	04/13/2023 02:19	WG2039488
C28-C36 Motor Oil Range	482		20.0	5	04/13/2023 08:54	WG2039488
(S) o-Terphenyl	*61.0*		*18.0-148*		*04/13/2023 02:19*	WG2039488
(S) o-Terphenyl	*73.9*		*18.0-148*		*04/13/2023 08:54*	WG2039488

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	04/13/2023 01:30	WG2040269
Anthracene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Benzo(a)anthracene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Benzo(b)fluoranthene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Benzo(k)fluoranthene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Benzo(a)pyrene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Chrysene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Dibenz(a,h)anthracene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Fluoranthene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Fluorene	ND		0.00600	1	04/13/2023 01:30	WG2040269
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	04/13/2023 01:30	WG2040269
1-Methylnaphthalene	ND		0.0200	1	04/13/2023 01:30	WG2040269
2-Methylnaphthalene	0.0271		0.0200	1	04/13/2023 01:30	WG2040269
Naphthalene	ND		0.0200	1	04/13/2023 01:30	WG2040269
Pyrene	0.00805		0.00600	1	04/13/2023 01:30	WG2040269
(S) p-Terphenyl-d14	*57.4*		*23.0-120*		*04/13/2023 01:30*	WG2040269
(S) Nitrobenzene-d5	*58.5*		*14.0-149*		*04/13/2023 01:30*	WG2040269
(S) 2-Fluorobiphenyl	*56.0*		*34.0-125*		*04/13/2023 01:30*	WG2040269

Method Blank (MB)

(MB) R3912610-1 04/12/23 23:56

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

L1603506-13 Original Sample (OS) • Duplicate (DUP)

(OS) L1603506-13 04/13/23 00:44 • (DUP) R3912610-3 04/13/23 01:00

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium	ND	ND	10	0.000		20

L1603902-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1603902-05 04/13/23 02:23 • (DUP) R3912610-8 04/13/23 02:28

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium	ND	ND	1	1.62		20

Laboratory Control Sample (LCS)

(LCS) R3912610-2 04/13/23 00:03

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	10.7	107	80.0-120	

L1603902-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1603902-01 04/13/23 01:31 • (MS) R3912610-4 04/13/23 01:36 • (MSD) R3912610-5 04/13/23 01:42

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hexavalent Chromium	20.0	ND	20.5	20.6	99.4	99.8	1	75.0-125			0.396	20

L1603902-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1603902-01 04/13/23 01:31 • (MS) R3912610-6 04/13/23 01:47

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	656	ND	772	118	50	75.0-125	

L1603754-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1603754-02 04/11/23 19:10 • (DUP) R3912011-3 04/11/23 19:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	11.3	11.3	1	0.177		1

Sample Narrative:

OS: 11.26 at 21.6C

DUP: 11.28 at 21.5C

Laboratory Control Sample (LCS)

(LCS) R3912011-1 04/11/23 19:10

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.97	99.7	99.0-101	

Sample Narrative:

LCS: 9.97 at 20C

Method Blank (MB)

(MB) R3912938-1 04/13/23 15:07

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

Sample Narrative:
BLANK: at 25C

L1603506-14 Original Sample (OS) • Duplicate (DUP)

(OS) L1603506-14 04/13/23 15:07 • (DUP) R3912938-3 04/13/23 15:07

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	725	713	1	1.67		20

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

L1603526-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1603526-03 04/13/23 15:07 • (DUP) R3912938-4 04/13/23 15:07

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	106	107	1	0.658		20

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

Laboratory Control Sample (LCS)

(LCS) R3912938-2 04/13/23 15:07

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1110	99.0	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3912898-1 04/13/23 11:41

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) R3912898-2 04/13/23 11:44 • (LCSD) R3912898-3 04/13/23 11:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.05	1.05	105	105	80.0-120			0.249	20

Method Blank (MB)

(MB) R3912523-1 04/12/23 16:16

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

Laboratory Control Sample (LCS)

(LCS) R3912523-2 04/12/23 16:20

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	95.4	95.4	80.0-120	
Barium	100	92.4	92.4	80.0-120	
Cadmium	100	103	103	80.0-120	
Copper	100	91.4	91.4	80.0-120	
Lead	100	96.6	96.6	80.0-120	
Nickel	100	101	101	80.0-120	
Selenium	100	104	104	80.0-120	
Silver	20.0	19.7	98.3	80.0-120	
Zinc	100	95.1	95.1	80.0-120	

L1603506-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1603506-13 04/12/23 16:23 • (MS) R3912523-5 04/12/23 16:33 • (MSD) R3912523-6 04/12/23 16:36

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 %
Arsenic	100	3.41	96.1	97.2	92.6	93.8	5	75.0-125			1.18	20
Barium	100	259	614	489	354	230	5	75.0-125	J5	J3 J5	22.6	20
Cadmium	100	ND	104	104	103	104	5	75.0-125			0.855	20
Copper	100	10.0	99.1	101	89.1	90.7	5	75.0-125			1.62	20
Lead	100	8.12	107	107	98.7	98.5	5	75.0-125			0.126	20
Nickel	100	13.5	110	111	96.5	97.1	5	75.0-125			0.569	20
Selenium	100	ND	105	105	105	105	5	75.0-125			0.144	20
Silver	20.0	ND	19.3	19.3	96.5	96.3	5	75.0-125			0.231	20
Zinc	100	37.9	139	131	101	93.3	5	75.0-125			5.51	20

Method Blank (MB)

(MB) R3913433-3 04/14/23 12:52

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.907	J	0.543	2.50
(S) a,a,a-Trifluorotoluene(FID)	*97.3*			*77.0-120*

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

(LCS) R3913433-1 04/14/23 11:30 • (LCSD) R3913433-2 04/14/23 11:50

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 %
TPH (GC/FID) Low Fraction	5.50	4.84	4.72	88.0	85.8	72.0-127			2.51	20
(S) a,a,a-Trifluorotoluene(FID)				*108*	*108*	*77.0-120*				

Method Blank (MB)

(MB) R3913613-3 04/14/23 14:50

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	*110*			*75.0-131*
(S) 4-Bromofluorobenzene	*105*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*99.9*			*70.0-130*

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

(LCS) R3913613-1 04/14/23 09:14 • (LCSD) R3913613-2 04/14/23 09:33

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	0.116	0.127	92.8	102	70.0-123			9.05	20
Toluene	0.125	0.124	0.135	99.2	108	75.0-121			8.49	20
Ethylbenzene	0.125	0.135	0.137	108	110	74.0-126			1.47	20
Xylenes, Total	0.375	0.411	0.436	110	116	72.0-127			5.90	20
1,2,4-Trimethylbenzene	0.125	0.117	0.130	93.6	104	70.0-126			10.5	20
1,3,5-Trimethylbenzene	0.125	0.121	0.131	96.8	105	73.0-127			7.94	20
(S) Toluene-d8				*108*	*108*	*75.0-131*				
(S) 4-Bromofluorobenzene				*110*	*108*	*67.0-138*				
(S) 1,2-Dichloroethane-d4				*107*	*101*	*70.0-130*				

Method Blank (MB)

(MB) R3912648-1 04/12/23 21:38

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C36 Motor Oil Range	0.365	J	0.274	4.00
(S) o-Terphenyl	*65.0*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3912648-2 04/12/23 21:50

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	38.7	77.4	50.0-150	
(S) o-Terphenyl			*67.7*	*18.0-148*	

L1603506-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1603506-05 04/13/23 01:29 • (MS) R3912648-3 04/13/23 01:42 • (MSD) R3912648-4 04/13/23 01:54

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	47.6	20.7	41.6	40.4	43.9	41.6	1	50.0-150	J6	J6	2.93	20
(S) o-Terphenyl					*46.8*	*55.9*		*18.0-148*				

Method Blank (MB)

(MB) R3913414-2 04/12/23 19:16

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	*70.0*			*23.0-120*
(S) Nitrobenzene-d5	*67.1*			*14.0-149*
(S) 2-Fluorobiphenyl	*68.9*			*34.0-125*

Laboratory Control Sample (LCS)

(LCS) R3913414-1 04/12/23 18:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0638	79.8	50.0-120	
Anthracene	0.0800	0.0660	82.5	50.0-126	
Benzo(a)anthracene	0.0800	0.0687	85.9	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0583	72.9	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0594	74.3	49.0-125	
Benzo(a)pyrene	0.0800	0.0649	81.1	42.0-120	
Chrysene	0.0800	0.0633	79.1	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0683	85.4	47.0-125	
Fluoranthene	0.0800	0.0681	85.1	49.0-129	
Fluorene	0.0800	0.0664	83.0	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0739	92.4	46.0-125	
1-Methylnaphthalene	0.0800	0.0668	83.5	51.0-121	
2-Methylnaphthalene	0.0800	0.0675	84.4	50.0-120	
Naphthalene	0.0800	0.0656	82.0	50.0-120	
Pyrene	0.0800	0.0589	73.6	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3913414-1 04/12/23 18:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			*72.5*	*23.0-120*	
(S) Nitrobenzene-d5			*74.5*	*14.0-149*	
(S) 2-Fluorobiphenyl			*73.9*	*34.0-125*	

L1603226-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1603226-01 04/12/23 19:35 • (MS) R3913414-3 04/12/23 19:55 • (MSD) R3913414-4 04/12/23 20:15

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	0.0783	ND	0.0574	0.0570	73.2	71.3	1	14.0-127			0.699	27
Anthracene	0.0783	ND	0.0554	0.0554	70.7	69.3	1	10.0-145			0.000	30
Benzo(a)anthracene	0.0783	ND	0.0548	0.0554	69.9	69.3	1	10.0-139			1.09	30
Benzo(b)fluoranthene	0.0783	ND	0.0475	0.0481	60.6	60.1	1	10.0-140			1.26	36
Benzo(k)fluoranthene	0.0783	ND	0.0484	0.0489	61.7	61.1	1	10.0-137			1.03	31
Benzo(a)pyrene	0.0783	ND	0.0545	0.0554	69.5	69.3	1	10.0-141			1.64	31
Chrysene	0.0783	ND	0.0518	0.0531	66.1	66.4	1	10.0-145			2.48	30
Dibenz(a,h)anthracene	0.0783	ND	0.0533	0.0544	68.0	68.0	1	10.0-132			2.04	31
Fluoranthene	0.0783	ND	0.0551	0.0556	70.3	69.5	1	10.0-153			0.903	33
Fluorene	0.0783	ND	0.0576	0.0573	73.5	71.6	1	11.0-130			0.522	29
Indeno(1,2,3-cd)pyrene	0.0783	ND	0.0551	0.0569	70.3	71.1	1	10.0-137			3.21	32
1-Methylnaphthalene	0.0783	ND	0.0617	0.0623	77.9	77.1	1	10.0-142			0.968	28
2-Methylnaphthalene	0.0783	ND	0.0621	0.0635	77.9	78.1	1	10.0-137			2.23	28
Naphthalene	0.0783	ND	0.0616	0.0633	78.6	79.1	1	10.0-135			2.72	27
Pyrene	0.0783	ND	0.0485	0.0492	61.9	61.5	1	10.0-148			1.43	35
(S) p-Terphenyl-d14					*58.1*	*55.3*		*23.0-120*				
(S) Nitrobenzene-d5					*67.6*	*66.4*		*14.0-149*				
(S) 2-Fluorobiphenyl					*61.1*	*60.8*		*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
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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.

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.

Company Name/Address:
Caerus Oil & Gas

143 Diamond Ave
Parachute,CO 81635

Billing Information:
Same as left.

Pres Chk

Report to:
Blair Rollins

Email To:
brollins@caerusoilandgas.com

Project Description:
YCF 1-41-1 Spill

City/State Collected:

Please Circle: PT MT CT ET

Phone:
(970) 640-6919

Client Project #

Lab Project #

Collected by (print):
MS

Site/Facility ID #

P.O. #

Collected by (signature):

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

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	TABLE 915 GRO/DRO/ORO	TABLE 915 Metals	TABLE 915 VOCs	TABLE 915 pH, SPCON, SAR	TABLE 915 PAHs	Remarks	Sample # (lab only)
20230406-YCF1411(CONT)@0-6"	Grab	SS		04/06/23	1315	3	X	X	X	X	X		-01

Chain of Custody Page ___ of ___

Pace
PEOPLE ADVANCING SCIENCE

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

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1603511
B148

Table #

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 #

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: 4/7/23	Time: 1320	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR	
Relinquished by : (Signature)	Date: 4/7/23	Time: 1500	Received by: (Signature)	Temp: °C Bottles Received: 3	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 4-8-23 Time: 9:15	Hold: Condition: NCF / OK

LI603511

Tracking Numbers	[redacted]	Temperature
5882 7564 6600		GB/AG 3.6 FO = 3.6
5882 7564 7434		GBAG 1.2 FO = 1.2

ANALYTICAL REPORT

May 15, 2023

Revised Report

Caerus Oil and Gas

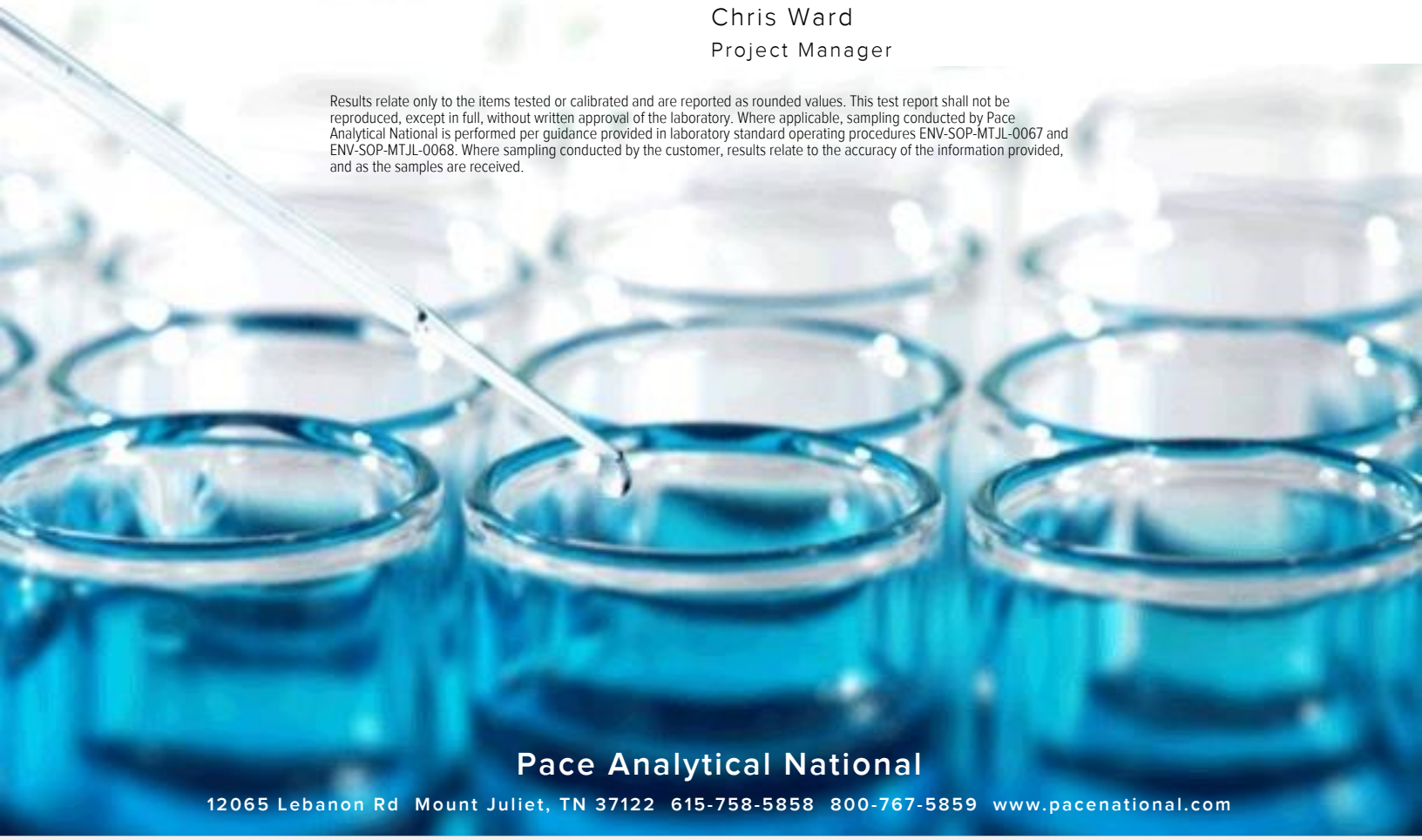
Sample Delivery Group:	L1608216
Samples Received:	04/22/2023
Project Number:	
Description:	YCF 1-41-1 Spill
Report To:	Brett M. , Jake J. , Blair R.
	143 Diamond Avenue
	Parachute, CO 81635

Entire Report Reviewed By:

Chris Ward

Project Manager

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



Pace Analytical National

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

TABLE OF CONTENTS

SAMPLE SUMMARY

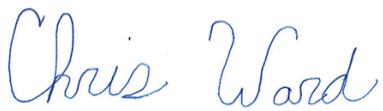
20230421-YCF1411-(CONT)0-1' L1608216-01 Solid

Collected by: MS
Collected date/time: 04/21/23 10:50
Received date/time: 04/22/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2047396	1	04/25/23 19:18	04/25/23 19:18	SPL	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2048724	1	04/26/23 03:42	04/27/23 11:55	SET	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2048486	1	04/26/23 18:00	04/26/23 20:20	KAD	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2048033	1	04/26/23 07:30	04/26/23 09:56	NTG	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2047411	1	04/24/23 10:31	04/25/23 11:58	CCE	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2047553	5	04/24/23 11:09	04/24/23 18:04	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2048585	1	04/25/23 00:53	04/25/23 22:25	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2047961	1	04/25/23 00:53	04/26/23 01:13	AV	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2047635	1	04/24/23 16:53	04/25/23 03:34	KAP	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2047979	1	04/25/23 07:18	04/25/23 16:26	KLZ	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

Report Revision History

Level II Report - Version 1: 04/27/23 15:29
Level II Report - Version 2: 04/28/23 13:57

Project Narrative

Report reissued 4/28 for missing Cr6 Data
Reissued for RDL reporting only

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.50		1	04/25/2023 19:18	WG2047396

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	ND		1.00	1	04/27/2023 11:55	WG2048724

Wet Chemistry by Method 9045D

Analyte	Result pH	Qualifier	Dilution	Analysis date / time	Batch
pH	8.01	T8	1	04/26/2023 20:20	WG2048486

Sample Narrative:
L1608216-01 WG2048486: 8.01 at 19.7C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	113		10.0	1	04/26/2023 09:56	WG2048033

Sample Narrative:
L1608216-01 WG2048033: at 25C

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	ND		0.200	1	04/25/2023 11:58	WG2047411

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	2.01		1.00	5	04/24/2023 18:04	WG2047553
Barium	87.0		2.50	5	04/24/2023 18:04	WG2047553
Cadmium	ND		1.00	5	04/24/2023 18:04	WG2047553
Copper	ND		5.00	5	04/24/2023 18:04	WG2047553
Lead	2.00		2.00	5	04/24/2023 18:04	WG2047553
Nickel	7.10		2.50	5	04/24/2023 18:04	WG2047553
Selenium	ND		2.50	5	04/24/2023 18:04	WG2047553
Silver	ND		0.500	5	04/24/2023 18:04	WG2047553
Zinc	ND		25.0	5	04/24/2023 18:04	WG2047553

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	0.241		0.100	1	04/25/2023 22:25	WG2048585
(S) a,a,a-Trifluorotoluene(FID)	*100*		*77.0-120*		*04/25/2023 22:25*	WG2048585

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	04/26/2023 01:13	WG2047961
Toluene	0.00523		0.00500	1	04/26/2023 01:13	WG2047961
Ethylbenzene	ND		0.00250	1	04/26/2023 01:13	WG2047961
Xylenes, Total	0.109		0.00650	1	04/26/2023 01:13	WG2047961
1,2,4-Trimethylbenzene	0.0438		0.00500	1	04/26/2023 01:13	WG2047961
1,3,5-Trimethylbenzene	0.0624		0.00500	1	04/26/2023 01:13	WG2047961
(S) Toluene-d8	*108*		*75.0-131*		*04/26/2023 01:13*	WG2047961
(S) 4-Bromofluorobenzene	*99.5*		*67.0-138*		*04/26/2023 01:13*	WG2047961
(S) 1,2-Dichloroethane-d4	*89.1*		*70.0-130*		*04/26/2023 01:13*	WG2047961

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	04/25/2023 03:34	WG2047635
C28-C36 Motor Oil Range	6.80		4.00	1	04/25/2023 03:34	WG2047635
(S) o-Terphenyl	*50.5*		*18.0-148*		*04/25/2023 03:34*	WG2047635

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	04/25/2023 16:26	WG2047979
Anthracene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Benzo(a)anthracene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Benzo(b)fluoranthene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Benzo(k)fluoranthene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Benzo(a)pyrene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Chrysene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Dibenz(a,h)anthracene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Fluoranthene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Fluorene	ND		0.00600	1	04/25/2023 16:26	WG2047979
Indeno(1,2,3-cd)pyrene	ND	J4	0.00600	1	04/25/2023 16:26	WG2047979
1-Methylnaphthalene	ND		0.0200	1	04/25/2023 16:26	WG2047979
2-Methylnaphthalene	ND		0.0200	1	04/25/2023 16:26	WG2047979
Naphthalene	ND		0.0200	1	04/25/2023 16:26	WG2047979
Pyrene	ND		0.00600	1	04/25/2023 16:26	WG2047979
(S) p-Terphenyl-d14	*97.8*		*23.0-120*		*04/25/2023 16:26*	WG2047979
(S) Nitrobenzene-d5	*90.7*		*14.0-149*		*04/25/2023 16:26*	WG2047979
(S) 2-Fluorobiphenyl	*80.3*		*34.0-125*		*04/25/2023 16:26*	WG2047979

Method Blank (MB)

(MB) R3918148-1 04/27/23 10:04

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

L1607891-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1607891-02 04/27/23 10:48 • (DUP) R3918148-3 04/27/23 10:53

Analyte	Original Result mg/kg	DUP Result mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hexavalent Chromium	1.21	1.07	1	11.9		20

L1608377-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1608377-05 04/27/23 12:31 • (DUP) R3918148-8 04/27/23 12:37

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) R3918148-2 04/27/23 10:11

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexavalent Chromium	10.0	12.0	120	80.0-120	

L1608097-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1608097-03 04/27/23 11:24 • (MS) R3918148-4 04/27/23 11:29 • (MSD) R3918148-5 04/27/23 11:34

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	23.5	20.1	118	100	1	75.0-125			15.7	20

L1608097-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1608097-03 04/27/23 11:24 • (MS) R3918148-6 04/27/23 11:40

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Hexavalent Chromium	656	ND	795	121	50	75.0-125	

L1607530-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1607530-02 04/26/23 20:20 • (DUP) R3917786-2 04/26/23 20:20

Analyte	Original Result su	DUP Result su	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
pH	6.97	6.97	1	0.000		1

Sample Narrative:

OS: 6.97 at 20.4C

DUP: 6.97 at 20.4C

L1607530-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1607530-12 04/26/23 20:20 • (DUP) R3917786-3 04/26/23 20:20

Analyte	Original Result su	DUP Result su	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
pH	7.82	7.83	1	0.128		1

Sample Narrative:

OS: 7.82 at 19.9C

DUP: 7.83 at 19.7C

Laboratory Control Sample (LCS)

(LCS) R3917786-1 04/26/23 20:20

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

Sample Narrative:

LCS: 10 at 19.2C

Method Blank (MB)

(MB) R3917434-1 04/26/23 09:56

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

L1607786-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1607786-03 04/26/23 09:56 • (DUP) R3917434-3 04/26/23 09:56

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	601	603	1	0.332		20

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

L1608219-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1608219-01 04/26/23 09:56 • (DUP) R3917434-4 04/26/23 09:56

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	1050	1010	1	3.90		20

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

Laboratory Control Sample (LCS)

(LCS) R3917434-2 04/26/23 09:56

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	1120	1140	102	85.0-115	

Sample Narrative:
LCS: at 25C

Method Blank (MB)

(MB) R3917059-1 04/25/23 10:49

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) R3917059-2 04/25/23 10:52 • (LCSD) R3917059-3 04/25/23 10:54

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hot Water Sol. Boron	1.00	1.05	1.02	105	102	80.0-120			2.80	20

QUALITY CONTROL SUMMARY

L1608216-01

Method Blank (MB)

(MB) R3916782-1 04/24/23 16:54

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

Laboratory Control Sample (LCS)

(LCS) R3916782-7 04/24/23 19:25

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	86.6	86.6	80.0-120	
Barium	100	84.2	84.2	80.0-120	
Cadmium	100	91.7	91.7	80.0-120	
Copper	100	83.2	83.2	80.0-120	
Lead	100	83.9	83.9	80.0-120	
Nickel	100	89.9	89.9	80.0-120	
Selenium	100	91.1	91.1	80.0-120	
Silver	20.0	17.3	86.4	80.0-120	
Zinc	100	86.8	86.8	80.0-120	

L1607840-17 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607840-17 04/24/23 17:00 • (MS) R3916782-5 04/24/23 17:10 • (MSD) R3916782-6 04/24/23 17:14

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	99.7	7.98	88.5	83.8	80.5	75.8	5	75.0-125			5.43	20
Barium	99.7	50.1	131	119	81.1	69.2	5	75.0-125		J6	9.55	20
Cadmium	99.7	ND	86.9	82.8	86.7	82.6	5	75.0-125			4.86	20
Copper	99.7	5.79	81.8	75.5	76.1	69.7	5	75.0-125		J6	8.05	20
Lead	99.7	7.12	90.3	85.0	83.1	77.9	5	75.0-125			6.00	20
Nickel	99.7	11.5	92.0	87.2	80.5	75.7	5	75.0-125			5.38	20
Selenium	99.7	ND	87.8	83.2	87.6	83.0	5	75.0-125			5.36	20
Silver	20.0	ND	16.8	15.7	83.8	78.6	5	75.0-125			6.33	20
Zinc	99.7	30.7	106	95.8	74.9	65.1	5	75.0-125	J6	J6	9.66	20

Method Blank (MB)

(MB) R3917555-2 04/25/23 21:40

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)	*100*			*77.0-120*

Laboratory Control Sample (LCS)

(LCS) R3917555-1 04/25/23 20:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	6.39	116	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			*112*	*77.0-120*	

Method Blank (MB)

(MB) R3918022-3 04/25/23 21:43

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	*99.5*			*67.0-138*
(S) 1,2-Dichloroethane-d4	*84.7*			*70.0-130*

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

(LCS) R3918022-1 04/25/23 20:08 • (LCSD) R3918022-2 04/25/23 20:27

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	0.125	0.116	100	92.8	70.0-123			7.47	20
Toluene	0.125	0.132	0.118	106	94.4	75.0-121			11.2	20
Ethylbenzene	0.125	0.133	0.127	106	102	74.0-126			4.62	20
Xylenes, Total	0.375	0.401	0.386	107	103	72.0-127			3.81	20
1,2,4-Trimethylbenzene	0.125	0.126	0.118	101	94.4	70.0-126			6.56	20
1,3,5-Trimethylbenzene	0.125	0.130	0.113	104	90.4	73.0-127			14.0	20
(S) Toluene-d8				*109*	*105*	*75.0-131*				
(S) 4-Bromofluorobenzene				*99.6*	*110*	*67.0-138*				
(S) 1,2-Dichloroethane-d4				*94.0*	*93.8*	*70.0-130*				

L1608377-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1608377-01 04/26/23 03:07 • (MS) R3918022-4 04/26/23 04:42 • (MSD) R3918022-5 04/26/23 05:02

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.139	ND	0.119	0.117	95.2	93.6	1	10.0-149			1.69	37
Toluene	0.139	ND	0.130	0.126	103	99.4	1	10.0-156			3.12	38
Ethylbenzene	0.139	ND	0.132	0.136	104	107	1	10.0-160			2.99	38
Xylenes, Total	0.419	ND	0.392	0.405	104	107	1	10.0-160			3.26	38
1,2,4-Trimethylbenzene	0.139	ND	0.126	0.131	101	105	1	10.0-160			3.89	36
1,3,5-Trimethylbenzene	0.139	ND	0.126	0.126	101	101	1	10.0-160			0.000	38
(S) Toluene-d8					*109*	*108*		*75.0-131*				
(S) 4-Bromofluorobenzene					*99.6*	*104*		*67.0-138*				
(S) 1,2-Dichloroethane-d4					*87.4*	*87.7*		*70.0-130*				

Method Blank (MB)

(MB) R3916863-1 04/24/23 23:57

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	*62.3*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3916863-2 04/25/23 00:10

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	27.8	55.6	50.0-150	
(S) o-Terphenyl			*68.9*	*18.0-148*	

L1607512-28 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1607512-28 04/25/23 00:36 • (MS) R3916863-3 04/25/23 00:49 • (MSD) R3916863-4 04/25/23 01:02

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	49.5	ND	26.2	28.9	48.0	54.1	1	50.0-150	J6		9.80	20
(S) o-Terphenyl					*61.7*	*68.6*		*18.0-148*				

Method Blank (MB)

(MB) R3917523-2 04/25/23 14:08

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	*102*			*23.0-120*
(S) Nitrobenzene-d5	*96.0*			*14.0-149*
(S) 2-Fluorobiphenyl	*87.6*			*34.0-125*

Laboratory Control Sample (LCS)

(LCS) R3917523-1 04/25/23 13:48

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0808	101	50.0-120	
Anthracene	0.0800	0.0860	108	50.0-126	
Benzo(a)anthracene	0.0800	0.0917	115	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0887	111	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0872	109	49.0-125	
Benzo(a)pyrene	0.0800	0.0759	94.9	42.0-120	
Chrysene	0.0800	0.0885	111	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0943	118	47.0-125	
Fluoranthene	0.0800	0.0916	115	49.0-129	
Fluorene	0.0800	0.0854	107	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.105	131	46.0-125	J4
1-Methylnaphthalene	0.0800	0.0826	103	51.0-121	
2-Methylnaphthalene	0.0800	0.0823	103	50.0-120	
Naphthalene	0.0800	0.0767	95.9	50.0-120	
Pyrene	0.0800	0.0868	109	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3917523-1 04/25/23 13:48

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
(S) p-Terphenyl-d14			*95.9*	*23.0-120*	
(S) Nitrobenzene-d5			*89.2*	*14.0-149*	
(S) 2-Fluorobiphenyl			*84.3*	*34.0-125*	

L1608377-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1608377-03 04/25/23 17:05 • (MS) R3917523-3 04/25/23 17:25 • (MSD) R3917523-4 04/25/23 17:45

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.0792	0.0199	0.0598	0.0701	50.4	63.4	1	14.0-127			15.9	27
Anthracene	0.0792	0.0183	0.0674	0.0783	62.0	75.8	1	10.0-145			15.0	30
Benzo(a)anthracene	0.0792	0.0171	0.0840	0.0904	84.5	92.6	1	10.0-139			7.34	30
Benzo(b)fluoranthene	0.0792	0.0193	0.0748	0.0804	70.1	77.1	1	10.0-140			7.22	36
Benzo(k)fluoranthene	0.0792	0.00700	0.0721	0.0751	82.2	86.0	1	10.0-137			4.08	31
Benzo(a)pyrene	0.0792	0.0186	0.0903	0.0947	90.5	96.1	1	10.0-141			4.76	31
Chrysene	0.0792	0.0221	0.0849	0.0885	79.3	83.8	1	10.0-145			4.15	30
Dibenz(a,h)anthracene	0.0792	ND	0.0770	0.0843	93.5	103	1	10.0-132			9.05	31
Fluoranthene	0.0792	0.0426	0.0870	0.100	56.1	72.5	1	10.0-153			13.9	33
Fluorene	0.0792	0.0320	0.0623	0.0737	38.3	52.7	1	11.0-130			16.8	29
Indeno(1,2,3-cd)pyrene	0.0792	0.0145	0.0846	0.0888	88.5	93.8	1	10.0-137			4.84	32
1-Methylnaphthalene	0.0792	ND	0.0645	0.0753	72.4	86.0	1	10.0-142			15.5	28
2-Methylnaphthalene	0.0792	ND	0.0635	0.0753	69.3	84.2	1	10.0-137			17.0	28
Naphthalene	0.0792	ND	0.0655	0.0734	73.6	83.6	1	10.0-135			11.4	27
Pyrene	0.0792	0.0431	0.0809	0.0925	47.7	62.4	1	10.0-148			13.4	35
(S) p-Terphenyl-d14					*62.5*	*84.0*		*23.0-120*				
(S) Nitrobenzene-d5					*94.8*	*91.9*		*14.0-149*				
(S) 2-Fluorobiphenyl					*54.7*	*74.7*		*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
J4	The associated batch QC was outside the established quality control range for accuracy.
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.

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.

Company Name/Address:	Billing Information:	Pres Chk	Analysis / Container / Preservative										Chain of Custody Page ___ of ___
Caerus Oil & Gas 143 Diamond Ave Parachute,CO 81635	Same as left.		TABLE 915 GRO/DRO/ORO	TABLE 915 Metals	TABLE 915 VOCs	TABLE 915 pH, SPCON, SAR	TABLE 915 PAHs						Pace PEOPLE ADVANCING SCIENCE 12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Alt: 800-767-5859 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf
Report to: Blair Rollins	Email To: brollins@caerusoilandgas.com												
Project Description: YCF 1-41-1 Spill	City/State Collected:	Please Circle: PT MT CT ET											
Phone: (970) 640-6919	Client Project #	Lab Project #											SDG # L1608216 D178
Collected by (print): MS	Site/Facility ID #	P.O. #											Acctnum: Template: Prelogin: PM: PB:
Collected by (signature): MJ 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) X Three Day	**Quote #** Date Results Needed											Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs										Remarks	Sample # (lab only)
20230421-YCF1411-(CONT) 0-1'	Grab	SS		04/21/23	1050	3	X	X	X	X	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 #

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	
	4/21/23	1500			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
	4/24/23	1600		NSAG 0.3+0=0.3 3	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK
			Kayla Z	4/22/23 900	