

January 15, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas

Sample Delivery Group: L1175038
Samples Received: 12/31/2019
Project Number:
Description: C16OU Dumpline Release

Report To: Jake Janicek
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.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20191230 - C16OU- RED ROOF BARN SPRING L1175038-01 GW

Collected by

Collected date/time

Received date/time

12/30/19 13:15

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1404640	1	01/10/20 08:14	01/10/20 08:14	RF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1406133	1	01/05/20 07:43	01/05/20 10:23	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1404999	1	01/02/20 12:07	01/02/20 12:07	LEB	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1405032	1	01/06/20 13:46	01/06/20 13:46	AJC	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1404602	1	12/31/19 14:35	12/31/19 14:35	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1405498	1	01/05/20 00:58	01/05/20 00:58	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	1	12/31/19 20:35	12/31/19 20:35	LBR	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	20	12/31/19 20:51	12/31/19 20:51	LBR	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1404906	1	01/02/20 09:24	01/02/20 13:18	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1404756	1	01/01/20 00:16	01/01/20 00:16	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1404920	1	01/02/20 14:45	01/02/20 14:45	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 03:29	01/01/20 03:29	TJJ	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1409864	1	01/13/20 20:16	01/14/20 12:36	JN	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TRIP BLANK L1175038-02 GW

Collected by

Collected date/time

Received date/time

12/30/19 13:20

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 00:48	01/01/20 00:48	TJJ	Mt. Juliet, TN



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

Chris Ward
Project Manager

¹ Cp

² Tc

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⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Report Revision History

Version 1: 01/10/20 13:54

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BL Blackened Liquid
BR Brown Ring
FO Foam
BB Blackened Base
BT Blackening around Ball
SR Slime Ring around Ball
PB Pale Blue Glow in UV Light



Collected date/time: 12/30/19 13:15

L1175038

Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	01/10/2020 08:14	WG1404640
Slime Forming Bacteria	Present		1	01/10/2020 08:14	WG1404640
Sulfate Reducing Bacteria	Present		1	01/10/2020 08:14	WG1404640

Sample Narrative:

L1175038-01 WG1404640: IRB Approximate Population=35,000 CFU/mL. Reactions=FO/BR/BL.

L1175038-01 WG1404640: SLYM Approximate Population=2,500 CFU/mL. Reactions=SR/PB.

L1175038-01 WG1404640: SRB Approximate Population=6,000 CFU/mL. Reactions=BB/BT.

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	701		13.3	1	01/05/2020 10:23	WG1406133

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	468		20.0	1	01/02/2020 12:07	WG1404999
Alkalinity,Carbonate	ND		20.0	1	01/02/2020 12:07	WG1404999

Sample Narrative:

L1175038-01 WG1404999: Endpoint pH 4.5

Wet Chemistry by Method 353.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	0.507		0.100	1	01/06/2020 13:46	WG1405032

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.41	T8	1	12/31/2019 14:35	WG1404602

Sample Narrative:

L1175038-01 WG1404602: 7.41 at 14.8C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1120		10.0	1	01/05/2020 00:58	WG1405498

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/31/2019 20:35	WG1404429
Chloride	12.9		1.00	1	12/31/2019 20:35	WG1404429
Fluoride	0.312		0.100	1	12/31/2019 20:35	WG1404429
Sulfate	215		100	20	12/31/2019 20:51	WG1404429

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



Collected date/time: 12/30/19 13:15

L1175038

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0301		0.00500	1	01/02/2020 13:18	WG1404906
Boron	0.272		0.200	1	01/02/2020 13:18	WG1404906
Calcium	82.5	V	1.00	1	01/02/2020 13:18	WG1404906
Iron	ND		0.100	1	01/02/2020 13:18	WG1404906
Magnesium	59.3	V	1.00	1	01/02/2020 13:18	WG1404906
Manganese	ND		0.0100	1	01/02/2020 13:18	WG1404906
Phosphorus	ND		0.100	1	01/02/2020 13:18	WG1404906
Potassium	2.70	B	1.00	1	01/02/2020 13:18	WG1404906
Selenium	0.0107		0.0100	1	01/02/2020 13:18	WG1404906
Sodium	115	V	1.00	1	01/02/2020 13:18	WG1404906
Strontium	0.750		0.0100	1	01/02/2020 13:18	WG1404906

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	01/01/2020 00:16	WG1404756
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.3		78.0-120		01/01/2020 00:16	WG1404756

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/02/2020 14:45	WG1404920
Ethane	ND		0.0130	1	01/02/2020 14:45	WG1404920
Ethene	ND		0.0130	1	01/02/2020 14:45	WG1404920
Propane	ND		0.0190	1	01/02/2020 14:45	WG1404920

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 03:29	WG1404860
Toluene	ND		0.00100	1	01/01/2020 03:29	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 03:29	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 03:29	WG1404860
(S) <i>Toluene-d8</i>	95.5		80.0-120		01/01/2020 03:29	WG1404860
(S) <i>4-Bromofluorobenzene</i>	92.9		77.0-126		01/01/2020 03:29	WG1404860
(S) <i>1,2-Dichloroethane-d4</i>	107		70.0-130		01/01/2020 03:29	WG1404860

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	01/14/2020 12:36	WG1409864
(S) <i>o</i> -Terphenyl	67.9		31.0-160		01/14/2020 12:36	WG1409864



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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 00:48	WG1404860
Toluene	ND		0.00100	1	01/01/2020 00:48	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 00:48	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 00:48	WG1404860
(S) Toluene-d8	93.6		80.0-120		01/01/2020 00:48	WG1404860
(S) 4-Bromofluorobenzene	92.9		77.0-126		01/01/2020 00:48	WG1404860
(S) 1,2-Dichloroethane-d4	109		70.0-130		01/01/2020 00:48	WG1404860

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Method Blank (MB)

(MB) R3488533-1 01/05/20 10:23

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

L1175041-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175041-01 01/05/20 10:23 • (DUP) R3488533-3 01/05/20 10:23

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1960	1980	1	1.27		5

Laboratory Control Sample (LCS)

(LCS) R3488533-2 01/05/20 10:23

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	7790	88.5	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3487614-1 01/02/20 11:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	5.60	⬇	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:
BLANK: Endpoint pH 4.5

L1175038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175038-01 01/02/20 12:07 • (DUP) R3487614-2 01/02/20 12:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP RPD Limits %
Alkalinity,Bicarbonate	468	467	1	0.130	20
Alkalinity,Carbonate	ND	0.000	1	0.000	20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Method Blank (MB)

(MB) R3488327-1 01/06/20 13:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0197	0.100

L1174731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174731-01 01/06/20 13:04 • (DUP) R3488327-3 01/06/20 13:05

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	ND	0.000	1	0.000		20

L1174960-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174960-01 01/06/20 13:29 • (DUP) R3488327-6 01/06/20 13:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.419	0.417	1	0.478		20

Laboratory Control Sample (LCS)

(LCS) R3488327-2 01/06/20 13:02

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	4.00	3.90	97.5	90.0-110	

L1174787-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174787-04 01/06/20 13:08 • (MS) R3488327-4 01/06/20 13:10 • (MSD) R3488327-5 01/06/20 13:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Nitrate-Nitrite	2.50	4.61	6.50	6.58	75.6	78.6	1	90.0-110	E J6	E J6	1.15	20

L1174960-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1174960-02 01/06/20 13:32 • (MS) R3488327-7 01/06/20 13:34

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	2.50	ND	2.34	90.4	1	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1174615-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174615-02 12/31/19 14:35 • (DUP) R3487361-2 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.83	7.84	1	0.128		1

Sample Narrative:
OS: 7.83 at 13.6C
DUP: 7.84 at 14.4C

L1175043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175043-01 12/31/19 14:35 • (DUP) R3487361-3 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.35	1	0.407		1

Sample Narrative:
OS: 7.38 at 15.4C
DUP: 7.35 at 15.1C

Laboratory Control Sample (LCS)

(LCS) R3487361-1 12/31/19 14:35

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:
LCS: 9.98 at 18.8C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Method Blank (MB)

(MB) R3488062-1 01/05/20 00:58

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1174928-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174928-02 01/05/20 00:58 • (DUP) R3488062-3 01/05/20 00:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	233	233	1	0.0859		20

L1175044-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175044-01 01/05/20 00:58 • (DUP) R3488062-4 01/05/20 00:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	3760	3710	1	1.34		20

Laboratory Control Sample (LCS)

(LCS) R3488062-2 01/05/20 00:58

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	475	475	100	85.0-115	



Method Blank (MB)

(MB) R3487516-1 12/31/19 10:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Sulfate	U		0.0774	5.00

L1174922-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174922-01 12/31/19 12:56 • (DUP) R3487516-3 12/31/19 13:12

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	4.45	4.45	1	0.0225		15
Fluoride	0.231	0.233	1	0.947		15
Sulfate	9.42	9.42	1	0.00955		15

L1174991-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1174991-03 12/31/19 15:40 • (DUP) R3487516-6 12/31/19 15:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	10.2	10.3	1	0.273		15
Fluoride	ND	0.000	1	0.000		15
Sulfate	9.84	9.79	1	0.491		15

Laboratory Control Sample (LCS)

(LCS) R3487516-2 12/31/19 10:57

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Bromide	40.0	40.1	100	80.0-120	
Chloride	40.0	39.4	98.5	80.0-120	
Fluoride	8.00	7.94	99.3	80.0-120	
Sulfate	40.0	40.3	101	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1174928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174928-01 12/31/19 13:28 • (MS) R3487516-4 12/31/19 13:45 • (MSD) R3487516-5 12/31/19 14:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	49.1	49.0	98.1	98.0	1	80.0-120			0.112	15
Chloride	50.0	1.89	52.7	52.6	102	101	1	80.0-120			0.326	15
Fluoride	5.00	ND	5.25	5.23	104	103	1	80.0-120			0.370	15
Sulfate	50.0	12.1	62.7	62.6	101	101	1	80.0-120			0.186	15

L1175023-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1175023-01 12/31/19 19:13 • (MS) R3487516-7 12/31/19 19:29

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	49.7	99.3	1	80.0-120	
Chloride	50.0	6.18	56.6	101	1	80.0-120	
Fluoride	5.00	ND	5.09	102	1	80.0-120	
Sulfate	50.0	5.93	56.0	100	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487745-1 01/02/20 13:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0329	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.273	U	0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.431	U	0.0985	1.00
Strontium	U		0.00170	0.0100
Phosphorus	U		0.00370	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3487745-2 01/02/20 13:12 • (LCSD) R3487745-3 01/02/20 13:15

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 %
Barium	1.00	1.03	1.03	103	103	80.0-120			0.662	20
Boron	1.00	0.994	0.985	99.4	98.5	80.0-120			0.924	20
Calcium	10.0	10.2	10.2	102	102	80.0-120			0.349	20
Iron	10.0	9.97	9.94	99.7	99.4	80.0-120			0.386	20
Magnesium	10.0	10.5	10.3	105	103	80.0-120			1.35	20
Manganese	1.00	0.997	0.987	99.7	98.7	80.0-120			1.01	20
Potassium	10.0	10.5	10.5	105	105	80.0-120			0.178	20
Selenium	1.00	1.01	1.00	101	100	80.0-120			0.915	20
Sodium	10.0	10.6	10.7	106	107	80.0-120			0.185	20
Strontium	1.00	1.00	0.998	100	99.8	80.0-120			0.501	20
Phosphorus	10.0	1.01	0.992	10.1	9.92	80.0-120			1.62	20

L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0301	1.03	1.06	100	103	1	75.0-125			2.94	20
Boron	1.00	0.272	1.23	1.24	96.2	96.9	1	75.0-125			0.499	20
Calcium	10.0	82.5	89.7	89.4	72.1	69.2	1	75.0-125	U	U	0.326	20
Iron	10.0	ND	9.65	9.74	96.2	97.0	1	75.0-125			0.853	20
Magnesium	10.0	59.3	66.0	65.8	67.6	64.9	1	75.0-125	U	U	0.413	20



L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese	1.00	ND	0.963	0.983	95.7	97.7	1	75.0-125			2.12	20
Potassium	10.0	2.70	12.1	12.2	93.7	95.4	1	75.0-125			1.39	20
Selenium	1.00	0.0107	1.03	1.03	102	102	1	75.0-125			0.639	20
Sodium	10.0	115	119	119	43.3	37.5	1	75.0-125	V	V	0.495	20
Strontium	1.00	0.750	1.70	1.71	95.2	96.3	1	75.0-125			0.679	20
Phosphorus	10.0	ND	1.03	1.04	10.1	10.2	1	75.0-125			0.596	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3487673-2 12/31/19 23:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0405	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.2			78.0-120

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3487673-1 12/31/19 22:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.49	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			103	78.0-120	



Method Blank (MB)

(MB) R3487698-1 01/02/20 14:19

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

L1175009-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1175009-02 01/02/20 14:30 • (DUP) R3487698-2 01/02/20 15:38

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

L1175120-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1175120-12 01/02/20 16:26 • (DUP) R3487698-3 01/02/20 16:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

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

(LCS) R3487698-4 01/02/20 16:41 • (LCSD) R3487698-5 01/02/20 16:55

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0660	0.0710	97.3	105	85.0-115			7.30	20
Ethane	0.129	0.116	0.136	89.9	105	85.0-115			15.9	20
Ethene	0.127	0.111	0.130	87.4	102	85.0-115			15.8	20
Propane	0.186	0.167	0.195	89.8	105	85.0-115			15.5	20

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) R3487679-2 01/01/20 00:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	94.4			80.0-120
(S) 4-Bromofluorobenzene	95.6			77.0-126
(S) 1,2-Dichloroethane-d4	108			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3487679-1 12/31/19 23:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00615	123	70.0-123	
Ethylbenzene	0.00500	0.00492	98.4	79.0-123	
Toluene	0.00500	0.00506	101	79.0-120	
Xylenes, Total	0.0150	0.0153	102	79.0-123	
(S) Toluene-d8			95.0	80.0-120	
(S) 4-Bromofluorobenzene			96.1	77.0-126	
(S) 1,2-Dichloroethane-d4			108	70.0-130	

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3490828-1 01/14/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	64.5			31.0-160

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

(LCS) R3490828-2 01/14/20 11:44 • (LCSD) R3490828-3 01/14/20 12:10

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 %
TPH (GC/FID) High Fraction	1.50	1.36	1.23	90.7	82.0	50.0-150			10.0	20
(S) o-Terphenyl				79.5	69.0	31.0-160				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* 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 National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
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}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Caerus Oil & Gas LLC
143 Diamond Avenue
Parachute, CO 81635
970-285-9606

Billing Information:

Same as above

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

Report to:
bmiddleton@caerusoilandgas.com

Email To:
jjanicek@caerusoilandgas.com

Project
Description: *C1600 Dughe Release*

City/State
Collected: **Parachute CO**

Phone:
Fax:

Client Project #
C1600 Dughe Release

Lab Project #

Collected by (print):

Site/Facility ID #
C1600 Dughe Release

P.O. #

Collected by (signature):

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

Quote #

Date Results Needed

Standard TAT

Immediately
Packed on Ice N ____ Y ☒

No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

TPH- (GRO/DRO), BTEX

BART

Total bicarbonate as CaCO3

Carbonate as CaCO3

TDS, pH, Specific Conductance

Nitrate and Nitrite as N

Br, Cl, F, SO42, Ca, Mg, K, Na, P, Fe, Mn, Ba, B

Se, S, r

Dissolved methane, propane, ethane

BTEX

L # *L1175038*

E016

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks

Sample # (lab only)

* Matrix:

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

Remarks:

** Cobalt 609 BASELINE &
Sampling Site*

Samples returned via:

____ UPS ____ FedEx ____ Courier

pH ____ Temp ____

Flow ____ Other ____

Sample Receipt Checklist

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

If Applicable

VOA Zero Headspace: ☒ Y ____ N
Preservation Correct/Checked: ☒ Y ____ N

RAD SCREEN: <0.5 mP/hr

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes/No

1 ☒ HCl / MeOH
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C Bottles Received:

Date:

Time:

Hold:

Condition:
NCF / ☒

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:
NCF / ☒

January 15, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas

Sample Delivery Group: L1175041
Samples Received: 12/31/2019
Project Number:
Description: C16OU Dumpline Release

Report To: Jake Janicek
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.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20191230 - C16OU- ALKALI CK SPG L1175041-01 GW

Collected by

Collected date/time

Received date/time

12/30/19 08:37

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1404640	1	01/10/20 08:14	01/10/20 08:14	RF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1406133	1	01/05/20 07:43	01/05/20 10:23	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1404999	1	01/02/20 12:24	01/02/20 12:24	LEB	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1405032	1	01/06/20 13:47	01/06/20 13:47	AJC	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1404602	1	12/31/19 14:35	12/31/19 14:35	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1405498	1	01/05/20 00:58	01/05/20 00:58	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	1	12/31/19 21:08	12/31/19 21:08	LBR	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	100	12/31/19 21:24	12/31/19 21:24	LBR	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1404906	1	01/02/20 09:24	01/02/20 13:42	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1404756	1	01/01/20 00:38	01/01/20 00:38	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1404920	1	01/02/20 14:50	01/02/20 14:50	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 03:50	01/01/20 03:50	TJJ	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1409864	1	01/13/20 20:16	01/14/20 13:02	JN	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

TRIP BLANK L1175041-02 GW

Collected by

Collected date/time

Received date/time

12/30/19 08:37

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 01:08	01/01/20 01:08	TJJ	Mt. Juliet, TN



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

Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Report Revision History

Version 1: 01/10/20 14:01

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BL Blackened Liquid
BR Brown Ring
FO Foam
BB Blackened Base
BT Blackening around Ball
SR Slime Ring around Ball
PB Pale Blue Glow in UV Light



Collected date/time: 12/30/19 08:37

L1175041

Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	01/10/2020 08:14	WG1404640
Slime Forming Bacteria	Present		1	01/10/2020 08:14	WG1404640
Sulfate Reducing Bacteria	Present		1	01/10/2020 08:14	WG1404640

Sample Narrative:

L1175041-01 WG1404640: IRB Approximate Population=9,000 CFU/mL. Reactions=FO/BR/BL.

L1175041-01 WG1404640: SLYM Approximate Population=2,500 CFU/mL. Reactions=SR/PB.

L1175041-01 WG1404640: SRB Approximate Population=500,000 CFU/mL. Reactions=BB/BT.

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	1960		25.0	1	01/05/2020 10:23	WG1406133

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	451		20.0	1	01/02/2020 12:24	WG1404999
Alkalinity,Carbonate	ND		20.0	1	01/02/2020 12:24	WG1404999

Sample Narrative:

L1175041-01 WG1404999: Endpoint pH 4.5

Wet Chemistry by Method 353.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	ND		0.100	1	01/06/2020 13:47	WG1405032

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.35	T8	1	12/31/2019 14:35	WG1404602

Sample Narrative:

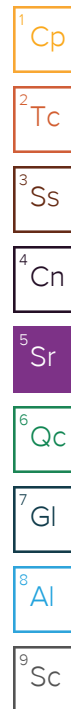
L1175041-01 WG1404602: 7.35 at 15.3C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	2490		10.0	1	01/05/2020 00:58	WG1405498

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/31/2019 21:08	WG1404429
Chloride	10.4		1.00	1	12/31/2019 21:08	WG1404429
Fluoride	0.657		0.100	1	12/31/2019 21:08	WG1404429
Sulfate	1220		500	100	12/31/2019 21:24	WG1404429





Collected date/time: 12/30/19 08:37

L1175041

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0170		0.00500	1	01/02/2020 13:42	WG1404906
Boron	ND		0.200	1	01/02/2020 13:42	WG1404906
Calcium	189		1.00	1	01/02/2020 13:42	WG1404906
Iron	0.153		0.100	1	01/02/2020 13:42	WG1404906
Magnesium	136		1.00	1	01/02/2020 13:42	WG1404906
Manganese	ND		0.0100	1	01/02/2020 13:42	WG1404906
Phosphorus	ND		0.100	1	01/02/2020 13:42	WG1404906
Potassium	4.64		1.00	1	01/02/2020 13:42	WG1404906
Selenium	0.0117		0.0100	1	01/02/2020 13:42	WG1404906
Sodium	287		1.00	1	01/02/2020 13:42	WG1404906
Strontium	4.44		0.0100	1	01/02/2020 13:42	WG1404906

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	01/01/2020 00:38	WG1404756
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.3		78.0-120		01/01/2020 00:38	WG1404756

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/02/2020 14:50	WG1404920
Ethane	ND		0.0130	1	01/02/2020 14:50	WG1404920
Ethene	ND		0.0130	1	01/02/2020 14:50	WG1404920
Propane	ND		0.0190	1	01/02/2020 14:50	WG1404920

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 03:50	WG1404860
Toluene	ND		0.00100	1	01/01/2020 03:50	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 03:50	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 03:50	WG1404860
(S) <i>Toluene-d8</i>	94.0		80.0-120		01/01/2020 03:50	WG1404860
(S) <i>4-Bromofluorobenzene</i>	95.3		77.0-126		01/01/2020 03:50	WG1404860
(S) <i>1,2-Dichloroethane-d4</i>	106		70.0-130		01/01/2020 03:50	WG1404860

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	01/14/2020 13:02	WG1409864
(S) <i>o</i> -Terphenyl	72.1		31.0-160		01/14/2020 13:02	WG1409864



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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 01:08	WG1404860
Toluene	ND		0.00100	1	01/01/2020 01:08	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 01:08	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 01:08	WG1404860
(S) Toluene-d8	93.6		80.0-120		01/01/2020 01:08	WG1404860
(S) 4-Bromofluorobenzene	92.8		77.0-126		01/01/2020 01:08	WG1404860
(S) 1,2-Dichloroethane-d4	109		70.0-130		01/01/2020 01:08	WG1404860

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Method Blank (MB)

(MB) R3488533-1 01/05/20 10:23

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

L1175041-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175041-01 01/05/20 10:23 • (DUP) R3488533-3 01/05/20 10:23

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1960	1980	1	1.27		5

Laboratory Control Sample (LCS)

(LCS) R3488533-2 01/05/20 10:23

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	7790	88.5	85.0-115	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3487614-1 01/02/20 11:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	5.60	⌵	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1175038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175038-01 01/02/20 12:07 • (DUP) R3487614-2 01/02/20 12:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity,Bicarbonate	468	467	1	0.130		20
Alkalinity,Carbonate	ND	0.000	1	0.000		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3488327-1 01/06/20 13:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0197	0.100

L1174731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174731-01 01/06/20 13:04 • (DUP) R3488327-3 01/06/20 13:05

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	ND	0.000	1	0.000		20

L1174960-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174960-01 01/06/20 13:29 • (DUP) R3488327-6 01/06/20 13:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.419	0.417	1	0.478		20

Laboratory Control Sample (LCS)

(LCS) R3488327-2 01/06/20 13:02

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	4.00	3.90	97.5	90.0-110	

L1174787-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174787-04 01/06/20 13:08 • (MS) R3488327-4 01/06/20 13:10 • (MSD) R3488327-5 01/06/20 13:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Nitrate-Nitrite	2.50	4.61	6.50	6.58	75.6	78.6	1	90.0-110	E J6	E J6	1.15	20

L1174960-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1174960-02 01/06/20 13:32 • (MS) R3488327-7 01/06/20 13:34

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	2.50	ND	2.34	90.4	1	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1174615-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174615-02 12/31/19 14:35 • (DUP) R3487361-2 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.83	7.84	1	0.128		1

Sample Narrative:

OS: 7.83 at 13.6C

DUP: 7.84 at 14.4C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1175043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175043-01 12/31/19 14:35 • (DUP) R3487361-3 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.35	1	0.407		1

Sample Narrative:

OS: 7.38 at 15.4C

DUP: 7.35 at 15.1C

Laboratory Control Sample (LCS)

(LCS) R3487361-1 12/31/19 14:35

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 18.8C

Method Blank (MB)

(MB) R3488062-1 01/05/20 00:58

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

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1174928-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174928-02 01/05/20 00:58 • (DUP) R3488062-3 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	233	233	1	0.0859		20

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3488062-4 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte		umhos/cm		%		%
Specific Conductance		3710	1	1.34		20

Laboratory Control Sample (LCS)

(LCS) R3488062-2 01/05/20 00:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	475	475	100	85.0-115	



Method Blank (MB)

(MB) R3487516-1 12/31/19 10:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Sulfate	U		0.0774	5.00

L1174922-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174922-01 12/31/19 12:56 • (DUP) R3487516-3 12/31/19 13:12

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	4.45	4.45	1	0.0225		15
Fluoride	0.231	0.233	1	0.947		15
Sulfate	9.42	9.42	1	0.00955		15

L1174991-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1174991-03 12/31/19 15:40 • (DUP) R3487516-6 12/31/19 15:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	10.2	10.3	1	0.273		15
Fluoride	ND	0.000	1	0.000		15
Sulfate	9.84	9.79	1	0.491		15

Laboratory Control Sample (LCS)

(LCS) R3487516-2 12/31/19 10:57

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Bromide	40.0	40.1	100	80.0-120	
Chloride	40.0	39.4	98.5	80.0-120	
Fluoride	8.00	7.94	99.3	80.0-120	
Sulfate	40.0	40.3	101	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1174928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174928-01 12/31/19 13:28 • (MS) R3487516-4 12/31/19 13:45 • (MSD) R3487516-5 12/31/19 14:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Bromide	50.0	ND	49.1	49.0	98.1	98.0	1	80.0-120			0.112	15
Chloride	50.0	1.89	52.7	52.6	102	101	1	80.0-120			0.326	15
Fluoride	5.00	ND	5.25	5.23	104	103	1	80.0-120			0.370	15
Sulfate	50.0	12.1	62.7	62.6	101	101	1	80.0-120			0.186	15

L1175023-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1175023-01 12/31/19 19:13 • (MS) R3487516-7 12/31/19 19:29

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	ND	49.7	99.3	1	80.0-120	
Chloride	50.0	6.18	56.6	101	1	80.0-120	
Fluoride	5.00	ND	5.09	102	1	80.0-120	
Sulfate	50.0	5.93	56.0	100	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487745-1 01/02/20 13:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0329	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.273	U	0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.431	U	0.0985	1.00
Strontium	U		0.00170	0.0100
Phosphorus	U		0.00370	0.100

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3487745-2 01/02/20 13:12 • (LCSD) R3487745-3 01/02/20 13:15

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 %
Barium	1.00	1.03	1.03	103	103	80.0-120			0.662	20
Boron	1.00	0.994	0.985	99.4	98.5	80.0-120			0.924	20
Calcium	10.0	10.2	10.2	102	102	80.0-120			0.349	20
Iron	10.0	9.97	9.94	99.7	99.4	80.0-120			0.386	20
Magnesium	10.0	10.5	10.3	105	103	80.0-120			1.35	20
Manganese	1.00	0.997	0.987	99.7	98.7	80.0-120			1.01	20
Potassium	10.0	10.5	10.5	105	105	80.0-120			0.178	20
Selenium	1.00	1.01	1.00	101	100	80.0-120			0.915	20
Sodium	10.0	10.6	10.7	106	107	80.0-120			0.185	20
Strontium	1.00	1.00	0.998	100	99.8	80.0-120			0.501	20
Phosphorus	10.0	1.01	0.992	10.1	9.92	80.0-120			1.62	20

L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0301	1.03	1.06	100	103	1	75.0-125			2.94	20
Boron	1.00	0.272	1.23	1.24	96.2	96.9	1	75.0-125			0.499	20
Calcium	10.0	82.5	89.7	89.4	72.1	69.2	1	75.0-125	U	U	0.326	20
Iron	10.0	ND	9.65	9.74	96.2	97.0	1	75.0-125			0.853	20
Magnesium	10.0	59.3	66.0	65.8	67.6	64.9	1	75.0-125	U	U	0.413	20



L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese	1.00	ND	0.963	0.983	95.7	97.7	1	75.0-125			2.12	20
Potassium	10.0	2.70	12.1	12.2	93.7	95.4	1	75.0-125			1.39	20
Selenium	1.00	0.0107	1.03	1.03	102	102	1	75.0-125			0.639	20
Sodium	10.0	115	119	119	43.3	37.5	1	75.0-125	V	V	0.495	20
Strontium	1.00	0.750	1.70	1.71	95.2	96.3	1	75.0-125			0.679	20
Phosphorus	10.0	ND	1.03	1.04	10.1	10.2	1	75.0-125			0.596	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3487673-2 12/31/19 23:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0405	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.2			78.0-120

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3487673-1 12/31/19 22:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.49	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			103	78.0-120	



Method Blank (MB)

(MB) R3487698-1 01/02/20 14:19

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

L1175009-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1175009-02 01/02/20 14:30 • (DUP) R3487698-2 01/02/20 15:38

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

L1175120-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1175120-12 01/02/20 16:26 • (DUP) R3487698-3 01/02/20 16:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

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

(LCS) R3487698-4 01/02/20 16:41 • (LCSD) R3487698-5 01/02/20 16:55

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0660	0.0710	97.3	105	85.0-115			7.30	20
Ethane	0.129	0.116	0.136	89.9	105	85.0-115			15.9	20
Ethene	0.127	0.111	0.130	87.4	102	85.0-115			15.8	20
Propane	0.186	0.167	0.195	89.8	105	85.0-115			15.5	20

1

Cp

2

Tc

3

Ss

4

Cn

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Sr

6

Qc

7

Gl

8

Al

9

Sc



Method Blank (MB)

(MB) R3487679-2 01/01/20 00:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	94.4			80.0-120
(S) 4-Bromofluorobenzene	95.6			77.0-126
(S) 1,2-Dichloroethane-d4	108			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3487679-1 12/31/19 23:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00615	123	70.0-123	
Ethylbenzene	0.00500	0.00492	98.4	79.0-123	
Toluene	0.00500	0.00506	101	79.0-120	
Xylenes, Total	0.0150	0.0153	102	79.0-123	
(S) Toluene-d8			95.0	80.0-120	
(S) 4-Bromofluorobenzene			96.1	77.0-126	
(S) 1,2-Dichloroethane-d4			108	70.0-130	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3490828-1 01/14/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	64.5			31.0-160

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3490828-2 01/14/20 11:44 • (LCSD) R3490828-3 01/14/20 12:10

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 %
TPH (GC/FID) High Fraction	1.50	1.36	1.23	90.7	82.0	50.0-150			10.0	20
(S) o-Terphenyl				79.5	69.0	31.0-160				



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.
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.

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



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* 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 National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
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}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Caerus Oil & Gas LLC
143 Diamond Avenue
Parachute, CO 81635
970-285-9606

Billing Information:

Same as above

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



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



L# L1175041
E017

Acctnum:

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks

Sample # (lab only)

Report to:
bmiddleton@caerusoilandgas.com

Email To:
jjanicek@caerusoilandgas.com

Project
Description: C11000 Daphne Release

City/State
Collected: **Parachute CO**

Phone:
Fax:

Client Project #

Lab Project #

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

Quote #

Date Results Needed

Standard TAT

No.
of
Cnts

Packed on Ice N Y X

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

~~20191230-C11000-Alkal, Clk Spg~~

20191230-C11000-Alkal, Clk Spg

Grab

GW

12/30/19

837

14

X

X

X

X

X

X

X

X

X

X

-01

Trip Blank

Grab

DE

12/30/19

840

1

X

-02

* Matrix:

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

Remarks:

609 ANALYTE LIST

Samples returned via:

 UPS FedEx Courier

Tracking # 4510 1663 5035

pH Temp

Flow Other

Sample Receipt Checklist

COC Seal Present/Intact: Y N

COC Signed/Accurate: Y N

Bottles arrive intact: Y N

Correct bottles used: Y N

Sufficient volume sent: Y N

If Applicable

VOA Zero Headspace: Y N

Preservation Correct/Checked: Y N

AD SCREEN: <0.5 mP/mr

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes / No
 HCL / MeOH
 TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C Bottles Received:

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 12-31-19 Time: 0830

Hold:

Condition:
NCF / OK

January 15, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas

Sample Delivery Group: L1175042
Samples Received: 12/31/2019
Project Number:
Description: C16OU Dumpline Release

Report To: Jake Janicek
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.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20191230 - C16OU- VANHOOSE/KEINATH SPRIN L1175042-01 GW

Collected by

Collected date/time

Received date/time

12/30/19 12:30

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1404640	1	01/10/20 08:14	01/10/20 08:14	RF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1406133	1	01/05/20 07:43	01/05/20 10:23	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1404999	1	01/02/20 12:31	01/02/20 12:31	LEB	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1405032	1	01/06/20 13:49	01/06/20 13:49	AJC	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1404602	1	12/31/19 14:35	12/31/19 14:35	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1405498	1	01/05/20 00:58	01/05/20 00:58	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	1	12/31/19 22:13	12/31/19 22:13	LBR	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1404429	20	12/31/19 22:30	12/31/19 22:30	LBR	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1404906	1	01/02/20 09:24	01/02/20 13:45	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1404756	1	01/01/20 01:00	01/01/20 01:00	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1404920	1	01/02/20 14:53	01/02/20 14:53	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 04:10	01/01/20 04:10	TJJ	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1409864	1	01/13/20 20:16	01/14/20 13:28	JN	Mt. Juliet, TN

¹Cp

²Tc

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⁸Al

⁹Sc

TRIP BLANK L1175042-02 GW

Collected by

Collected date/time

Received date/time

12/30/19 12:35

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 01:28	01/01/20 01:28	TJJ	Mt. Juliet, TN



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

Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Report Revision History

Version 1: 01/10/20 14:01

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BR Brown Ring



Collected date/time: 12/30/19 12:30

L1175042

Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	01/10/2020 08:14	WG1404640
Slime Forming Bacteria	Absent		1	01/10/2020 08:14	WG1404640
Sulfate Reducing Bacteria	Absent		1	01/10/2020 08:14	WG1404640

Sample Narrative:

L1175042-01 WG1404640: IRB Approximate Population=500 CFU/mL. Reactions=BR.

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	658		10.0	1	01/05/2020 10:23	WG1406133

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	393		20.0	1	01/02/2020 12:31	WG1404999
Alkalinity,Carbonate	ND		20.0	1	01/02/2020 12:31	WG1404999

Sample Narrative:

L1175042-01 WG1404999: Endpoint pH 4.5

Wet Chemistry by Method 353.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	0.834		0.100	1	01/06/2020 13:49	WG1405032

Wet Chemistry by Method 9040C

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.55	T8	1	12/31/2019 14:35	WG1404602

Sample Narrative:

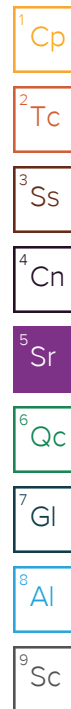
L1175042-01 WG1404602: 7.55 at 15C

Wet Chemistry by Method 9050A

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	995		10.0	1	01/05/2020 00:58	WG1405498

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	12/31/2019 22:13	WG1404429
Chloride	9.26		1.00	1	12/31/2019 22:13	WG1404429
Fluoride	0.317		0.100	1	12/31/2019 22:13	WG1404429
Sulfate	220		100	20	12/31/2019 22:30	WG1404429





Collected date/time: 12/30/19 12:30

L1175042

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0295		0.00500	1	01/02/2020 13:45	WG1404906
Boron	0.221		0.200	1	01/02/2020 13:45	WG1404906
Calcium	73.9		1.00	1	01/02/2020 13:45	WG1404906
Iron	ND		0.100	1	01/02/2020 13:45	WG1404906
Magnesium	52.3		1.00	1	01/02/2020 13:45	WG1404906
Manganese	ND		0.0100	1	01/02/2020 13:45	WG1404906
Phosphorus	ND		0.100	1	01/02/2020 13:45	WG1404906
Potassium	4.08		1.00	1	01/02/2020 13:45	WG1404906
Selenium	ND		0.0100	1	01/02/2020 13:45	WG1404906
Sodium	98.4		1.00	1	01/02/2020 13:45	WG1404906
Strontium	0.801		0.0100	1	01/02/2020 13:45	WG1404906

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	01/01/2020 01:00	WG1404756
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.2		78.0-120		01/01/2020 01:00	WG1404756

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/02/2020 14:53	WG1404920
Ethane	ND		0.0130	1	01/02/2020 14:53	WG1404920
Ethene	ND		0.0130	1	01/02/2020 14:53	WG1404920
Propane	ND		0.0190	1	01/02/2020 14:53	WG1404920

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 04:10	WG1404860
Toluene	ND		0.00100	1	01/01/2020 04:10	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 04:10	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 04:10	WG1404860
(S) <i>Toluene-d8</i>	95.1		80.0-120		01/01/2020 04:10	WG1404860
(S) <i>4-Bromofluorobenzene</i>	93.7		77.0-126		01/01/2020 04:10	WG1404860
(S) <i>1,2-Dichloroethane-d4</i>	106		70.0-130		01/01/2020 04:10	WG1404860

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	01/14/2020 13:28	WG1409864
(S) <i>o</i> -Terphenyl	69.5		31.0-160		01/14/2020 13:28	WG1409864



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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 01:28	WG1404860
Toluene	ND		0.00100	1	01/01/2020 01:28	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 01:28	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 01:28	WG1404860
(S) Toluene-d8	94.8		80.0-120		01/01/2020 01:28	WG1404860
(S) 4-Bromofluorobenzene	90.3		77.0-126		01/01/2020 01:28	WG1404860
(S) 1,2-Dichloroethane-d4	107		70.0-130		01/01/2020 01:28	WG1404860

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Method Blank (MB)

(MB) R3488533-1 01/05/20 10:23

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1175041-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175041-01 01/05/20 10:23 • (DUP) R3488533-3 01/05/20 10:23

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	1960	1980	1	1.27		5

Laboratory Control Sample (LCS)

(LCS) R3488533-2 01/05/20 10:23

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	7790	88.5	85.0-115	



Method Blank (MB)

(MB) R3487614-1 01/02/20 11:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	5.60	⬇	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1175038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175038-01 01/02/20 12:07 • (DUP) R3487614-2 01/02/20 12:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity,Bicarbonate	468	467	1	0.130		20
Alkalinity,Carbonate	ND	0.000	1	0.000		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3488327-1 01/06/20 13:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0197	0.100

L1174731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174731-01 01/06/20 13:04 • (DUP) R3488327-3 01/06/20 13:05

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	ND	0.000	1	0.000		20

L1174960-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174960-01 01/06/20 13:29 • (DUP) R3488327-6 01/06/20 13:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.419	0.417	1	0.478		20

Laboratory Control Sample (LCS)

(LCS) R3488327-2 01/06/20 13:02

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	4.00	3.90	97.5	90.0-110	

L1174787-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174787-04 01/06/20 13:08 • (MS) R3488327-4 01/06/20 13:10 • (MSD) R3488327-5 01/06/20 13:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Nitrate-Nitrite	2.50	4.61	6.50	6.58	75.6	78.6	1	90.0-110	E J6	E J6	1.15	20

L1174960-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1174960-02 01/06/20 13:32 • (MS) R3488327-7 01/06/20 13:34

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	2.50	ND	2.34	90.4	1	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1174615-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174615-02 12/31/19 14:35 • (DUP) R3487361-2 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.83	7.84	1	0.128		1

Sample Narrative:
OS: 7.83 at 13.6C
DUP: 7.84 at 14.4C

L1175043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175043-01 12/31/19 14:35 • (DUP) R3487361-3 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.35	1	0.407		1

Sample Narrative:
OS: 7.38 at 15.4C
DUP: 7.35 at 15.1C

Laboratory Control Sample (LCS)

(LCS) R3487361-1 12/31/19 14:35

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:
LCS: 9.98 at 18.8C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Method Blank (MB)

(MB) R3488062-1 01/05/20 00:58

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

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1174928-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174928-02 01/05/20 00:58 • (DUP) R3488062-3 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	233	233	1	0.0859		20

L1175044-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175044-01 01/05/20 00:58 • (DUP) R3488062-4 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	3760	3710	1	1.34		20

Laboratory Control Sample (LCS)

(LCS) R3488062-2 01/05/20 00:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	475	475	100	85.0-115	

Method Blank (MB)

(MB) R3487516-1 12/31/19 10:40

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Sulfate	U		0.0774	5.00

L1174922-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174922-01 12/31/19 12:56 • (DUP) R3487516-3 12/31/19 13:12

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	4.45	4.45	1	0.0225		15
Fluoride	0.231	0.233	1	0.947		15
Sulfate	9.42	9.42	1	0.00955		15

L1174991-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1174991-03 12/31/19 15:40 • (DUP) R3487516-6 12/31/19 15:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	10.2	10.3	1	0.273		15
Fluoride	ND	0.000	1	0.000		15
Sulfate	9.84	9.79	1	0.491		15

Laboratory Control Sample (LCS)

(LCS) R3487516-2 12/31/19 10:57

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Bromide	40.0	40.1	100	80.0-120	
Chloride	40.0	39.4	98.5	80.0-120	
Fluoride	8.00	7.94	99.3	80.0-120	
Sulfate	40.0	40.3	101	80.0-120	

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



L1174928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174928-01 12/31/19 13:28 • (MS) R3487516-4 12/31/19 13:45 • (MSD) R3487516-5 12/31/19 14:01

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Bromide	50.0	ND	49.1	49.0	98.1	98.0	1	80.0-120			0.112	15
Chloride	50.0	1.89	52.7	52.6	102	101	1	80.0-120			0.326	15
Fluoride	5.00	ND	5.25	5.23	104	103	1	80.0-120			0.370	15
Sulfate	50.0	12.1	62.7	62.6	101	101	1	80.0-120			0.186	15

L1175023-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1175023-01 12/31/19 19:13 • (MS) R3487516-7 12/31/19 19:29

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	ND	49.7	99.3	1	80.0-120	
Chloride	50.0	6.18	56.6	101	1	80.0-120	
Fluoride	5.00	ND	5.09	102	1	80.0-120	
Sulfate	50.0	5.93	56.0	100	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487745-1 01/02/20 13:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0329	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.273	U	0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.431	U	0.0985	1.00
Strontium	U		0.00170	0.0100
Phosphorus	U		0.00370	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3487745-2 01/02/20 13:12 • (LCSD) R3487745-3 01/02/20 13:15

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 %
Barium	1.00	1.03	1.03	103	103	80.0-120			0.662	20
Boron	1.00	0.994	0.985	99.4	98.5	80.0-120			0.924	20
Calcium	10.0	10.2	10.2	102	102	80.0-120			0.349	20
Iron	10.0	9.97	9.94	99.7	99.4	80.0-120			0.386	20
Magnesium	10.0	10.5	10.3	105	103	80.0-120			1.35	20
Manganese	1.00	0.997	0.987	99.7	98.7	80.0-120			1.01	20
Potassium	10.0	10.5	10.5	105	105	80.0-120			0.178	20
Selenium	1.00	1.01	1.00	101	100	80.0-120			0.915	20
Sodium	10.0	10.6	10.7	106	107	80.0-120			0.185	20
Strontium	1.00	1.00	0.998	100	99.8	80.0-120			0.501	20
Phosphorus	10.0	1.01	0.992	10.1	9.92	80.0-120			1.62	20

L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0301	1.03	1.06	100	103	1	75.0-125			2.94	20
Boron	1.00	0.272	1.23	1.24	96.2	96.9	1	75.0-125			0.499	20
Calcium	10.0	82.5	89.7	89.4	72.1	69.2	1	75.0-125	U	U	0.326	20
Iron	10.0	ND	9.65	9.74	96.2	97.0	1	75.0-125			0.853	20
Magnesium	10.0	59.3	66.0	65.8	67.6	64.9	1	75.0-125	U	U	0.413	20



L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese	1.00	ND	0.963	0.983	95.7	97.7	1	75.0-125			2.12	20
Potassium	10.0	2.70	12.1	12.2	93.7	95.4	1	75.0-125			1.39	20
Selenium	1.00	0.0107	1.03	1.03	102	102	1	75.0-125			0.639	20
Sodium	10.0	115	119	119	43.3	37.5	1	75.0-125	V	V	0.495	20
Strontium	1.00	0.750	1.70	1.71	95.2	96.3	1	75.0-125			0.679	20
Phosphorus	10.0	ND	1.03	1.04	10.1	10.2	1	75.0-125			0.596	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3487673-2 12/31/19 23:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0405	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.2			78.0-120

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

Laboratory Control Sample (LCS)

(LCS) R3487673-1 12/31/19 22:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.49	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			103	78.0-120	



Method Blank (MB)

(MB) R3487698-1 01/02/20 14:19

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

L1175009-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1175009-02 01/02/20 14:30 • (DUP) R3487698-2 01/02/20 15:38

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	U	0.000	1	0.000		20
Ethane	U	0.000	1	0.000		20
Ethene	U	0.000	1	0.000		20
Propane	U	0.000	1	0.000		20

L1175120-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1175120-12 01/02/20 16:26 • (DUP) R3487698-3 01/02/20 16:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20
Propane	ND	0.000	1	0.000		20

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

(LCS) R3487698-4 01/02/20 16:41 • (LCSD) R3487698-5 01/02/20 16:55

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	%	%	%			%	%
Methane	0.0678	0.0660	0.0710	97.3	105	85.0-115			7.30	20
Ethane	0.129	0.116	0.136	89.9	105	85.0-115			15.9	20
Ethene	0.127	0.111	0.130	87.4	102	85.0-115			15.8	20
Propane	0.186	0.167	0.195	89.8	105	85.0-115			15.5	20

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3487679-2 01/01/20 00:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	94.4			80.0-120
(S) 4-Bromofluorobenzene	95.6			77.0-126
(S) 1,2-Dichloroethane-d4	108			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

Laboratory Control Sample (LCS)

(LCS) R3487679-1 12/31/19 23:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00615	123	70.0-123	
Ethylbenzene	0.00500	0.00492	98.4	79.0-123	
Toluene	0.00500	0.00506	101	79.0-120	
Xylenes, Total	0.0150	0.0153	102	79.0-123	
(S) Toluene-d8			95.0	80.0-120	
(S) 4-Bromofluorobenzene			96.1	77.0-126	
(S) 1,2-Dichloroethane-d4			108	70.0-130	

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3490828-1 01/14/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	64.5			31.0-160

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

(LCS) R3490828-2 01/14/20 11:44 • (LCSD) R3490828-3 01/14/20 12:10

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 %
TPH (GC/FID) High Fraction	1.50	1.36	1.23	90.7	82.0	50.0-150			10.0	20
(S) o-Terphenyl				79.5	69.0	31.0-160				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



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.
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.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* 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 National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
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}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Caerus Oil & Gas LLC
143 Diamond Avenue
Parachute, CO 81635
970-285-9606

Billing Information:

Same as above

Report to:
bmiddleton@caerusoilandgas.com

Email To:
ijjanicek@caerusoilandgas.com

Project
Description: C1000 Dimpline Release

City/State
Collected: Parachute CO

Phone:
Fax:
Client Project #
C1000 Dimpline Release

Lab Project #

Collected by (print):
D. H. H.
Site/Facility ID #
C1000 Dimpline Release

P.O. #

Collected by (signature):
JH
Rush? (Lab MUST Be Notified)
Immediately
Packed on Ice N ☐ Y ☒

Quote #

Date Results Needed

Standard TAT

No. of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

20191230-C1000-VanHose/Kenneth Spring

G

GW

12/30/19

1230

14

Trip Blank

G

DI

12/30/19

1235

1

TPH- (GRO/DRO), BTEX

BART

Total bicarbonate as CACO3

Carbonate as CACO3

TDS, pH, Specific Conductance

Nitrate and Nitrite as N

Br, Cl, F, SO42, Ca, Mg, K, Na, P, Fe, Mn, Ba, B

Se, Sr

Dissolved methane, propane, ethane

BTEX

Chain of Custody Page 1 of 1



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



L# 1175042

Ta E018

Acctnum:

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks

Sample # (lab only)

-01

-02

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

Remarks:

COAL 60% BENTONITE 40%

Samples returned via:

UPS FedEx Courier

pH Temp

Flow Other

Tracking # 4570 1663 5035

Relinquished by: (Signature)

Date:

12/30/19

Time:

1400

Received by: (Signature)

Trip Blank Received: Yes/No

HOI/MeOH

TBR

Relinquished by: (Signature)

Date:

12/30/19

Time:

1700

Received by: (Signature)

Temp: °C

Bottles Received:

10.2 = 1.32

14

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

12/31/19 0830

Sample Receipt Checklist
COC Seal Present/Intact: ☒ Y ☐ N
COC Signed/Accurate: ☒ Y ☐ N
Bottles arrive intact: ☒ Y ☐ N
Correct bottles used: ☒ Y ☐ N
Sufficient volume sent: ☒ Y ☐ N
If Applicable
VOA Zero Headspace: ☒ Y ☐ N
Preservation Correct/Checked: ☒ Y ☐ N

RAD SCREEN: <0.5 mR/hr

If preservation required by Login: Date/Time

Hold:

Condition:
NCF / OK

Caerus Oil and Gas

Sample Delivery Group: L1175043
Samples Received: 12/31/2019
Project Number:
Description: C16OU Dumpline Release

Report To: Jake Janicek
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.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20191230 - C16OU - KEINATH WELL #2 L1175043-01 GW

Collected by

Collected date/time

Received date/time

12/30/19 10:11

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1404640	1	01/10/20 08:14	01/10/20 08:14	RF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1404672	1	12/31/19 14:23	12/31/19 14:56	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1404999	1	01/02/20 12:39	01/02/20 12:39	LEB	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1405032	1	01/06/20 13:50	01/06/20 13:50	AJC	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1404602	1	12/31/19 14:35	12/31/19 14:35	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1405498	1	01/05/20 00:58	01/05/20 00:58	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1405013	1	01/02/20 18:15	01/02/20 18:15	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1405013	50	01/02/20 18:29	01/02/20 18:29	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1404906	1	01/02/20 09:24	01/02/20 13:47	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1404756	1	01/01/20 01:21	01/01/20 01:21	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1405423	1	01/03/20 13:50	01/03/20 13:50	JAL	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 04:30	01/01/20 04:30	TJJ	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1409864	1	01/13/20 20:16	01/14/20 13:54	JN	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

TRIP BLANK L1175043-02 GW

Collected by

Collected date/time

Received date/time

12/30/19 10:15

12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 01:48	01/01/20 01:48	TJJ	Mt. Juliet, TN



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

Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Report Revision History

Version 1: 01/10/20 14:03

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BC Brown Cloudy
BR Brown Ring
FO Foam
BB Blackened Base
BT Blackening around Ball
SR Slime Ring around Ball
PB Pale Blue Glow in UV Light



Collected date/time: 12/30/19 10:11

L1175043

Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	01/10/2020 08:14	WG1404640
Slime Forming Bacteria	Present		1	01/10/2020 08:14	WG1404640
Sulfate Reducing Bacteria	Present		1	01/10/2020 08:14	WG1404640

Sample Narrative:

L1175043-01 WG1404640: IRB Approximate Population=500 CFU/mL. Reactions=FO/BR/BC.

L1175043-01 WG1404640: SLYM Approximate Population=100 CFU/mL. Reactions=SR/PB.

L1175043-01 WG1404640: SRB Approximate Population=75 CFU/mL. Reactions=BB/BT.

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	2870		50.0	1	12/31/2019 14:56	WG1404672

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	374		20.0	1	01/02/2020 12:39	WG1404999
Alkalinity,Carbonate	ND		20.0	1	01/02/2020 12:39	WG1404999

Sample Narrative:

L1175043-01 WG1404999: Endpoint pH 4.5

Wet Chemistry by Method 353.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	ND		0.100	1	01/06/2020 13:50	WG1405032

Wet Chemistry by Method 9040C

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.38	T8	1	12/31/2019 14:35	WG1404602

Sample Narrative:

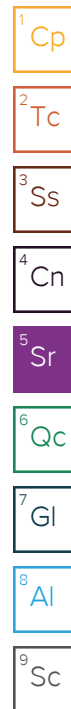
L1175043-01 WG1404602: 7.38 at 15.4C

Wet Chemistry by Method 9050A

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	3290		10.0	1	01/05/2020 00:58	WG1405498

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		50.0	50	01/02/2020 18:29	WG1405013
Chloride	50.6		1.00	1	01/02/2020 18:15	WG1405013
Fluoride	0.472		0.100	1	01/02/2020 18:15	WG1405013
Sulfate	1770		250	50	01/02/2020 18:29	WG1405013





Collected date/time: 12/30/19 10:11

L1175043

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.00919		0.00500	1	01/02/2020 13:47	WG1404906
Boron	ND		0.200	1	01/02/2020 13:47	WG1404906
Calcium	225		1.00	1	01/02/2020 13:47	WG1404906
Iron	0.414		0.100	1	01/02/2020 13:47	WG1404906
Magnesium	178		1.00	1	01/02/2020 13:47	WG1404906
Manganese	0.144		0.0100	1	01/02/2020 13:47	WG1404906
Phosphorus	ND		0.100	1	01/02/2020 13:47	WG1404906
Potassium	7.05		1.00	1	01/02/2020 13:47	WG1404906
Selenium	0.0110		0.0100	1	01/02/2020 13:47	WG1404906
Sodium	365		1.00	1	01/02/2020 13:47	WG1404906
Strontium	5.60		0.0100	1	01/02/2020 13:47	WG1404906

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	01/01/2020 01:21	WG1404756
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.2		78.0-120		01/01/2020 01:21	WG1404756

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/03/2020 13:50	WG1405423
Ethane	ND		0.0130	1	01/03/2020 13:50	WG1405423
Ethene	ND		0.0130	1	01/03/2020 13:50	WG1405423
Propane	ND		0.0190	1	01/03/2020 13:50	WG1405423

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 04:30	WG1404860
Toluene	ND		0.00100	1	01/01/2020 04:30	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 04:30	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 04:30	WG1404860
(S) <i>Toluene-d8</i>	97.9		80.0-120		01/01/2020 04:30	WG1404860
(S) <i>4-Bromofluorobenzene</i>	90.8		77.0-126		01/01/2020 04:30	WG1404860
(S) <i>1,2-Dichloroethane-d4</i>	105		70.0-130		01/01/2020 04:30	WG1404860

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND	T8	0.100	1	01/14/2020 13:54	WG1409864
(S) <i>o</i> -Terphenyl	67.9		31.0-160		01/14/2020 13:54	WG1409864



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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 01:48	WG1404860
Toluene	ND		0.00100	1	01/01/2020 01:48	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 01:48	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 01:48	WG1404860
(S) Toluene-d8	93.9		80.0-120		01/01/2020 01:48	WG1404860
(S) 4-Bromofluorobenzene	94.6		77.0-126		01/01/2020 01:48	WG1404860
(S) 1,2-Dichloroethane-d4	108		70.0-130		01/01/2020 01:48	WG1404860

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Method Blank (MB)

(MB) R3487564-1 12/31/19 14:56

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

L1173522-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1173522-03 12/31/19 14:56 • (DUP) R3487564-3 12/31/19 14:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	67100	57700	1	15.1	J3	5

Laboratory Control Sample (LCS)

(LCS) R3487564-2 12/31/19 14:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8650	98.3	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487614-1 01/02/20 11:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	5.60	⌵	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1175038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175038-01 01/02/20 12:07 • (DUP) R3487614-2 01/02/20 12:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity,Bicarbonate	468	467	1	0.130		20
Alkalinity,Carbonate	ND	0.000	1	0.000		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3488327-1 01/06/20 13:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0197	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1174731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174731-01 01/06/20 13:04 • (DUP) R3488327-3 01/06/20 13:05

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	ND	0.000	1	0.000		20

L1174960-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174960-01 01/06/20 13:29 • (DUP) R3488327-6 01/06/20 13:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.419	0.417	1	0.478		20

Laboratory Control Sample (LCS)

(LCS) R3488327-2 01/06/20 13:02

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	4.00	3.90	97.5	90.0-110	

L1174787-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174787-04 01/06/20 13:08 • (MS) R3488327-4 01/06/20 13:10 • (MSD) R3488327-5 01/06/20 13:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Nitrate-Nitrite	2.50	4.61	6.50	6.58	75.6	78.6	1	90.0-110	E J6	E J6	1.15	20

L1174960-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1174960-02 01/06/20 13:32 • (MS) R3488327-7 01/06/20 13:34

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	2.50	ND	2.34	90.4	1	90.0-110	



L1174615-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174615-02 12/31/19 14:35 • (DUP) R3487361-2 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.83	7.84	1	0.128		1

Sample Narrative:

OS: 7.83 at 13.6C

DUP: 7.84 at 14.4C

L1175043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175043-01 12/31/19 14:35 • (DUP) R3487361-3 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.35	1	0.407		1

Sample Narrative:

OS: 7.38 at 15.4C

DUP: 7.35 at 15.1C

Laboratory Control Sample (LCS)

(LCS) R3487361-1 12/31/19 14:35

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:

LCS: 9.98 at 18.8C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3488062-1 01/05/20 00:58

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1174928-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174928-02 01/05/20 00:58 • (DUP) R3488062-3 01/05/20 00:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	233	233	1	0.0859		20

L1175044-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175044-01 01/05/20 00:58 • (DUP) R3488062-4 01/05/20 00:58

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	3760	3710	1	1.34		20

Laboratory Control Sample (LCS)

(LCS) R3488062-2 01/05/20 00:58

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	475	475	100	85.0-115	



Method Blank (MB)

(MB) R3487791-1 01/02/20 16:34

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Sulfate	U		0.0774	5.00

L1175274-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1175274-02 01/02/20 21:15 • (DUP) R3487791-3 01/02/20 21:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	21.2	21.1	1	0.382		15
Fluoride	0.182	0.183	1	0.932		15
Sulfate	11.2	11.1	1	1.01		15

L1175546-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175546-01 01/03/20 00:30 • (DUP) R3487791-7 01/03/20 00:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	3.46	5	0.000		15
Chloride	113	112	5	1.07		15
Fluoride	1.32	1.30	5	1.30		15
Sulfate	181	179	5	1.15		15

Laboratory Control Sample (LCS)

(LCS) R3487791-2 01/02/20 16:48

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Bromide	40.0	39.6	99.1	80.0-120	
Chloride	40.0	39.0	97.4	80.0-120	
Fluoride	8.00	7.91	98.9	80.0-120	
Sulfate	40.0	39.9	99.8	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1175274-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175274-02 01/02/20 21:15 • (MS) R3487791-4 01/02/20 21:43 • (MSD) R3487791-5 01/02/20 21:57

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	47.5	47.7	95.1	95.4	1	80.0-120			0.330	15
Chloride	50.0	21.2	69.7	69.6	97.0	96.8	1	80.0-120			0.101	15
Fluoride	5.00	0.182	5.08	5.07	97.9	97.8	1	80.0-120			0.0907	15
Sulfate	50.0	11.2	60.4	60.5	98.4	98.6	1	80.0-120			0.148	15

L1175404-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1175404-01 01/03/20 00:02 • (MS) R3487791-6 01/03/20 00:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	48.4	96.8	1	80.0-120	
Chloride	50.0	9.19	59.1	99.9	1	80.0-120	
Fluoride	5.00	0.650	5.64	99.7	1	80.0-120	
Sulfate	50.0	22.9	71.3	96.7	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487745-1 01/02/20 13:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0329	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.273	U	0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.431	U	0.0985	1.00
Strontium	U		0.00170	0.0100
Phosphorus	U		0.00370	0.100

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3487745-2 01/02/20 13:12 • (LCSD) R3487745-3 01/02/20 13:15

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 %
Barium	1.00	1.03	1.03	103	103	80.0-120			0.662	20
Boron	1.00	0.994	0.985	99.4	98.5	80.0-120			0.924	20
Calcium	10.0	10.2	10.2	102	102	80.0-120			0.349	20
Iron	10.0	9.97	9.94	99.7	99.4	80.0-120			0.386	20
Magnesium	10.0	10.5	10.3	105	103	80.0-120			1.35	20
Manganese	1.00	0.997	0.987	99.7	98.7	80.0-120			1.01	20
Potassium	10.0	10.5	10.5	105	105	80.0-120			0.178	20
Selenium	1.00	1.01	1.00	101	100	80.0-120			0.915	20
Sodium	10.0	10.6	10.7	106	107	80.0-120			0.185	20
Strontium	1.00	1.00	0.998	100	99.8	80.0-120			0.501	20
Phosphorus	10.0	1.01	0.992	10.1	9.92	80.0-120			1.62	20

L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0301	1.03	1.06	100	103	1	75.0-125			2.94	20
Boron	1.00	0.272	1.23	1.24	96.2	96.9	1	75.0-125			0.499	20
Calcium	10.0	82.5	89.7	89.4	72.1	69.2	1	75.0-125	U	U	0.326	20
Iron	10.0	ND	9.65	9.74	96.2	97.0	1	75.0-125			0.853	20
Magnesium	10.0	59.3	66.0	65.8	67.6	64.9	1	75.0-125	U	U	0.413	20



L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese	1.00	ND	0.963	0.983	95.7	97.7	1	75.0-125			2.12	20
Potassium	10.0	2.70	12.1	12.2	93.7	95.4	1	75.0-125			1.39	20
Selenium	1.00	0.0107	1.03	1.03	102	102	1	75.0-125			0.639	20
Sodium	10.0	115	119	119	43.3	37.5	1	75.0-125	V	V	0.495	20
Strontium	1.00	0.750	1.70	1.71	95.2	96.3	1	75.0-125			0.679	20
Phosphorus	10.0	ND	1.03	1.04	10.1	10.2	1	75.0-125			0.596	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3487673-2 12/31/19 23:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0405	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.2			78.0-120

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R3487673-1 12/31/19 22:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.49	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			103	78.0-120	



Method Blank (MB)

(MB) R3487917-1 01/03/20 13:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

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

(LCS) R3487917-3 01/03/20 14:42 • (LCSD) R3487917-4 01/03/20 14:46

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 %
Methane	0.0678	0.0659	0.0618	97.2	91.2	85.0-115			6.42	20
Ethane	0.129	0.122	0.115	94.6	89.1	85.0-115			5.91	20
Ethene	0.127	0.116	0.109	91.3	85.8	85.0-115			6.22	20
Propane	0.186	0.176	0.167	94.6	89.8	85.0-115			5.25	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487679-2 01/01/20 00:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	94.4			80.0-120
(S) 4-Bromofluorobenzene	95.6			77.0-126
(S) 1,2-Dichloroethane-d4	108			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3487679-1 12/31/19 23:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00615	123	70.0-123	
Ethylbenzene	0.00500	0.00492	98.4	79.0-123	
Toluene	0.00500	0.00506	101	79.0-120	
Xylenes, Total	0.0150	0.0153	102	79.0-123	
(S) Toluene-d8			95.0	80.0-120	
(S) 4-Bromofluorobenzene			96.1	77.0-126	
(S) 1,2-Dichloroethane-d4			108	70.0-130	

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3490828-1 01/14/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	64.5			31.0-160

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

(LCS) R3490828-2 01/14/20 11:44 • (LCSD) R3490828-3 01/14/20 12:10

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 %
TPH (GC/FID) High Fraction	1.50	1.36	1.23	90.7	82.0	50.0-150			10.0	20
(S) o-Terphenyl				79.5	69.0	31.0-160				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



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.
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.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* 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 National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
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}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Caerus Oil & Gas LLC 143 Diamond Avenue Parachute, CO 81635 970-285-9606			Billing Information: Same as above			Pres Chk	Analysis / Container / Preservative										Chain of Custody Page 1 of 1			
Report to: bmiddleton@caerusoilandgas.com			Email To: jjanicek@caerusoilandgas.com														Pace Analytical® National Center for Testing & Innovation			
Project Description: C1600 Dimple Release			City/State Collected: Parachute CO														12065 Lebanon Rd Mount Juliet, TN 37122 Phone: 615-758-5858 Phone: 800-767-5859 Fax: 615-758-5859			
Phone: Fax:			Client Project # C1600 Dimple Release			Lab Project #													L# L1175043	
Collected by (print): Don Han			Site/Facility ID # C1600 Dimple Release			P.O. #													E019	
Collected by (signature): [Signature]			Rush? (Lab MUST Be Notified) Same Day Five Day Next Day 5 Day (Rad Only) Two Day 10 Day (Rad Only) Three Day			Quote #													Acctnum:	
Immediately Packed on Ice N Y X			Date Results Needed Standard TAT																Template:	
Sample ID			Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	TPH- (GRO/DRO), BTEX	BART	Total bicarbonate as CaCO3	Carbonate as CaCO3	TDS, pH, Specific Conductance	Nitrate and Nitrite as N	Br, Cl, F, SO4, 2, Ca, Mg, K, Na, P, Fe, Mn, Ba, B	Se, S	Dissolved methane, propane, ethane	312X	Shipped Via:	
20191230-C1600- Kennel Well #2			Grab	GW	12/30/19	1011	14	1	X	X	X	X	X	X	X	X	X	X	Remarks	Sample # (lab only)
Trip Blank			Grab	DI	12/30/19	1015	1													-01
																				-02
						</														

Caerus Oil and Gas

Sample Delivery Group: L1175044
Samples Received: 12/31/2019
Project Number:
Description: C16OU Dumpline Release

Report To: Jake Janicek
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:

Chris Ward

Chris Ward
Project Manager

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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



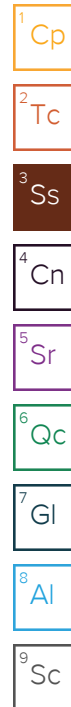
20191230 - C16OU- KEINATH WELL #1 L1175044-01 GW

Collected by
Dustin H.

Collected date/time
12/30/19 11:30

Received date/time
12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1404640	1	01/10/20 08:14	01/10/20 08:14	RF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1404672	1	12/31/19 14:23	12/31/19 14:56	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1404999	1	01/02/20 12:47	01/02/20 12:47	LEB	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1405032	1	01/06/20 13:52	01/06/20 13:52	AJC	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1404602	1	12/31/19 14:35	12/31/19 14:35	JIC	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1405498	1	01/05/20 00:58	01/05/20 00:58	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1405013	1	01/02/20 18:42	01/02/20 18:42	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1405013	50	01/02/20 18:56	01/02/20 18:56	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1404906	1	01/02/20 09:24	01/02/20 13:50	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1404756	1	01/01/20 01:43	01/01/20 01:43	BMB	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1405423	1	01/03/20 13:53	01/03/20 13:53	JAL	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 04:51	01/01/20 04:51	TJJ	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1409864	1	01/13/20 20:16	01/14/20 14:20	JN	Mt. Juliet, TN



TRIP BLANK L1175044-02 GW

Collected by
Dustin H.

Collected date/time
12/30/19 11:35

Received date/time
12/31/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1404860	1	01/01/20 02:08	01/01/20 02:08	TJJ	Mt. Juliet, TN



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

Chris Ward
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Report Revision History

Version 1: 01/10/20 16:54

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BC Brown Cloudy
BR Brown Ring
CL Cloudy Growth
FO Foam
SR Slime Ring around Ball
PB Pale Blue Glow in UV Light



Collected date/time: 12/30/19 11:30

L1175044

Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	01/10/2020 08:14	WG1404640
Slime Forming Bacteria	Present		1	01/10/2020 08:14	WG1404640
Sulfate Reducing Bacteria	Present		1	01/10/2020 08:14	WG1404640

Sample Narrative:

L1175044-01 WG1404640: IRB Approximate Population=2,200 CFU/mL. Reactions=FO/BR/BC.

L1175044-01 WG1404640: SLYM Approximate Population=13,000 CFU/mL. Reactions=SR/PB.

L1175044-01 WG1404640: SRB Approximate Population=6,000 CFU/mL. Reactions=CL...

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	3340		50.0	1	12/31/2019 14:56	WG1404672

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	393		20.0	1	01/02/2020 12:47	WG1404999
Alkalinity,Carbonate	ND		20.0	1	01/02/2020 12:47	WG1404999

Sample Narrative:

L1175044-01 WG1404999: Endpoint pH 4.5

Wet Chemistry by Method 353.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	1.11		0.100	1	01/06/2020 13:52	WG1405032

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.24	T8	1	12/31/2019 14:35	WG1404602

Sample Narrative:

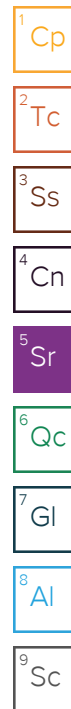
L1175044-01 WG1404602: 7.24 at 13.9C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	3760		10.0	1	01/05/2020 00:58	WG1405498

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		50.0	50	01/02/2020 18:56	WG1405013
Chloride	64.6		1.00	1	01/02/2020 18:42	WG1405013
Fluoride	0.555		0.100	1	01/02/2020 18:42	WG1405013
Sulfate	2000		250	50	01/02/2020 18:56	WG1405013





Collected date/time: 12/30/19 11:30

L1175044

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0130		0.00500	1	01/02/2020 13:50	WG1404906
Boron	0.206		0.200	1	01/02/2020 13:50	WG1404906
Calcium	276		1.00	1	01/02/2020 13:50	WG1404906
Iron	5.01		0.100	1	01/02/2020 13:50	WG1404906
Magnesium	207		1.00	1	01/02/2020 13:50	WG1404906
Manganese	ND		0.0100	1	01/02/2020 13:50	WG1404906
Phosphorus	0.101		0.100	1	01/02/2020 13:50	WG1404906
Potassium	5.99		1.00	1	01/02/2020 13:50	WG1404906
Selenium	0.0346		0.0100	1	01/02/2020 13:50	WG1404906
Sodium	397		1.00	1	01/02/2020 13:50	WG1404906
Strontium	6.90		0.0100	1	01/02/2020 13:50	WG1404906

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	01/01/2020 01:43	WG1404756
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.2		78.0-120		01/01/2020 01:43	WG1404756

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	01/03/2020 13:53	WG1405423
Ethane	ND		0.0130	1	01/03/2020 13:53	WG1405423
Ethene	ND		0.0130	1	01/03/2020 13:53	WG1405423
Propane	ND		0.0190	1	01/03/2020 13:53	WG1405423

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 04:51	WG1404860
Toluene	ND		0.00100	1	01/01/2020 04:51	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 04:51	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 04:51	WG1404860
(S) Toluene-d8	95.3		80.0-120		01/01/2020 04:51	WG1404860
(S) 4-Bromofluorobenzene	93.6		77.0-126		01/01/2020 04:51	WG1404860
(S) 1,2-Dichloroethane-d4	107		70.0-130		01/01/2020 04:51	WG1404860

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	01/14/2020 14:20	WG1409864
(S) <i>o</i> -Terphenyl	73.7		31.0-160		01/14/2020 14:20	WG1409864



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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	01/01/2020 02:08	WG1404860
Toluene	ND		0.00100	1	01/01/2020 02:08	WG1404860
Ethylbenzene	ND		0.00100	1	01/01/2020 02:08	WG1404860
Total Xylenes	ND		0.00300	1	01/01/2020 02:08	WG1404860
(S) Toluene-d8	94.1		80.0-120		01/01/2020 02:08	WG1404860
(S) 4-Bromofluorobenzene	94.4		77.0-126		01/01/2020 02:08	WG1404860
(S) 1,2-Dichloroethane-d4	108		70.0-130		01/01/2020 02:08	WG1404860

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Method Blank (MB)

(MB) R3487564-1 12/31/19 14:56

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Dissolved Solids	U		2.82	10.0

L1173522-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1173522-03 12/31/19 14:56 • (DUP) R3487564-3 12/31/19 14:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Dissolved Solids	67100	57700	1	15.1	J3	5

Laboratory Control Sample (LCS)

(LCS) R3487564-2 12/31/19 14:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8650	98.3	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3487614-1 01/02/20 11:47

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	5.60	⬇	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:
BLANK: Endpoint pH 4.5

L1175038-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175038-01 01/02/20 12:07 • (DUP) R3487614-2 01/02/20 12:16

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity,Bicarbonate	468	467	1	0.130		20
Alkalinity,Carbonate	ND	0.000	1	0.000		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Method Blank (MB)

(MB) R3488327-1 01/06/20 13:01

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0197	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1174731-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174731-01 01/06/20 13:04 • (DUP) R3488327-3 01/06/20 13:05

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	ND	0.000	1	0.000		20

L1174960-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1174960-01 01/06/20 13:29 • (DUP) R3488327-6 01/06/20 13:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.419	0.417	1	0.478		20

Laboratory Control Sample (LCS)

(LCS) R3488327-2 01/06/20 13:02

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	4.00	3.90	97.5	90.0-110	

L1174787-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1174787-04 01/06/20 13:08 • (MS) R3488327-4 01/06/20 13:10 • (MSD) R3488327-5 01/06/20 13:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Nitrate-Nitrite	2.50	4.61	6.50	6.58	75.6	78.6	1	90.0-110	E J6	E J6	1.15	20

L1174960-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1174960-02 01/06/20 13:32 • (MS) R3488327-7 01/06/20 13:34

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	2.50	ND	2.34	90.4	1	90.0-110	

L1174615-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174615-02 12/31/19 14:35 • (DUP) R3487361-2 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.83	7.84	1	0.128		1

Sample Narrative:
OS: 7.83 at 13.6C
DUP: 7.84 at 14.4C

L1175043-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175043-01 12/31/19 14:35 • (DUP) R3487361-3 12/31/19 14:35

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.38	7.35	1	0.407		1

Sample Narrative:
OS: 7.38 at 15.4C
DUP: 7.35 at 15.1C

Laboratory Control Sample (LCS)

(LCS) R3487361-1 12/31/19 14:35

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.98	99.8	99.0-101	

Sample Narrative:
LCS: 9.98 at 18.8C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3488062-1 01/05/20 00:58

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1174928-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1174928-02 01/05/20 00:58 • (DUP) R3488062-3 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	233	233	1	0.0859		20

L1175044-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175044-01 01/05/20 00:58 • (DUP) R3488062-4 01/05/20 00:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	3760	3710	1	1.34		20

Laboratory Control Sample (LCS)

(LCS) R3488062-2 01/05/20 00:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	475	475	100	85.0-115	



Method Blank (MB)

(MB) R3487791-1 01/02/20 16:34

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Sulfate	U		0.0774	5.00

L1175274-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1175274-02 01/02/20 21:15 • (DUP) R3487791-3 01/02/20 21:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	0.000	1	0.000		15
Chloride	21.2	21.1	1	0.382		15
Fluoride	0.182	0.183	1	0.932		15
Sulfate	11.2	11.1	1	1.01		15

L1175546-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1175546-01 01/03/20 00:30 • (DUP) R3487791-7 01/03/20 00:44

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Bromide	ND	3.46	5	0.000		15
Chloride	113	112	5	1.07		15
Fluoride	1.32	1.30	5	1.30		15
Sulfate	181	179	5	1.15		15

Laboratory Control Sample (LCS)

(LCS) R3487791-2 01/02/20 16:48

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Bromide	40.0	39.6	99.1	80.0-120	
Chloride	40.0	39.0	97.4	80.0-120	
Fluoride	8.00	7.91	98.9	80.0-120	
Sulfate	40.0	39.9	99.8	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1175274-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175274-02 01/02/20 21:15 • (MS) R3487791-4 01/02/20 21:43 • (MSD) R3487791-5 01/02/20 21:57

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	47.5	47.7	95.1	95.4	1	80.0-120			0.330	15
Chloride	50.0	21.2	69.7	69.6	97.0	96.8	1	80.0-120			0.101	15
Fluoride	5.00	0.182	5.08	5.07	97.9	97.8	1	80.0-120			0.0907	15
Sulfate	50.0	11.2	60.4	60.5	98.4	98.6	1	80.0-120			0.148	15

L1175404-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1175404-01 01/03/20 00:02 • (MS) R3487791-6 01/03/20 00:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Bromide	50.0	ND	48.4	96.8	1	80.0-120	
Chloride	50.0	9.19	59.1	99.9	1	80.0-120	
Fluoride	5.00	0.650	5.64	99.7	1	80.0-120	
Sulfate	50.0	22.9	71.3	96.7	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487745-1 01/02/20 13:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	U		0.0463	1.00
Iron	U		0.0141	0.100
Magnesium	0.0329	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	0.273	U	0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.431	U	0.0985	1.00
Strontium	U		0.00170	0.0100
Phosphorus	U		0.00370	0.100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

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

(LCS) R3487745-2 01/02/20 13:12 • (LCSD) R3487745-3 01/02/20 13:15

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 %
Barium	1.00	1.03	1.03	103	103	80.0-120			0.662	20
Boron	1.00	0.994	0.985	99.4	98.5	80.0-120			0.924	20
Calcium	10.0	10.2	10.2	102	102	80.0-120			0.349	20
Iron	10.0	9.97	9.94	99.7	99.4	80.0-120			0.386	20
Magnesium	10.0	10.5	10.3	105	103	80.0-120			1.35	20
Manganese	1.00	0.997	0.987	99.7	98.7	80.0-120			1.01	20
Potassium	10.0	10.5	10.5	105	105	80.0-120			0.178	20
Selenium	1.00	1.01	1.00	101	100	80.0-120			0.915	20
Sodium	10.0	10.6	10.7	106	107	80.0-120			0.185	20
Strontium	1.00	1.00	0.998	100	99.8	80.0-120			0.501	20
Phosphorus	10.0	1.01	0.992	10.1	9.92	80.0-120			1.62	20

L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.0301	1.03	1.06	100	103	1	75.0-125			2.94	20
Boron	1.00	0.272	1.23	1.24	96.2	96.9	1	75.0-125			0.499	20
Calcium	10.0	82.5	89.7	89.4	72.1	69.2	1	75.0-125	U	U	0.326	20
Iron	10.0	ND	9.65	9.74	96.2	97.0	1	75.0-125			0.853	20
Magnesium	10.0	59.3	66.0	65.8	67.6	64.9	1	75.0-125	U	U	0.413	20



L1175038-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1175038-01 01/02/20 13:18 • (MS) R3487745-5 01/02/20 13:23 • (MSD) R3487745-6 01/02/20 13:26

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Manganese	1.00	ND	0.963	0.983	95.7	97.7	1	75.0-125			2.12	20
Potassium	10.0	2.70	12.1	12.2	93.7	95.4	1	75.0-125			1.39	20
Selenium	1.00	0.0107	1.03	1.03	102	102	1	75.0-125			0.639	20
Sodium	10.0	115	119	119	43.3	37.5	1	75.0-125	V	V	0.495	20
Strontium	1.00	0.750	1.70	1.71	95.2	96.3	1	75.0-125			0.679	20
Phosphorus	10.0	ND	1.03	1.04	10.1	10.2	1	75.0-125			0.596	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3487673-2 12/31/19 23:10

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0405	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	97.2			78.0-120

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3487673-1 12/31/19 22:10

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.49	99.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			103	78.0-120	



Method Blank (MB)

(MB) R3487917-1 01/03/20 13:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130
Propane	U		0.00548	0.0190

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

(LCS) R3487917-3 01/03/20 14:42 • (LCSD) R3487917-4 01/03/20 14:46

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 %
Methane	0.0678	0.0659	0.0618	97.2	91.2	85.0-115			6.42	20
Ethane	0.129	0.122	0.115	94.6	89.1	85.0-115			5.91	20
Ethene	0.127	0.116	0.109	91.3	85.8	85.0-115			6.22	20
Propane	0.186	0.176	0.167	94.6	89.8	85.0-115			5.25	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3487679-2 01/01/20 00:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	94.4			80.0-120
(S) 4-Bromofluorobenzene	95.6			77.0-126
(S) 1,2-Dichloroethane-d4	108			70.0-130

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

Laboratory Control Sample (LCS)

(LCS) R3487679-1 12/31/19 23:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00615	123	70.0-123	
Ethylbenzene	0.00500	0.00492	98.4	79.0-123	
Toluene	0.00500	0.00506	101	79.0-120	
Xylenes, Total	0.0150	0.0153	102	79.0-123	
(S) Toluene-d8			95.0	80.0-120	
(S) 4-Bromofluorobenzene			96.1	77.0-126	
(S) 1,2-Dichloroethane-d4			108	70.0-130	

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) R3490828-1 01/14/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	64.5			31.0-160

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R3490828-2 01/14/20 11:44 • (LCSD) R3490828-3 01/14/20 12:10

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 %
TPH (GC/FID) High Fraction	1.50	1.36	1.23	90.7	82.0	50.0-150			10.0	20
(S) o-Terphenyl				79.5	69.0	31.0-160				



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.
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.

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



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* 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 National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
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}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Caerus Oil & Gas LLC
143 Diamond Avenue
Parachute, CO 81635
970-285-9606

Billing Information:

Same as above

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

Report to:
bmiddleton@caerusoilandgas.com

Email To:
jjanicek@caerusoilandgas.com

Project
Description: C1000 Drought Release

City/State
Collected: Parachute CO

Phone:
Fax:

Client Project #

Lab Project #

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

Quote #

Immediately
Packed on Ice N ☐ Y ☒ X

Same Day ☐ Five Day ☐
Next Day ☐ 5 Day (Rad Only) ☐
Two Day ☐ 10 Day (Rad Only) ☐
Three Day ☐

Date Results Needed

Standard TAT

No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

20191230-C1000 - Kernath Well #1

Grab

GW

12/30/19

1130

14

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

Trip Blank

Grab

DI

12/30/19

1135

1

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

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

Remarks:

8 609 ANALYTE LIST 20

Samples returned via:

UPS ☐ FedEx ☐ Courier ☐

pH _____ Temp _____

Flow _____ Other _____

Tracking # 4510 1663 5035

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes / No

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: _____ °C Bottles Received: _____

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 12/31/19 Time: 0830

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

SCREEN: <0.5 mR/hr

If preservation required by Login: Date/Time

Hold:

Condition:

NCF / OK