



VIA ELECTRONIC MAIL –

January 4, 2021

Jake Janicek
EH&S Specialist
Caerus Oil & Gas, LLC
143 Diamond Avenue
Parachute, Colorado 81635

**Subject: O19EB Produced Water Sample Collection
O19EB Dumpline Release\O19EB
Mamm Creek Field
Garfield County, Colorado**

Dear Mr. Janicek:

WSP USA Inc. (WSP), formerly LT Environmental, Inc. (LTE), on behalf of Caerus Oil and Gas, LLC (Caerus), collected a produced water sample at the Shideler 19-16C (O19EB) (Facility ID: 431050) pad location (Site). The sample was collected in response to the condition of approval (COA) issued by the Colorado Oil and Gas Conservation Commission (COGCC) in initial Spill/Release Report Form 19 Document Number 402541392. This sampling was requested after up to four barrels of produced water were reported to have been released from a produced water dumpline at the Site. The Site is located in Caerus Mamm Creek area of operation in Garfield County, Colorado (Figure 1).

On December 1, 2020, WSP personnel completed the requested sampling activities. In order to collect a representative produced water sample, a high-density polyethylene (HDPE) bailer was used. The bailer was lowered into produced water tank 84128 from the opened thief hatch. Produced water sample 20201201 – O19EB (PW) was collected in clean laboratory prepared bottles and submitted to Pace Analytical (Pace) of Mount Juliet, Tennessee for analysis of the analytical suite listed in COGCC Rule 609, except for dissolved gases and bacteria as per the COA. The laboratory analytical report is provided as Enclosure A. The enclosed Site Map illustrates the sample collection location from production tank 84128 location (Figure 2).

Please contact us at (970) 618-4514 or (720) 490-6758 if you have any questions regarding this report of require additional information.

WSP USA
820 MEGAN AVENUE, UNIT B
RIFLE CO 81650

Tel.: 970-285-9985
wsp.com



Kind regards,

A handwritten signature in blue ink, appearing to read 'D. Held'.

Dustin Held
Consultant, Environmental Geologist

A handwritten signature in blue ink, appearing to read 'Chris McKisson'.

Chris McKisson
Senior Consultant, Environmental Scientist

Encl.

Figure 1 – Site Location Map

Figure 2 - Site Map

Enclosure A – Laboratory Analytical Report

FIGURES

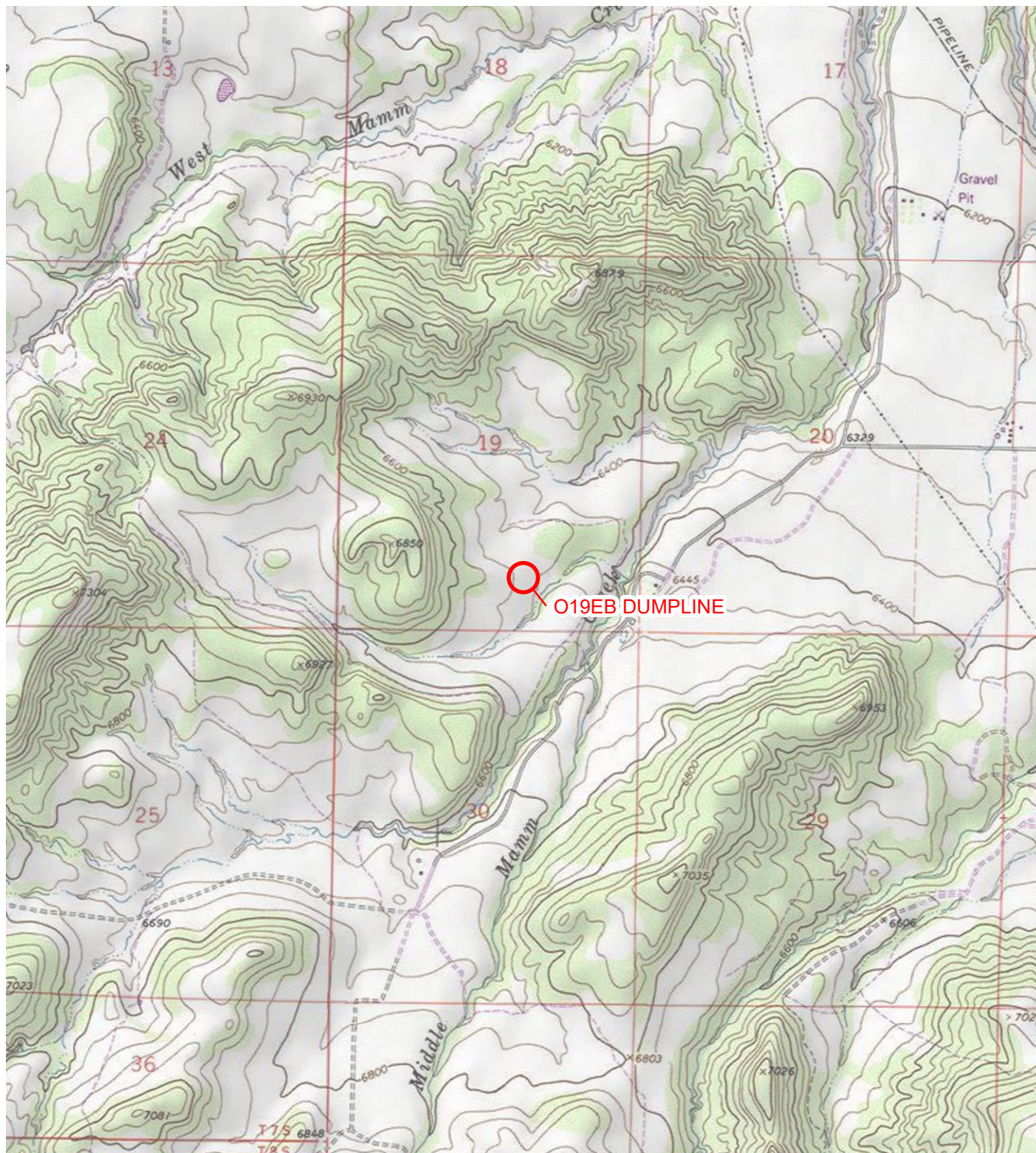


IMAGE COURTESY OF ESRI/USGS

LEGEND

○ SITE LOCATION

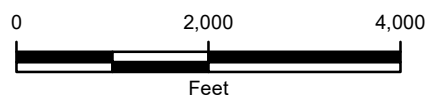


FIGURE 1
SITE LOCATION MAP
O19EB DUMPLINE
SWSE SEC 19-T7S-R92W
GARFIELD COUNTY, COLORADO
CAERUS OIL AND GAS, LLC





20201201-O19EB (PW)

IMAGE COURTESY OF GOOGLE EARTH 2016

LEGEND



PRODUCED WATER SAMPLE (TANK 84128)

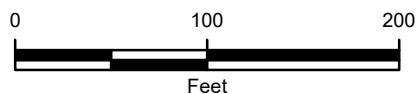


FIGURE 2
SITE MAP
O19EB DUMPLINE
SWSE SEC 19-T7S-R92W
GARFIELD COUNTY, COLORADO
CAERUS OIL AND GAS, LLC



ENCLOSURE A – LABORATORY ANALYTICAL REPORT

Caerus Oil and Gas

Sample Delivery Group: L1291885
Samples Received: 12/03/2020
Project Number: 019EB
Description: 019EB Dumpline
Site: 019EB
Report To: Brett Middleton
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.



20201201-019EB (PW) L1291885-01 GW

Collected by
Dustin H.

Collected date/time
12/01/20 11:20

Received date/time
12/03/20 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1587089	1	12/05/20 09:34	12/05/20 16:52	CAT	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1587839	1	12/08/20 17:26	12/08/20 17:26	SL	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1588194	1	12/09/20 18:25	12/09/20 18:25	MSP	Mt. Juliet, TN
Wet Chemistry by Method 365.4	WG1587540	1	12/06/20 23:59	12/11/20 04:48	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1587762	1	12/07/20 15:55	12/07/20 15:55	KPS	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1588208	1	12/08/20 17:00	12/08/20 17:00	JRB	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1588484	1	12/09/20 08:40	12/09/20 08:40	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1588484	10	12/09/20 02:50	12/09/20 02:50	ELN	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1588484	100	12/09/20 03:06	12/09/20 03:06	ELN	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1586787	1	12/04/20 20:43	12/07/20 20:31	EL	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1586787	10	12/04/20 20:43	12/08/20 02:03	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1588611	2000	12/11/20 06:39	12/11/20 06:39	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1587079	2000	12/06/20 00:49	12/06/20 00:49	JCP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1587629	100	12/07/20 10:13	12/09/20 22:27	DMG	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



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

Sample Delivery Group (SDG) Narrative

pH outside of method requirement.

Lab Sample ID

[L1291885-01](#)

Project Sample ID

[20201201-019EB \(PW\)](#)

Method

8015D/GRO

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	14000		400	1	12/05/2020 16:52	WG1587089

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity,Bicarbonate	1910		20.0	1	12/08/2020 17:26	WG1587839
Alkalinity,Carbonate	ND		20.0	1	12/08/2020 17:26	WG1587839

Sample Narrative:

L1291885-01 WG1587839: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 353.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	ND		0.100	1	12/09/2020 18:25	WG1588194

Wet Chemistry by Method 365.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Phosphorus,Total	1.50		0.100	1	12/11/2020 04:48	WG1587540

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.43	T8	1	12/07/2020 15:55	WG1587762

Sample Narrative:

L1291885-01 WG1587762: 7.43 at 18.6C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	23700		10.0	1	12/08/2020 17:00	WG1588208

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	56.0		1.00	1	12/09/2020 08:40	WG1588484
Chloride	7270		100	100	12/09/2020 03:06	WG1588484
Fluoride	ND		1.50	10	12/09/2020 02:50	WG1588484
Sulfate	ND		5.00	1	12/09/2020 08:40	WG1588484

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Barium	57.1		0.0500	10	12/08/2020 02:03	WG1586787
Boron	13.5		0.200	1	12/07/2020 20:31	WG1586787
Calcium	200		1.00	1	12/07/2020 20:31	WG1586787
Iron	118		0.100	1	12/07/2020 20:31	WG1586787
Magnesium	12.1		1.00	1	12/07/2020 20:31	WG1586787
Manganese	1.47		0.0100	1	12/07/2020 20:31	WG1586787
Potassium	57.1		2.00	1	12/07/2020 20:31	WG1586787



Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Selenium	ND		0.0100	1	12/07/2020 20:31	WG1586787
Sodium	4790		30.0	10	12/08/2020 02:03	WG1586787
Sulfur	8.60		1.00	1	12/07/2020 20:31	WG1586787

1
Cp2
Tc3
Ss4
Cn5
Sr

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	8600		200	2000	12/11/2020 06:39	WG1588611
(S) <i>o,a,a</i> -Trifluorotoluene(FID)	102		78.0-120		12/11/2020 06:39	WG1588611

6
Qc7
Gl8
Al9
Sc

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	8.61		2.00	2000	12/06/2020 00:49	WG1587079
Toluene	43.0		2.00	2000	12/06/2020 00:49	WG1587079
Ethylbenzene	3.69		2.00	2000	12/06/2020 00:49	WG1587079
Total Xylenes	54.4		6.00	2000	12/06/2020 00:49	WG1587079
(S) Toluene-d8	108		80.0-120		12/06/2020 00:49	WG1587079
(S) 4-Bromofluorobenzene	102		77.0-126		12/06/2020 00:49	WG1587079
(S) 1,2-Dichloroethane-d4	108		70.0-130		12/06/2020 00:49	WG1587079

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	338		10.0	100	12/09/2020 22:27	WG1587629
(S) <i>o</i> -Terphenyl	0.000	J7	31.0-160		12/09/2020 22:27	WG1587629

Method Blank (MB)

(MB) R3601211-1 12/05/20 16:52

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

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601211-4 12/05/20 16:52

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte		mg/l		%		%
Dissolved Solids		212	1	0.473		5

Laboratory Control Sample (LCS)

(LCS) R3601211-2 12/05/20 16:52

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8690	98.8	77.4-123	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3601639-1 12/08/20 14:42

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity,Bicarbonate	U		8.45	20.0
Alkalinity,Carbonate	U		8.45	20.0

Sample Narrative:
BLANK: Endpoint pH 4.5

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601639-3 12/08/20 15:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		mg/l		%		%
Alkalinity,Bicarbonate		245	1	0.373		20
Alkalinity,Carbonate		ND	1	0.000		20

Sample Narrative:
DUP: Endpoint pH 4.5

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601639-6 12/08/20 16:42

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
		mg/l		%		%
Alkalinity,Bicarbonate		77.4	1	0.352		20
Alkalinity,Carbonate		ND	1	0.000		20

Sample Narrative:
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) R3601904-1 12/09/20 16:31

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Nitrate-Nitrite	U		0.0500	0.100

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1291868-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1291868-01 12/09/20 16:49 • (DUP) R3601904-4 12/09/20 16:50

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.785	0.786	1	0.127		20

L1291917-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1291917-09 12/09/20 17:09 • (DUP) R3601904-7 12/09/20 17:11

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Nitrate-Nitrite	0.686	0.685	1	0.146		20

Laboratory Control Sample (LCS)

(LCS) R3601904-2 12/09/20 16:33

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Nitrate-Nitrite	5.00	2.72	109	90.0-110	

L1291804-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1291804-01 12/09/20 16:38 • (MS) R3601904-3 12/09/20 16:39

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Nitrate-Nitrite	0.500	6.10	8.85	110	5	90.0-110	

L1291917-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1291917-01 12/09/20 16:53 • (MS) R3601904-5 12/09/20 16:54 • (MSD) R3601904-6 12/09/20 16:55

	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	0.846	3.59	3.65	110	112	1	90.0-110		J5	1.66	20

Method Blank (MB)

(MB) R3602454-1 12/11/20 04:21

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Phosphorus,Total	0.0432	⬇	0.0350	0.100

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Laboratory Control Sample (LCS)

(LCS) R3602454-2 12/11/20 04:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Phosphorus,Total	4.26	4.50	106	82.4-117	



Laboratory Control Sample (LCS)

(LCS) R3601077-1 12/07/20 15:55

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

Sample Narrative:

LCS: 10.01 at 18.4C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3601463-1 12/08/20 17:00

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

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601463-3 12/08/20 17:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	171		1	0.698		20

L1292519-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1292519-01 12/08/20 17:00 • (DUP) R3601463-4 12/08/20 17:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	umhos/cm	umhos/cm		%		%
Specific Conductance	115	114	1	0.437		20

Laboratory Control Sample (LCS)

(LCS) R3601463-2 12/08/20 17:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	umhos/cm	umhos/cm	%	%	
Specific Conductance	483	483	100	85.0-115	



Method Blank (MB)

(MB) R3601702-1 12/08/20 15:31

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.353	1.00
Chloride	U		0.379	1.00
Fluoride	U		0.0640	0.150
Sulfate	U		0.594	5.00

L1293733-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1293733-01 12/08/20 16:24 • (DUP) R3601702-3 12/08/20 16:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	ND	1	1.09		15
Chloride	49.2	49.4	1	0.348		15
Fluoride	1.61	1.62	1	0.848		15

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601702-6 12/08/20 17:43

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate		94.6	5	1.40		15

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601702-7 12/08/20 22:51

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide		1.28	1	2.20		15
Fluoride		1.57	1	2.12		15

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3601702-9 12/08/20 23:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride		227	5	6.24		15
Sulfate		220	5	6.43		15





Laboratory Control Sample (LCS)

(LCS) R3601702-2 12/08/20 15:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Bromide	40.0	38.7	96.7	80.0-120	
Chloride	40.0	39.0	97.6	80.0-120	
Fluoride	8.00	8.03	100	80.0-120	
Sulfate	40.0	39.5	98.8	80.0-120	

L1293733-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1293733-01 12/08/20 16:24 • (MS) R3601702-4 12/08/20 16:56 • (MSD) R3601702-5 12/08/20 17:12

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	49.1	96.9	97.0	1	80.0-120			0.123	15
Chloride	50.0	49.2	98.8	98.8	99.3	99.3	1	80.0-120			0.00253	15
Fluoride	5.00	1.61	6.86	6.84	105	105	1	80.0-120			0.240	15
Sulfate	50.0	103	150	150	93.4	93.3	1	80.0-120	<u>E</u>	<u>E</u>	0.0415	15

Original Sample (OS) • Matrix Spike (MS)

(OS) • (MS) R3601702-8 12/08/20 23:07

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		47.1	91.7	1	80.0-120	
Chloride	50.0		267	80.0	1	80.0-120	<u>E</u>
Fluoride	5.00		6.75	103	1	80.0-120	
Sulfate	50.0		259	75.7	1	80.0-120	<u>E V</u>

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



Method Blank (MB)

(MB) R3601204-1 12/07/20 19:43

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.000736	0.00500
Boron	U		0.0200	0.200
Calcium	U		0.0793	1.00
Iron	U		0.0180	0.100
Magnesium	U		0.0853	1.00
Manganese	U		0.000934	0.0100
Potassium	U		0.261	2.00
Selenium	U		0.00735	0.0100
Sodium	U		0.504	3.00
Sulfur	U		0.124	1.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3601204-2 12/07/20 19:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	1.00	0.981	98.1	80.0-120	
Boron	1.00	0.967	96.7	80.0-120	
Calcium	10.0	9.65	96.5	80.0-120	
Iron	10.0	9.64	96.4	80.0-120	
Magnesium	10.0	9.40	94.0	80.0-120	
Manganese	1.00	0.961	96.1	80.0-120	
Potassium	10.0	9.39	93.9	80.0-120	
Selenium	1.00	0.979	97.9	80.0-120	
Sodium	10.0	9.77	97.7	80.0-120	
Sulfur	10.0	9.24	92.4	80.0-120	

Method Blank (MB)

(MB) R3602768-2 12/10/20 23:45

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	U		0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	101			78.0-120

Laboratory Control Sample (LCS)

(LCS) R3602768-1 12/10/20 23:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	6.90	125	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			116	78.0-120	

L1292209-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1292209-02 12/11/20 05:17 • (MS) R3602768-3 12/11/20 07:00 • (MSD) R3602768-4 12/11/20 07:21

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 %
TPH (GC/FID) Low Fraction	55.0	10.9	42.0	42.3	56.5	57.1	10	10.0-160			0.712	22
(S) a,a,a-Trifluorotoluene(FID)					107	109		78.0-120				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3601084-2 12/05/20 16:48

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.0000941	0.00100
Ethylbenzene	U		0.000137	0.00100
Toluene	U		0.000278	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	109			80.0-120
(S) 4-Bromofluorobenzene	103			77.0-126
(S) 1,2-Dichloroethane-d4	105			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3601084-1 12/05/20 15:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.00500	0.00505	101	70.0-123	
Ethylbenzene	0.00500	0.00464	92.8	79.0-123	
Toluene	0.00500	0.00510	102	79.0-120	
Xylenes, Total	0.0150	0.0138	92.0	79.0-123	
(S) Toluene-d8			109	80.0-120	
(S) 4-Bromofluorobenzene			103	77.0-126	
(S) 1,2-Dichloroethane-d4			109	70.0-130	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3601426-1 12/08/20 09:49

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	73.0			31.0-160

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

(LCS) R3601426-2 12/08/20 10:09 • (LCSD) R3601426-3 12/08/20 10:29

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	1.51	1.54	101	103	50.0-150			1.97	20
(S) o-Terphenyl				93.5	92.0	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
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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
T8	Sample(s) received past/too close to holding time expiration.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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

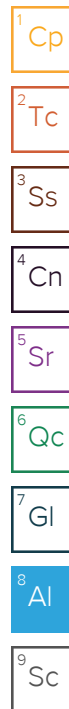
Third Party Federal Accreditations

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: O19EB Dumpline

City/State
Collected: Rifle, CO

Phone:
Fax:
Client Project #
O19EB

Lab Project #
O19EB

Collected by (print):
Dustin Held
Site/Facility ID #
O19EB

P.O. #
O19EB

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

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

Dissolved methane, propane, ethane

L #

J085

Acctnum:

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:

OT: produced water

Samples returned via:

UPS FedEx Courier

Tracking # 167627505490

pH Temp

Flow Other

Sample Receipt Checklist

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

If Applicable

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

RAD SCREEN: <0.5 mR/hr

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: 16.3 °C
Bottles Received: 10

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 12/3/20
Time: 10:00

Hold:

Condition:
NCF / OK