


October 15, 2018

Caerus Oil and Gas

Sample Delivery Group: L1033793
Samples Received: 10/11/2018
Project Number:
Description: WFPL 10" SB3
Site: WFPL
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 National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



20181010-WFPL-SB3(26-28') L1033793-01 Solid

Collected by

Blair K. Rollins

Collected date/time

10/10/18 13:10

Received date/time

10/11/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Calculated Results	WG1179162	1	10/14/18 18:54	10/15/18 13:50	CCE
Calculated Results	WG1179846	1	10/12/18 11:46	10/12/18 13:43	TRB
Wet Chemistry by Method 3060A/7196A	WG1179744	1	10/12/18 07:10	10/12/18 11:50	EEM
Wet Chemistry by Method 9045D	WG1179873	1	10/12/18 08:30	10/12/18 12:30	AMB
Wet Chemistry by Method 9050AMod	WG1180153	1	10/13/18 12:50	10/13/18 13:29	KBW
Mercury by Method 7471A	WG1180177	1	10/12/18 14:02	10/14/18 12:05	EL
Metals (ICP) by Method 6010B	WG1179846	1	10/12/18 11:46	10/12/18 13:43	TRB
Volatile Organic Compounds (GC) by Method 8015/8021	WG1179895	1	10/11/18 16:30	10/12/18 15:23	LRL
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1180390	1	10/12/18 20:44	10/13/18 13:57	DMW
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1179683	1	10/12/18 06:56	10/12/18 17:09	CJR

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Gl

⁷Al

⁸Sc

ACCOUNT:

Caerus Oil and Gas

PROJECT:

SDG:

L1033793

DATE/TIME:

10/15/18 15:36

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

Chris Ward
Project Manager





Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.01		1	10/15/2018 13:50	WG1179162

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Gl

7 Al

8 Sc

Calculated Results

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Trivalent	24.7		1.00	1	10/12/2018 13:43	WG1179846

Wet Chemistry by Method 3060A/7196A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Chromium, Hexavalent	ND		2.00	1	10/12/2018 11:50	WG1179744

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.38	T8	1	10/12/2018 12:30	WG1179873

Sample Narrative:

L1033793-01 WG1179873: 8.38 at 17.7C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	355		10.0	1	10/13/2018 13:29	WG1180153

Mercury by Method 7471A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Mercury	0.0545	B	0.0200	1	10/14/2018 12:05	WG1180177

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	17.2		2.00	1	10/12/2018 13:43	WG1179846
Barium	270		0.500	1	10/12/2018 13:43	WG1179846
Cadmium	ND		0.500	1	10/12/2018 13:43	WG1179846
Chromium	24.7		1.00	1	10/12/2018 13:43	WG1179846
Copper	30.1		2.00	1	10/12/2018 13:43	WG1179846
Lead	16.5		0.500	1	10/12/2018 13:43	WG1179846
Nickel	22.2		2.00	1	10/12/2018 13:43	WG1179846
Selenium	ND		2.00	1	10/12/2018 13:43	WG1179846
Silver	ND		1.00	1	10/12/2018 13:43	WG1179846
Zinc	65.4		5.00	1	10/12/2018 13:43	WG1179846

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.0158		0.000500	1	10/12/2018 15:23	WG1179895
Toluene	0.0164		0.00500	1	10/12/2018 15:23	WG1179895
Ethylbenzene	0.00458		0.000500	1	10/12/2018 15:23	WG1179895
Total Xylene	0.0152		0.00150	1	10/12/2018 15:23	WG1179895
TPH (GC/FID) Low Fraction	0.437		0.100	1	10/12/2018 15:23	WG1179895



Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
(S) a,a,a-Trifluorotoluene(FID)	89.0		77.0-120		10/12/2018 15:23	WG1179895
(S) a,a,a-Trifluorotoluene(PID)	84.3		72.0-128		10/12/2018 15:23	WG1179895

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	6.33		4.00	1	10/13/2018 13:57	WG1180390
(S) o-Terphenyl	52.9		18.0-148		10/13/2018 13:57	WG1180390

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

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Acenaphthene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Acenaphthylene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Benzo(a)anthracene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Benzo(a)pyrene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Benzo(b)fluoranthene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Benzo(g,h,i)perylene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Benzo(k)fluoranthene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Chrysene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Dibenz(a,h)anthracene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Fluoranthene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Fluorene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Indeno(1,2,3-cd)pyrene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Naphthalene	ND		0.0200	1	10/12/2018 17:09	WG1179683
Phenanthrene	ND		0.00600	1	10/12/2018 17:09	WG1179683
Pyrene	ND		0.00600	1	10/12/2018 17:09	WG1179683
1-Methylnaphthalene	ND		0.0200	1	10/12/2018 17:09	WG1179683
2-Methylnaphthalene	ND		0.0200	1	10/12/2018 17:09	WG1179683
2-Chloronaphthalene	ND		0.0200	1	10/12/2018 17:09	WG1179683
(S) p-Terphenyl-d14	64.9		23.0-120		10/12/2018 17:09	WG1179683
(S) Nitrobenzene-d5	73.9		14.0-149		10/12/2018 17:09	WG1179683
(S) 2-Fluorobiphenyl	73.1		34.0-125		10/12/2018 17:09	WG1179683

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Gl

7 Al

8 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.

Abbreviations and Definitions

ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
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.
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.
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.
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.
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.
T8	Sample(s) received past/too close to holding time expiration.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Gl

⁷ A

⁸ 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	T 104704245-17-14
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.



