

**Caerus Oil and Gas**

Sample Delivery Group: L1619129  
Samples Received: 05/23/2023  
Project Number:  
Description: 909 J  
  
Report To: Brett Middleton

Entire Report Reviewed By:



Donna Eidson  
Project Manager

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

**Pace Analytical National**12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [www.pacenational.com](http://www.pacenational.com)

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# SAMPLE SUMMARY

20230522-LMSOURCE-(11X-14196) L1619129-01 GW

Collected by: WH  
 Collected date/time: 05/22/23 09:15  
 Received date/time: 05/23/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2067574	1	05/27/23 09:12	05/27/23 10:43	AS	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 D-2015	WG2067577	1	05/27/23 11:10	05/27/23 11:51	AS	Mt. Juliet, TN
Radiochemistry by Method 904-9320 (TENORM)	WG2078620	1	06/15/23 19:18	06/22/23 16:42	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M (TENORM)	WG2078608	1	06/22/23 12:18	06/23/23 17:46	RGT	Mt. Juliet, TN

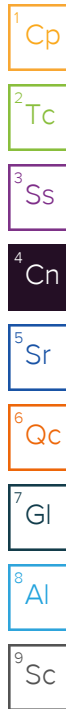
- <sup>1</sup>Cp
- <sup>2</sup>Tc
- <sup>3</sup>Ss
- <sup>4</sup>Cn
- <sup>5</sup>Sr
- <sup>6</sup>Qc
- <sup>7</sup>Gl
- <sup>8</sup>Al
- <sup>9</sup>Sc

# CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. 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.



Donna Eidson  
Project Manager



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	5560		200	1	05/27/2023 10:43	<a href="#">WG2067574</a>

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	79.3		16.7	1	05/27/2023 11:51	<a href="#">WG2067577</a>

3 Ss

4 Cn

Radiochemistry by Method 904-9320 (TENORM)

Analyte	Result	Result	Qualifier	Uncertainty	MDA	MDA	Analysis Date	Batch
	pCi/l	pCi/g		+ / -	pCi/l	pCi/g	date / time	
RADIUM-228	1.58	0.281		0.225	0.377	0.0669	06/22/2023 16:42	<a href="#">WG2078620</a>
(T) Barium	103				30.0-143		06/22/2023 16:42	<a href="#">WG2078620</a>
(T) Yttrium	114				30.0-136		06/22/2023 16:42	<a href="#">WG2078620</a>

5 Sr

6 Qc

7 Gl

Radiochemistry by Method SM7500Ra B M (TENORM)

Analyte	Result	Result	Qualifier	Uncertainty	MDA	MDA	Analysis Date	Batch
	pCi/l	pCi/g		+ / -	pCi/l	pCi/g	date / time	
RADIUM-226	2.12	0.376		0.619	0.382	0.0677	06/23/2023 17:46	<a href="#">WG2078608</a>
(T) Barium-133	89.6				30.0-143		06/23/2023 17:46	<a href="#">WG2078608</a>

8 Al

9 Sc

Method Blank (MB)

(MB) R3930820-1 05/27/23 10:43

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Dissolved Solids	U	U	10.0	10.0

1 Cp

2 Tc

3 Ss

L1618089-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1618089-02 05/27/23 10:43 • (DUP) R3930820-3 05/30/23 05:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	730	700	1	4.20		5

4 Cn

5 Sr

L1618138-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1618138-06 05/27/23 10:43 • (DUP) R3930820-4 05/30/23 05:50

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	2450	2320	1	5.25	J3	5

6 Qc

7 Gl

8 Al

Laboratory Control Sample (LCS)

(LCS) R3930820-2 05/27/23 10:43

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Dissolved Solids	8800	7810	88.8	77.3-123	

9 Sc

Method Blank (MB)

(MB) R3930461-1 05/27/23 11:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Suspended Solids	U		2.50	2.50

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1618858-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1618858-01 05/27/23 11:51 • (DUP) R3930461-3 05/27/23 11:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	338	320	1	5.47	J3	5

L1618976-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1618976-01 05/27/23 11:51 • (DUP) R3930461-4 05/27/23 11:51

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	20.0	20.0	1	0.000		5

Laboratory Control Sample (LCS)

(LCS) R3930461-2 05/27/23 11:51

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Suspended Solids	773	696	90.0	85.7-114	

Method Blank (MB)

(MB) R3941742-1 06/22/23 16:42

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-228	-0.212	<u>U</u>	0.123	0.245
(T) Barium	100		100	
(T) Yttrium	111		111	

L1619306-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1619306-08 06/22/23 16:42 • (DUP) R3941742-5 06/22/23 16:42

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.847	0.267	0.480	1.20	0.324	0.480	1	34.6	0.844		20	3
(T) Barium	131			129	129							
(T) Yttrium	102			117	117							

Laboratory Control Sample (LCS)

(LCS) R3941742-2 06/22/23 16:42

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.60	92.0	80.0-120	
(T) Barium			117		
(T) Yttrium			106		

L1619306-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1619306-01 06/22/23 16:42 • (MS) R3941742-3 06/22/23 16:42 • (MSD) R3941742-4 06/22/23 16:42

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	-0.332	8.85	8.33	88.5	83.3	1	70.0-130			6.08		20
(T) Barium		125			113	108							
(T) Yttrium		110			101	112							

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Method Blank (MB)

(MB) R3941782-1 06/23/23 17:46

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-226	0.0104	<u>U</u>	0.0583	0.109
(T) Barium-133	64.8		64.8	

L1620768-20 Original Sample (OS) • Duplicate (DUP)

(OS) L1620768-20 06/23/23 17:46 • (DUP) R3941782-5 06/23/23 17:46

Analyte	Original Result pCi/l	Original Uncertainty + / -	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty + / -	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.0818	0.160	0.270	0.0852	0.183	0.270	1	4.12	0.0142	<u>U</u>	20	3
(T) Barium-133	92.4			81.8	81.8							

Laboratory Control Sample (LCS)

(LCS) R3941782-2 06/23/23 17:46

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.72	114	80.0-120	
(T) Barium-133			69.2		

L1620768-27 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620768-27 06/23/23 17:46 • (MS) R3941782-3 06/23/23 17:46 • (MSD) R3941782-4 06/23/23 17:46

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.133	21.8	19.9	108	98.6	1	75.0-125			9.31		20
(T) Barium-133		99.2			80.1	90.4							

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

# GLOSSARY OF TERMS

## Guide to Reading and Understanding Your Laboratory Report

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

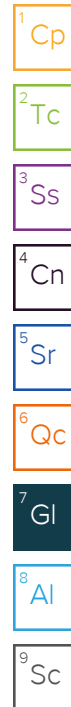
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

### Abbreviations and Definitions

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

### Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
U	Below Detectable Limits: Indicates that the analyte was not detected.



# ACCREDITATIONS & LOCATIONS

## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	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 <sup>1,6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1,4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr


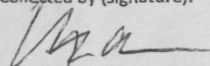
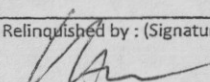
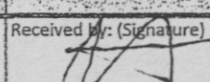
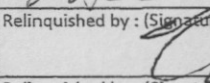
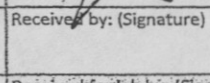

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



Company Name/Address: <b>Caerus Oil and Gas</b> 143 Diamond Avenue Parachute, CO 81635		Billing Information: Accounts Payable 1001 17th St., Ste. 1600 Denver, CO 80202		Pres Chk	Analysis / Container / Preservative							Chain of Custody Page ___ of ___
Report to: <b>Brett Middleton</b>		Email To: JJanicek@caerusoilandgas.com;brollins@caerus		V8260BTEXN 40miAmb-HCl V8260BTEXN 40miAmb-HCl-Blk pH 125m HDPE-NOPies							 PEOPLE ADVANCING SCIENCE  <b>MT JULIET, TN</b> 12065 Lebanon Rd Mount Juliet, TN 37122 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <a href="https://info.pacelabs.com/hubs/pas-standard-terms.pdf">https://info.pacelabs.com/hubs/pas-standard-terms.pdf</a>	
Project Description: <b>909 J</b>		City/State Collected: <b>Parachute, CO</b>									Please Circle: PT <b>(MT)</b> CT ET	
Phone: 970-285-2653		Client Project #		Lab Project #		Acctnum: CAERUSPCO		Template: T215555				
Collected by (print): <b>Will Harmon</b>		Site/Facility ID #		P.O. #		Prelogin: P963757		PM: 824 - Chris Ward				
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 <b>ASAP</b>		PB:				
Immediately Packed on Ice N ___ Y <b>X</b>		Date Results Needed		No. of Cntrs		Shipped Via: <b>FedEX Ground</b>		Remarks   Sample # (lab only)				
Sample ID		Comp/Grab	Matrix *	Depth	Date	Time	Cntrs					
20230522-LMSOURCE-(11X-14196)		Grab	GW	Surface	05/22/2023	0915	17	-a				
			GW				17					
			GW				17					
			GW				17					
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			GW				17					
			GW				17					
			GW				17					
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other		Remarks: Metals - Ba,B,Ca,Fe,K,Mg,Mn,Na,Se,Sr		pH _____ Temp _____		Flow _____ Other _____		Sample Receipt Checklist COC Seal Present/Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N COC Signed/Accurate: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N IF Applicable VOA Zero Headspace: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Preservation Correct/Checked: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N RAD Screen <0.5 mR/hr: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N				
Samples returned via: UPS: <input checked="" type="checkbox"/> FedEx: <input type="checkbox"/> Courier: _____		Tracking #		Relinquished by: (Signature) 		Date: 5/22/23 Time: 1630		Received by: (Signature) 				
Relinquished by: (Signature) 		Date: 5/22/23 Time: 1700		Received by: (Signature) 		Trip Blank Received: Yes/No (HCl) MeOH TBR		Temp: 20.5°C Bottles Received: 17				
Relinquished by: (Signature)		Date:		Received for lab by: (Signature) 		Date: 5/23/23 Time: 0900		Hold: Condition: NCF / OK				

1619129

<u>Tracking Numbers</u>		<u>Temperature</u>
6126 6537 4107		170 = 24
6126 6537 4118		46 + 0 = 46
6126 6537 4084		34 + 0 = 34