

Caerus Oil and Gas

Sample Delivery Group: L1612503
Samples Received: 05/04/2023
Project Number:
Description: 909J

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 National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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SAMPLE SUMMARY

20230503-OUSOURCE-(C100U-13544) L1612503-01 GW

Collected by: WH
 Collected date/time: 05/03/23 09:00
 Received date/time: 05/04/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2056425	1	05/09/23 08:50	05/09/23 10:33	MMF	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 D-2015	WG2056123	1	05/08/23 14:38	05/08/23 14:41	AS	Mt. Juliet, TN
Radiochemistry by Method 904-9320 (TENORM)	WG2071725	1	06/05/23 15:23	06/08/23 20:25	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M (TENORM)	WG2072625	1	06/12/23 10:09	06/13/23 18:47	RGT	Mt. Juliet, TN

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

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

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	12900		400	1	05/09/2023 10:33	WG2056425

1 Cp

2 Tc

Gravimetric Analysis by Method 2540 D-2015

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Suspended Solids	80.0	J4	12.5	1	05/08/2023 14:41	WG2056123

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	13.5	1.04		0.410	0.453	0.0348	06/08/2023 20:25	WG2071725
(T) Barium	255		C1		30.0-143		06/08/2023 20:25	WG2071725
(T) Yttrium	98.8				30.0-136		06/08/2023 20:25	WG2071725

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	5.44	0.418		0.913	0.314	0.0242	06/13/2023 18:47	WG2072625
(T) Barium-133	108				30.0-143		06/13/2023 18:47	WG2072625

8 Al

9 Sc

Method Blank (MB)

(MB) R3923261-1 05/09/23 10:33

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

1 Cp

2 Tc

3 Ss

L1612539-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1612539-03 05/09/23 10:33 • (DUP) R3923261-3 05/09/23 10:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	280	294	1	4.88		5

4 Cn

5 Sr

6 Qc

L1612621-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1612621-04 05/09/23 10:33 • (DUP) R3923261-4 05/09/23 10:33

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Dissolved Solids	315	313	1	0.637		5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3923261-2 05/09/23 10:33

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Dissolved Solids	8800	8390	95.3	77.3-123	

Method Blank (MB)

(MB) R3922413-1 05/08/23 14:41

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

1 Cp

2 Tc

3 Ss

L1612238-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1612238-02 05/08/23 14:41 • (DUP) R3922413-3 05/08/23 14:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	148	144	1	2.74		5

4 Cn

5 Sr

6 Qc

L1612674-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1612674-01 05/08/23 14:41 • (DUP) R3922413-4 05/08/23 14:41

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Suspended Solids	106	100	1	5.83	P1	5

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3922413-2 05/08/23 14:41

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Suspended Solids	773	920	119	85.7-114	J4

Method Blank (MB)

(MB) R3934754-1 06/08/23 20:25

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty + / -	MB MDA pCi/l
Radium-228	0.102	<u>U</u>	0.142	0.261
(T) Barium	112		112	
(T) Yttrium	124		124	

L1612483-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1612483-01 06/08/23 20:25 • (DUP) R3934754-5 06/08/23 20:25

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	14.7	0.437	0.512	15.5	0.531	0.512	1	5.22	1.15		20	3
(T) Barium	239			213	213					<u>C1</u>		
(T) Yttrium	109			123	123							

Laboratory Control Sample (LCS)

(LCS) R3934754-2 06/08/23 20:25

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.20	84.0	80.0-120	
(T) Barium			112		
(T) Yttrium			101		

L1613236-25 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1613236-25 06/08/23 20:25 • (MS) R3934754-3 06/08/23 20:25 • (MSD) R3934754-4 06/08/23 20:25

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	16.7	1.21	14.2	16.9	77.6	94.0	1	70.0-130			17.6		20
(T) Barium		94.6			106	104							
(T) Yttrium		110			108	128							

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3936878-1 06/13/23 18:47

Analyte	MB Result	MB Qualifier	MB Uncertainty	MB MDA
	pCi/l		+ / -	pCi/l
Radium-226	0.0168	<u>U</u>	0.0520	0.0901
(T) Barium-133	91.2		91.2	

L1617720-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1617720-01 06/13/23 21:10 • (DUP) R3936878-5 06/13/23 18:47

Analyte	Original Result	Original Uncertainty	Original MDA	DUP Result	DUP Uncertainty	DUP MDA	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	+ / -	pCi/l	pCi/l	+ / -	pCi/l		%			%	
Radium-226	0.125	0.140	0.185	0.177	0.231	0.185	1	34.6	0.193	<u>J</u>	20	3
(T) Barium-133	97.4			101	101							

Laboratory Control Sample (LCS)

(LCS) R3936878-2 06/13/23 18:47

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.01	5.28	105	80.0-120	
(T) Barium-133			101		

L1613236-17 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1613236-17 06/13/23 21:10 • (MS) R3936878-3 06/13/23 18:47 • (MSD) R3936878-4 06/13/23 18:47

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.0	0.00663	19.9	19.0	99.7	95.1	1	75.0-125			4.72		20
(T) Barium-133		97.0			92.2	99.8							

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

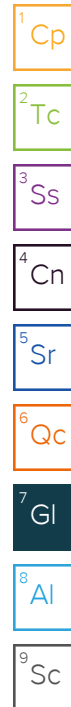
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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
C1	Tracer recovery limits have been exceeded; values are outside upper control limits.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
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 ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

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

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al


⁹ Sc

Company Name/Address:
Caerus Oil and Gas
 Diamond Avenue
 Parachute, CO 81635

Billing Information:
 Accounts Payable
 1001 17th St., Ste. 1600
 Denver, CO 80202

Pres Chk

Chain of Custody Page of



MT JULIET, TN
 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: <https://info.pacelabs.com/hubs/pas-standard-terms.pdf>

Port to:
 Mt Middleton

Email To:
 JJanicek@caerusoilandgas.com; brollins@caerus

Project Description: **9095**

City/State Collected: **Parachute, CO**

Please Circle: PT MD CT ET

Phone: 970-285-2653

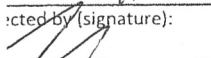
Client Project #

Lab Project #

Collected by (print): **VILL HARMON**

Site/Facility ID #

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: **ASAP**

Shipped on Ice: N Y

No. of Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs
303		GW				17
30503-DuJanice (100al-13544)	Grab	GW	Surface	5/3/23	0900	17
		GW				17
		GW				17
		GW				17
		GW				17
		GW				17
		GW				17
		GW				17
		GW				17

Analysis / Container / Preservative									
V8260B	TEXN	40ml	Amb	HCl					
V8260B	TEXN	40ml	Amb	HCl	BIK				
pH	125ml	HDPE	NoPres						

Matrix:
 Soil AIR - Air F - Filter
 - Groundwater B - Bioassay
 - WasteWater
 - Drinking Water
 Other

Remarks: Metals - Ba,B,Ca,Fe,K,Mg,Mn,Na,Se,Sr

pH _____ Temp _____
 Flow _____ Other _____

Samples returned via:
 UPS FedEx Courier


Tracking #

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

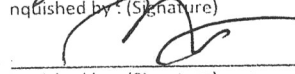
VOA Zero Headspace: Y N
 Preservation Correct/Checked: Y N
 RAD Screen <0.5 mR/hr: Y N

Received by: (Signature) 

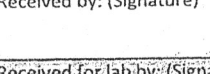
Date: **5/3/23** Time: **1000**

Received by: (Signature) 

Trip Blank Received: Yes (No)
 HCl / MeOH
 TBR

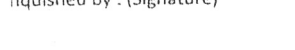
Received by: (Signature) 

Date: **5/3/22** Time: **1700**


Received by: (Signature) 

Temp: **25.4°C** Bottles Received: **3.8 to 3.8** **17**

If preservation required by Login: Date/Time

Received by: (Signature) 

Date: _____ Time: _____

Received for lab by: (Signature) 

Date: **5/4/23** Time: **0900**

Hold: _____ Condition: **NCF / OK**

4612503

<u>Tracking Numbers</u>	<u>NSM7 Temperature</u>
6126 6537 8471	3.8 to 3.8
5755 2085 1657	1.4 to 1.1
5755 2085 1668	3.7 to 3.7