

July 10, 2024

## Caerus Oil and Gas

Sample Delivery Group: L1753898  
Samples Received: 07/06/2024  
Project Number:  
Description: Love Ranch 8 Remediation  
Site: LOVE RANCH 8  
Report To: Jake J. / Brett M. / Blair R. / Andy V.  
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.

**Pace Analytical National**

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 [mydata.pacelabs.com](https://mydata.pacelabs.com)

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# SAMPLE SUMMARY

20240703-XTWP-(LR8-PZ04) L1753898-01 GW

Collected by  
MS

Collected date/time  
07/03/24 09:40

Received date/time  
07/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2318460	1	07/06/24 14:18	07/06/24 16:03	JAC	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2318380	5	07/07/24 05:24	07/07/24 05:24	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2318534	1	07/07/24 03:09	07/07/24 03:09	DYW	Mt. Juliet, TN

20240703-XTWP-(LR8-MW03) L1753898-02 GW

Collected by  
MS

Collected date/time  
07/03/24 09:55

Received date/time  
07/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG2318460	1	07/06/24 14:18	07/06/24 16:03	JAC	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2318380	1	07/07/24 05:37	07/07/24 05:37	JDG	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2318380	10	07/07/24 05:50	07/07/24 05:50	JDG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2318534	1	07/07/24 03:31	07/07/24 03:31	DYW	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 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



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	1530		50.0	1	07/06/2024 16:03	<a href="#">WG2318460</a>

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloride	247		5.00	5	07/07/2024 05:24	<a href="#">WG2318380</a>
Sulfate	419		25.0	5	07/07/2024 05:24	<a href="#">WG2318380</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.00100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
Toluene	ND		0.00100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
Ethylbenzene	ND		0.00100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
Xylenes, Total	ND		0.00300	1	07/07/2024 03:09	<a href="#">WG2318534</a>
Naphthalene	ND		0.00500	1	07/07/2024 03:09	<a href="#">WG2318534</a>
1,2,4-Trimethylbenzene	ND		0.00100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
1,3,5-Trimethylbenzene	ND		0.00100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
1-Methylnaphthalene	ND	<a href="#">J3 J4</a>	0.0100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
2-Methylnaphthalene	ND	<a href="#">J3</a>	0.0100	1	07/07/2024 03:09	<a href="#">WG2318534</a>
(S) Toluene-d8	105		80.0-120		07/07/2024 03:09	<a href="#">WG2318534</a>
(S) 4-Bromofluorobenzene	94.3		77.0-126		07/07/2024 03:09	<a href="#">WG2318534</a>
(S) 1,2-Dichloroethane-d4	100		70.0-130		07/07/2024 03:09	<a href="#">WG2318534</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	1650		25.0	1	07/06/2024 16:03	<a href="#">WG2318460</a>

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloride	86.8		1.00	1	07/07/2024 05:37	<a href="#">WG2318380</a>
Sulfate	618		50.0	10	07/07/2024 05:50	<a href="#">WG2318380</a>

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Benzene	ND		0.00100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
Toluene	ND		0.00100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
Ethylbenzene	ND		0.00100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
Xylenes, Total	ND		0.00300	1	07/07/2024 03:31	<a href="#">WG2318534</a>
Naphthalene	ND		0.00500	1	07/07/2024 03:31	<a href="#">WG2318534</a>
1,2,4-Trimethylbenzene	ND		0.00100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
1,3,5-Trimethylbenzene	ND		0.00100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
1-Methylnaphthalene	ND	<a href="#">J3 J4</a>	0.0100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
2-Methylnaphthalene	ND	<a href="#">J3</a>	0.0100	1	07/07/2024 03:31	<a href="#">WG2318534</a>
(S) Toluene-d8	105		80.0-120		07/07/2024 03:31	<a href="#">WG2318534</a>
(S) 4-Bromofluorobenzene	93.9		77.0-126		07/07/2024 03:31	<a href="#">WG2318534</a>
(S) 1,2-Dichloroethane-d4	100		70.0-130		07/07/2024 03:31	<a href="#">WG2318534</a>

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4090840-1 07/06/24 16:03

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

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

(LCS) R4090840-2 07/06/24 16:03 • (LCSD) R4090840-3 07/06/24 16:03

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Dissolved Solids	8800	8270	8970	94.0	102	85.0-115			8.12	10

<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) R4091229-1 07/06/24 18:16

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Chloride	0.795	⬇	0.379	1.00
Sulfate	U		0.594	5.00

L1747877-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1747877-06 07/07/24 02:00 • (DUP) R4091229-3 07/07/24 02:13

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	80.5	80.8	1	0.288		15
Sulfate	8.21	7.44	1	9.90		15

L1753539-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1753539-03 07/07/24 04:33 • (DUP) R4091229-6 07/07/24 04:46

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Chloride	20.0	19.9	1	0.461		15
Sulfate	8.08	8.27	1	2.22		15

Laboratory Control Sample (LCS)

(LCS) R4091229-2 07/06/24 18:29

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Chloride	40.0	39.3	98.3	80.0-120	
Sulfate	40.0	39.1	97.7	80.0-120	

L1747877-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1747877-06 07/07/24 02:00 • (MS) R4091229-4 07/07/24 02:25 • (MSD) R4091229-5 07/07/24 02:38

	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	%	%		%			%	%
Chloride	40.0	80.5	105	105	61.5	60.8	1	80.0-120	J6	J6	0.257	15
Sulfate	40.0	8.21	45.1	45.2	92.3	92.4	1	80.0-120			0.0964	15





L1753539-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1753539-03 07/07/24 04:33 • (MS) R4091229-7 07/07/24 04:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Chloride	40.0	20.0	55.9	89.7	1	80.0-120	
Sulfate	40.0	8.08	45.9	94.5	1	80.0-120	

<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) R4091626-3 07/07/24 02:23

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.0000941	0.00100
Toluene	U		0.000278	0.00100
Ethylbenzene	U		0.000137	0.00100
Xylenes, Total	U		0.000174	0.00300
Naphthalene	U		0.00100	0.00500
1,2,4-Trimethylbenzene	U		0.000322	0.00100
1,3,5-Trimethylbenzene	U		0.000104	0.00100
1-Methylnaphthalene	U		0.00730	0.0100
2-Methylnaphthalene	U		0.00718	0.0100
(S) Toluene-d8	105			80.0-120
(S) 4-Bromofluorobenzene	96.0			77.0-126
(S) 1,2-Dichloroethane-d4	99.9			70.0-130

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

(LCS) R4091626-1 07/07/24 01:15 • (LCSD) R4091626-2 07/07/24 01:38

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 %
Benzene	0.00500	0.00556	0.00582	111	116	70.0-123			4.57	20
Toluene	0.00500	0.00530	0.00551	106	110	79.0-120			3.89	20
Ethylbenzene	0.00500	0.00535	0.00568	107	114	79.0-123			5.98	20
Xylenes, Total	0.0150	0.0158	0.0164	105	109	79.0-123			3.73	20
Naphthalene	0.00500	0.00532	0.00467	106	93.4	54.0-135			13.0	20
1,2,4-Trimethylbenzene	0.00500	0.00539	0.00556	108	111	76.0-121			3.11	20
1,3,5-Trimethylbenzene	0.00500	0.00537	0.00557	107	111	76.0-122			3.66	20
1-Methylnaphthalene	0.00500	0.00774	0.00449	155	89.8	14.0-154	J4	J3	53.1	40
2-Methylnaphthalene	0.00500	0.00589	0.00369	118	73.8	15.0-159		J3	45.9	40
(S) Toluene-d8				105	106	80.0-120				
(S) 4-Bromofluorobenzene				97.9	98.6	77.0-126				
(S) 1,2-Dichloroethane-d4				101	98.9	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

# 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.

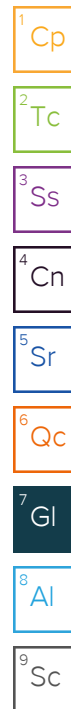
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

## Abbreviations and Definitions

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

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.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.



# 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.



[illegible]