



September 14, 2022

Mr. Blair Rollins  
Caerus Oil and Gas  
143 Diamond Avenue  
Parachute, CO 81635

**RE: Report of Work Completed  
KE Road –Soil Sampling  
COGCC Remediation Number 15310  
Mesa County, Colorado**

Mr. Rollins,

Entrada Consulting Group (Entrada) has prepared this Report of Work Completed (ROWC) for Caerus Oil and Gas (Caerus) related to the Plateau Pipeline site (Site) located in Mesa County, Colorado. The Site is located on Caerus's Plateau operating area and near KE road east of the town of Mesa, Colorado. The center location coordinates of the release area are approximately 39.174425 latitude, and -108.100587 longitude.

Entrada was contracted to collect native subsurface soil samples to characterize the site-specific root zone soil suitability chemistry in response to the Colorado Oil and Gas Conservation Commission (COGCC) Form 27 Document Number 402875116. Entrada was also contracted to collect surface samples within the perimeter of of the historic excavation/source area to monitor natural attenuation of inorganic contaminants.

### **SUBSURFACE SOIL SAMPLING ACTIVITIES**

On July 7<sup>th</sup>, 2022, an Entrada Environmental Scientist collected soil samples from five borings using a hand auger. Sample depths were 10 inches below ground surface (in-bgs) and 36 in-bgs in all borings. The background sample locations were in vegetated areas outside of the spill area and the spill sample locations were located along the perimeter of the historic excavation. Soil sample locations are illustrated on **Figure 1**.

### **SOIL ANALYSIS**

Soil samples were collected in sample containers appropriate for the specified analyses, sealed, labeled, and placed into an ice filled cooler for preservation. Soil samples were submitted to Pace Analytical in Mt. Juliet, Tennessee following chain of custody procedures and analyzed for:

- EC and SAR by U.S. Environmental Protection Agency Method 9050A Modified; and
- pH by EPA Method 9045D.

In total, ten samples were collected and submitted for laboratory analysis.

## SOIL ANALYTICAL RESULTS

The laboratory soil analytical results were compared to the COGCC Table 915-1 Cleanup Concentrations. The soil analytical results reported above the COGCC Table 915-1 are summarized below.

- SAR levels in 20220707-KEROAD-SWBG-10"-1215, 20220707-KEROAD-SWBG-36"-1230, and 20220831-KEROAD-SEBG-10"-1145 were reported above the applicable COGCC Table 915-1 Cleanup Concentration.
- EC levels in 20220707-KEROAD-SWBG-10"-1215 and 20220707-KEROAD-SWBG-36"-1230 were reported above the applicable COGCC Table 915-1 Cleanup Concentration.
- pH levels in 20220707-KEROAD-SEBG-10"-1145, 20220707-KEROAD-SEBG-36"-1200, 20220707-KEROAD-SWBG-10"-1215, 20220707-KEROAD-E-36"-900, 20220707-KEROAD-N-36"-1000, and 20220707-KEROAD-W-36"-930 were reported above the applicable COGCC Table 915-1 Cleanup Concentration.

The soil analytical results are summarized in **Table 1** and the laboratory analytical report is included as **Attachment 1**.

## CONCLUSIONS

Soil results from the background soil samples clearly indicate that naturally elevated SAR, EC, and pH are present at root zone depths in established and healthy areas of vegetation. Furthermore, the historic KE Road Center 18-24" sample had a SAR value of 35.8 and the recent adjacent samples 20220707-KEROAD-E-10" and 20220707-KEROAD-E-36" had values of 5.82 and 5.1 respectively. This indicates that in-situ remediation is occurring.

Additionally, over the life of this project, the average SAR for all spill samples collected is 17.8 while the average SAR for all background samples collected is 23.3 indicating that elevated SAR is a naturally occurring phenomenon in this area. Soil amendments are not recommended at this time as current vegetation in the historic spill area is established, healthy and not effected by the naturally high conditions of inorganics present in native soils. Previous site characterizations displayed inorganics exceeding table 915 in source area and native soils with lack of evidence provided within root zone (0 – 3 feet bgs). With the new data presented herein, Entrada recommends that Caerus pursue closure with the COGCC regarding REM# 15310.

We appreciate the opportunity to assist Caerus Oil and Gas. Please contact me (720) 253-2940 if you have any questions.

Sincerely,

### **ENTRADA CONSULTING GROUP**



Reed Johnson, PG  
Senior Project Geologist



Matt Kasten  
Project Manager

Attachments:

**Figure 1 – Sample Location Map**  
**Table 1 – Soil Data Summary**  
**Laboratory Analytical Reports**

# TABLES

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TABLE 1  
 CAERUS OPERATING LLC  
 KE ROAD INVESTIGATION  
 SOIL ANALYTICAL RESULTS  
 MESA COUNTY, COLORADO

PROTECTION OF GROUNDWATER SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)						Soil Suitability for Reclamation		
RESIDENTIAL SOIL SCREENING LEVEL CONCENTRATION (mg/Kg)						<4.0 mmhos/cm	<6	6 - 8.3
Location	Lab Report #	Sampler	Sample Date	Sample Matrix	Matrix Notes	Electrical Conductivity (EC) (by saturated paste method)	Sodium Adsorption Ratio (SAR) by saturated paste (method)	pH (by saturated paste method)
KE Road	L1512960	CH	07/07/22	Background	20220707-KEROAD-SWBG-10"-1215	5.040	30.2	8.42
KE Road	L1512960	CH	07/07/22	Background	20220707-KEROAD-SWBG-36"-1230	6.630	21.3	8.17
KE Road	L1512960	CH	07/07/22	Background	20220707-KEROAD-SEBG-10"-1145	0.815	7.95	9.37
KE Road	L1512960	CH	07/07/22	Background	20220707-KEROAD-SEBG-36"-1200	0.913	3.97	8.85
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KEROAD-E-10"-845	0.585	5.82	8.22
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KEROAD-E-36"-900	0.48	5.10	8.60
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KEROAD-N-10"-945	0.452	4.67	8.27
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KEROAD-N-36"-1000	0.274	4.65	8.31
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KRROAD-N-10"-915	0.185	1.17	8.11
KE Road	L1512950	CH	07/07/22	SPILL	20220707-KEROAD-W-36"-930	0.179	1.22	8.36

# FIGURES

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# SOIL ANALYTICAL REPORTS

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**Caerus Oil and Gas**

Sample Delivery Group: L1512950  
Samples Received: 07/08/2022  
Project Number: KE ROAD  
Description: KE ROAD CLEARANCE

Report To: Blair Rollins  
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 [www.pacenational.com](http://www.pacenational.com)

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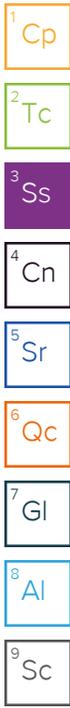
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# SAMPLE SUMMARY

## 20220707-KEROAD-E-10"-845 L1512950-01 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 08:45  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:34	07/26/22 21:34	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893469	1	07/12/22 13:00	07/12/22 15:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897843	1	07/21/22 03:31	07/21/22 07:51	ARD	Mt. Juliet, TN



## 20220707-KEROAD-E-36"-900 L1512950-02 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 09:00  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:37	07/26/22 21:37	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893495	1	07/12/22 10:00	07/12/22 12:12	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-W-10"-915 L1512950-03 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 09:15  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:40	07/26/22 21:40	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893495	1	07/12/22 10:00	07/12/22 12:12	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-W-36"-930 L1512950-04 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 09:30  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:43	07/26/22 21:43	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893469	1	07/12/22 13:00	07/12/22 15:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-N-10"-945 L1512950-05 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 09:45  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:46	07/26/22 21:46	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893469	1	07/12/22 13:00	07/12/22 15:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-N-36"-1000 L1512950-06 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 10:00  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1897998	1	07/26/22 21:49	07/26/22 21:49	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893495	1	07/12/22 10:00	07/12/22 12:12	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

# 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

<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

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.82		1	07/26/2022 21:34	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.22	T8	1	07/12/2022 15:00	<a href="#">WG1893469</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-01 WG1893469: 8.22 at 23.5C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	585		10.0	1	07/21/2022 07:51	<a href="#">WG1897843</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-01 WG1897843: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.10		1	07/26/2022 21:37	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.60	T8	1	07/12/2022 12:12	<a href="#">WG1893495</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-02 WG1893495: 8.6 at 24.1C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	480		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-02 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.17		1	07/26/2022 21:40	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.11	<u>T8</u>	1	07/12/2022 12:12	<a href="#">WG1893495</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-03 WG1893495: 8.11 at 23.8C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	185		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-03 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	1.22		1	07/26/2022 21:43	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.36	<u>T8</u>	1	07/12/2022 15:00	<a href="#">WG1893469</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-04 WG1893469: 8.36 at 23.4C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	179		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-04 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.67		1	07/26/2022 21:46	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.27	<u>T8</u>	1	07/12/2022 15:00	<a href="#">WG1893469</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-05 WG1893469: 8.27 at 23.4C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	452		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-05 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.65		1	07/26/2022 21:49	WG1897998

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.31	T8	1	07/12/2022 12:12	<a href="#">WG1893495</a>

3 Ss

4 Cn

Sample Narrative:

L1512950-06 WG1893495: 8.31 at 24.2C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	274		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512950-06 WG1897844: at 25C

8 Al

9 Sc

L1511319-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1511319-02 07/12/22 15:00 • (DUP) R3813760-2 07/12/22 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.99	7.98	1	0.125		1

Sample Narrative:

OS: 7.99 at 24.1C  
 DUP: 7.98 at 24.2C

L1511718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1511718-01 07/12/22 15:00 • (DUP) R3813760-3 07/12/22 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.11	8.12	1	0.123		1

Sample Narrative:

OS: 8.11 at 24.1C  
 DUP: 8.12 at 23.6C

Laboratory Control Sample (LCS)

(LCS) R3813760-1 07/12/22 15:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 23.6C



L1512950-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1512950-03 07/12/22 12:12 • (DUP) R3813609-2 07/12/22 12:12

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.11	8.13	1	0.246		1

Sample Narrative:

OS: 8.11 at 23.8C

DUP: 8.13 at 24C

Laboratory Control Sample (LCS)

(LCS) R3813609-1 07/12/22 12:12

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	9.91	99.1	99.0-101	

Sample Narrative:

LCS: 9.91 at 24C



Method Blank (MB)

(MB) R3817496-1 07/21/22 07:51

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

Sample Narrative:

BLANK: at 25C

L1512916-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1512916-01 07/21/22 07:51 • (DUP) R3817496-3 07/21/22 07:51

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	523	563	1	7.37		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1512920-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1512920-03 07/21/22 07:51 • (DUP) R3817496-4 07/21/22 07:51

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	390	435	1	10.9		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3817496-2 07/21/22 07:51

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	286	282	98.6	85.0-115	

Sample Narrative:

LCS: at 25C

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3817489-1 07/21/22 07:16

Analyte	MB Result umhos/cm	MB Qualifier	MB MDL umhos/cm	MB RDL umhos/cm
Specific Conductance	U		10.0	10.0

Sample Narrative:

BLANK: at 25C

L1512956-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1512956-02 07/21/22 07:16 • (DUP) R3817489-3 07/21/22 07:16

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	48.6	45.7	1	6.15		20

Sample Narrative:

OS: at 25C  
DUP: at 25C

L1513292-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1513292-01 07/21/22 07:16 • (DUP) R3817489-4 07/21/22 07:16

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits
Specific Conductance	1080	1180	1	8.93		20

Sample Narrative:

OS: at 25C  
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3817489-2 07/21/22 07:16

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	286	277	96.8	85.0-115	

Sample Narrative:

LCS: at 25C



# 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.

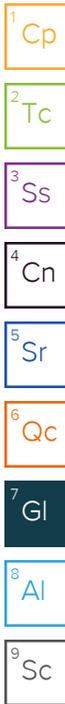
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

### Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
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.
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### Qualifier Description

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.



# 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
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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



**Caerus Oil and Gas**

Sample Delivery Group: L1512960  
Samples Received: 07/08/2022  
Project Number: KE ROAD BG  
Description: KE ROAD CLEARANCE

Report To: Blair Rollins  
143 Diamond Avenue  
Parachute, CO 81635

Entire Report Reviewed By:



Kelly Mercer  
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

## 20220707-KEROAD-SEBG-10"-1145 L1512960-01 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 11:45  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1898962	1	07/28/22 22:13	07/28/22 22:13	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893065	1	07/11/22 14:00	07/11/22 16:53	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

## 20220707-KEROAD-SEBG-36"-1200 L1512960-02 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 12:00  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1898962	1	07/28/22 22:16	07/28/22 22:16	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893065	1	07/11/22 14:00	07/11/22 16:53	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-SWBG-10"-1215 L1512960-03 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 12:15  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1898962	1	07/28/22 22:19	07/28/22 22:19	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893469	1	07/12/22 13:00	07/12/22 15:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

## 20220707-KEROAD-SWBG-36"-1230 L1512960-04 Solid

Collected by: Chance Holder  
 Collected date/time: 07/07/22 12:30  
 Received date/time: 07/08/22 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1898962	1	07/28/22 22:22	07/28/22 22:22	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1893469	1	07/12/22 13:00	07/12/22 15:00	NTG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1897844	1	07/21/22 03:26	07/21/22 07:16	ARD	Mt. Juliet, TN

# 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.



Kelly Mercer  
Project Manager

<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

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	7.95		1	07/28/2022 22:13	WG1898962

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.37	T8	1	07/11/2022 16:53	<a href="#">WG1893065</a>

3 Ss

4 Cn

Sample Narrative:

L1512960-01 WG1893065: 9.37 at 23C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	815		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512960-01 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	3.97		1	07/28/2022 22:16	WG1898962

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.85	T8	1	07/11/2022 16:53	<a href="#">WG1893065</a>

3 Ss

4 Cn

Sample Narrative:

L1512960-02 WG1893065: 8.85 at 23.2C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	913		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512960-02 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	30.2		1	07/28/2022 22:19	WG1898962

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.42	T8	1	07/12/2022 15:00	<a href="#">WG1893469</a>

3 Ss

4 Cn

Sample Narrative:

L1512960-03 WG1893469: 8.42 at 23.6C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	5040		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512960-03 WG1897844: at 25C

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	21.3		1	07/28/2022 22:22	WG1898962

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.17	<u>T8</u>	1	07/12/2022 15:00	<a href="#">WG1893469</a>

3 Ss

4 Cn

Sample Narrative:

L1512960-04 WG1893469: 8.17 at 23.4C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	6630		10.0	1	07/21/2022 07:16	<a href="#">WG1897844</a>

6 Qc

7 Gl

Sample Narrative:

L1512960-04 WG1897844: at 25C

8 Al

9 Sc

L1512921-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1512921-03 07/11/22 16:53 • (DUP) R3813340-2 07/11/22 16:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.23	8.25	1	0.243		1

Sample Narrative:

OS: 8.23 at 23C

DUP: 8.25 at 23.2C

L1513243-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1513243-05 07/11/22 16:53 • (DUP) R3813340-3 07/11/22 16:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
pH	8.09	8.13	1	0.493		1

Sample Narrative:

OS: 8.09 at 22.9C

DUP: 8.13 at 23C

Laboratory Control Sample (LCS)

(LCS) R3813340-1 07/11/22 16:53

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 23.2C

<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

L1511319-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1511319-02 07/12/22 15:00 • (DUP) R3813760-2 07/12/22 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.99	7.98	1	0.125		1

Sample Narrative:

OS: 7.99 at 24.1C  
 DUP: 7.98 at 24.2C

L1511718-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1511718-01 07/12/22 15:00 • (DUP) R3813760-3 07/12/22 15:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	8.11	8.12	1	0.123		1

Sample Narrative:

OS: 8.11 at 24.1C  
 DUP: 8.12 at 23.6C

Laboratory Control Sample (LCS)

(LCS) R3813760-1 07/12/22 15:00

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	su	su	%	%	
pH	10.0	9.90	99.0	99.0-101	

Sample Narrative:

LCS: 9.9 at 23.6C

<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) R3817489-1 07/21/22 07:16

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Specific Conductance	U		10.0	10.0

Sample Narrative:

BLANK: at 25C

L1512956-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1512956-02 07/21/22 07:16 • (DUP) R3817489-3 07/21/22 07:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	48.6	45.7	1	6.15		20

Sample Narrative:

OS: at 25C  
DUP: at 25C

L1513292-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1513292-01 07/21/22 07:16 • (DUP) R3817489-4 07/21/22 07:16

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Specific Conductance	1080	1180	1	8.93		20

Sample Narrative:

OS: at 25C  
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3817489-2 07/21/22 07:16

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Specific Conductance	286	277	96.8	85.0-115	

Sample Narrative:

LCS: at 25C

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.

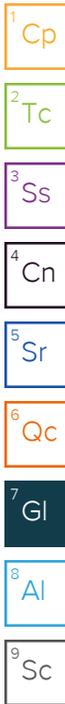
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

### Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
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.
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### Qualifier Description

Qualifier	Description
T8	Sample(s) received past/too close to holding time expiration.



# ACCREDITATIONS & LOCATIONS

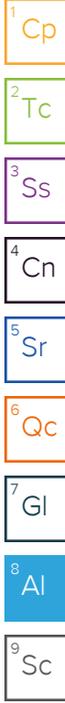
## Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
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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.



# Caerus Oil and Gas

143 Diamond Ave  
Parachute, Co 81635

Billing Information:

Caerus Oil and Gas

Pres  
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



12065 Lebanon Rd  
Mount Juliet, TN 37122  
Phone: 615-758-5858  
Phone: 800-767-5859  
Fax: 615-758-5859



Report to:  
Blair Rollins

Email To: brollins@caerusoilandgas.com;  
jjanicek@caerusoilandgas.com;  
bmiddleton@caerusoilandgas.com

Project Description:

KE ROAD BG

City/State  
Collected:

Please Circle:  
PT MT CT ET

Phone: 970-640-6919

Client Project #

KE ROAD BG

Lab Project #

Collected by (print):

CHANCE HOLDER

Site/Facility ID #

P.O. #

Collected by (signature):

*[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

Immediately

Packed on Ice N \_\_\_ Y

No.  
of  
Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Table915 GRO/DRO/ORO 4ozClr-NoPres	Table915 Metals 4ozClr-NoPres	Table915 PAHs 4ozClr-NoPres	Table915 VOCs 4ozClr-NoPres	Table915 pH SPCONSAR 4ozClr-NoPres	EC	PH	SAR	Remarks	Sample # (lab only)
20220707-KE ROAD-SE BG-10"-1145	GRAB	SS	10"	7/7/22	1145	2	<input checked="" type="checkbox"/>	X	X	X		21				
20220707-KE ROAD-SE BG-36"-1200			36"		1200	2						X	X	X		22
20220707-KE ROAD-SW BG-10"-1215			10"		1215	2						X	X	X		23
20220707-KE ROAD-SW BG-36"-1230			36"		1230	2						X	X	X		24

\* Matrix:  
SS - Soil AIR - Air F - Filter  
GW - Groundwater B - Bioassay  
WW - WasteWater  
DW - Drinking Water  
OT - Other

Remarks:

pH \_\_\_\_\_ Temp \_\_\_\_\_

Flow \_\_\_\_\_ Other \_\_\_\_\_

Samples returned via:

\_\_\_ UPS \_\_\_ FedEx \_\_\_ Courier

Tracking # 5755 8084 8271

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 Headpace:  Y  N  
Preservation Correct/Checked:  Y  N  
RAD Screen <0.5 mR/hr:  Y  N

Relinquished by: (Signature)

Date:

7/7/22

Time:

1806

Received by: (Signature)

Trip Blank Received: Yes  No

HCL / MeOH  
TBR

Relinquished by: (Signature)

Date:

7/7/22

Time:

1500

Received by: (Signature)

Temp: 22.5 °C  
Bottles Received: 8

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

7/8/22

Time:

8:45

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:

NCF 1 OK