



March 20, 2020

Mr. Brett Middleton
Caerus Oil and Gas
143 Diamond Avenue
Parachute, Co 81635

**RE: Reclamation Investigation Report: Sampling and Analysis of Inorganics
Church #2 Pit Closure and Landfarm Assessment
COGCC Remediation 4301
Washington County, Colorado**

Mr. Middleton,

Entrada Consulting Group (Entrada) has prepared this Investigation Report for Caerus Oil and Gas (Caerus) in response to the sampling request of the Church #2 landfarm located in Washington County, Colorado. The site is located on County Road Nn approximately 5 miles northwest of the town of Arickaree, Colorado. The center location coordinates of the Church #2 landfarm are approximately 39.767280° North latitude and -103.029368° West longitude. A general location map is provided as Figure 1.

The nearest surface water drainage is located approximately 0.25 miles to the southeast. The nearest groundwater well is a domestic well (permit #117964) located approximately 0.25 miles to the southeast. Well construction reports indicate groundwater at 185 feet below ground surface (ft-bgs) at the time of drilling in 1981 and withdraws water from the Ogalla Aquifer. Intended use is for watering the lawn, garden and providing water for livestock.

Entrada was consulted to collect soil samples that correspond with Colorado Oil and Gas Conservation Commission (COGCC) Remediation (REM) number 4301. The COGCC inspected the location on February 18th, 2020 and determined that adequate vegetation has not been established in the areas of the former pits. Sampling was conducted on March 11, 2020. Five soil borings (SS1-SS5) were advanced in the area of the former pits, and two background borings (BS1-BS2) were advanced offsite to the west of the location. At each boring, a hand auger was used to advance to a total depth of 2 ft-bgs. Samples were collected from the 0 to 1 ft-bgs interval and the 1 to 2 ft-bgs interval, and named SSX-1 and SSX-2, respectively. The sampling effort intended to represent the 0-6 inches below ground surface (in-bgs) and the 18-24 in-bgs portions of these intervals. Sample locations are presented on Figure 2.

Representative soils samples were screened with a photo-ionization detector (PID). Evidence of staining or other visual impact was not observed during the investigation and all PID readings were background, or below 1.0 ppm. A photographic log is presented attached to this report that is representative of the site conditions at the time of this assessment.

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, TN following chain of custody procedures and analyzed for the following parameters by the stated Methods:

- pH by EPA Method 9045D;
- Specific Conductance, or Electrical conductivity (EC) by U.S. Department of Agriculture (USDA) Method 950Amod;
- Sodium adsorption ratio (SAR) as Calculated Results.

An additional composite soil sample was collected using soil obtained from the five on-site borings and submitted to the Colorado State University Soil, Water and Plant Testing Laboratory for Soil Amendment Analysis in order to assist in further remediation and soil amendment determinations.

SOIL ANALYTICAL RESULTS

Soil analytical results were reported for 14 soil samples at depths ranging from 0 to 24 in-bgs. The analytical results are presented in **Table 1** and are summarized below:

- pH was reported above the COGCC Table 910-1 standard for pH (>9) in both the 1 ft-bgs and 2 ft-bgs intervals submitted for analysis from soil borings SS1, SS2, SS3 and SS5.
- SAR was reported above the COGCC Table 910-1 standard for SAR from the 1 ft-bgs to 2 ft-bgs intervals of soil borings SS1, SS2 and SS3.
- EC was not reported above the COGCC Table 910-1 standard.
- Constituents of concern were not reported in concentrations above their respective standards for samples collected from soil boring SS4 or background soil borings BS1 and BS2.

CONCLUSIONS AND RECOMMENDATIONS

Based upon soil sampling activities completed at the site and laboratory analytical data presented herein, inorganic impacts of pH and SAR are contained within the area of the Church #2 landfarm. Potential remediation strategies to obtain levels of pH and SAR below their respective COGCC Table 910-1 standards include, but are not limited to, the following:

- Excavation and burial of the impacted material, followed by capping and revegetation.
- Excavation and removal of impacted material to an off-site disposal facility, followed by replacement of clean borrow soil and revegetation.
- Application of a remedial agent, ripping of the surface material, and revegetation.

Upon the date of this report, the results of the Soil Amendment Analysis are pending. These results will aid in the appropriate selection of a remedial strategy to be included with a supplementary work plan to the COGCC.

We appreciate the opportunity to assist Caerus Oil and Gas. Please contact me at (804) 513-0707 if you have any questions.

Sincerely,

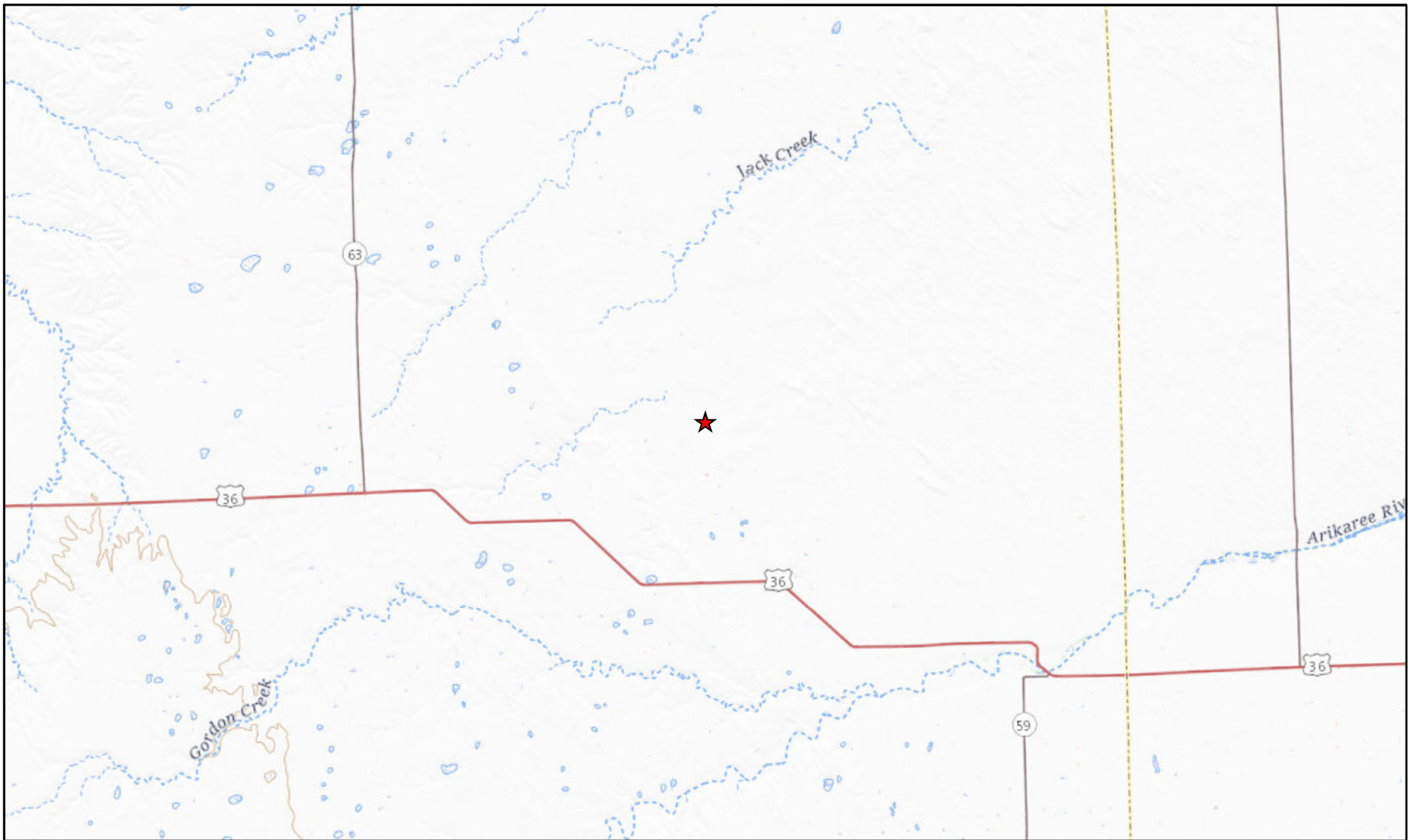
ENTRADA CONSULTING GROUP

A handwritten signature in black ink, appearing to read 'Ben Baugh', with a stylized flourish at the end.

Ben Baugh
Project Geologist

Attachments:

Figure 1 – General Location Map
Figure 2 – Sample Location Map
Table 1 – Soil Data Summary
Photographic Log
Laboratory Analytical Reports



LEGEND

★ SITE LOCATION

0 4 8 Miles
1 inch = 4 miles



Project No: 020-009

Drawn By: N.Peace

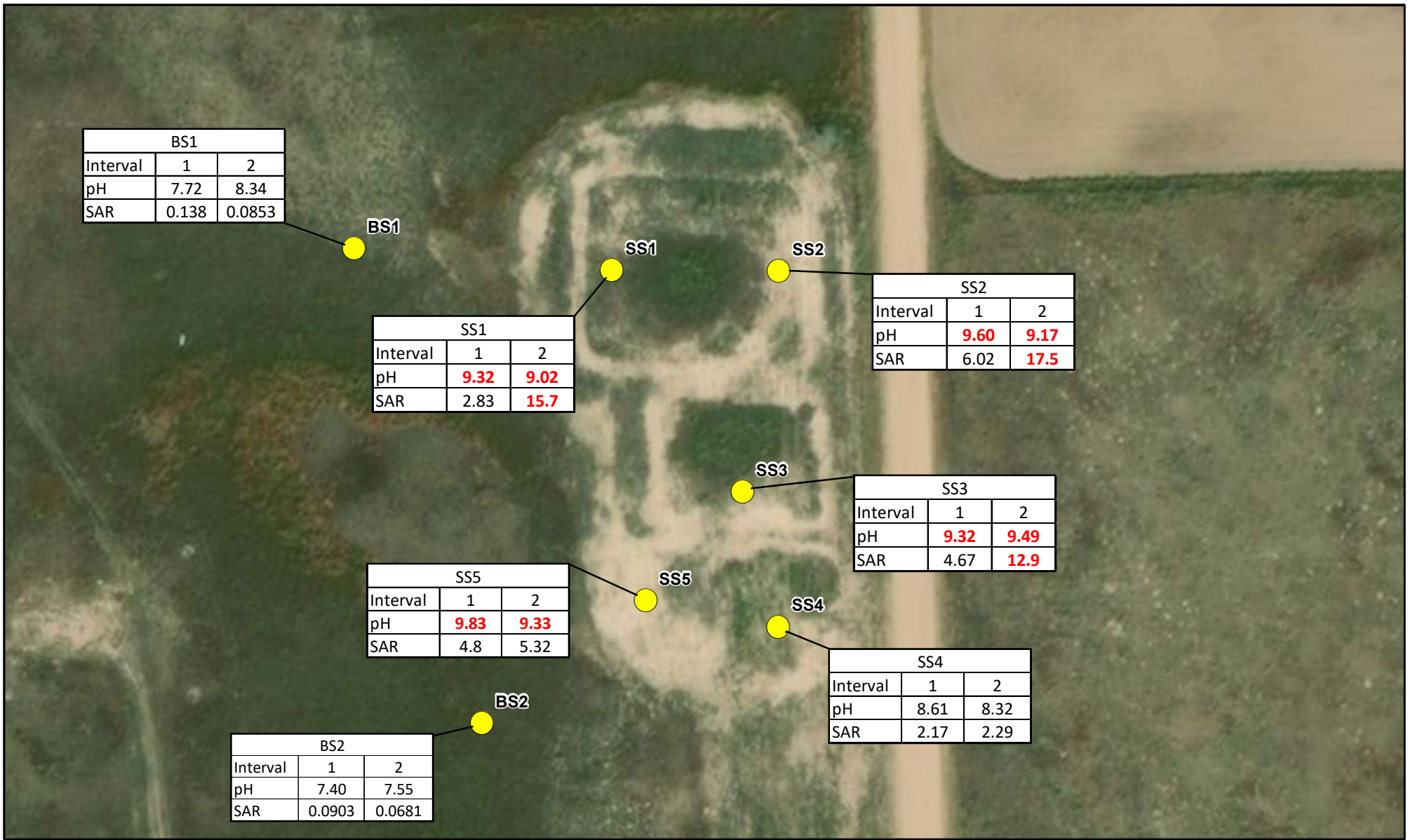
Date: 3/18/20

Church #2 Landfarm Reclamation - Overview Map
Caerus Oil and Gas
SENE Section 25, T3S, R51W
Washington County, Colorado



6689 Howell Street
Arvada, CO 80004
303.378.4036

Figure
1



LEGEND



BORING LOCATION

9.33 EXCEEDS COGCC TABLE 910-1 STANDARDS

**All Samples Were Collected 3/11/2020*

0 100 200 Feet

1 inch = 100 ft



Project No: 020-009

Drawn By: N.Peace

Date: 3/19/20

Church #2 Landfarm Reclamation
Caerus Oil and Gas
SENE Section 25, T3S, R51W
Washington County, Colorado



6689 Howell Street
Arvada, CO 80004
303.378.4036

Figure
2

TABLE 1
ANALYTICAL RESULTS SUMMARY TABLE
Caerus Church #2 Landfarm near Arickaree, Colorado

Site ID	Sample ID	Sample Depth	Sample Date	pH	EC (mmhos/cm)	SAR	PID Screening (ppm)
COGCC Table 910-1 Cleanup Levels				6-9	4	12	
Church #2 Landfarm	SS1-1	0-6"	3/11/2020	9.32	0.417	2.83	<1
	SS1-2	18-24"	3/11/2020	9.02	1.030	15.7	<1
	SS2-1	0-6"	3/11/2020	9.60	1.080	6.02	<1
	SS2-2	18-24"	3/11/2020	9.17	1.460	17.5	<1
	SS3-1	0-6"	3/11/2020	9.32	0.824	4.67	<1
	SS3-2	18-24"	3/11/2020	9.49	1.000	12.9	<1
	SS4-1	0-6"	3/11/2020	8.61	0.224	2.17	<1
	SS4-2	18-24"	3/11/2020	8.32	0.330	2.29	<1
Offsite Background	SS5-1	0-6"	3/11/2020	9.83	0.793	4.80	<1
	SS5-2	18-24"	3/11/2020	9.33	0.796	5.32	<1
	BS1-1	0-6"	3/11/2020	7.72	0.0374	0.138	<1
	BS1-2	18-24"	3/11/2020	8.34	0.105	0.0853	<1
	BS2-1	0-6"	3/11/2020	7.40	0.0312	0.0903	<1
	BS2-2	18-24"	3/11/2020	7.55	0.0370	0.0681	<1

Note: See site maps for soil sample locations

mmhos/cm - microseimens per centimeter

<1 - Soil screeneing is background

" - inches below ground surface

BOLD - analyte exceeds COGCC Table 910-1 standard

**Photographic Log – Caerus Oil and Gas
Church #2 Reclamation
Washington County, CO**



PHOTO 1

Subject: Church #2 Reclamation

Notes: Looking south-southwest over the Site from County Road NN. Most of the Site is vegetated.



PHOTO 2

Subject: Church #2 Reclamation

Notes: Looking west-southwest over the Site from County Road NN. Most of the Site is vegetated.



PHOTO 3

Subject: Church #2 Reclamation

Notes: Looking west over the Site from County Road NN. Vegetation is shorter and light green in color. Offsite vegetation is taller and red-brown in color.

**Photographic Log – Caerus Oil and Gas
Church #2 Reclamation
Washington County, CO**

PHOTO 4



Subject: Church #2 Reclamation

Notes: Looking north across the Site from the southern margin of the Site. Area of lesser vegetation observed in western portion of photo.

PHOTO 5



Subject: Church #2 Reclamation

Notes: Looking north from west central part of the Site showing straw waddles and area lacking vegetation.

PHOTO 6



Subject: Church #2 Reclamation

Notes: Looking north from adjacent to soil boring SS5, shown flagged in pink.

**Photographic Log – Caerus Oil and Gas
Church #2 Reclamation
Washington County, CO**

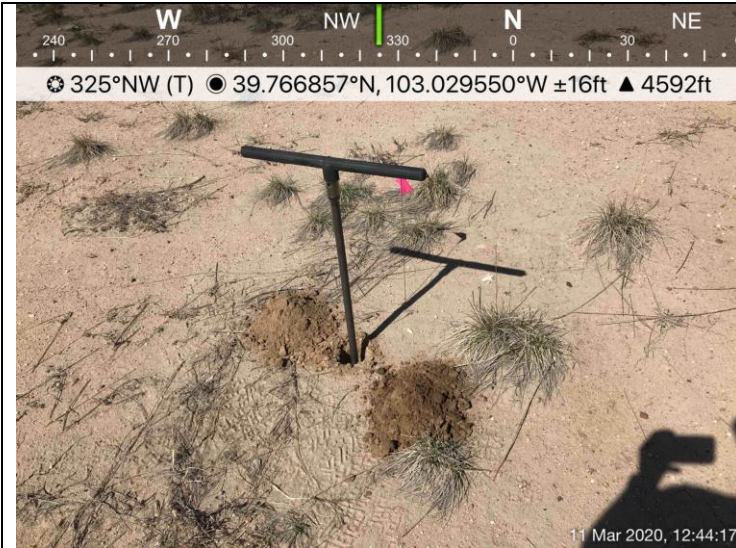


PHOTO 7

Subject: Church #2 Reclamation

Notes: Soil boring SS5. Approximate maximum depth of hand auger.



PHOTO 8

Subject: Offsite area west of Church #2

Notes: Areas west of the Site show vegetation and bare spots similar to the landfarm.



PHOTO 9

Subject: Offsite area west of Church #2

Notes: Areas west of Site show vegetation and bare spots similar to the landfarm.

March 19, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Caerus Oil and Gas

Sample Delivery Group: L1198122
Samples Received: 03/12/2020
Project Number:
Description: Church #2

Report To: Ben Baugh
143 Diamond Avenue
Parachute, CO 81635

Entire Report Reviewed By:

Chris Ward

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.



Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
Ss: Sample Summary	3	² Tc
Cn: Case Narrative	6	
Sr: Sample Results	7	³ Ss
SS1-1 L1198122-01	7	
SS1-2 L1198122-02	8	⁴ Cn
SS2-1 L1198122-03	9	⁵ Sr
SS2-2 L1198122-04	10	
SS3-1 L1198122-05	11	⁶ Qc
SS3-2 L1198122-06	12	
SS4-1 L1198122-07	13	⁷ Gl
SS4-2 L1198122-08	14	⁸ Al
SS5-1 L1198122-09	15	
SS5-2 L1198122-10	16	⁹ Sc
BS1-1 L1198122-11	17	
BS1-2 L1198122-12	18	
BS2-1 L1198122-13	19	
BS2-2 L1198122-14	20	
Qc: Quality Control Summary	21	
Wet Chemistry by Method 9045D	21	
Wet Chemistry by Method 9050AMod	22	
Gl: Glossary of Terms	23	
Al: Accreditations & Locations	24	
Sc: Sample Chain of Custody	25	

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SS1-1 L1198122-01 Solid

				Collected by Ben B.	Collected date/time 03/11/20 10:25	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:10	03/16/20 01:10	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

SS1-2 L1198122-02 Solid

				Collected by Ben B.	Collected date/time 03/11/20 10:30	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:12	03/16/20 01:12	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

⁴ Cn

⁵ Sr

⁶ Qc

SS2-1 L1198122-03 Solid

				Collected by Ben B.	Collected date/time 03/11/20 11:30	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:15	03/16/20 01:15	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

⁷ Gl

⁸ Al

⁹ Sc

SS2-2 L1198122-04 Solid

				Collected by Ben B.	Collected date/time 03/11/20 11:35	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:18	03/16/20 01:18	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

SS3-1 L1198122-05 Solid

				Collected by Ben B.	Collected date/time 03/11/20 11:55	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:20	03/16/20 01:20	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

SS3-2 L1198122-06 Solid

				Collected by Ben B.	Collected date/time 03/11/20 12:00	Received date/time 03/12/20 08:30
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:23	03/16/20 01:23	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SS4-1 L1198122-07 Solid

Collected by Ben B. Collected date/time 03/11/20 12:20 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:26	03/16/20 01:26	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

SS4-2 L1198122-08 Solid

Collected by Ben B. Collected date/time 03/11/20 12:25 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:28	03/16/20 01:28	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

SS5-1 L1198122-09 Solid

Collected by Ben B. Collected date/time 03/11/20 12:45 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:31	03/16/20 01:31	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

SS5-2 L1198122-10 Solid

Collected by Ben B. Collected date/time 03/11/20 12:50 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:39	03/16/20 01:39	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

BS1-1 L1198122-11 Solid

Collected by Ben B. Collected date/time 03/11/20 10:55 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:42	03/16/20 01:42	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

BS1-2 L1198122-12 Solid

Collected by Ben B. Collected date/time 03/11/20 11:00 Received date/time 03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:44	03/16/20 01:44	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN



BS2-1 L1198122-13 Solid

Collected by
Ben B.Collected date/time
03/11/20 13:15Received date/time
03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:47	03/16/20 01:47	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

BS2-2 L1198122-14 Solid

Collected by
Ben B.Collected date/time
03/11/20 13:20Received date/time
03/12/20 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1442822	1	03/16/20 01:50	03/16/20 01:50	CCE	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1442702	1	03/13/20 11:00	03/13/20 13:00	KEG	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1446023	1	03/18/20 11:08	03/18/20 13:00	CAT	Mt. Juliet, TN



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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.83		1	03/16/2020 01:10	WG1442822

1
Cp

2
Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.32	T8	1	03/13/2020 13:00	WG1442702

3
Ss

4
Cn

Sample Narrative:
L1198122-01 WG1442702: 9.32 at 22.8C

5
Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	417		10.0	1	03/18/2020 13:00	WG1446023

6
Qc

7
Gl

8
Al

9
Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	15.7		1	03/16/2020 01:12	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.02	<u>T8</u>	1	03/13/2020 13:00	WG1442702

Sample Narrative:

L1198122-02 WG1442702: 9.02 at 22.7C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1030		10.0	1	03/18/2020 13:00	WG1446023

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	6.02		1	03/16/2020 01:15	WG1442822

¹ Cp

² Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.60	T8	1	03/13/2020 13:00	WG1442702

³ Ss

⁴ Cn

Sample Narrative:
L1198122-03 WG1442702: 9.6 at 22.3C

⁵ Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1080		10.0	1	03/18/2020 13:00	WG1446023

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	17.5		1	03/16/2020 01:18	WG1442822

1 Cp

2 Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.17	T8	1	03/13/2020 13:00	WG1442702

3 Ss

4 Cn

Sample Narrative:
L1198122-04 WG1442702: 9.17 at 22.1C

5 Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1460		10.0	1	03/18/2020 13:00	WG1446023

6 Qc

7 Gl

8 Al

9 Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.67		1	03/16/2020 01:20	WG1442822

1
Cp

2
Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.32	T8	1	03/13/2020 13:00	WG1442702

3
Ss

4
Cn

Sample Narrative:
L1198122-05 WG1442702: 9.32 at 22.4C

5
Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	824		10.0	1	03/18/2020 13:00	WG1446023

6
Qc

7
Gl

8
Al

9
Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	12.9		1	03/16/2020 01:23	WG1442822

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.49	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-06 WG1442702: 9.49 at 22.1C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		umhos/cm			
Specific Conductance	1000		10.0	1	03/18/2020 13:00	WG1446023

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.17		1	03/16/2020 01:26	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.61	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-07 WG1442702: 8.61 at 21.9C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	224		10.0	1	03/18/2020 13:00	WG1446023

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	2.29		1	03/16/2020 01:28	WG1442822

1
Cp

2
Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.32	T8	1	03/13/2020 13:00	WG1442702

3
Ss

4
Cn

Sample Narrative:
L1198122-08 WG1442702: 8.32 at 21.8C

5
Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	330		10.0	1	03/18/2020 13:00	WG1446023

6
Qc

7
Gl

8
Al

9
Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	4.80		1	03/16/2020 01:31	WG1442822

1
Cp

2
Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.83	T8	1	03/13/2020 13:00	WG1442702

3
Ss

4
Cn

Sample Narrative:
L1198122-09 WG1442702: 9.83 at 21.8C

5
Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	793		10.0	1	03/18/2020 13:00	WG1446023

6
Qc

7
Gl

8
Al

9
Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	5.32		1	03/16/2020 01:39	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	9.33	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-10 WG1442702: 9.33 at 21.8C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	796		10.0	1	03/18/2020 13:00	WG1446023

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.138		1	03/16/2020 01:42	WG1442822

¹ Cp

² Tc

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.72	T8	1	03/13/2020 13:00	WG1442702

³ Ss

⁴ Cn

Sample Narrative:

L1198122-11 WG1442702: 7.72 at 21.5C

⁵ Sr

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	37.4		10.0	1	03/18/2020 13:00	WG1446023

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.0853		1	03/16/2020 01:44	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.34	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-12 WG1442702: 8.34 at 21.5C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	105		10.0	1	03/18/2020 13:00	WG1446023

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.0903		1	03/16/2020 01:47	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.40	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-13 WG1442702: 7.4 at 21.3C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	31.2		10.0	1	03/18/2020 13:00	WG1446023

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.0681		1	03/16/2020 01:50	WG1442822

Wet Chemistry by Method 9045D

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	7.55	T8	1	03/13/2020 13:00	WG1442702

Sample Narrative:
L1198122-14 WG1442702: 7.55 at 21.1C

Wet Chemistry by Method 9050AMod

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	umhos/cm		umhos/cm			
Specific Conductance	37.0		10.0	1	03/18/2020 13:00	WG1446023

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1198004-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1198004-03 03/13/20 13:00 • (DUP) R3508354-2 03/13/20 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.95	9.05	1	1.11	J3	1

Sample Narrative:

OS: 8.95 at 23.5C

DUP: 9.05 at 23.4C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1198122-10 Original Sample (OS) • Duplicate (DUP)

(OS) L1198122-10 03/13/20 13:00 • (DUP) R3508354-3 03/13/20 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	9.33	9.40	1	0.747		1

Sample Narrative:

OS: 9.33 at 21.8C

DUP: 9.4 at 2.16C

Laboratory Control Sample (LCS)

(LCS) R3508354-1 03/13/20 13:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.95	99.5	99.0-101	

Sample Narrative:

LCS: 9.95 at 19.8C



Method Blank (MB)

(MB) R3509945-1 03/18/20 13:00

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

L1198122-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1198122-06 03/18/20 13:00 • (DUP) R3509945-3 03/18/20 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	1000	1030	1	2.56		20

Laboratory Control Sample (LCS)

(LCS) R3509945-2 03/18/20 13:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	445	445	100	85.0-115	

⁷Gl

⁸Al

⁹Sc



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.
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

J3	The associated batch QC was outside the established quality control range for precision.
T8	Sample(s) received past/too close to holding time expiration.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

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

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

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Entrada Consulting Group

240 Mesa Avenue
Grand Junction, CO 81501

Billing Information:
Brett Middleton
Caerus Oil + Gas
143 Diamond Ave
Parachute, CO 81635

Report to: Ben Bough

Email To: bbaugh@entradainc.com

Project Description: Church #2

City/State
Collected:

Phone: 804-513-0707
Fax:

Client Project #

Lab Project #

Collected by (print): Ben Bough
Collected by (signature): [Signature]

Site/Facility ID #

P.O. #

Immediately Packed on Ice N ☐ Y ☒

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

No. of Cntrs

Analysis / Container / Preservative

Chain of Custody Page 1 of 2



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



L# 1198122

G242

Acctnum: ENTCONGJCO

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks Sample # (lab only)

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	pH	EC	SAR											
SS1-1	Grab	SS	NA	3/11/20	1025	1	X	X	X											-01
SS1-2					1030															02
SS2-1					1130															03
SS2-2					1135															04
SS3-1					1155															05
SS3-2					1200															06
SS4-1					1220															07
SS4-2					1225															08
SS5-1					1245															09
SS5-2	✓	✓	✓	✓	1250	✓	✓	✓	✓											10

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

Remarks: cci bmiddleton@caerusoilandgas.com

pH Temp

Flow Other

Samples returned via:
☐ UPS ☐ FedEx ☐ Courier

Tracking # 1380 7995 8732

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: <0.00111111

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes ☐ No ☒

HCL/MeOH
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: 14°C Bottles Received: 14

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 3/12/20 Time: 8:30

Hold:

Condition:

NCF / OK

Entrada Consulting Group

240 Mesa Avenue
Grand Junction, CO 81501

Billing Information:

Brett Middleton
Coerus Oil & Gas
143 Diamond Ave
Parachute, CO 81635

Pres
Chk

Analysis / Container / Preservative

Chain of Custody

Page 2 of 2

Report to:

Ben Baugh

Email To:

bbaugh@entradaix.com

Project

Description:

Church #2

City/State

Collected:

Phone: 804-513-0707

Fax:

Client Project #

Lab Project #

Collected by (print):

Ben Baugh

Site/Facility ID #

P.O. #

Collected by (signature):

Quote #

Rush? (Lab MUST Be Notified)

Same Day ☒ Five Day
Next Day ☐ 5 Day (Rad Only)
Two Day ☐ 10 Day (Rad Only)
Three Day ☐

Date Results Needed

Immediately
Packed on Ice N ☐ Y ☒

No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

BS1-1

Grab

SS

NA

3/11/20

1055

1

X

X

X

BS1-2

↓

↓

↓

↓

1100

1

↓

↓

↓

BS2-1

↓

↓

↓

↓

1315

1

↓

↓

↓

BS2-2

↓

↓

↓

↓

1320

↓

↓

↓

↓

* Matrix:

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

Remarks: cci bmiddleton@coerusoilandgas.com

pH Temp

Flow Other

Samples returned via:

UPS FedEx Courier

Tracking # 1380 7995 8732

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes (No)

HCL / MeOH

TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: 14 °C

Bottles Received:

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:

NCF / 64

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