

## Lamkin, Baylen, EMNRD

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**From:** Goetze, Phillip, EMNRD  
**Sent:** Tuesday, March 30, 2021 1:02 PM  
**To:** Andy Rickard  
**Cc:** nwofford@goodnightmidstream.com; Chris Gaddy; David Hines  
**Subject:** RE: Water Sample from Swab test of Sosa 17 SWD#2

Mr. Rickard:

This sample satisfies the COA for the analysis of the formation water. I appreciate your efforts to obtain the sample as this addresses one of the concerns of the EPA has raised with the OCD on the potential classification of portions of the San Andres as protectable under the SDWA. Please make sure that all the proper reports have been filed regarding the well completion so that the well file will be complete. Thank you. PRG

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**From:** Andy Rickard <arickard@cambrianmgmt.com>  
**Sent:** Tuesday, March 30, 2021 12:37 PM  
**To:** Goetze, Phillip, EMNRD <Phillip.Goetze@state.nm.us>  
**Cc:** nwofford@goodnightmidstream.com; Chris Gaddy <cgaddy@cambrianmgmt.com>; David Hines <DAVIDHINES2@msn.com>  
**Subject:** [EXT] Water Sample from Swab test of Sosa 17 SWD#2

See attached

**Andrew E Rickard**  
Project Manager



415 West Wall St., Suite 900  
Midland, TX 79701  
Off: 432-620-9181  
Cell: 432-553-2828



March 30, 2021

ANDY RICKARD  
CAMBRIAN MANAGEMENT, LTD  
P.O. BOX 272  
MIDLAND, TEXAS 79702

RE: SOSA SA 17 SWD #2

Enclosed are the results of analyses for samples received by the laboratory on 03/23/21 9:15.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-20-13. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/ga/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/ga/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene  
Lab Director/Quality Manager

**Analytical Results For:**CAMBRIAN MANAGEMENT, LTD  
P.O. BOX 272  
MIDLAND TEXAS, 79702Project: SOSA SA 17 SWD #2  
Project Number: NONE GIVEN  
Project Manager: ANDY RICKARD  
Fax To: (432) 570-0102Reported:  
30-Mar-21 08:59

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SOSA SA 17 SWD	H210727-01	Water	23-Mar-21 06:30	23-Mar-21 09:15

Cardinal Laboratories

\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 CAMBRIAN MANAGEMENT, LTD  
 P.O. BOX 272  
 MIDLAND TEXAS, 79702

 Project: SOSA SA 17 SWD #2  
 Project Number: NONE GIVEN  
 Project Manager: ANDY RICKARD  
 Fax To: (432) 570-0102

 Reported:  
 30-Mar-21 08:59

**SOSA SA 17 SWD  
 H210727-01 (Water)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

Alkalinity, Bicarbonate	915		5.00	mg/L	1	1030909	GM	24-Mar-21	310.1	
Alkalinity, Carbonate	<1.00		1.00	mg/L	1	1030909	GM	24-Mar-21	310.1	
Chloride*	8900		4.00	mg/L	1	1031702	GM	23-Mar-21	4500-Cl-B	
Conductivity*	27900		1.00	umhos/cm @ 25°C	1	1032307	AC	23-Mar-21	120.1	
pH*	7.01		0.100	pH Units	1	1032307	AC	23-Mar-21	150.1	
Temperature °C	17.0			pH Units	1	1032307	AC	23-Mar-21	150.1	
Resistivity	0.359			Ohms/m	1	1032307	AC	23-Mar-21	120.1	
Specific Gravity @ 60° F	1.013		0.000	[blank]	1	1032308	AC	23-Mar-21	SM 2710F	
Sulfate*	2100		500	mg/L	50	1032309	GM	24-Mar-21	375.4	
TDS*	19000		5.00	mg/L	1	1032305	GM	24-Mar-21	160.1	
Alkalinity, Total*	750		4.00	mg/L	1	1030909	GM	24-Mar-21	310.1	

**Green Analytical Laboratories**
**Total Recoverable Metals by ICP (E200.7)**

Barium*	0.148	0.071	1.00	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	J
Calcium*	958		2.00	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	
Iron*	39.0		1.00	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	
Magnesium*	326		2.00	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	
Potassium*	170		20.0	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	
Sodium*	5380		20.0	mg/L	20	B210679	AES	29-Mar-21	EPA200.7	

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 CMBRIAN MANAGEMENT, LTD  
 P.O. BOX 272  
 MIDLAND TEXAS, 79702

 Project: SOSA SA 17 SWD #2  
 Project Number: NONE GIVEN  
 Project Manager: ANDY RICKARD  
 Fax To: (432) 570-0102

 Reported:  
 30-Mar-21 08:59

**Inorganic Compounds - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1030909 - General Prep - Wet Chem**
**Blank (1030909-BLK1)**

Prepared &amp; Analyzed: 09-Mar-21

Alkalinity, Carbonate	ND	1.00	mg/L							
Alkalinity, Bicarbonate	5.00	5.00	mg/L							
Alkalinity, Total	4.00	4.00	mg/L							

**LCS (1030909-BS1)**

Prepared &amp; Analyzed: 09-Mar-21

Alkalinity, Carbonate	ND	2.50	mg/L				80-120			
Alkalinity, Bicarbonate	318	12.5	mg/L				80-120			
Alkalinity, Total	260	10.0	mg/L	250		104	80-120			

**LCS Dup (1030909-BSD1)**

Prepared &amp; Analyzed: 09-Mar-21

Alkalinity, Carbonate	ND	2.50	mg/L				80-120		20	
Alkalinity, Bicarbonate	330	12.5	mg/L				80-120	3.86	20	
Alkalinity, Total	270	10.0	mg/L	250		108	80-120	3.77	20	

**Batch 1031702 - General Prep - Wet Chem**
**Blank (1031702-BLK1)**

Prepared &amp; Analyzed: 17-Mar-21

Chloride	ND	4.00	mg/L							
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**LCS (1031702-BS1)**

Prepared &amp; Analyzed: 17-Mar-21

Chloride	92.0	4.00	mg/L	100		92.0	80-120			
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**LCS Dup (1031702-BSD1)**

Prepared &amp; Analyzed: 17-Mar-21

Chloride	92.0	4.00	mg/L	100		92.0	80-120	0.00	20	
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**Batch 1032305 - Filtration**
**Blank (1032305-BLK1)**

Prepared: 23-Mar-21 Analyzed: 26-Mar-21

TDS	ND	5.00	mg/L							
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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 CAMBRIAN MANAGEMENT, LTD  
 P.O. BOX 272  
 MIDLAND TEXAS, 79702

 Project: SOSA SA 17 SWD #2  
 Project Number: NONE GIVEN  
 Project Manager: ANDY RICKARD  
 Fax To: (432) 570-0102

 Reported:  
 30-Mar-21 08:59

**Inorganic Compounds - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1032305 - Filtration**
**LCS (1032305-BS1)**

Prepared: 23-Mar-21 Analyzed: 24-Mar-21

TDS	475		mg/L	500		95.0	80-120			
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**Duplicate (1032305-DUP1)**

Source: H210718-01

Prepared: 23-Mar-21 Analyzed: 24-Mar-21

TDS	315	5.00	mg/L		371			16.3	20	
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**Batch 1032307 - General Prep - Wet Chem**
**LCS (1032307-BS1)**

Prepared &amp; Analyzed: 23-Mar-21

pH	7.07		pH Units	7.00		101	90-110			
Conductivity	52200		uS/cm	50000		104	80-120			

**Duplicate (1032307-DUP1)**

Source: H210727-01

Prepared &amp; Analyzed: 23-Mar-21

pH	7.04	0.100	pH Units		7.01			0.427	20	
Conductivity	28200	1.00	umhos/cm @ 25°C		27900			1.21	20	
Resistivity	0.354		Ohms/m		0.359			1.21	20	
Temperature °C	17.0		pH Units		17.0			0.00	200	

**Batch 1032308 - General Prep - Wet Chem**
**Duplicate (1032308-DUP1)**

Source: H210727-01

Prepared &amp; Analyzed: 23-Mar-21

Specific Gravity @ 60° F	1.006	0.000	[blank]		1.013			0.744	20	
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**Batch 1032309 - General Prep - Wet Chem**
**Blank (1032309-BLK1)**

Prepared: 23-Mar-21 Analyzed: 24-Mar-21

Sulfate	ND	10.0	mg/L							
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**Analytical Results For:**

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 P.O. BOX 272  
 MIDLAND TEXAS, 79702

 Project: SOSA SA 17 SWD #2  
 Project Number: NONE GIVEN  
 Project Manager: ANDY RICKARD  
 Fax To: (432) 570-0102

 Reported:  
 30-Mar-21 08:59

**Inorganic Compounds - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1032309 - General Prep - Wet Chem**
**LCS (1032309-BS1)**

Prepared: 23-Mar-21 Analyzed: 24-Mar-21

Sulfate	21.0	10.0	mg/L	20.0		105	80-120			
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**LCS Dup (1032309-BSD1)**

Prepared: 23-Mar-21 Analyzed: 24-Mar-21

Sulfate	20.4	10.0	mg/L	20.0		102	80-120	2.65	20	
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 CAMBRIAN MANAGEMENT, LTD  
 P.O. BOX 272  
 MIDLAND TEXAS, 79702

 Project: SOSA SA 17 SWD #2  
 Project Number: NONE GIVEN  
 Project Manager: ANDY RICKARD  
 Fax To: (432) 570-0102

 Reported:  
 30-Mar-21 08:59

**Total Recoverable Metals by ICP (E200.7) - Quality Control**
**Green Analytical Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch B210679 - Total Rec. 200.7/200.8/200.2**
**Blank (B210679-BLK1)**

Prepared &amp; Analyzed: 29-Mar-21

Iron	ND	0.050	mg/L							
Barium	ND	0.050	mg/L							
Sodium	ND	1.00	mg/L							
Calcium	ND	0.100	mg/L							
Potassium	ND	1.00	mg/L							
Magnesium	ND	0.100	mg/L							

**LCS (B210679-BS1)**

Prepared &amp; Analyzed: 29-Mar-21

Sodium	3.13	1.00	mg/L	3.24		96.6	85-115			
Potassium	7.83	1.00	mg/L	8.00		97.8	85-115			
Magnesium	20.0	0.100	mg/L	20.0		100	85-115			
Iron	3.88	0.050	mg/L	4.00		97.1	85-115			
Calcium	3.90	0.100	mg/L	4.00		97.4	85-115			
Barium	1.94	0.050	mg/L	2.00		96.9	85-115			

**LCS Dup (B210679-BSD1)**

Prepared &amp; Analyzed: 29-Mar-21

Calcium	3.97	0.100	mg/L	4.00		99.3	85-115	1.88	20	
Magnesium	20.4	0.100	mg/L	20.0		102	85-115	1.86	20	
Barium	1.94	0.050	mg/L	2.00		97.1	85-115	0.111	20	
Potassium	7.95	1.00	mg/L	8.00		99.4	85-115	1.59	20	
Sodium	3.15	1.00	mg/L	3.24		97.1	85-115	0.590	20	
Iron	3.95	0.050	mg/L	4.00		98.8	85-115	1.83	20	

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Celey D. Keene, Lab Director/Quality Manager

### Notes and Definitions

- J Estimated concentration. Analyte concentration between MDL and RL.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM450Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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Celey D. Keene, Lab Director/Quality Manager



**CARDINAL LABORATORIES**  
**SCALE INDEX WATER ANALYSIS REPORT**

Company : CAMBRIAN MANAGEMENT  
 Lease Name : SOSA SA 17 SWD #2  
 Well Number : SOSA SA17 SWD (H210727-01)  
 Location : EUNICE, NM

Date Sampled : 03/23/21  
 Company Rep. : ANDY RICKARD

**ANALYSIS**

1. pH	7.01	
2. Specific Gravity @ 60/60 F.	1.0130	
3. CaCO3 Saturation Index @ 80 F.	+0.835	'Calcium Carbonate Scale Possible'
@ 140 F.	+1.685	'Calcium Carbonate Scale Possible'

**Dissolved Gasses**

4. Hydrogen Sulfide	ND	PPM
5. Carbon Dioxide	ND	PPM
6. Dissolved Oxygen	ND	PPM

**Cations**

		/	Eq. Wt.	=	MEQ/L
7. Calcium (Ca++)	958.00	/	20.1	=	47.66
8. Magnesium (Mg++)	326.00	/	12.2	=	26.72
9. Sodium (Na+)	5,380	/	23.0	=	234.33
10. Barium (Ba++)	0.148	/	68.7	=	0.00

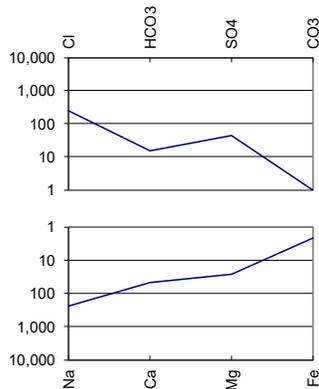
**Anions**

11. Hydroxyl (OH-)	0	/	17.0	=	0.00
12. Carbonate (CO3=)	0	/	30.0	=	0.00
13. Bicarbonate (HCO3-)	915	/	61.1	=	14.98
14. Sulfate (SO4=)	2,100	/	48.8	=	43.03
15. Chloride (Cl-)	8,900	/	35.5	=	250.70

**Other**

16. Total Iron (Fe)	39.000	/	18.2	=	2.14
17. Total Dissolved Solids	19,000				
18. Total Hardness As CaCO3	3,735.0				
19. Calcium Sulfate Solubility @ 90 F.	3,705				
20. Resistivity (Measured)	0.359	Ohm/Meters	@ 77	Degrees (F)	

Logarithmic Water Pattern



**PROBABLE MINERAL COMPOSITION**

COMPOUND	Eq. Wt.	X	MEQ/L	=	mg/L
Ca(HCO3)2	81.04	X	14.98	=	1,214
CaSO4	68.07	X	32.69	=	2,225
CaCl2	55.50	X	0.00	=	0
Mg(HCO3)2	73.17	X	0.00	=	0
MgSO4	60.19	X	0.00	=	0
MgCl2	47.62	X	26.72	=	1,272
NaHCO3	84.00	X	0.00	=	0
NaSO4	71.03	X	10.35	=	735
NaCl	58.46	X	223.98	=	13,094

ND = Not Determined