

January 31, 2020
SCS Project No. 16218157.00

Mr. Darryl Sparks
Compliance Manager
NAES Corporation
2161 Rattlesnake Road
Riesel, Texas 76682

Subject: Sandy Creek Energy Station
McLennan County, Texas
2019 Annual Groundwater Monitoring and Corrective Actions Report Submittal

Dear Mr. Sparks:

SCS Engineers (SCS) is pleased to submit the December 2019 Annual Groundwater Monitoring and Corrective Actions Report to the Sandy Creek Energy Station (SCES), in accordance with Title 40, Code of Federal Regulation (CFR) Part §257.105(h)(6), and the site Groundwater Sampling and Analysis Plan (GWSAP), prepared by SCS, dated March 2, 2016.

Please contact James Lawrence at (817) 358-6106 if you have comments or require additional information.

Sincerely,



Tyson Milbrand
Staff Professional
SCS ENGINEERS
TBPE Registration No. F-3407



Brett DeVries, Ph.D., P.E.
Project Professional
SCS ENGINEERS

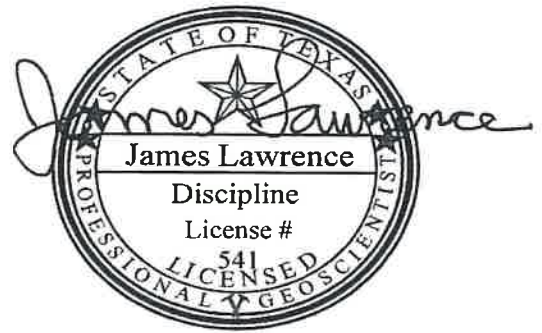


James Lawrence, P.G.
Project Director
SCS ENGINEERS

Attachment: 2019 Annual Groundwater Monitoring and Corrective Actions Report



Brett DeVries
1/30/2020



1.31.2020





2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

Sandy Creek Energy Station
McLennan County, Texas

Prepared For:

Sandy Creek Energy Station
2161 Rattlesnake Road
Riesel, Texas 76682

SCS ENGINEERS

SCS Project 16218157.00 | January 31, 2020

1901 Central Drive, Suite 550
Bedford, TX 76021
817-571-2288

Table of Contents

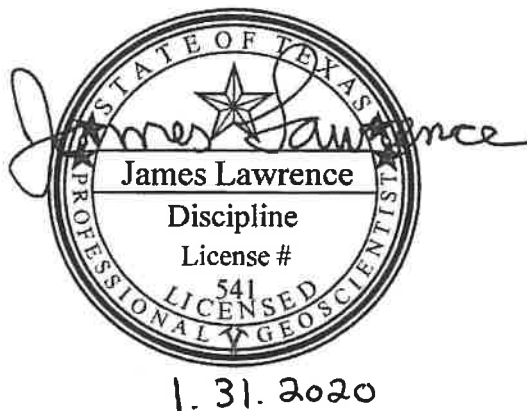
Section	Page
1.0 Introduction and Background.....	1
2.0 Groundwater Monitoring Summary.....	2
2.1 Groundwater Monitoring System.....	2
2.2 Summary of 2019 Sampling Events	2
3.0 Results and Statistical Analysis.....	3
4.0 Groundwater Flow Rate And Direction Calculations	5
5.0 Recommendations	6

Figures

Figure 1. Monitoring Well Location Map	7
--	---

Appendices

Appendix A:	2019 Groundwater Monitoring Field Forms
Appendix B:	2019 Laboratory Report with Chain of Custody
Appendix C:	Historical Analytical Data
Appendix D:	Time Series Graphs
Appendix E:	Alternate Source Demonstrations



1.0 INTRODUCTION AND BACKGROUND

SCS Engineers (SCS) is submitting this 2019 Annual Groundwater Monitoring and Corrective Action Report for the Sandy Creek Energy Station (SCES). This report is submitted in accordance with Coal Combustion Residual Rule (CCR) 40 CFR §257.105(h)(6) and the site Groundwater Sampling and Analysis Plan (GWSAP) prepared by SCS, dated March 2, 2016. This report includes results for two semiannual detection monitoring events, conducted in June 2019 and December 2019.

SCES is a pulverized coal-fired electric generation facility which operates a landfill for disposal of dry scrubber ash and bottom ash generated during the coal combustion process at the facility. Incidental wastes generated during the operation of the facility may also be disposed in the landfill, as described in the initial registration notification to TCEQ and the most recent version of the Operations Plan for the facility. The landfill is currently comprised of two CCR disposal cells, Cells 1 and 2, which commenced receiving waste in early 2013 and October 2014, respectively. The approximate area of Cells 1 and 2 are 10.0 and 14.3 acres, respectively.

Sampling of groundwater monitoring wells is conducted in accordance with 40 CFR §257.93 and the GWSAP. Initial monitoring of four wells (MW-1, MW-2, MW-3, and BW-1; as depicted on **Figure 1**) was performed for eight consecutive quarters in accordance with 40 CFR §257.94(b) (i.e., eight independent samples were collected for each well). The initial monitoring described above commenced in December 2015 and was completed in August 2017. The constituents monitored during the required background monitoring period and the first semiannual detection monitoring event included 18 inorganic compounds, total dissolved solids, radium-226, and radium-228, while the constituents monitored in subsequent events and during the December 2019 semiannual detection monitoring event included Appendix III constituents only, in accordance with 40 CFR §257.

2.0 GROUNDWATER MONITORING SUMMARY

2.1 GROUNDWATER MONITORING SYSTEM

The current groundwater monitoring system at the SCES landfill consists of four wells (see Table 1 below). One upgradient (BW-1) and three downgradient (MW-1, MW-2, & MW-3). All four wells are currently in detection monitoring. Figure 1 shows monitoring well locations at SCES.

Table 1. Sandy Creek Energy Station Groundwater Monitoring System

Well Name (U/D) ¹	Completion Date	Status	Top of Casing Elevation (ft msl) ²	Well Depth (ft bgs) ²	Screen Interval (ft bgs) ²	Water Level Elevation (ft msl on 12/10/2019)
MW-1 (D)	9/21/2015	Detection	465.87	34.23	23.90 - 33.90	453.99
MW-2 (D)	9/23/2015	Detection	442.15	19.63	9.30 - 19.30	430.19
MW-3 (D)	9/1/2010	Detection	430.06	16.23	5.98 - 15.98	419.87
BW-1 (U)	9/22/2015	Detection	485.57	38.63	28.30 - 38.30	467.39

¹ (U) = upgradient, (D) = downgradient; ² Top of Casing Elevation, Well Depth, and Screen Interval information obtained from Table 1 – Monitoring Well and Piezometer Construction Details and Groundwater Elevations prepared by Geosyntec Consultants, dated March 11, 2016; **ft msl** = feet above mean sea level; **ft bgs** = feet below ground surface

2.2 SUMMARY OF 2019 SAMPLING EVENTS

All sampling events followed the groundwater sampling and laboratory analysis procedures outlined in the GWSAP. A duplicate sample was collected from one well during each event for Quality Assurance & Quality Control (QA/QC) purposes. All monitoring wells were sampled and analyzed for 40 CFR §257 Appendix III constituents, in accordance with 40 CFR §257.94(a).

June 2019 – Semiannual Detection Monitoring Event

All four wells (MW-1, MW-2, MW-3, and BW-1) were purged and sampled on June 24, 2019 using the conventional purge and sampling method with disposable PVC bailers. The results of the sampling were provided to the SCES in a report dated September 6, 2019. Field forms and laboratory results are provided in **Appendices A & B**, respectively, and summarized in **Table 2**.

December 2019 – Semiannual Detection Monitoring Event

All four wells (MW-1, MW-2, MW-3, and BW-1) were purged and sampled on December 10, 2019 using the conventional purge and sampling method with disposable PVC bailers. Field forms and laboratory results are provided in **Appendices A & B**, respectively, and summarized in **Table 2**.

3.0 RESULTS AND STATISTICAL ANALYSIS

A summary of June 2019 and December 2019 laboratory results and statistical limits in each well-constituent pair is provided in **Table 2**. Time series graphs of Appendix III constituent concentrations are provided in **Appendix D**. Statistical limits were determined in accordance with 40 CFR §257.93(f-g) and the GWSAP using the software program Sanitas®. Statistical limits were determined in the 2017 Annual Groundwater Monitoring and Corrective Action report, and were presented using Shewhart-CUSUM control charts, non-parametric prediction limits, or parametric prediction limits as deemed appropriate by background data distributions. EPA primary drinking water Maximum Contaminant Levels (MCLs) are also presented in **Table 2** for comparison to current data.

Table 2. Sandy Creek Energy Station 2019 Sampling Results and Statistical Limits

MW-ID	Constituent	Lab Results June 2019	Lab Results Dec 2019	MCL	Statistical Limit*
MW-1	Boron (mg/L)	1.1	1.10	n/a	2.6
	Calcium (mg/L)	492	534	n/a	1030
	Chloride (mg/L)	169	192	n/a	402
	pH at 25 °C	7.2	7.43	n/a	6.136 - 8.289
	Sulfate (mg/L)	2430	2420	n/a	3402
	TDS (mg/L)	4030	3720	n/a	6765
	Fluoride (mg/L)	0.73	0.236	4	0.4
MW-2	Boron (mg/L)	1.7	1.48	n/a	2.4
	Calcium (mg/L)	656	660	n/a	874.4
	Chloride (mg/L)	2420	2180	n/a	3336
	pH at 25 °C	7.0	6.93	n/a	6.7 - 7.5
	Sulfate (mg/L)	3480	2620	n/a	4635
	TDS (mg/L)	9560	8120	n/a	23969
	Fluoride (mg/L)	<0.18	0.229	4	2.831
MW-3	Boron (mg/L)	0.99	1.26	n/a	1.2
	Calcium (mg/L)	452	572	n/a	688.1
	Chloride (mg/L)	306	345	n/a	606.9
	pH at 25 °C	6.6	6.67	n/a	5.71 - 8.09
	Sulfate (mg/L)	3130	3140	n/a	4447
	TDS (mg/L)	5740	5830	n/a	9375
	Fluoride (mg/L)	<0.18	0.137	4	2.201

Table 2. Sandy Creek Energy Station 2019 Sampling Results and Statistical Limits

MW-ID	Constituent	Lab Results June 2019	Lab Results Dec 2019	MCL	Statistical Limit*
BW-1	Boron (mg/L)	3.1	2.98	n/a	6.787
	Calcium (mg/L)	564	591	n/a	723.7
	Chloride (mg/L)	1160	1150	n/a	1540
	pH at 25 °C	7.1	7.11	n/a	6.8 - 9.5
	Sulfate (mg/L)	2930	2830	n/a	3884
	TDS (mg/L)	6380	6300	n/a	10119
	Fluoride (mg/L)	0.90	0.390	4	2.356

* Calculated in 2017 Annual Report

No constituents were detected in any wells or Quality Assurance/Quality Control (QA/QC) samples at concentrations exceeding federally-promulgated maximum concentration limits (MCLs) in 2019. Unconfirmed statistically significant increases (SSI) were determined for fluoride in MW-1 (June 2019) and boron in MW-3 (December 2019). In accordance with 40 CFR §257.94(e), alternate source demonstrations (ASDs) are provided in **Appendix E**.

4.0 GROUNDWATER FLOW RATE AND DIRECTION CALCULATIONS

In accordance with 40 CFR Part §257.93(c), the groundwater flow rate and direction in the uppermost aquifer in the area of the existing groundwater monitoring wells were calculated.

Flow Rate Calculation Using December 2019 Data

$$V_a = \frac{KI}{7.5N} \quad (\text{Driscoll, 1986, Groundwater and Wells})$$

Where:

- V_a = Actual Velocity of Groundwater Flow (ft/day)
- K = Hydraulic Conductivity (gpd/ft²)
- I = Hydraulic Gradient (ft/ft)
- N = Effective Porosity (%)

Then:

- K = 2.0×10^{-4} cm/sec (geometric mean hydraulic conductivity obtained from slug tests performed by Geosyntec in 2010)

Find K equivalent in units of gpd/ft²:

$$(1 \text{ cm/sec} = 21,200 \text{ gallons/day/ft}^2)$$

$$2.0 \times 10^{-4} \text{ cm/sec} \times 21,200 \text{ gallons/day/ft}^2 = 4.24 \text{ gpd/ft}^2$$

Find I: BW-1 elevation – MW-3 elevation: 467.39 ft – 419.87 ft = 0.0202 ft/ft
distance between wells: 2,350 ft

- I = 0.0202 ft/ft (ave. gradient across the site, from December 2019 water levels)
- N = 6% (representative effective porosity for clay from Morris and Johnson, 1967)

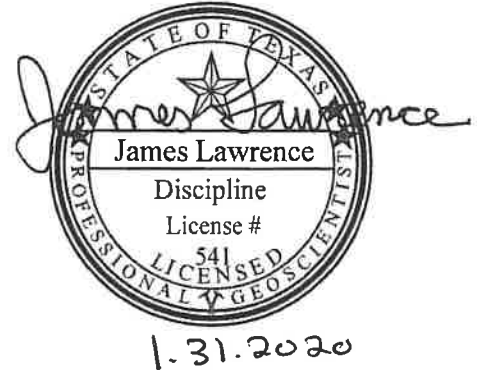
Therefore:

$$V_a = \frac{4.24 \text{ gpd/ft}^2 \times (0.0202 \text{ ft/ft})}{7.5 (0.06)} = 0.191 \text{ ft/day}$$

$$(0.191 \text{ ft/day})(365 \text{ days/year}) = 69 \text{ ft/year}$$

Conclusion

The December 2019 site groundwater flow rate is **69 ft/year**. The gradient was measured using BW-1 and MW-3. The December 2019 groundwater flow direction is to the west-southwest. The groundwater flow rate and direction are consistent with conditions previously observed at the site. See the attached groundwater gradient map for details, provided in accordance with 40 CFR Part §257.93(c).




5.0 RECOMMENDATIONS

As outlined in the attached ASDs for fluoride in MW-1 and boron in MW-3, no confirmed SSIs were identified for any Appendix III constituents during 2019 detection monitoring at the SCES. SCS recommends that the facility remain in semiannual detection monitoring, in accordance with 40 CFR §257.94.

Due to the lack of confirmed SSIs for Appendix III constituents during 2019 detection monitoring, the facility will continue monitoring for all constituents listed in 40 CFR §257 Appendix III during semiannual groundwater monitoring events, in accordance with 40 CFR §257.94(a). The Appendix IV constituent list will be analyzed if any confirmed statistical exceedances of the Appendix III list are indicated in future events. The next planned groundwater monitoring event is a semiannual detection monitoring event scheduled for June 2020.

Figure 1. Monitoring Well Location Map



Appendix A

2019 Groundwater Monitoring Field Forms

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-1
3. Date of sampling: 6/24/2019

Name of sampler: Doug Steen
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/21/2015

Most recent previous sampling: 12/13/2018
Date of water level measurements: 6/24/2019
Datum reference point: Top of Casing
Datum elevation*: 465.87
Depth to water(below datum)*: 10.49
4. Water level elevation*: 455.38

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 2.0
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☒ yes ☐ no (check one)
9. How long before sampling? 2
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 7.22
15. Spec. cond. 4.142
17. Temp. 22.90
19. Turbidity 21.58

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name Pace Analytical Services, Inc.
Address: 400 W. Bethany Drive, Suite 190, Allen, TX 75013

Phone: (972) 727-1123

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-2
3. Date of sampling: 6/24/2019

Name of sampler: Doug Steen
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/23/2015

Most recent previous sampling: 12/13/2018
Date of water level measurements: 6/24/2019
Datum reference point: Top of Casing
Datum elevation*: 442.15
Depth to water(below datum)*: 9.87
4. Water level elevation*: 432.28

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 2.7
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☒ yes ☐ no (check one)
9. How long before sampling? 2
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 6.87
15. Spec. cond. 10.77
17. Temp. 21.05
19. Turbidity 9.87

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name Pace Analytical Services, Inc.
Address: 400 W. Bethany Drive, Suite 190, Allen, TX 75013

Phone: (972) 727-1123

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-3
3. Date of sampling: 6/24/2019

Name of sampler: Doug Steen
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/1/2010

Most recent previous sampling: 12/13/2018
Date of water level measurements: 6/24/2019
Datum reference point: Top of Casing
Datum elevation*: 430.06
Depth to water(below datum)*: 7.06
4. Water level elevation*: 423.00

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 3.2
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☐ yes ☒ no (check one)
9. How long before sampling? 2
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 6.70
15. Spec. cond. 5.659
17. Temp. 20.89
19. Turbidity 10.3

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name Pace Analytical Services, Inc.
Address: 400 W. Bethany Drive, Suite 190, Allen, TX 75013

Phone: (972) 727-1123

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: BW-1
3. Date of sampling: 6/24/2019

Name of sampler: Doug Steen
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/22/2015

Most recent previous sampling: 12/13/2018
Date of water level measurements: 6/24/2019
Datum reference point: Top of Casing
Datum elevation*: 485.57
Depth to water(below datum)*: 18.20
4. Water level elevation*: 467.37

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 3.2
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☐ yes ☒ no (check one)
9. How long before sampling? 2
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 7.21
15. Spec. cond. 7.319
17. Temp. 22.10
19. Turbidity 157

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name Pace Analytical Services, Inc.
Address: 400 W. Bethany Drive, Suite 190, Allen, TX 75013

Phone: (972) 727-1123

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: DUP
3. Date of sampling: 6/24/2019

Name of sampler: Doug Steen
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: N/A
Installation date: N/A

Most recent previous sampling: N/A
Date of water level measurements: N/A
Datum reference point: Top of Casing
Datum elevation*: N/A
Depth to water(below datum)*: N/A
4. Water level elevation*: N/A

5. Purging/Sampling method: N/A (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☐ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: N/A
7. Was the well dry before purging? ☐ yes ☐ no (check one)
8. Was the well dry after purging? ☐ yes ☐ no (check one)
9. How long before sampling? N/A
10. Unit of measure? N/A (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Duplicate
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH N/A
15. Spec. cond. N/A
17. Temp. N/A
19. Turbidity N/A

16. ☐ mS/cm
18. ☐ F or ☐ C (check one)
20. ☐ NTU

Laboratory:

21. Name Pace Analytical Services, Inc.
Address: 400 W. Bethany Drive, Suite 190, Allen, TX 75013

Phone: (972) 727-1123

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-1
3. Date of sampling: 12/10/2019

Name of sampler: Tyson Milbrand
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/21/2015

Most recent previous sampling: 6/24/2019
Date of water level measurements: 12/10/2019
Datum reference point: Top of Casing
Datum elevation*: 465.87
Depth to water(below datum)*: 11.88
4. Water level elevation*: 453.99

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 2.0
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☒ yes ☐ no (check one)
9. How long before sampling? 1
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 8.46
15. Spec. cond. 4.278
17. Temp. 19.27
19. Turbidity 64

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name ALS Houston
Address: 10450 Stancliff Rd #210, Houston, TX 77099

Phone: (281) 530-5656

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-2
3. Date of sampling: 12/10/2019

Name of sampler: Tyson Milbrand
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/23/2015

Most recent previous sampling: 6/24/2019
Date of water level measurements: 12/10/2019
Datum reference point: Top of Casing
Datum elevation*: 442.15
Depth to water(below datum)*: 11.96
4. Water level elevation*: 430.19

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 2.7
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☒ yes ☐ no (check one)
9. How long before sampling? 1
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 7.84
15. Spec. cond. 8.676
17. Temp. 18.56
19. Turbidity 19.1

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name ALS Houston
Address: 10450 Stancliff Rd #210, Houston, TX 77099

Phone: (281) 530-5656

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: MW-3
3. Date of sampling: 12/10/2019

Name of sampler: Tyson Milbrand
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/1/2010

Most recent previous sampling: 6/24/2019
Date of water level measurements: 12/10/2019
Datum reference point: Top of Casing
Datum elevation*: 430.06
Depth to water(below datum)*: 10.19
4. Water level elevation*: 419.87

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 2.5
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☐ yes ☒ no (check one)
9. How long before sampling? 1
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 7.93
15. Spec. cond. 6.189
17. Temp. 17.24
19. Turbidity 34.3

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name ALS Houston
Address: 10450 Stancliff Rd #210, Houston, TX 77099

Phone: (281) 530-5656

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: BW-1
3. Date of sampling: 12/10/2019

Name of sampler: Tyson Milbrand
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: Good
Installation date: 9/22/2015

Most recent previous sampling: 6/24/2019
Date of water level measurements: 12/10/2019
Datum reference point: Top of Casing
Datum elevation*: 485.57
Depth to water(below datum)*: 18.18
4. Water level elevation*: 467.39

5. Purging/Sampling method: Bailer (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☒ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: 3.0
7. Was the well dry before purging? ☐ yes ☒ no (check one)
8. Was the well dry after purging? ☐ yes ☒ no (check one)
9. How long before sampling? 1
10. Unit of measure? hours (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment

12. Sample schedule: Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual

13. Sample type: Regular
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH 7.95
15. Spec. cond. 6.612
17. Temp. 17.90
19. Turbidity 214

16. ☒ mS/cm
18. ☐ F or ☒ C (check one)
20. ☒ NTU

Laboratory:

21. Name ALS Houston
Address: 10450 Stancliff Rd #210, Houston, TX 77099

Phone: (281) 530-5656

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).

Groundwater Monitoring Form

Facility name: Sandy Creek Energy Station
Permittee: Sandy Creek Energy Associates, L.P.
County: McLennan

1. Facility Type: Power Station
2. Monitor well no.: DUP
3. Date of sampling: 12/10/2019

Name of sampler: Tyson Milbrand
Affiliation of sampler: SCS Engineers
If split sampled, with whom? N/A
Integrity of well: N/A
Installation date: N/A

Most recent previous sampling: N/A
Date of water level measurements: N/A
Datum reference point: Top of Casing
Datum elevation*: N/A
Depth to water(below datum)*: N/A
4. Water level elevation*: N/A

5. Purging/Sampling method: N/A (Enter bailer or pump)
Were low-flow methods used? ☐ yes ☐ no (check one)
If yes, what volume was purged? N/A gal.
6. Well volumes purged: N/A
7. Was the well dry before purging? ☐ yes ☐ no (check one)
8. Was the well dry after purging? ☐ yes ☐ no (check one)
9. How long before sampling? N/A
10. Unit of measure? N/A (Enter value as days, hours, or mins.)

11. Sample event: Detection
- Background - Corrective Action
- Detection - Other
- Assessment
12. Sample schedule: Semi-Annual
- Quarterly - Fourth Year
- Semi-Annual - Other
- Annual
13. Sample type: Duplicate
- Regular - Split
- Duplicate - Other
- Resample

Field Measurements:

14. pH N/A
15. Spec. cond. N/A
17. Temp. N/A
19. Turbidity N/A


16. ☐ mS/cm
18. ☐ F or ☐ C (check one)
20. ☐ NTU

Laboratory:

21. Name ALS Houston
Address: 10450 Stancliff Rd #210, Houston, TX 77099

Phone: (281) 530-5656

* Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (msl).



Appendix B

2019 Laboratory Reports with Chain of Custody Forms



Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

July 03, 2019

Jim Lawrence
SCS Engineers
1901 Central Dr.
Suite 550
Bedford, TX 76021

RE: Pace Project 75110801
Project ID: Sandy Creek GW

Dear Jim Lawrence:

Enclosed are the analytical results for sample(s) received by the laboratory on June 25, 2019. Results reported herein conform to the most current NELAP standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Leslie Underwood
leslie.underwood@pacelabs.com
(972)727-1123

Laboratory Certifications

Pace Dallas: Texas T104704232-18-26

Pace Dallas: Texas Certification #: T104704232-18-26



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

07/03/2019 16:47:17



Sample Cross Reference

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Pace Project 75110801

Client: SCS Engineers
Project ID: Sandy Creek GW

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
BW-1	75110801001	Water	06/24/2019 13:45	06/25/2019 08:10
MW-1	75110801002	Water	06/24/2019 14:15	06/25/2019 08:10
MW-2	75110801003	Water	06/24/2019 14:40	06/25/2019 08:10
MW-3	75110801004	Water	06/24/2019 15:10	06/25/2019 08:10
DUP	75110801005	Water	06/24/2019 15:10	06/25/2019 08:10



Project Narrative

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Pace Project 75110801

Holding Times:

These holding times were exceeded due to sample receipt or re-extraction after the holding time expired.

Sample 75110801001 analysis 9040 pH

Sample 75110801002 analysis 9040 pH

Sample 75110801003 analysis 9040 pH

Sample 75110801004 analysis 9040 pH

Sample 75110801005 analysis 9040 pH

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

MS or MSD recoveries outside of QC limits are qualified in the Report of Quality Control section.

Surrogate:

All surrogate recoveries were within QC limits.

Appendix A
LABORATORY DATA PACKAGE COVER PAGE

This data package is for Job No. 75110801 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

- | |
|---|
| X |
| X |
| X |
- R1 - Field chain-of-custody documentation;
- | |
|---|
| X |
|---|
- R2 - Sample identification cross-reference;
- | |
|---|
| X |
|---|
- R3 - Test reports (analytical data sheets) for each environmental sample that includes:
- a. Items consistent with NELAC Chapter 5,
 - b. Dilution factors,
 - c. Preparation methods,
 - d. Cleanup methods, and
 - e. If required for the project, tentatively identified compounds (TICs).
- | |
|---|
| X |
|---|
- R4 - Surrogate recovery data including:
- a. Calculated recovery (%R), and
 - b. The laboratory's surrogate QC limits.
- | |
|---|
| X |
|---|
- R5 - Test reports/summary forms for blank samples;
- | |
|---|
| X |
|---|
- R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
- a. LCS spiking amounts,
 - b. Calculated %R for each analyte, and
 - c. The laboratory's LCS QC limits.
- | |
|---|
| X |
|---|
- R7 - Test reports/summary forms for matrix spike/matrix spike duplicates (MS/MSDs) including:
- a. Samples associated with the MS/MSD clearly identified,
 - b. MS/MSD spiking amounts,
 - c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d. Calculated %Rs and relative percent differences, and
 - e. The laboratory's MS/MSD QC limits.
- | |
|---|
| X |
|---|
- R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
- a. The amount of analyte measured in the duplicate,
 - b. The calculated RPD, and
 - c. The laboratory's QC limits for analytical duplicated.
- | |
|---|
| X |
|---|
- R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte and
- | |
|---|
| X |
|---|
- R10 - Other problems or anomalies.

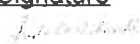
The exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by [X] TCEQ on 05/02/2018

Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)
Leslie Underwood

Signature


Official Title (Printed)
Project Manager

Date
07/03/2019



Sample Results

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Client: SCS Engineers

Client ID: BW-1

Lab ID: 75110801001

Collected: 06/24/2019 13:45

Moisture: N/A

Received 06/25/2019 08:10

Project ID: Sandy Creek GW

Pace Project 75110801

Matrix: Water

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
6010 Metals, Total	Analytical Method: EPA 6010				Preparation Method: EPA 3010					
Boron	1	3.1		mg/L	0.10	0.017	07/02/2019 15:35	07/01/2019 08:20	120770	75ICP1
Calcium	1	564	M1	mg/L	1.0	0.093	07/02/2019 00:53	07/01/2019 08:20	120770	75ICP1
9040 pH	Analytical Method: EPA 9040									
pH at 25 Degrees C	1	7.1	H3,H6	Std. Units	0.10	0.10	07/01/2019 12:39		120808	75WETP
9056 IC Anions	Analytical Method: EPA 9056A									
Chloride	100	1160		mg/L	80.0	35.8	07/01/2019 14:48		120798	75WTA4
Fluoride	1	0.90		mg/L	0.50	0.18	07/01/2019 14:30		120798	75WTA4
Sulfate	1000	2930		mg/L	700	393	07/01/2019 15:06		120798	75WTA4
2540C Total Dissolved Solids	Analytical Method: SM 2540C									
Total Dissolved Solids	1	6380		mg/L	500	500	06/27/2019 10:41		120600	75BL17



Sample Results

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Client: SCS Engineers

Client ID: MW-1

Lab ID: 75110801002

Collected: 06/24/2019 14:15

Moisture: N/A

Received 06/25/2019 08:10

Project ID: Sandy Creek GW

Pace Project 75110801

Matrix: Water

Parameters	DF	Results	Qual	Units	MQL	SDL	Analysis Date	Prep Date	Batch	Instr.
6010 Metals, Total	Analytical Method: EPA 6010				Preparation Method: EPA 3010					
Boron	1	1.1		mg/L	0.10	0.017	07/02/2019 15:41	07/01/2019 08:20	120770	75ICP1
Calcium	1	492		mg/L	1.0	0.093	07/02/2019 00:58	07/01/2019 08:20	120770	75ICP1
9040 pH	Analytical Method: EPA 9040									
pH at 25 Degrees C	1	7.2	H3,H6	Std. Units	0.10	0.10	07/01/2019 12:41		120808	75WETP
9056 IC Anions	Analytical Method: EPA 9056A									
Chloride	100	169		mg/L	80.0	35.8	07/01/2019 16:53		120798	75WTA4
Fluoride	1	0.73		mg/L	0.50	0.18	07/01/2019 15:23		120798	75WTA4
Sulfate	1000	2430		mg/L	700	393	07/01/2019 17:46		120798	75WTA4
2540C Total Dissolved Solids	Analytical Method: SM 2540C									
Total Dissolved Solids	1	4030		mg/L	125	125	06/27/2019 10:41		120600	75BL17



Sample Results

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Client: SCS Engineers

Client ID: MW-2

Lab ID: 75110801003

Collected: 06/24/2019 14:40

Moisture: N/A

Received 06/25/2019 08:10

Project ID: Sandy Creek GW

Pace Project 75110801

Matrix: Water

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
6010 Metals, Total	Analytical Method: EPA 6010				Preparation Method: EPA 3010					
Boron	1	1.7		mg/L	0.10	0.017	07/02/2019 15:46	07/01/2019 08:20	120770	75ICP1
Calcium	1	656		mg/L	1.0	0.093	07/02/2019 01:04	07/01/2019 08:20	120770	75ICP1
9040 pH	Analytical Method: EPA 9040									
pH at 25 Degrees C	1	7.0	H3,H6	Std. Units	0.10	0.10	07/01/2019 12:45		120808	75WETP
9056 IC Anions	Analytical Method: EPA 9056A									
Chloride	1000	2420		mg/L	800	358	07/01/2019 18:58		120798	75WTA4
Fluoride	1	< 0.18		mg/L	0.50	0.18	07/01/2019 18:40		120798	75WTA4
Sulfate	1000	3480		mg/L	700	393	07/01/2019 18:58		120798	75WTA4
2540C Total Dissolved Solids	Analytical Method: SM 2540C									
Total Dissolved Solids	1	9560		mg/L	500	500	06/27/2019 10:42		120600	75BL17



Sample Results

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Client: SCS Engineers

Client ID: MW-3

Lab ID: 75110801004

Collected: 06/24/2019 15:10

Moisture: N/A

Received 06/25/2019 08:10

Project ID: Sandy Creek GW

Pace Project 75110801

Matrix: Water

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
6010 Metals, Total	Analytical Method: EPA 6010				Preparation Method: EPA 3010					
Boron	1	0.99		mg/L	0.10	0.017	07/02/2019 15:52	07/01/2019 08:20	120770	75ICP1
Calcium	1	452		mg/L	1.0	0.093	07/02/2019 01:09	07/01/2019 08:20	120770	75ICP1
9040 pH	Analytical Method: EPA 9040									
pH at 25 Degrees C	1	6.6	H3,H6	Std. Units	0.10	0.10	07/01/2019 12:47		120808	75WETP
9056 IC Anions	Analytical Method: EPA 9056A									
Chloride	50	306	M6	mg/L	40.0	17.9	07/02/2019 19:25		120880	75WTA4
Fluoride	1	< 0.18		mg/L	0.50	0.18	07/02/2019 18:32		120880	75WTA4
Sulfate	500	3130		mg/L	350	196	07/02/2019 20:55		120880	75WTA4
2540C Total Dissolved Solids	Analytical Method: SM 2540C									
Total Dissolved Solids	1	5740		mg/L	250	250	06/27/2019 10:42		120600	75BL17



Sample Results

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Client: SCS Engineers

Client ID: DUP

Lab ID: 75110801005

Moisture: N/A

Project ID: Sandy Creek GW

Pace Project 75110801

Collected: 06/24/2019 15:10

Received 06/25/2019 08:10

Matrix: Water

Parameters	DF	Results	Qual	Units	ML	SDL	Analysis Date	Prep Date	Batch	Instr.
6010 Metals, Total	Analytical Method: EPA 6010				Preparation Method: EPA 3010					
Boron	1	3.0		mg/L	0.10	0.017	07/02/2019 15:57	07/01/2019 08:20	120770	75ICP1
Calcium	1	554		mg/L	1.0	0.093	07/02/2019 01:15	07/01/2019 08:20	120770	75ICP1
9040 pH	Analytical Method: EPA 9040									
pH at 25 Degrees C	1	7.1	H3,H6	Std. Units	0.10	0.10	07/01/2019 12:49		120808	75WETP
9056 IC Anions	Analytical Method: EPA 9056A									
Chloride	100	1100		mg/L	80.0	35.8	07/02/2019 22:06		120880	75WTA4
Fluoride	1	0.62		mg/L	0.50	0.18	07/02/2019 21:48		120880	75WTA4
Sulfate	500	2970		mg/L	350	196	07/02/2019 22:24		120880	75WTA4
2540C Total Dissolved Solids	Analytical Method: SM 2540C									
Total Dissolved Solids	1	6340		mg/L	500	500	06/27/2019 10:42		120600	75BL17



Quality Control

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Batch: 120770
Method: EPA 6010
Prep EPA 3010

Pace Project No.: 75110801
Instrument ID: 75ICP1

Blank: 544942

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Boron	1	U	<0.017	mg/L	0.10	0.017	07/02/2019 14:12	07/01/2019 08:20
Calcium	1	U	<0.093	mg/L	1.0	0.093	07/02/2019 14:12	07/01/2019 08:20

Laboratory Control Sample: 544943

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Boron	1	0.99	mg/L	99	88-111	
Calcium	10	9.4	mg/L	94	87-112	

Matrix Spike: 544944

Matrix Spike Duplicate: 544945

Original for Sample: Project sample BW-1

Parameters	Original Result	MS Spk	MSD Spk	MS Result	MSD Result	Units	MS %Rec	MSD %Rec	% Rec Limits	RPD	Max RPD	Quals
Boron	3.1	1	1	4.1	4.0	mg/L	104	91	84-113	3	20	
Calcium	564	10	10	558	556	mg/L	-59	-72	10-200	0	20	M1



Quality Control

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Batch: 120808
Method: EPA 9040

Pace Project No.: 75110801
Instrument ID: 75WETP

Laboratory Control Sample: 545057

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
pH at 25 Degrees C	6	6.0	Std. Units	100	99-101	H6



Quality Control

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Batch: 120798
Method: EPA 9056A

Pace Project No.: 75110801
Instrument ID: 75WTA4

Blank: 545030

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Chloride	1	U	<0.36	mg/L	0.80	0.36	07/01/2019 13:54	
Fluoride	1	U	<0.18	mg/L	0.50	0.18	07/01/2019 13:54	
Sulfate	1	U	<0.39	mg/L	0.70	0.39	07/01/2019 13:54	

Laboratory Control Sample: 545031

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Chloride	5	4.8	mg/L	95	80-120	
Fluoride	5	5.2	mg/L	105	80-120	
Sulfate	5	5.1	mg/L	102	80-120	

Matrix Spike: 545053

Matrix Spike Duplicate: 545054

Original for Sample: Project sample MW-1

Parameters	Original Result	MS Spk	MSD Spk	MS Result	MSD Result	Units	MS %Rec	MSD %Rec	% Rec Limits	RPD	Max RPD	Quals
Chloride	169	500	500	674	673	mg/L	101	101	80-120	0	20	
Fluoride	0.73	5	5	5.8	5.7	mg/L	102	99	80-120	2	20	
Sulfate	2430	5000	5000	7760	7840	mg/L	107	108	80-120	1	20	



Quality Control

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Batch: 120880
Method: EPA 9056A

Pace Project No.: 75110801
Instrument ID: 75WTA4

Blank: 545336

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Chloride	1	U	<0.36	mg/L	0.80	0.36	07/02/2019 17:56	
Fluoride	1	U	<0.18	mg/L	0.50	0.18	07/02/2019 17:56	
Sulfate	1	U	<0.39	mg/L	0.70	0.39	07/02/2019 17:56	

Laboratory Control Sample: 545337

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Chloride	5	4.8	mg/L	96	80-120	
Fluoride	5	5.4	mg/L	107	80-120	
Sulfate	5	5.3	mg/L	105	80-120	

Matrix Spike: 545338

Matrix Spike Duplicate: 545339

Original for Sample: Project sample MW-3

Parameters	Original Result	MS Spk	MSD Spk	MS Result	MSD Result	Units	MS %Rec	MSD %Rec	% Rec Limits	RPD	Max RPD	Quals
Chloride	306	250	250	608	609	mg/L	121	121	80-120	0	20	M6
Fluoride	<0.18	5	5	5.0	5.0	mg/L	92	92	80-120	0	20	
Sulfate	3130	2500	2500	5930	5970	mg/L	112	114	80-120	1	20	



Quality Control

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Batch: 120600
Method: SM 2540C

Pace Project No.: 75110801
Instrument ID: 75BL17

Blank: 544068

Parameters	Dilutio	Quals	Result	Units	MQL	SDL	Analysis Date	Prep Date
Total Dissolved Solids	1	U	<25.0	mg/L	25.0	25.0	06/27/2019 10:41	

Laboratory Control Sample: 544069

Parameters	Spk Amt	LCS Result	Units	LCS %Rec	% Rec Limits	LCS Quals
Total Dissolved Solids	250	266	mg/L	106	85-115	



Unadjusted MQL

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Pace Project 75110801

Analyte	Method	Unadjusted MQL	Reporting Units
Boron	EPA 6010	0.10	mg/L
Calcium	EPA 6010	1.0	mg/L
pH at 25 Degrees C	EPA 9040	0.10	Std. Units
Chloride	EPA 9056A	0.80	mg/L
Fluoride	EPA 9056A	0.50	mg/L
Sulfate	EPA 9056A	0.70	mg/L
Total Dissolved Solids	SM 2540C	25.0	mg/L



Pace Project 75110801

DEFINITIONS

DF	Dilution Factor
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting
U	Indicates the compound was analyzed for, but not detected.
SDL	Sample Detection Limit
MQL	Method Quantitation Limit
LCS(D)	Laboratory Control Sample (Duplicate)
MS(D)	Matrix Spike (Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
TNI	The Nelac Institute

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

ANALYTE QUALIFIERS

H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.



Quality Control Data Cross Reference Table

Pace Analytical Services, Inc.
400 W. Bethany Drive, Suite 190
Allen, TX 75013
(972) 727-1123

Pace Project 75110801

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical	Analytical
75110801001	BW-1	EPA 3010	120770	EPA 6010	120775
75110801002	MW-1	EPA 3010	120770	EPA 6010	120775
75110801003	MW-2	EPA 3010	120770	EPA 6010	120775
75110801004	MW-3	EPA 3010	120770	EPA 6010	120775
75110801005	DUP	EPA 3010	120770	EPA 6010	120775
75110801001	BW-1	SM 2540C	120600		
75110801002	MW-1	SM 2540C	120600		
75110801003	MW-2	SM 2540C	120600		
75110801004	MW-3	SM 2540C	120600		
75110801005	DUP	SM 2540C	120600		
75110801001	BW-1	EPA 9040	120808		
75110801002	MW-1	EPA 9040	120808		
75110801003	MW-2	EPA 9040	120808		
75110801004	MW-3	EPA 9040	120808		
75110801005	DUP	EPA 9040	120808		
75110801001	BW-1	EPA 9056A	120798		
75110801002	MW-1	EPA 9056A	120798		
75110801003	MW-2	EPA 9056A	120798		
75110801004	MW-3	EPA 9056A	120880		
75110801005	DUP	EPA 9056A	120880		

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		07/03/2019				
Project Name:		Sandy Creek GW	Laboratory Job		75110801				
Reviewer		Leslie Underwood	Prep Batch Number		See exception report.				
#1	A2	Description	Yes	No	NA³	NR⁴	ER #⁵		
R1	OI	Chain-of-custody (C-O-C)							
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?		X					R1.1
		Were all departures from standard conditions described in an exception report?	X						
R2	OI	Sample and quality control (QC) identification							
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X						
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X						
R3	OI	Test reports							
		Were all samples prepared and analyzed within holding times?		X					R3.1
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X						
		Were calculations checked by a peer or supervisor?	X						
		Were all analyte identifications checked by a peer or supervisor?	X						
		Were sample detection limits reported for all analytes not detected?	X						
		Were all results for soil and sediment samples reported on a dry weight basis?				X			
		Were % moisture (or solids) reported for all soil and sediment samples?				X			
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?				X			
		If required for the project, are TICs reported?				X			
R4	O	Surrogate recovery data							
		Were surrogates added prior to extraction?				X			
		Were surrogate percent recoveries in all samples within the laboratory QC limits?				X			
R5	OI	Test reports/summary forms for blank samples							
		Were appropriate type(s) of blanks analyzed?	X						
		Were blanks analyzed at the appropriate frequency?	X						
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X						
		Were blank concentrations < MQL?	X						
R6	OI	Laboratory control samples (LCS):							
		Were all COCs included in the LCS?	X						
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X						
		Were LCSs analyzed at the required frequency?	X						
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X						
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X						
		Was the LCSD RPD within QC limits?				X			
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data							
		Were the project/method specified analytes included in the MS and MSD?	X						
		Were MS/MSD analyzed at the appropriate frequency?	X						
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X					R7.3
		Were MS/MSD RPDs within laboratory QC limits?	X						
R8	OI	Analytical duplicate data							
		Were appropriate analytical duplicates analyzed for each matrix?				X			
		Were analytical duplicates analyzed at the appropriate frequency?				X			
		Were RPDs or relative standard deviations within the laboratory QC limits?				X			
R9	OI	Method quantitation limits (MQLs):							
		Are the MQLs for each method analyte included in the laboratory data package?	X						
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X						
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X						
R10	OI	Other problems/anomalies							
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X						
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X						
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices, and methods associated with this laboratory data package?	X						

TRRP LABORATORY REVIEW CHECKLIST


Laboratory	Pace Analytical Services, Inc.	LRC Date:	07/03/2019
Project Name:	Sandy Creek GW	Laboratory Job	75110801
Reviewer	Leslie Underwood	Prep Batch Number	See exception report.
<p>1. Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;</p> <p>2. O = Organic analyses; I = Inorganic analyses (and general chemistry, when applicable);</p> <p>3. NA = Not applicable;</p> <p>4. NR = Not reviewed;</p> <p>5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).</p>			

TRRP LABORATORY REVIEW CHECKLIST

Laboratory		Pace Analytical Services, Inc.	LRC Date:		07/03/2019				
Project Name:		Sandy Creek GW	Laboratory Job		75110801				
Reviewer		Leslie Underwood	Prep Batch Number		See exception report.				
#¹	A²	Description	Yes	No	NA³	NR⁴	ER #⁵		
S1	OI	Initial calibration (ICAL)							
		Were response factors and/or relative response factors for each analyte within QC limits?	X						
		Were percent RSDs or correlation coefficient criteria met?	X						
		Was the number of standards recommended in the method used for all analytes?	X						
		Were all points generated between the lowest and highest standard used to calculate the curve?	X						
		Are ICAL data available for all instruments used?	X						
		Has the initial calibration curve been verified using an appropriate second source standard?	X						
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):							
		Was the CCV analyzed at the method-required frequency?	X						
		Were percent differences for each analyte within the method-required QC limits?	X						
		Was the ICAL curve verified for each analyte?	X						
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X						
S3	O	Mass spectral tuning							
		Was the appropriate compound for the method used for tuning?			X				
		Were ion abundance data within the method-required QC limits?			X				
S4	O	Internal standards (IS)							
		Were IS area counts and retention times within the method-required QC limits?			X				
S5	OI	Raw data (NELAC Section 5.5.10)							
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X						
		Were data associated with manual integrations flagged on the raw data?	X						
S6	O	Dual column confirmation							
		Did dual column confirmation results meet the method-required QC?			X				
S7	O	Tentatively identified compounds (TICs)							
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X				
S8	I	Interference Check Sample (ICS) results							
		Were percent recoveries within method QC limits?	X						
S9	I	Serial dilutions, post digestion spikes, and method of standard additions							
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X						
S10	OI	Method detection limit (MDL) studies							
		Was a MDL study performed for each reported analyte?	X						
		Is the MDL either adjusted or supported by the analysis of DCSs?	X						
S11	OI	Proficiency test reports							
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X						
S12	OI	Standards documentation							
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X						
S13	OI	Compound/analyte identification procedures							
		Are the procedures for compound/analyte identification documented?	X						
S14	OI	Demonstration of analyst competency (DOC)							
		Was DOC conducted consistent with NELAC Chapter 5?	X						
		Is documentation of the analyst's competency up-to-date and on file?	X						
S15	OI	Verification/validation documentation for methods (NELAC Chapter 5)							
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X						
S16	OI	Laboratory standard operating procedures (SOPs)							
		Are laboratory SOPs current and on file for each method performed?	X						
<p>1. Items identified by the letter "R" must be included in the laboratory in the laboratory data package submitted in the TRRP-required reports(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period;</p> <p>2. O = Organic analyses, I = inorganic analyses (and general chemistry, when applicable);</p> <p>3. NA = Not applicable;</p> <p>4. NR = Not reviewed;</p> <p>5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).</p>									

TRRP LABORATORY REVIEW CHECKLIST

Laboratory	Pace Analytical Services, Inc.	LRC Date:	07/03/2019
Project Name:	Sandy Creek GW	Laboratory Job	75110801
Reviewer	Leslie Underwood	Prep Batch Number	120600,120770,120798,120808,120880
ER #¹	Description		
R1.1	Sample 545058, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R1.1	Sample 75110801001, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R1.1	Sample 75110801002, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R1.1	Sample 75110801003, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R1.1	Sample 75110801004, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R1.1	Sample 75110801005, Method EPA 9040, pH at 25 Degrees C: H3 - Sample was received or analysis requested beyond the recognized method holding time.		
R3.1	Sample 75110801001, 9040 pH. Run on 07/01/19 12:39 is 6.9 days past hold. Sample received after hold date.		
R3.1	Sample 75110801002, 9040 pH. Run on 07/01/19 12:41 is 6.9 days past hold. Sample received after hold date.		
R3.1	Sample 75110801003, 9040 pH. Run on 07/01/19 12:45 is 6.9 days past hold. Sample received after hold date.		
R3.1	Sample 75110801004, 9040 pH. Run on 07/01/19 12:47 is 6.9 days past hold. Sample received after hold date.		
R3.1	Sample 75110801005, 9040 pH. Run on 07/01/19 12:49 is 6.9 days past hold. Sample received after hold date.		
R7.3	MS Sample #544944: Calcium -59% spike recovery outside laboratory QC limit of 10-200%.		
R7.3	MS Sample #545338: Chloride 121% spike recovery outside laboratory QC limit of 80-120%.		
R7.3	MSD Sample #544945: Calcium -72% spike recovery outside laboratory QC limit of 10-200%.		
R7.3	MSD Sample #545339: Chloride 121% spike recovery outside laboratory QC limit of 80-120%.		
1. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).			

	Document Name: Sample Condition Upon Receipt	Document Revised: 03-14-19 Page 1 of 1
	Document No.: F-DAL-C-001-rev.9	Issuing Authority: Pace Dallas Quality Office

Sample Condition Upon Receipt

☐ Dallas ☒ Ft Worth

WO#: 75110801



Client Name: SCS Engineers Project Work order: _____

Courier: FedEX ☐ UPS ☐ USPS ☐ Client ☒ LSO ☐ PACE ☐ Other: _____

Tracking #: _____

Custody Seal on Cooler/Box: Yes ☐ No ☒ Packing Material: Bubble Wrap/Bags ☐ Foam ☐ None ☒ Other ☐

Received on ice: Yes ☒ No ☐ Type of Ice: Wet ☒ Blue ☐

Thermometer Used: 1812 Cooler Temp °C: 2.8 (Recorded) 0 (Correction Factor) 2.8 (Actual)

Temperature should be above freezing to 6°C

Chain of Custody relinquished	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sampler name & signature on COC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Short HT analyses (<72 hrs)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Sufficient Volume received	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Correct Container used	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Container Intact	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample pH Acceptable pH Strips: <u>143849</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>
Residual Chlorine Present Cl Strips: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Sulfide Present Lead Acetate Strips: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Are soil samples (volatiles, TPH) received in 5035A Kits	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Unpreserved 5035A soil frozen within 48 hrs	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Headspace in VOA (>6mm)	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Project sampled in USDA Regulated Area: State Sampled: <u>TX</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Non-Conformance(s):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company:	SCS Engineers	Report To:	Doug Steen	Attention:	
Address:	1901 Central Dr.	Copy To:		Company Name:	
	Bedford, TX 76021			Address:	
Email:	dsleen@scsengineers.com	Purchase Order #:		Pace Quote:	
Phone:	NONE	Project Name:	Sandy Creek GW	Pace Project Manager:	leslie.underwood@pacelabs.com
Requested Due Date:		Project #:		Pace Profile #:	72568
				Regulatory Agency:	
				State / Location:	
				TX	

[illegible]

SAMPLER: DOUG STEEN Dyla 287



10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

January 14, 2020

Jim Lawrence
SCS Engineers
1901 Central Drive
Suite 550
Bedford, TX 76021

Work Order: **HS19120609**

Laboratory Results for: **Sandy Creek**

Dear Jim,

ALS Environmental received 5 sample(s) on Dec 12, 2019 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKELAWAL
Dane J. Wacasey

Client: SCS Engineers
Project: Sandy Creek
Work Order: HS19120609

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS19120609-01	BW-1	Groundwater		10-Dec-2019 14:30	12-Dec-2019 08:00	<input type="checkbox"/>
HS19120609-02	MW-1	Groundwater		10-Dec-2019 14:50	12-Dec-2019 08:00	<input type="checkbox"/>
HS19120609-03	MW-2	Groundwater		10-Dec-2019 15:03	12-Dec-2019 08:00	<input type="checkbox"/>
HS19120609-04	MW-3	Groundwater		10-Dec-2019 15:30	12-Dec-2019 08:00	<input type="checkbox"/>
HS19120609-05	DUP	Groundwater		10-Dec-2019 14:40	12-Dec-2019 08:00	<input type="checkbox"/>

Client: SCS Engineers
Project: Sandy Creek
Work Order: HS19120609

CASE NARRATIVE**Work Order Comments**

- Sample received outside method holding time for pH. pH is an immediate test. Sample results are flagged with an "H" qualifier. The temperature at the time of pH is reported. Please note that all pH results are already normalized to a temperature of 25 °C.

Metals by Method SW6020**Batch ID: 149347****Sample ID: BW-1 (HS19120609-01)**

- Sample ran at 5x due to high concentration of Sodium.

Sample ID: DUP (HS19120609-05)

- Sample ran at 5x due to high concentration of Sodium.

Sample ID: HS19121499-01MS

- MS and MSD are for an unrelated sample

Sample ID: MW-2 (HS19120609-03)

- Sample ran at 5x due to high concentration of Sodium.

Sample ID: MW-3 (HS19120609-04)

- Sample ran at 5x due to high concentration of Sodium.

WetChemistry by Method SW9056**Batch ID: R354039****Sample ID: MW-3 (HS19120609-04MS)**

- The MS and/or MSD recovery was outside of the control limits; however, the result in the parent sample is greater than 4x the spike amount. (Sulfate)

WetChemistry by Method SW9040C**Batch ID: R352956**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method M2540C**Batch ID: R352817**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Client: SCS Engineers
 Project: Sandy Creek
 Sample ID: BW-1
 Collection Date: 10-Dec-2019 14:30

ANALYTICAL REPORT

WorkOrder: HS19120609
 Lab ID: HS19120609-01
 Matrix: Groundwater

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		Method: SW6020		Prep: SW3010A / 03-Jan-2020		Analyst: JHD	
Arsenic	0.00236	J	0.00200	0.0100	mg/L	5	06-Jan-2020 23:09
Boron	2.98		0.0550	0.100	mg/L	5	06-Jan-2020 23:09
Calcium	591		0.170	2.50	mg/L	5	06-Jan-2020 23:09
Selenium	U		0.00550	0.0100	mg/L	5	06-Jan-2020 23:09
TOTAL DISSOLVED SOLIDS BY SM2540C		Method: M2540C				Analyst: KAH	
Total Dissolved Solids (Residue, Filterable)	6,300		5.00	10.0	mg/L	1	17-Dec-2019 16:30
PH BY SW9040C		Method: SW9040C				Analyst: MWG	
pH	7.11	H	0.100	0.100	pH Units	1	19-Dec-2019 16:00
Temp Deg C @pH	22.4	H	0	0	DEG C	1	19-Dec-2019 16:00
ANIONS BY SW9056A		Method: SW9056				Analyst: KMU	
Chloride	1,150		4.00	10.0	mg/L	20	07-Jan-2020 12:02
Fluoride	0.309		0.0500	0.100	mg/L	1	07-Jan-2020 11:47
Sulfate	2,830		20.0	50.0	mg/L	100	07-Jan-2020 15:49

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: SCS Engineers
 Project: Sandy Creek
 Sample ID: MW-1
 Collection Date: 10-Dec-2019 14:50

ANALYTICAL REPORT

WorkOrder: HS19120609
 Lab ID: HS19120609-02
 Matrix: Groundwater

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		Method: SW6020		Prep: SW3010A / 03-Jan-2020		Analyst: JHD	
Arsenic	0.000667	J	0.000400	0.00200	mg/L	1	07-Jan-2020 14:24
Boron	1.10		0.0550	0.100	mg/L	5	06-Jan-2020 23:11
Calcium	534		0.170	2.50	mg/L	5	06-Jan-2020 23:11
Selenium	0.0809		0.00550	0.0100	mg/L	5	06-Jan-2020 23:11
TOTAL DISSOLVED SOLIDS BY SM2540C		Method: M2540C				Analyst: KAH	
Total Dissolved Solids (Residue, Filterable)	3,720		5.00	10.0	mg/L	1	17-Dec-2019 16:30
PH BY SW9040C		Method: SW9040C				Analyst: MWG	
pH	7.43	H	0.100	0.100	pH Units	1	19-Dec-2019 16:00
Temp Deg C @pH	22.4	H	0	0	DEG C	1	19-Dec-2019 16:00
ANIONS BY SW9056A		Method: SW9056				Analyst: KMU	
Chloride	192		2.00	5.00	mg/L	10	07-Jan-2020 12:31
Fluoride	0.236		0.0500	0.100	mg/L	1	07-Jan-2020 12:16
Sulfate	2,420		20.0	50.0	mg/L	100	07-Jan-2020 16:04

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: SCS Engineers
 Project: Sandy Creek
 Sample ID: MW-2
 Collection Date: 10-Dec-2019 15:03

ANALYTICAL REPORT

WorkOrder: HS19120609
 Lab ID: HS19120609-03
 Matrix: Groundwater

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		Method: SW6020		Prep: SW3010A / 03-Jan-2020		Analyst: JHD	
Arsenic	0.00219	J	0.00200	0.0100	mg/L	5	06-Jan-2020 23:14
Boron	1.48		0.0550	0.100	mg/L	5	06-Jan-2020 23:14
Calcium	660		0.170	2.50	mg/L	5	06-Jan-2020 23:14
Selenium	U		0.00550	0.0100	mg/L	5	06-Jan-2020 23:14
TOTAL DISSOLVED SOLIDS BY SM2540C		Method: M2540C				Analyst: KAH	
Total Dissolved Solids (Residue, Filterable)	8,120		5.00	10.0	mg/L	1	17-Dec-2019 16:30
PH BY SW9040C		Method: SW9040C				Analyst: MWG	
pH	6.93	H	0.100	0.100	pH Units	1	19-Dec-2019 16:00
Temp Deg C @pH	23.4	H	0	0	DEG C	1	19-Dec-2019 16:00
ANIONS BY SW9056A		Method: SW9056				Analyst: KMU	
Chloride	2,180		10.0	25.0	mg/L	50	07-Jan-2020 13:00
Fluoride	0.229		0.100	0.200	mg/L	2	07-Jan-2020 15:34
Sulfate	2,620		10.0	25.0	mg/L	50	07-Jan-2020 13:00

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: SCS Engineers
 Project: Sandy Creek
 Sample ID: MW-3
 Collection Date: 10-Dec-2019 15:30

ANALYTICAL REPORT
 WorkOrder: HS19120609
 Lab ID: HS19120609-04
 Matrix: Groundwater

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		Method: SW6020		Prep: SW3010A / 03-Jan-2020		Analyst: JHD	
Arsenic	0.00240	J	0.00200	0.0100	mg/L	5	06-Jan-2020 23:16
Boron	1.26		0.0550	0.100	mg/L	5	06-Jan-2020 23:16
Calcium	572		0.170	2.50	mg/L	5	06-Jan-2020 23:16
Selenium	U		0.00550	0.0100	mg/L	5	06-Jan-2020 23:16
TOTAL DISSOLVED SOLIDS BY SM2540C		Method: M2540C				Analyst: KAH	
Total Dissolved Solids (Residue, Filterable)	5,830		5.00	10.0	mg/L	1	17-Dec-2019 16:30
PH BY SW9040C		Method: SW9040C				Analyst: MWG	
pH	6.67	H	0.100	0.100	pH Units	1	19-Dec-2019 16:00
Temp Deg C @pH	22.2	H	0	0	DEG C	1	19-Dec-2019 16:00
ANIONS BY SW9056A		Method: SW9056				Analyst: KMU	
Chloride	345		2.00	5.00	mg/L	10	07-Jan-2020 14:06
Fluoride	0.137		0.0500	0.100	mg/L	1	07-Jan-2020 13:22
Sulfate	3,140		20.0	50.0	mg/L	100	07-Jan-2020 16:18

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: SCS Engineers
 Project: Sandy Creek
 Sample ID: DUP
 Collection Date: 10-Dec-2019 14:40

ANALYTICAL REPORT

WorkOrder: HS19120609
 Lab ID: HS19120609-05
 Matrix: Groundwater

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP-MS METALS BY SW6020A		Method: SW6020		Prep: SW3010A / 03-Jan-2020		Analyst: JHD	
Arsenic	0.00234	J	0.00200	0.0100	mg/L	5	06-Jan-2020 23:18
Boron	2.86		0.0550	0.100	mg/L	5	06-Jan-2020 23:18
Calcium	607		0.170	2.50	mg/L	5	06-Jan-2020 23:18
Selenium	U		0.00550	0.0100	mg/L	5	06-Jan-2020 23:18
TOTAL DISSOLVED SOLIDS BY SM2540C		Method: M2540C				Analyst: KAH	
Total Dissolved Solids (Residue, Filterable)	6,370		5.00	10.0	mg/L	1	17-Dec-2019 16:30
PH BY SW9040C		Method: SW9040C				Analyst: MWG	
pH	7.17	H	0.100	0.100	pH Units	1	19-Dec-2019 16:00
Temp Deg C @pH	21.8	H	0	0	DEG C	1	19-Dec-2019 16:00
ANIONS BY SW9056A		Method: SW9056				Analyst: KMU	
Chloride	1,150		4.00	10.0	mg/L	20	07-Jan-2020 15:05
Fluoride	0.230		0.0500	0.100	mg/L	1	07-Jan-2020 14:50
Sulfate	2,890		40.0	100	mg/L	200	07-Jan-2020 15:20

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Weight / Prep Log

Client: SCS Engineers
Project: Sandy Creek
WorkOrder: HS19120609

Batch ID: 149347**Start Date:** 03 Jan 2020 09:00**End Date:** 03 Jan 2020 13:00**Method:** WATER, SW3010A**Prep Code:** 3010A

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor
HS19120609-01		10 (mL)	10 (mL)	1
HS19120609-02		10 (mL)	10 (mL)	1
HS19120609-03		10 (mL)	10 (mL)	1
HS19120609-04		10 (mL)	10 (mL)	1
HS19120609-05		10 (mL)	10 (mL)	1

Client: SCS Engineers
Project: Sandy Creek
WorkOrder: HS19120609

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 149347 (0)		Test Name : ICP-MS METALS BY SW6020A			Matrix: Groundwater	
HS19120609-01	BW-1	10 Dec 2019 14:30		03 Jan 2020 13:00	06 Jan 2020 23:09	5
HS19120609-02	MW-1	10 Dec 2019 14:50		03 Jan 2020 13:00	07 Jan 2020 14:24	1
HS19120609-02	MW-1	10 Dec 2019 14:50		03 Jan 2020 13:00	06 Jan 2020 23:11	5
HS19120609-03	MW-2	10 Dec 2019 15:03		03 Jan 2020 13:00	06 Jan 2020 23:14	5
HS19120609-04	MW-3	10 Dec 2019 15:30		03 Jan 2020 13:00	06 Jan 2020 23:16	5
HS19120609-05	DUP	10 Dec 2019 14:40		03 Jan 2020 13:00	06 Jan 2020 23:18	5
Batch ID: R352817 (0)		Test Name : TOTAL DISSOLVED SOLIDS BY SM2540C			Matrix: Groundwater	
HS19120609-01	BW-1	10 Dec 2019 14:30			17 Dec 2019 16:30	1
HS19120609-02	MW-1	10 Dec 2019 14:50			17 Dec 2019 16:30	1
HS19120609-03	MW-2	10 Dec 2019 15:03			17 Dec 2019 16:30	1
HS19120609-04	MW-3	10 Dec 2019 15:30			17 Dec 2019 16:30	1
HS19120609-05	DUP	10 Dec 2019 14:40			17 Dec 2019 16:30	1
Batch ID: R352956 (0)		Test Name : PH BY SW9040C			Matrix: Groundwater	
HS19120609-01	BW-1	10 Dec 2019 14:30			19 Dec 2019 16:00	1
HS19120609-02	MW-1	10 Dec 2019 14:50			19 Dec 2019 16:00	1
HS19120609-03	MW-2	10 Dec 2019 15:03			19 Dec 2019 16:00	1
HS19120609-04	MW-3	10 Dec 2019 15:30			19 Dec 2019 16:00	1
HS19120609-05	DUP	10 Dec 2019 14:40			19 Dec 2019 16:00	1
Batch ID: R354039 (0)		Test Name : ANIONS BY SW9056A			Matrix: Groundwater	
HS19120609-01	BW-1	10 Dec 2019 14:30			07 Jan 2020 15:49	100
HS19120609-01	BW-1	10 Dec 2019 14:30			07 Jan 2020 12:02	20
HS19120609-01	BW-1	10 Dec 2019 14:30			07 Jan 2020 11:47	1
HS19120609-02	MW-1	10 Dec 2019 14:50			07 Jan 2020 16:04	100
HS19120609-02	MW-1	10 Dec 2019 14:50			07 Jan 2020 12:31	10
HS19120609-02	MW-1	10 Dec 2019 14:50			07 Jan 2020 12:16	1
HS19120609-03	MW-2	10 Dec 2019 15:03			07 Jan 2020 15:34	2
HS19120609-03	MW-2	10 Dec 2019 15:03			07 Jan 2020 13:00	50
HS19120609-04	MW-3	10 Dec 2019 15:30			07 Jan 2020 16:18	100
HS19120609-04	MW-3	10 Dec 2019 15:30			07 Jan 2020 14:06	10
HS19120609-04	MW-3	10 Dec 2019 15:30			07 Jan 2020 13:22	1
HS19120609-05	DUP	10 Dec 2019 14:40			07 Jan 2020 15:20	200
HS19120609-05	DUP	10 Dec 2019 14:40			07 Jan 2020 15:05	20
HS19120609-05	DUP	10 Dec 2019 14:40			07 Jan 2020 14:50	1

Client: SCS Engineers
 Project: Sandy Creek
 WorkOrder: HS19120609

QC BATCH REPORT

Batch ID: 149347 (0)

Instrument: ICPMS04

Method: ICP-MS METALS BY SW6020A

MBLK	Sample ID: MBLK-149347	Units: mg/L			Analysis Date: 08-Jan-2020 15:21				
Client ID:		Run ID: ICPMS04_354019	SeqNo: 5429119		PrepDate: 03-Jan-2020		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Arsenic	U	0.00200								
Boron	U	0.0200								
Calcium	U	0.500								
Selenium	U	0.00200								

LCS	Sample ID: LCS-149347	Units: mg/L	Analysis Date: 06-Jan-2020 22:52							
Client ID:	Run ID: ICPMS05_353879	SeqNo: 5426277	PrepDate: 03-Jan-2020	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Arsenic	0.04952	0.00200	0.05	0	99.0	80 - 120				
Boron	0.4411	0.0200	0.5	0	88.2	80 - 120				
Calcium	4.91	0.500	5	0	98.2	80 - 120				
Selenium	0.04954	0.00200	0.05	0	99.1	80 - 120				

MS	Sample ID: HS19121499-01MS	Units: mg/L	Analysis Date: 06-Jan-2020 22:58							
Client ID:	Run ID: ICPMS05_353879	SeqNo: 5426280	PrepDate: 03-Jan-2020	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Arsenic	0.05025	0.00200	0.05	0.000332	99.8	80 - 120				
Boron	0.5313	0.0200	0.5	0.04774	96.7	80 - 120				
Calcium	92.56	0.500	5	86.11	129	80 - 120				SO
Selenium	0.05255	0.00200	0.05	0.001974	101	80 - 120				

MSD	Sample ID: HS19121499-01MSD	Units: mg/L	Analysis Date: 06-Jan-2020 23:00							
Client ID:	Run ID: ICPMS05_353879	SeqNo: 5426281	PrepDate: 03-Jan-2020	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Arsenic	0.04878	0.00200	0.05	0.000332	96.9	80 - 120	0.05025	2.97	20	
Boron	0.4838	0.0200	0.5	0.04774	87.2	80 - 120	0.5313	9.37	20	
Calcium	88	0.500	5	86.11	37.8	80 - 120	92.56	5.06	20	SO
Selenium	0.05123	0.00200	0.05	0.001974	98.5	80 - 120	0.05255	2.55	20	

Client: SCS Engineers
 Project: Sandy Creek
 WorkOrder: HS19120609

QC BATCH REPORT

Batch ID: 149347 (0)

Instrument: ICPMS04

Method: ICP-MS METALS BY SW6020A

PDS	Sample ID:	HS19121499-01PDS			Units:	mg/L	Analysis Date: 06-Jan-2020 23:03			
Client ID:		Run ID:	ICPMS05_353879		SeqNo:	5426282	PrepDate:	03-Jan-2020	DF: 1	
Analyte		Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Arsenic		0.1027	0.00200	0.1	0.000332	102	75 - 125			
Calcium		96.55	0.500	10	86.11	104	75 - 125			C
Selenium		0.1061	0.00200	0.1	0.001974	104	75 - 125			

SD	Sample ID: HS19121499-01SD	Units: mg/L	Analysis Date: 06-Jan-2020 22:56							
Client ID:	Run ID: ICPMS05_353879	SeqNo: 5426279	PrepDate: 03-Jan-2020		DF: 5					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit Qual	
Arsenic	U	0.0100					0.000332	0	10	
Boron	0.07153	0.100					0.04774	0	10	
Calcium	85.08	2.50					86.11	1.19	10	
Selenium	U	0.0100					0.001974	0	10	

The following samples were analyzed in this batch:

HS19120609-01	HS19120609-02	HS19120609-03	HS19120609-04
HS19120609-05			

Client: SCS Engineers
 Project: Sandy Creek
 WorkOrder: HS19120609

QC BATCH REPORT

Batch ID: R352817 (0) Instrument: Balance1 Method: TOTAL DISSOLVED SOLIDS BY SM2540C

MBLK	Sample ID: WBLK-121719	Units: mg/L	Analysis Date: 17-Dec-2019 16:30							
Client ID:	Run ID: Balance1_352817	SeqNo: 5398043	PrepDate:	DF: 1						
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual	

Total Dissolved Solids (Residue, Filterable) U 10.0

LCS	Sample ID: WLCS-121719	Units: mg/L			Analysis Date: 17-Dec-2019 16:30				
Client ID:		Run ID: Balance1_352817	SeqNo: 5398044		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

Total Dissolved Solids (Residue, Filterable) 1024 10.0 1000 0 102 85 - 115

Filterable)										
DUP	Sample ID:	HS19120760-27DUP			Units:	mg/L	Analysis Date: 17-Dec-2019 16:30			
Client ID:	Run ID:	Balance1_352817		SeqNo:	5398042		PrepDate:	DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual

Total Dissolved Solids (Residue, Filterable) 14520 10.0 14620 0.686 5

Filterable)										
DUP	Sample ID:	HS19120466-02DUP			Units:	mg/L	Analysis Date: 17-Dec-2019 16:30			
Client ID:		Run ID:	Balance1_352817		SeqNo:	5398022	PrepDate:		DF:	1
Analyte	Result	PQL	SPK Val		SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

Total Dissolved Solids (Residue, Filterable) 1392 10.0 1382 0.721 5

The following samples were analyzed in this batch: HS19120609-01 HS19120609-02 HS19120609-03 HS19120609-04
 HS19120609-05

Client: SCS Engineers
Project: Sandy Creek
WorkOrder: HS19120609

QC BATCH REPORT**Batch ID:** R352956 (0)**Instrument:** WetChem_HS**Method:** PH BY SW9040C

DUP	Sample ID: HS19120942-01DUP	Units: pH Units	Analysis Date: 19-Dec-2019 16:00							
Client ID:	Run ID: WetChem_HS_352956	SeqNo: 5401708	PrepDate: DF: 1							
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	7.64	0.100					7.64	0	10	
Temp Deg C @pH	21.5	0					21.8	1.39	10	

The following samples were analyzed in this batch:

HS19120609-01	HS19120609-02	HS19120609-03	HS19120609-04
HS19120609-05			

Client: SCS Engineers
 Project: Sandy Creek
 WorkOrder: HS19120609

QC BATCH REPORT

Batch ID: R354039 (0) Instrument: ICS2100 Method: ANIONS BY SW9056A

MBLK	Sample ID: WBLKW1-010720	Units: mg/L	Analysis Date: 07-Jan-2020 11:03						
Client ID:	Run ID: ICS2100_354039	SeqNo: 5428725	PrepDate:	DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	U	0.500							
Fluoride	U	0.100							
Sulfate	U	0.500							

LCS	Sample ID: WLCSW1-010720	Units: mg/L	Analysis Date: 07-Jan-2020 11:18						
Client ID:	Run ID: ICS2100_354039	SeqNo: 5428726	PrepDate:	DF: 1					
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.35	0.500	20	0	96.8	80 - 120			
Fluoride	3.77	0.100	4	0	94.2	80 - 120			
Sulfate	19.32	0.500	20	0	96.6	80 - 120			

LCSD	Sample ID: WLCSDW1-010720	Units: mg/L			Analysis Date: 07-Jan-2020 11:32				
Client ID:	Run ID: ICS2100_354039			SeqNo: 5428727		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	19.09	0.500	20	0	95.4	80 - 120	19.35	1.38	20
Fluoride	3.712	0.100	4	0	92.8	80 - 120	3.77	1.55	20
Sulfate	19.19	0.500	20	0	96.0	80 - 120	19.32	0.665	20

MS	Sample ID: HS19120609-04MS	Units: mg/L	Analysis Date: 07-Jan-2020 14:21						
Client ID: MW-3	Run ID: ICS2100_354039			SeqNo: 5428738		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	433.1	5.00	100	344.6	88.5	80 - 120			
Fluoride	18.02	1.00	20	0.165	89.3	80 - 120			
Sulfate	2981	5.00	100	2972	8.68	80 - 120			SEC

Client: SCS Engineers
Project: Sandy Creek
WorkOrder: HS19120609

QC BATCH REPORT

Batch ID: R354039 (0) **Instrument:** ICS2100 **Method:** ANIONS BY SW9056A

MSD	Sample ID: HS19120609-04MSD			Units: mg/L		Analysis Date: 07-Jan-2020 14:36			
Client ID: MW-3	Run ID: ICS2100_354039			SeqNo: 5428739		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	436.6	5.00	100	344.6	92.0	80 - 120	433.1	0.802	20
Fluoride	19.02	1.00	20	0.165	94.3	80 - 120	18.02	5.38	20
Sulfate	3004	5.00	100	2972	31.3	80 - 120	2981	0.757	20 SEO

The following samples were analyzed in this batch:

HS19120609-01	HS19120609-02	HS19120609-03	HS19120609-04
HS19120609-05			

Client: SCS Engineers
Project: Sandy Creek
WorkOrder: HS19120609

**QUALIFIERS,
ACRONYMS, UNITS**

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	19-028-0	27-Mar-2020
California	2919, 2019-2020	30-Apr-2020
Dept of Defense	ANAB L2231	20-Dec-2021
Florida	E87611-28	30-Jun-2020
Illinois	2000322019-2	09-May-2020
Kansas	E-10352 2019-2020	31-Jul-2020
Kentucky	123043, 2019-2020	30-Apr-2020
Louisiana	03087, 2019-2020	30-Jun-2020
Maryland	343, 2019-2020	30-Jun-2020
North Dakota	R-193 2019-2020	30-Apr-2020
Oklahoma	2019-067	31-Aug-2020
Texas	TX104704231-19-23	30-Apr-2020

Sample Receipt Checklist

Client Name: SCS ENGINEERS - Bedford TX
Work Order: HS19120609

Date/Time Received: 12-Dec-2019 08:00
Received by: JRM

Checklist completed by: Raegen Giga 12-Dec-2019
eSignature Date

Reviewed by: Dane J. Wacasey 17-Dec-2019
eSignature Date

Matrices: GW

Carrier name: Greyhound

Shipping container/cooler in good condition?
Custody seals intact on shipping container/cooler?
Custody seals intact on sample bottles?
VOA/TX1005/TX1006 Solids in hermetically sealed vials?
Chain of custody present?
Chain of custody signed when relinquished and received?
Samplers name present on COC?
Chain of custody agrees with sample labels?
Samples in proper container/bottle?
Sample containers intact?
Sufficient sample volume for indicated test?
All samples received within holding time?
Container/Temp Blank temperature in compliance?
Temperature(s)/Thermometer(s):

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	1 Page(s)
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	COC IDs:212588
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

Cooler(s)/Kit(s):

1.2°C uc/c IR 25
45387
12/12/2019 16:50

Water - VOA vials have zero headspace?

Yes ☐ No ☐ No VOA vials submitted ☒

Water - pH acceptable upon receipt?

Yes ☒ No ☐ N/A ☐

pH adjusted?

Yes ☐ No ☒ N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:

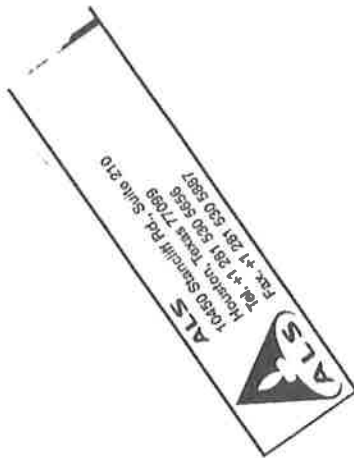


SCS Engineers
Sandy Creek

CUSTODY SEAL

Order: 131119
 Name: [Signature]
 Company: [Signature]
 Time: 12:00
 Date: 12-11-19

Seal Broken By: [Signature]
 Date: 12-11-19




575

ALS 10450 Stancliff Rd., Suite 210 Houston, Texas 77099 Tel. +1 281 530 5656 Fax. +1 281 530 5687	CUSTODY SEAL Date: 12-11-19 Time: 1730 Name: J. WOOD Company: JTS		Seal Broken By: <i>gm</i> Date: 12/12/19
	45387		

45387 DEC 12 2019

11DEC19 21:02A ** LABEL **
 Schd: GLI 7219
 HOUSTON, TX
 : ALS GLOBAL DALLAS
 : 281-530-5656
 : 45387
 : ALS GLOBAL DALLAS
 : 10450 STANCLIFF RD
 HOUSTON, TX 77099
 Phone: 281-530-5656
 GPX DIRECT (B)
 Agency Phone: (713) 759-6550
 GLI 3087836015

 gm 12112119
 08:00
 Manual Wght: 180.0
 Tariff Wght: 180.0
 PO/Ref #: 555191
 WWW.SHIPGREYHOUND.COM




Appendix C

Historical Groundwater Analytical Data

APPENDIX C - GROUNDWATER ANALYTICAL DATA
2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION
SANDY CREEK ENERGY STATION
2161 RATTLESNAKE ROAD
RIESEL, TX 76682

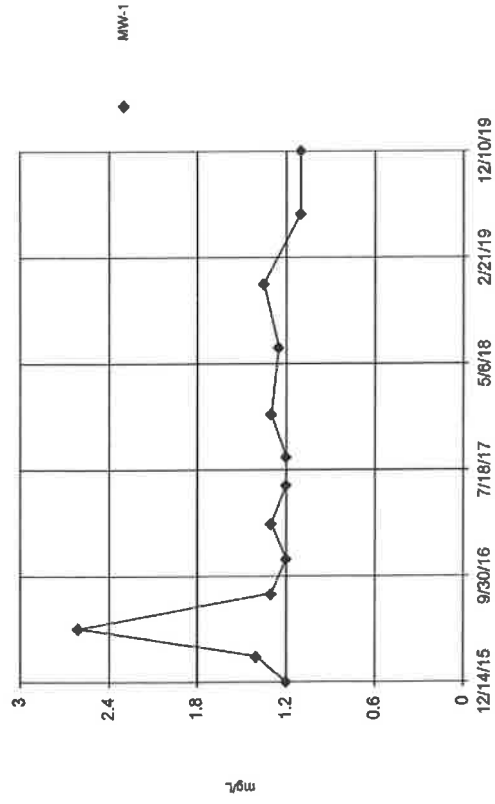
	Water Level	Conductivity	Turbidity	Boron	Calcium	Chloride	pH at 25°C	Sulfate	Total Dissolved Solids	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium	Radium-226	Radium-228	Combined Radium	Fluoride	
Units	ft msl	mS/cm	NTU	mg/L	mg/L	mg/L	Std. Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L	mg/L	
MW-1																											
12/14/2015	453.53	4.51	25.2	1.2	454	253	7.6	2090	4090	<0.0010	<0.0050	0.044	<0.0010	<0.0010	0.0073	<0.0025	<0.0050	0.43	<0.00020	<0.010	0.16	<0.00050	1.04 ± 0.838	1.09 ± 0.523	2.13	<0.30	
2/25/2016	453.38	4.98	>800	1.4	520	236	7.5	2190	4060	<0.0010	<0.0050	0.033	<0.0010	<0.0010	0.0074	<0.0025	0.0084	0.39	<0.00020	<0.010	0.2	<0.00050	0.922 ± 0.720	1.46 ± 0.496	2.382	<0.30	
5/11/2016	454.14	4.83	>800	2.6	1030	402	7.2	2580	5260	<0.0010	0.12	1	0.029	<0.0020	0.69	0.087	0.21	0.78	<0.00020	<0.020	0.039	0.00089	3.94 ± 1.31	8.39 ± 1.74	12.33	<0.30	
8/16/2016	453.67	4.47	800	1.3	535	239	6.8	2300	3880	<0.0010	<0.0050	0.022	<0.0010	<0.0010	<0.0050	<0.0025	<0.0050	0.41	<0.00020	<0.010	0.13	<0.00050	0.593 ± 0.620	3.29 ± 0.828	3.883	0.35	
11/17/2016	454.43	4.45	17.7	1.2	542	216	7	2130	3720	<0.0010	<0.0050	0.018	<0.0010	<0.0010	<0.0050	<0.0025	<0.0050	0.37	<0.00020	<0.020	0.16	<0.00050	0.338 ± 0.339	2.49 ± 0.783	2.828	<0.30	
2/23/2017	454.72	5.08	452	1.3	531	223	7	2350	3980	<0.0010	<0.010	<0.20	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.0050	0.44	<0.00020	<0.010	0.066	<0.00050	-0.207 ± 0.945	3.13 ± 0.908	2.923	<0.30
6/7/2017	454.42	4.77	500	1.2	530	203	7.5	2010	3680	<0.0010	<0.0050	0.019	<0.0010	<0.0010	<0.0050	<0.0025	<0.0050	0.36	<0.00020	<0.020	0.15	<0.00050	0.000 ± 0.449	1.30 ± 0.518	1.3	<0.30	
8/24/2017	454.69	4.58	223	1.2	518	241	7.1	2620	4550	<0.0010	<0.0050	0.02	<0.0010	<0.0010	<0.0050	<0.0025	<0.0050	0.395	<0.00020	<0.020	0.17	<0.00050	0.577 ± 0.429	1.69 ± 0.634	2.267	0.4	
12/20/2017	454.22	4.287	66.2	1.3	548	248	7.4	2340	4250	<0.0010	<0.0060	0.017	<0.0010	<0.0050	<0.0070	<0.0025	<0.010	0.38	<0.00020	<0.030	0.18	<0.00050	1.26 ± 0.680	2.46 ± 0.888	3.72	1.1	
6/21/2018	453.85	4.67	681	1.25	587	247	7.38	2530	4270	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.3 J	
12/13/2018	454.86	4.369	30	1.35	515	241	7.52	2570	4100	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.585	
6/24/2019	455.38	4.142	22.9	1.1	492	169	7.2	2430	4030	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.73	
12/10/2019	453.99	4.278	64	1.1	534	192	7.43	2420	3720	n/a	0.000667	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0809	n/a	n/a	n/a	n/a	0.236	
MW-2																											
12/14/2015	424.11	10.6	2.8	1.9	569	1890	6.7	2810	8520	<0.0010	<0.0050	0.031	<0.0010	<0.0010	<0.0050	0.0061	<0.0050	0.69	<0.00020	<0.010	<0.010	<0.00050	1.41 ± 0.938	2.76 ± 0.771	4.17	0.98	
2/25/2016	429.50	11.3	52.2	2.4	697	2080	7.3	2890	8070	<0.0010	0.014	0.038	<0.0010	<0.0010	<0.0050	<0.011	<0.0050	0.74	<0.00020	<0.010	<0.010	<0.00050	0.857 ± 0.590	2.57 ± 0.665	3.427	<0.30	
5/11/2016	430.72	10.8	23.7	2.2	613	2340	6.7	3010	9930	<0.0010	<0.0050	0.027	<0.0010	<0.0010	<0.0050	0.0079	<0.0050	0.87	<0.00020	<0.010	<0.010	<0.00050	0.859 ± 0.561	3.13 ± 0.822	3.989	<0.30	
8/16/2016	430.78	11.9	5.5	2.1	680	2440	6.7	3080	7870	<0.0020	<0.0050	0.021	<0.0010	<0.0010	<0.0050	0.0084	<0.0050	0.84	<0.00020	<0.010	<0.010	<0.0010	0.237 ± 0.329	3.28 ± 0.775	3.517	0.64	
11/17/2016	430.80	10.7	0.4	1.9	701	2140	6.7	2770	9680	<0.0010	0.0059	0.024	<0.0010	<0.0010	<0.0050	0.0064	<0.0050	0.82	<0.00020	0.024	<0.010	<0.00050	0.923 ± 0.594	3.16 ± 0.826	4.083	0.35	
2/23/2017	430.85	13.7	6.2	1.9	646	2320	6.9	3110	9630	<0.0010	<0.010	<0.20	<0.0050	<0.0050	<0.010	<0.010	<0.0050	0.8	<0.00020	<0.010	<0.020	<0.00050	1.52 ± 1.50	4.27 ± 1.07	5.79	0.46	
6/7/2017	431.12	11	30.5	1.9	640	2420	7.5	2970	14200	<0.0010	<0.0050	0.016	<0.0010	<0.0010	<0.0050	0.0051	<0.0050	0.75	<0.00020	<0.020	<0.010	<0.00050	0.344 ± 0.415	3.82 ± 0.931	4.164	1.3	
8/24/2017	431.20	11.4	8.1	1.9	664	2520	6.8	3710	9600	<0.0010	<0.010	0.017	<0.0010	<0.0020	<0.0050	0.0065	<0.010	0.729	<0.00020	<0.020	0.026	<0.00050	1.12 ± 0.610	3.78 ± 0.960	4.9	0.32	
12/20/2017	429.47	6.198	37.7	2.2	716	2590	7.2	3100	9600	<0.0010	<0.012	0.022	<0.0010	<0.010	<0.014	0.0072	<0.020	0.74	<0.00020	<0.030	<0.040	<0.00050	0.945 ± 0.578	4.07 ± 0.940	5.015	<0.50	
6/21/2018	430.02	12.66	4.42	1.9	706	2840	7.09	3400	10200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.6	
12/13/2018	430.72	11.89	15.1	2.58	690	2740	6.71	3220	10500	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.618	
6/24/2019	432.28	10.77	9.87	1.7	656	2420	7.0	3480	9560	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.18	
12/10/2019	430.19	8.676	19.1	1.48	660	2180	6.93	2620	8120	n/a	0.00219	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.010	n/a	n/a	n/a	n/a	0.229	
MW-3																											
12/14/2015	421.77	1.17	11.9	0.35	67.6	12.3	7.2	135	586	<0.0010	<0.0050	0.021	<0.0010	<0.0010	<0.0050	<0.0025	<0.0050	<0.050	<0.00020	<0.010	<0.010	<0.00050	0.997 ± 0.813	0.736 ± 0.505	1.733	0.62	
2/25/2016	421.66	6.04	93.3	1.2	479	347	7	2430	5400	<0.0010	0.0061	0.052	<0.0010	<0.0010	<0.0050	0.0098	<0.0050	0.85	<0.00020	<0.010	<0.010	<0.00050	1.26 ± 0.762	3.02 ± 0.791	4.28	0.9	
5/11/2016	421.94	3.82	197	1.1	465	349	6.5	2330	5440	<0.0010	<0.0050	0.024	<0.0010	<0.0010	<0.0050	0.0059	<0.0050	0.65	<0.00020	<0.010	<0.010	<0.00050	1.54 ± 0.797	1.62 ± 0.547	3.16	<0.30	
8/16/2016	420.42	6.01	101	1.2	505	381	7.3	2950	5680	<0.0010	<0.0050	0.018	<0.0010	<0.0010	<0.0050	0.006	<0.0050	0.98	<0.00020	<0.010	<0.010	<0.00050	0.891 ± 0.626	5.10 ± 1.13	5.991	<0.30	
11/17/2016	421.03	5.43	87	1.1	494	322	6.6	2420	5420	<0.0010	<0.0050	0.028	<0.0010	<0.0010	<0.0050	0.0068	<0.0050	0.94	<0.00020	<0.020	<0.010	<0.00050	0.872 ± .0579	5.23 ± 1.30	6.102	<0.30	
2/23/2017	422.58	6.79	82	1.1	389	202	7	1450	2900	<0.0010	<0.010	<0.20	<0.0050	<0.0050	<0.010	<0.010	<0.0050	0.7	<0.00020	<0.010	<0.020	<0.00050	-0.239 ± 1.09	4.07 ± 1.03	3.831	0.45	
6/7/2017	422.23	3.68	145	1.2	486	327	7.1	2260	4740	<0.0010	<0.0050	0.015	<0.0010	<0.0010	<0.0050	0.0058	<0.0050	0.62	<0.00020	<0.020	<0.010	<0.00050	0.941 ± 0.658	2.76 ± 0.765	3.701	0.57	
8/24/2017	419.66	6.55	82.6	1.1	519	401	6.5	2890	6160	<0.0010	<0.010	0.014	<0.0010	<0.0020	<0.0050	0.0084	<0.010	1.03	<0.00020	<0.020	<0.020	<0.00050	1.26 ± 0.600	4.41 ± 1.07	5.67	<0.30	
12/20/2017	421.08	6.459	22.4	1.3	563	380	6.8	2830	5790	<0.0010	<0.0060	0.034	<0.0010	<0.0050	<0.0070	0.0086	<0.010	0.92	<0.00020	<0.030	<0.020	<0.00050	0.626 ± 0.567	2.77 ± 0.728	3.396	0.61	
6/21/2018	418.68	6.633	51.1	1.13	526	396	6.76	3160	6090	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.3	
12/13/2018	422.36	4.47	10.6	1.08	327	206	6.61	1790	3520	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.662	
6/24/2019	423.00	5.659	10.3	0.99	452	306	6.6	3130	5740	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.18	
12/10/2019	419.87	6.189	34.3	1.26	572	345	6.67	3140	5830	n/a	0.0024	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	<0.010	n/a	n/a	n/a	n/a	0.137	
BW-1																											
12/14/2015	465.60	5.35	155	1.8	465	727	9.5	2130	4900	<0.0010	<0.0050	0.17	<0.0010	<0.0010	0.015	0.0026	<0.0050	0.7	<0.00020	<0.010	<0.010	0.00073	0.900 ± 0.728	1.13 ± 0.513	2.03	<0.30	
2/25/2016	465.44	5.8	307	3.5	586	1050	7.4	2690	6420	<0.0010	0.015	0.055	<0.0010	<0.0010	0.0053	0.0035	0.0069	0.71	<0.00020	<0.010	<0.010	<0.00050	0.887 ± 0.697	1.82 ± 0.541	2.707	0.67	
5																											



Appendix D

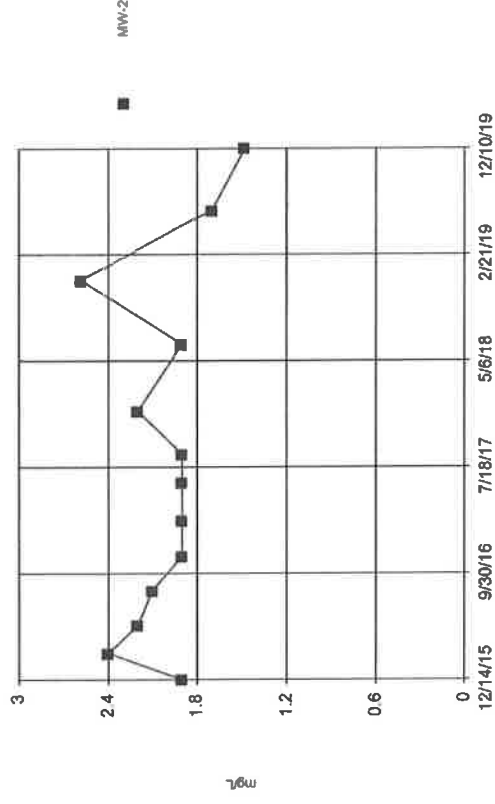
Time Series Graphs

Time Series



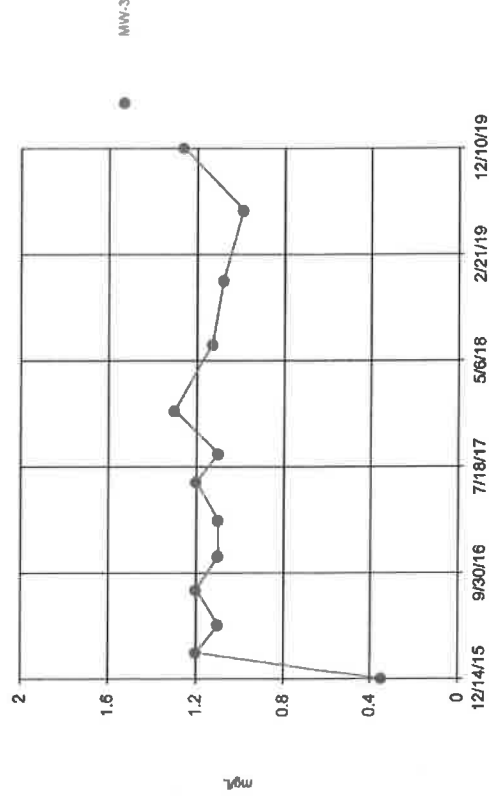
Constituent: Boron Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series



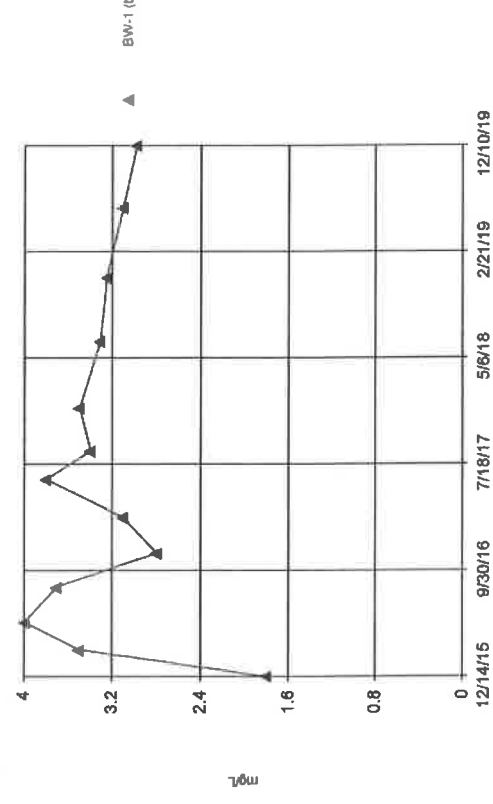
Constituent: Boron Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series



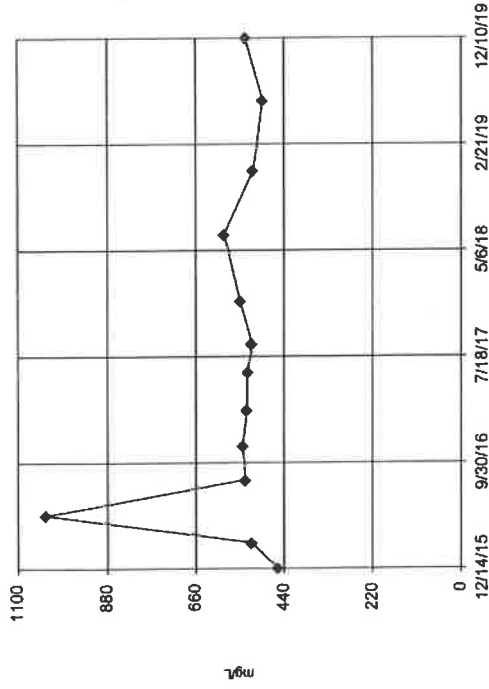
Constituent: Boron Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series



Constituent: Boron Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

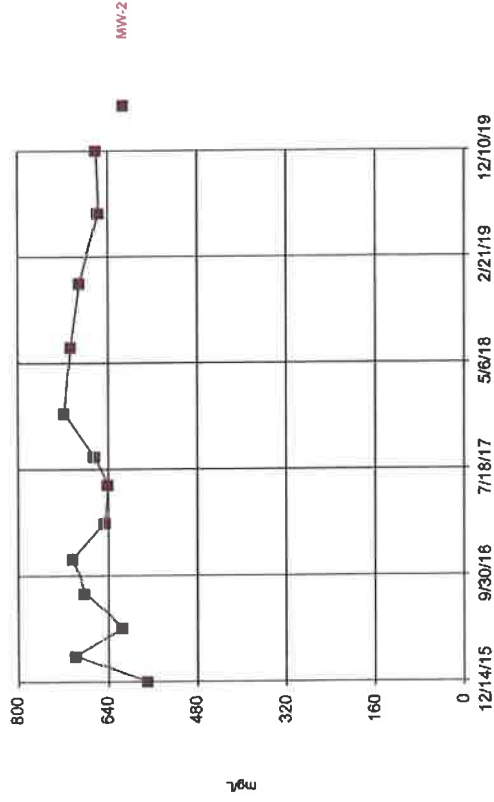
Time Series



Constituent: Calcium Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

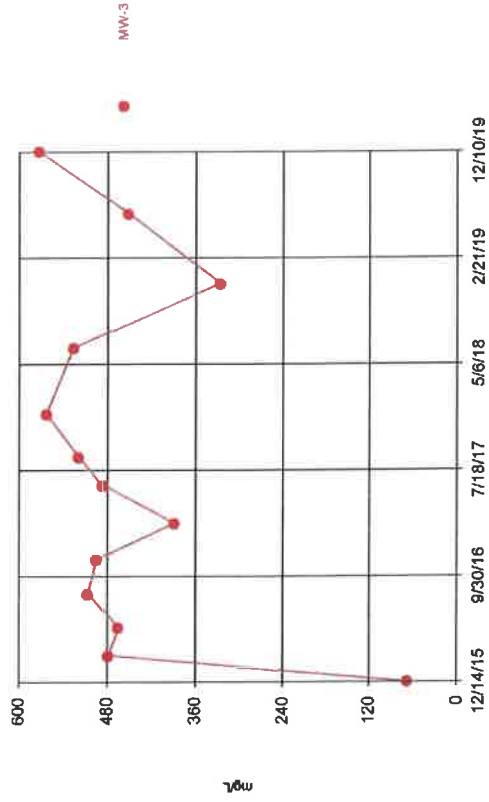
Time Series



Constituent: Calcium Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

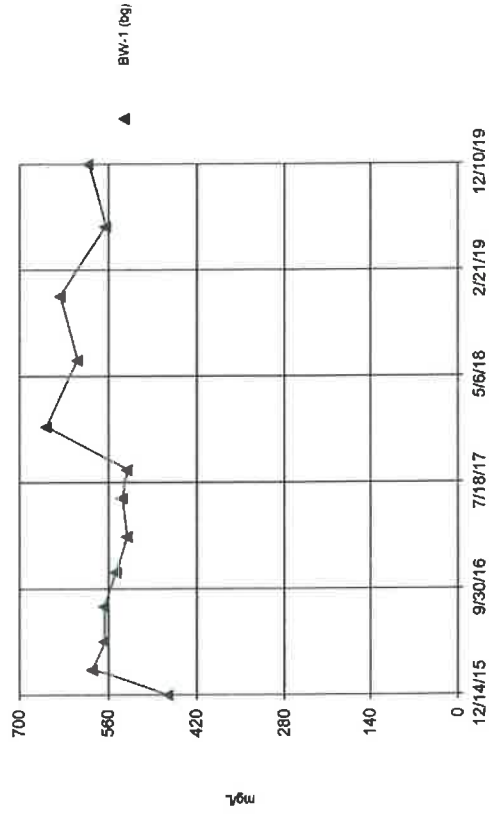
Time Series



Constituent: Calcium Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

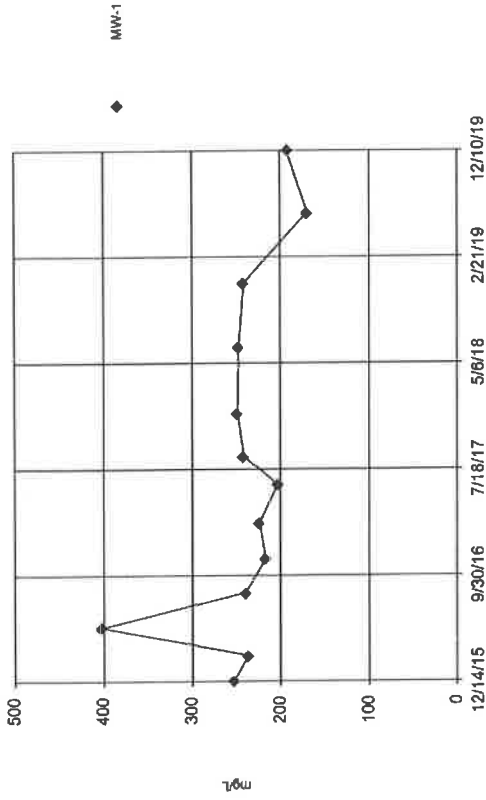
Time Series



Constituent: Calcium Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

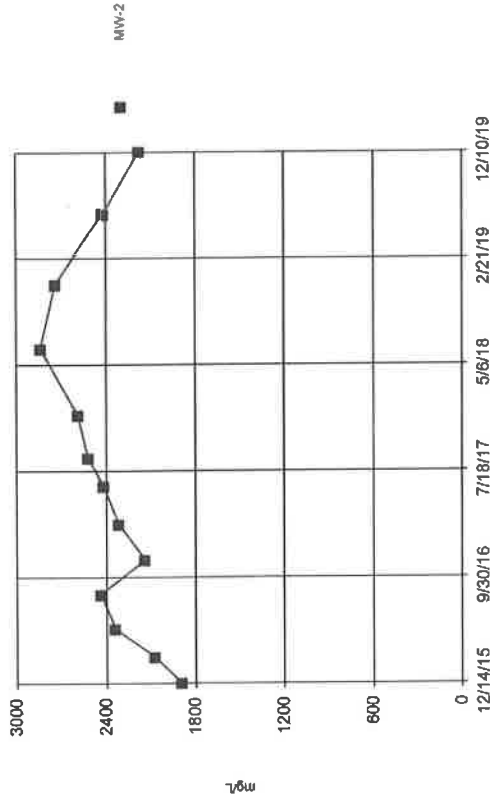
Time Series



Constituent: Chloride Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

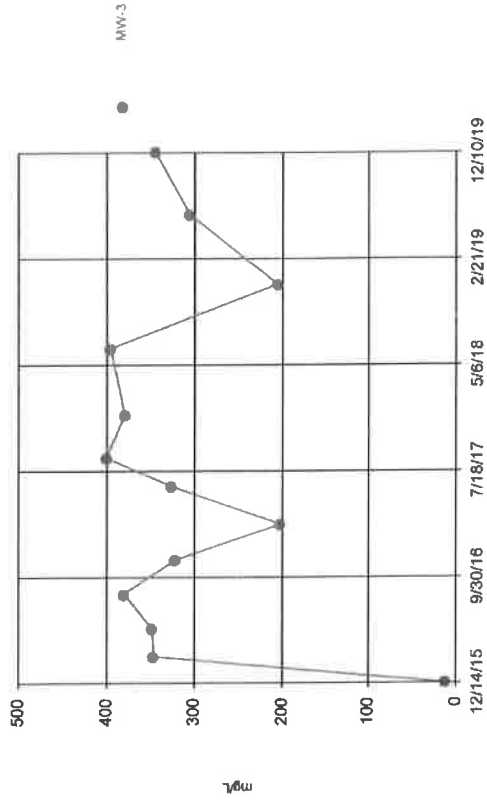
Time Series



Constituent: Chloride Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

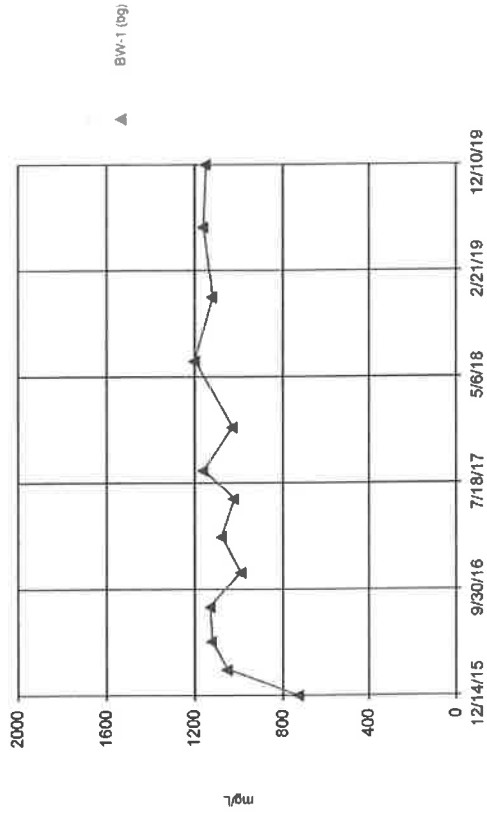
Time Series



Constituent: Chloride Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

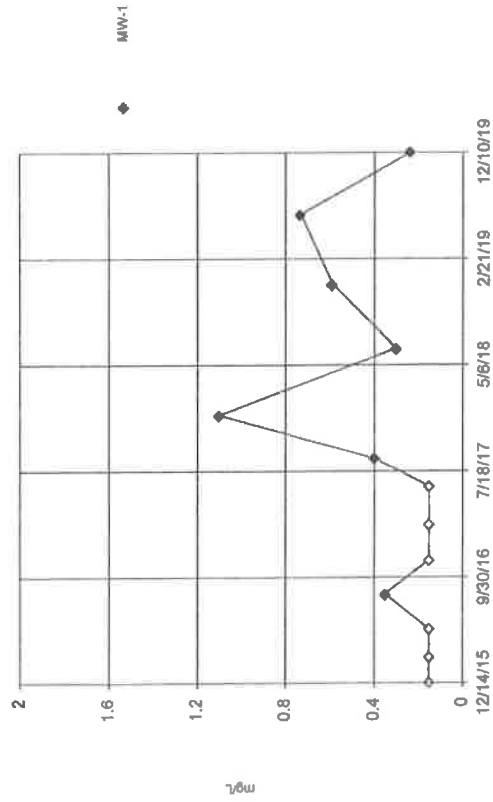
Time Series



Constituent: Chloride Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series

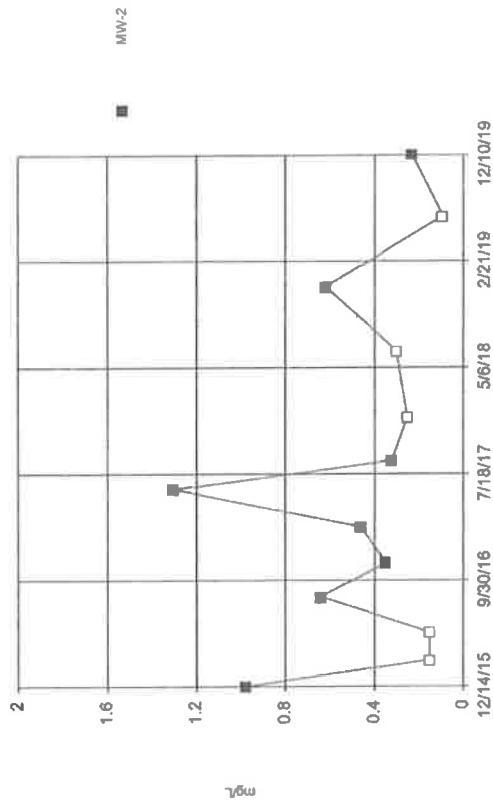


MW-1

Constituent: Fluoride Analysis Run 12/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series

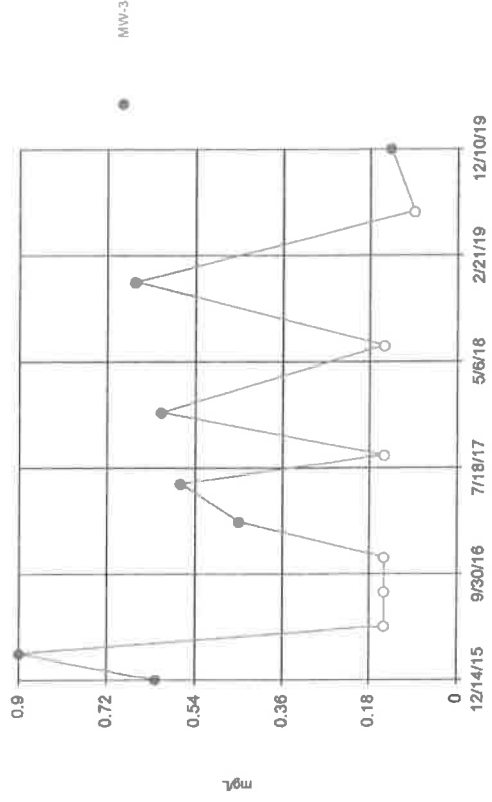


MW-2

Constituent: Fluoride Analysis Run 12/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series

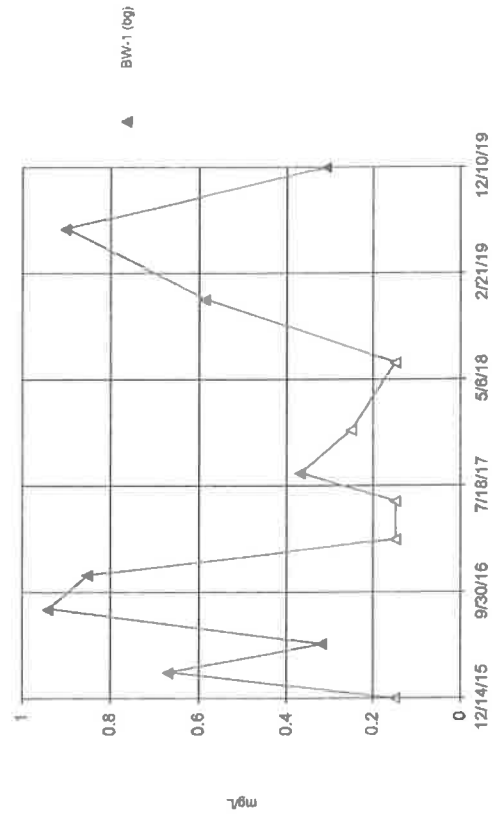


MW-3

Constituent: Fluoride Analysis Run 12/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series

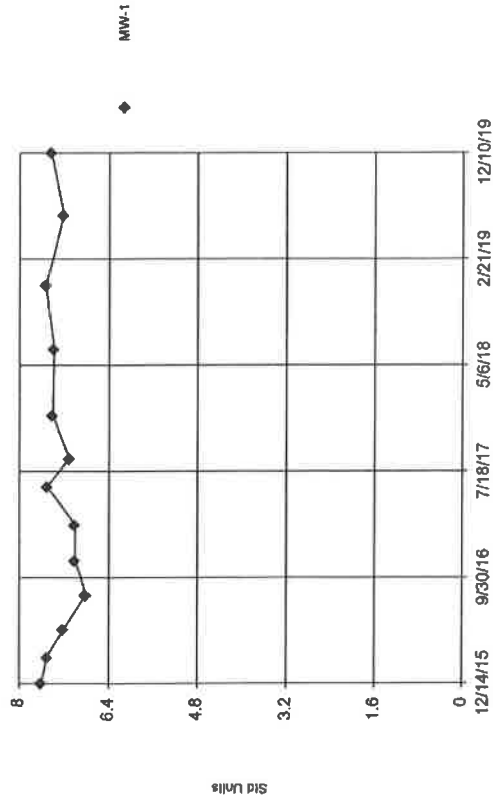


BW-1 (eq)

Constituent: Fluoride Analysis Run 12/21/2020 12:20 PM

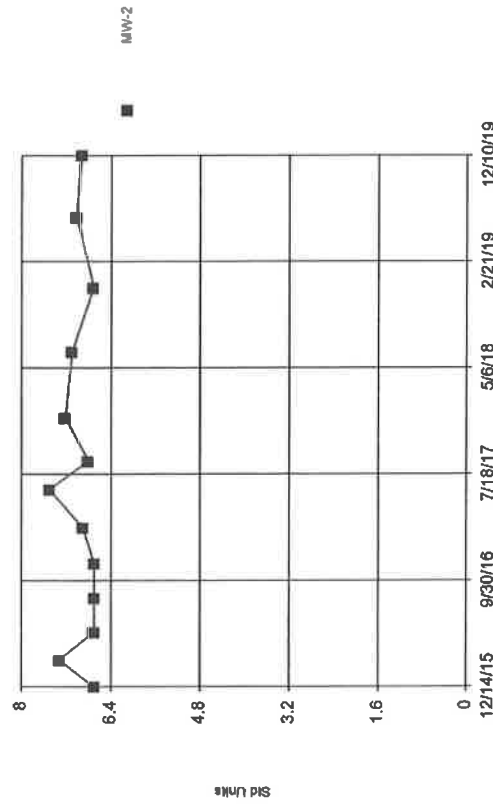
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series



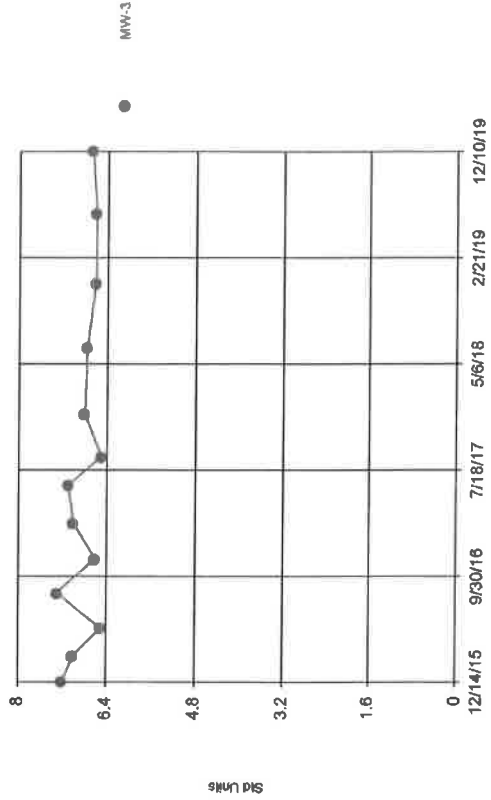
Constituent: pH Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Time Series



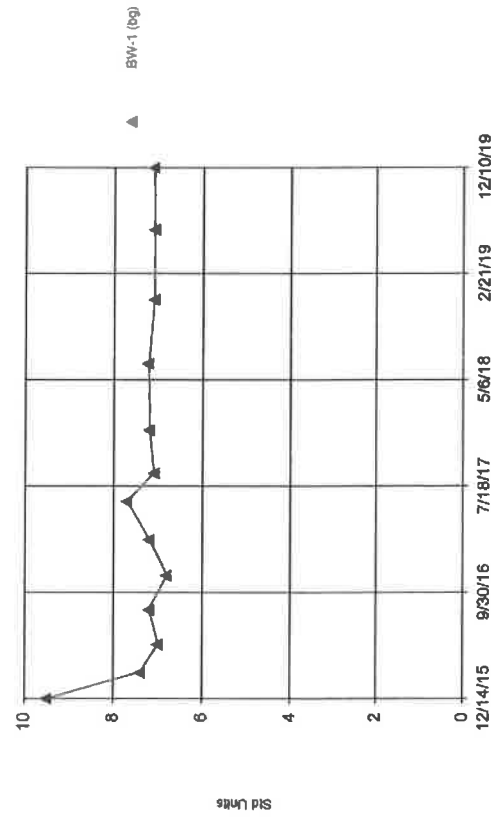
Constituent: pH Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Time Series



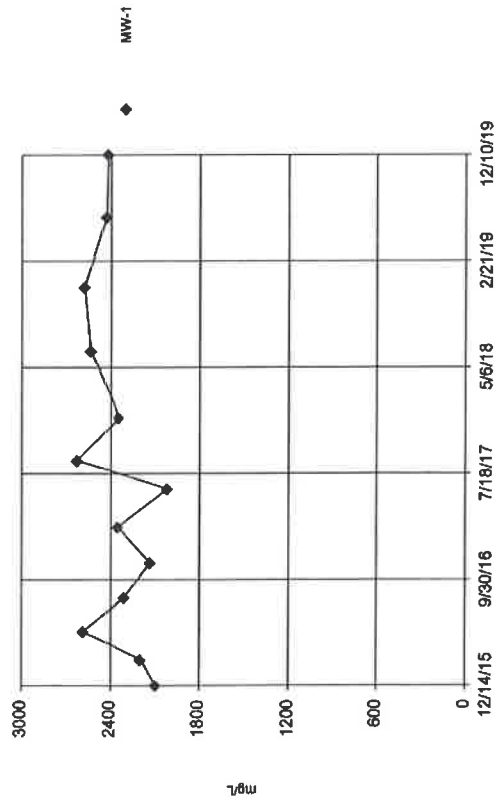
Constituent: pH Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Time Series



Constituent: pH Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Time Series



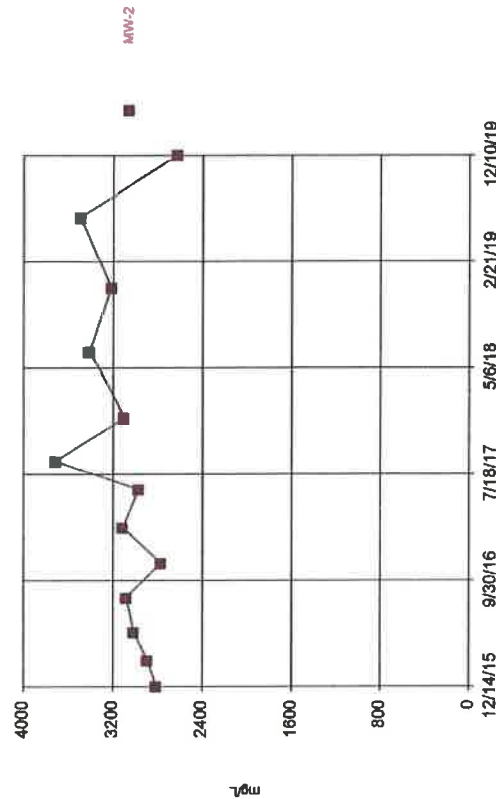
Constituent: Sulfate Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

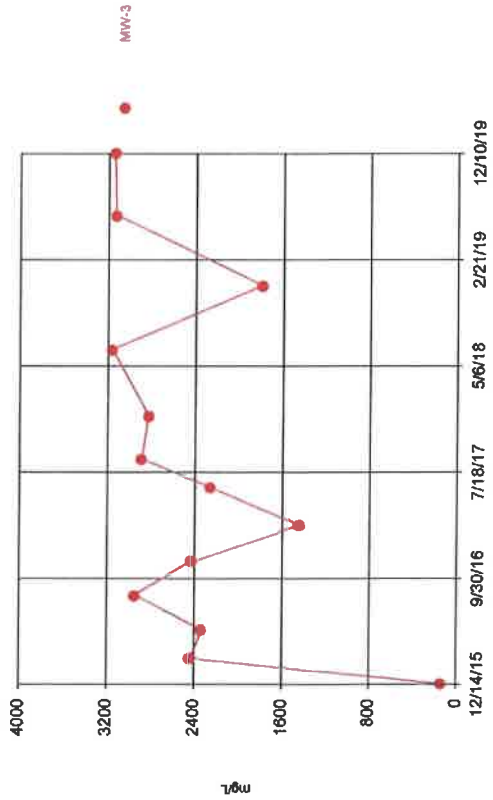
Constituent: Sulfate Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Time Series



Time Series



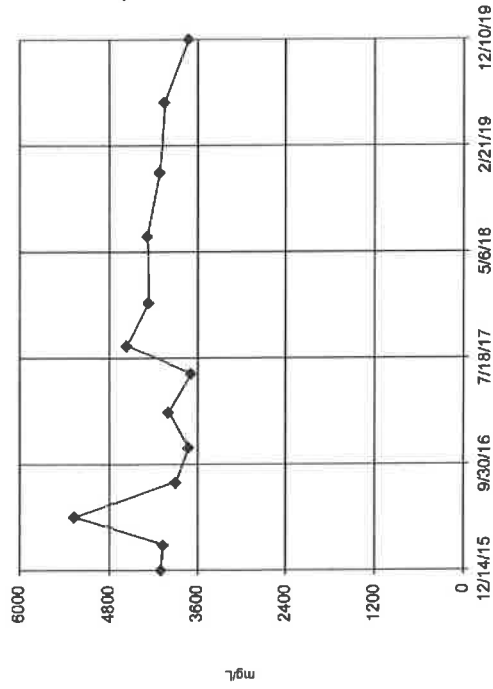
Constituent: Sulfate Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

Constituent: Sulfate Analysis Run 1/21/2020 12:20 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Santitas)_1.21.2020

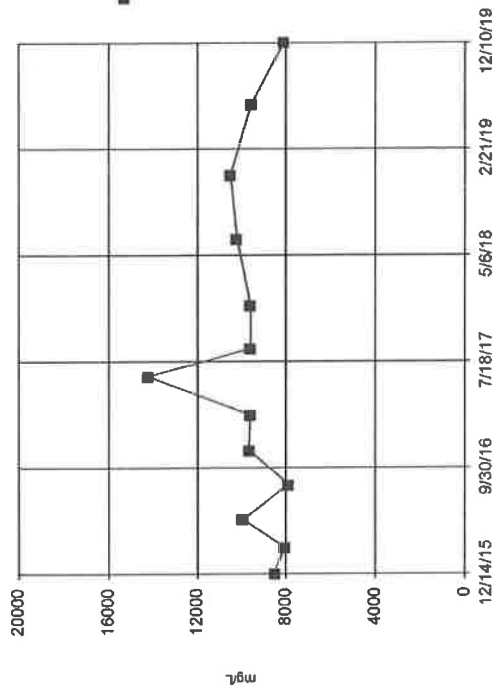
Time Series



MW-1

Constituent: Total Dissolved Solids Analysis Run 1/21/2020 12:20 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

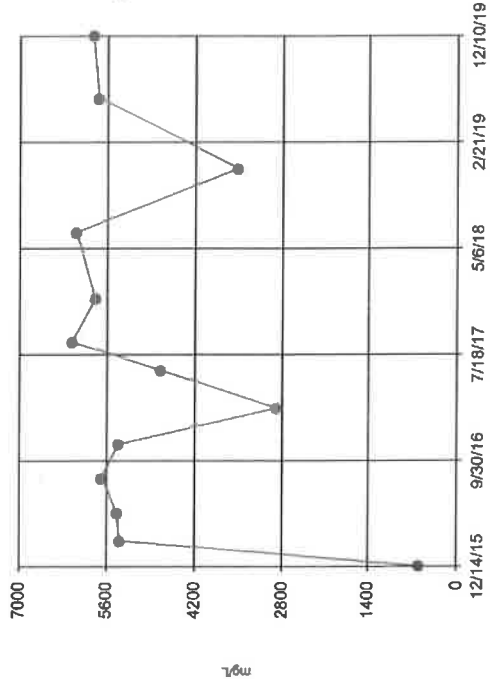
Time Series



MW-2

Constituent: Total Dissolved Solids Analysis Run 1/21/2020 12:21 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

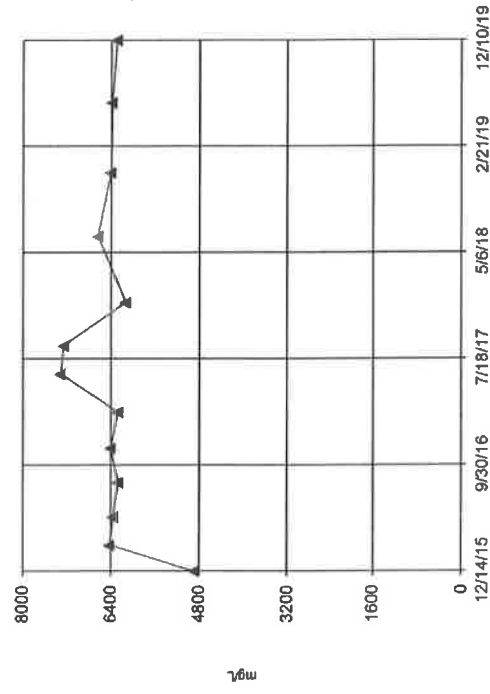
Time Series



MW-3


Constituent: Total Dissolved Solids Analysis Run 1/21/2020 12:21 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Time Series



BW-1 (OG)

Constituent: Total Dissolved Solids Analysis Run 1/21/2020 12:21 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020



Appendix E

2019 Alternate Source Demonstrations

September 6, 2019
SCS Project 16218157.00

Mr. Darryl Sparks
Compliance Manager
NAES Corporation
2161 Rattlesnake Road
Riesel, Texas 76682

Subject: Alternate Source Demonstration for Fluoride in MW-1
June 2019 Semiannual Groundwater Monitoring Report
Sandy Creek Energy Station
McLennan County, Texas

Dear Mr. Sparks:

On behalf of the Sandy Creek Energy Station (SCES), SCS Engineers (SCS) is submitting this Alternate Source Demonstration (ASD) in accordance with the site Groundwater Sampling and Analysis Plan (GWSAP) prepared by SCS, dated March 2, 2016, and Coal Combustion Residual Rule (CCR) 40 CFR §257.94(e)(2) for a fluoride detection in groundwater monitoring well MW-1. During the June 2019 groundwater monitoring event, fluoride was detected in MW-1 at 0.73 mg/L, above the statistical limit of 0.4 mg/L. This ASD was conducted to investigate the likely source of the fluoride detection. In accordance with 40 CFR §257.94(e)(2), this ASD is being submitted within 90 days of detecting an unconfirmed statistically significant increase (SSI) above background values.

Project Background

SCES is a pulverized coal-fired electric generation facility which operates a landfill for disposal of dry scrubber ash and bottom ash generated during the coal combustion process at the facility. Incidental wastes generated during the operation of the facility may also be disposed in the landfill, as described in the initial registration notification to TCEQ and the most recent version of the Landfill Operations Plan for the facility. The landfill is currently comprised of two CCR disposal cells, Cells 1 and 2, which commenced receiving waste in early 2013 and October 2014, respectively. The approximate area of Cells 1 and 2 are 10.0 and 14.3 acres, respectively.

In accordance with 40 CFR §257 Appendix III and IV, the list of constituents for monitoring at SCES includes 18 inorganic compounds, total dissolved solids, radium-226, and radium-228. Currently, all monitoring wells are sampled and analyzed for 40 CFR §257 Appendix III constituents, in accordance with 40 CFR §257.94(a).

June 2019 Fluoride Detection

Fluoride was detected in MW-1 at a concentration of 0.73 mg/L during the June 2019 semiannual groundwater monitoring event.



Naturally Occurring Fluoride in Regional Groundwater

Median fluoride concentrations in groundwater samples from a regional major aquifer (Trinity) and a regional minor aquifer (Woodbine) are 0.7 mg/L (n=1,524) and 1.0 mg/L (n=179), respectively (Reedy et al., 2011). The June 2019 MW-1 fluoride detection of 0.73 mg/L in MW-1 is consistent with expected regional fluoride concentrations in groundwater. Fluoride concentrations in SCES upgradient well BW-1 range from <0.3 mg/L to 0.94 mg/L, indicating that SCES background groundwater fluoride concentrations are comparable to regional naturally-occurring concentrations.

Naturally Occurring Fluoride in Texas Soils

The Texas Commission on Environmental Quality (TCEQ) Texas-Specific Soil Background Concentration (TSBC) for fluoride is 190 mg/kg (equivalent mg/L) in soil (see attached TCEQ TSBC guidance). Note that the naturally-occurring median fluoride concentration expected in Texas soils is orders of magnitude greater than the concentration that is the subject of this ASD, detected in groundwater on June 24, 2019.

Statistical Analysis

Initial statistical analysis of fluoride in MW-1 included the use of a non-parametric prediction limit, using background data collected from MW-1. This test is appropriate because the background data pool for fluoride in MW-1 is non-normally distributed. Therefore, the intrawell statistical limit is represented as the highest of the eight background values from fluoride in MW-1 (see "Intrawell Limit" in Table 1).

Since the June 2019 laboratory result for fluoride in MW-1 exceeded its respective intrawell limit, additional statistical evaluation was performed in accordance with 40 CFR §257.94(e)(2). This additional analysis consisted of calculating an interwell parametric prediction limit (see "Interwell Limit" in Table 1 and attachments). This test is commonly used to provide a comparison between a detection in a downgradient monitoring well and a statistical limit derived from background data from one or more upgradient monitoring wells. If the detection falls below the interwell statistical limit, this is evidence that the detection is representative of background data.

Table 1 – June 2019 Unconfirmed SSIs (mg/L)

MW- ID	Constituent	Lab Result	Intrawell Limit	Interwell Limit
MW-1	Fluoride	0.73	0.4	1.187

Conclusion

As a result of this analysis comparing upgradient to downgradient data, the interwell statistical limit is higher than the June 2019 laboratory result for fluoride in MW-1. Attached are the interwell statistical graph and data, demonstrating the comparison between the upgradient and downgradient wells. The detection appears to be coming from a non-landfill, upgradient source, so no further action is recommended. The detection is most likely a naturally-derived component of the site geology, which can result in a natural variation in groundwater quality. The detected concentration is consistent with expected naturally-occurring fluoride concentrations in regional groundwater.

Closing

SCS recommends that the facility remain in detection monitoring, in accordance with 40 CFR §257.94, as these ASDs satisfy the 90-day demonstration period requirement outlined in 40 CFR §257.94(e)(2). Please contact Jim Lawrence at (817) 358-6106 if you have comments or require additional information.

Sincerely,



Doug Steen
Staff Professional
SCS ENGINEERS
TBPE Registration No. F-3407

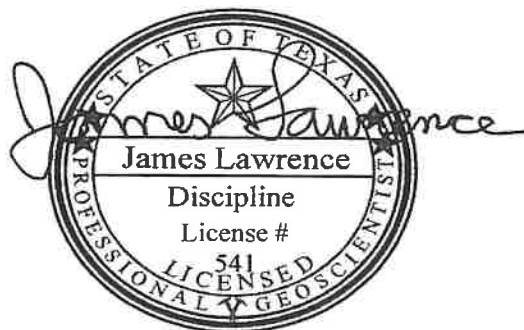


James Lawrence, P.G.
Project Director
SCS ENGINEERS

Attachments: Interwell Statistical Graph and Data
TCEQ Texas-Specific Soil Background Concentrations Guidance

References:

Reedy, R.C., B.R. Scanlon, S. Walden, and G. Strassberg (2011), Naturally Occurring Groundwater Contamination in Texas, *Bureau of Economic Geology, The University of Texas at Austin*, TWDB Contract No. 1004831125, 203 p.

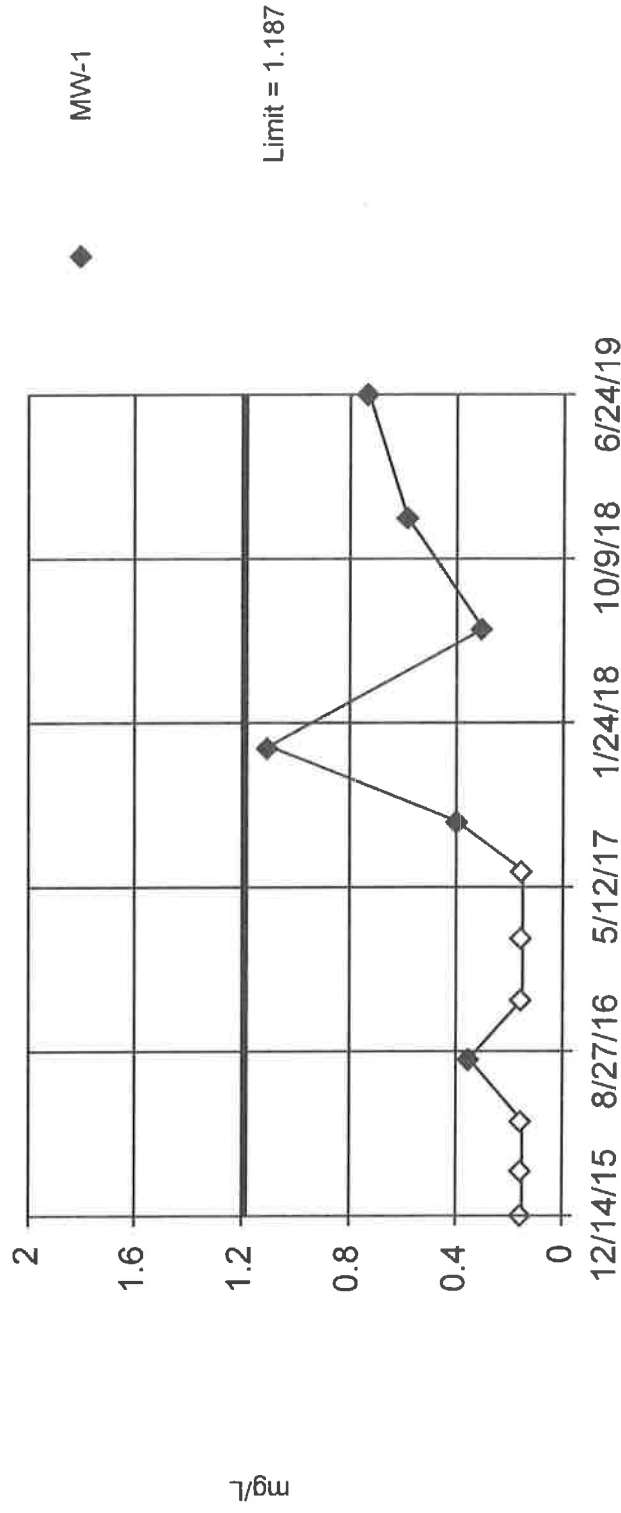


9.6.2019

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (after Cohen's Adjustment): Mean=0.4018, Std. Dev.=0.3908, n=8, 37.5% NDs.
Insufficient data to test for seasonality; not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8478, critical = 0.818. Report alpha = 0.05. Most recent point compared to limit.

Constituent: Fluoride Analysis Run 8/16/2019 9:19 AM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_7.31.2019

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/16/2019 9:20 AM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_7.31.2019

	MW-1	BW-1 (bg)
12/14/2015	<0.3	<0.3
2/25/2016	<0.3	0.67
5/11/2016	<0.3	0.32
8/16/2016	0.35	0.94
11/17/2016	<0.3	0.85
2/23/2017	<0.3	<0.3
6/7/2017	<0.3	<0.3
8/24/2017	0.4	0.37
12/20/2017	1.1	
6/21/2018	0.3	
12/13/2018	0.585	
6/24/2019	0.73	

Texas-Specific Soil Background Concentrations milligrams per kilogram (mg/kg) ¹	
Metal	Median Background Concentration (mg/kg)
Aluminum	30,000
Antimony	1
Arsenic	5.9
Barium	300
Beryllium	1.5
Boron	30
Total Chromium	30
Cobalt	7
Copper	15
Fluoride	190
Iron	15,000
Lead	15
Manganese	300
Mercury	0.04
Nickel	10
Selenium	0.3
Strontium	100
Tin	0.9
Titanium	2,000
Thorium	9.3
Vanadium	50
Zinc	30

¹ Source: "Background Geochemistry of Some Rocks, Soils, Plants, and Vegetables in the Conterminous United States", by Jon J. Connor, Hansford T. Shacklette, et al., Geological Survey Professional Paper 574-F, US Geological Survey.

January 31, 2020
SCS Project 16218157.00

Mr. Darryl Sparks
Compliance Manager
NAES Corporation
2161 Rattlesnake Road
Riesel, Texas 76682

Subject: Alternate Source Demonstration for Boron in MW-3
2019 Annual Groundwater Monitoring and Corrective Action Report
Sandy Creek Energy Station
McLennan County, Texas

Dear Mr. Sparks:

On behalf of the Sandy Creek Energy Station (SCES), SCS Engineers (SCS) is submitting this Alternate Source Demonstration (ASD) in accordance with the site Groundwater Sampling and Analysis Plan (GWSAP) prepared by SCS, dated March 2, 2016, and Coal Combustion Residual Rule (CCR) 40 CFR §257.94(e)(2) for a boron detection in groundwater monitoring well MW-3. During the December 2019 groundwater monitoring event, boron was detected in MW-3 at 1.26 mg/L, above the statistical limit of 1.2 mg/L. This ASD was conducted to investigate the likely source of the boron detection. In accordance with 40 CFR §257.94(e)(2), this ASD is being submitted within 90 days of detecting an unconfirmed statistically significant increase (SSI) above background values.

Project Background

SCES is a pulverized coal-fired electric generation facility which operates a landfill for disposal of dry scrubber ash and bottom ash generated during the coal combustion process at the facility. Incidental wastes generated during the operation of the facility may also be disposed in the landfill, as described in the initial registration notification to TCEQ and the most recent version of the Landfill Operations Plan for the facility. The landfill is currently comprised of two CCR disposal cells, Cells 1 and 2, which commenced receiving waste in early 2013 and October 2014, respectively. The approximate area of Cells 1 and 2 are 10.0 and 14.3 acres, respectively.

In accordance with 40 CFR §257 Appendix III and IV, the list of constituents for monitoring at SCES includes 18 inorganic compounds, total dissolved solids, radium-226, and radium-228. Currently, all monitoring wells are sampled and analyzed for 40 CFR §257 Appendix III constituents, in accordance with 40 CFR §257.94(a).

December 2019 Boron Detection

Boron was detected in MW-3 at a concentration of 1.26 mg/L during the December 2019 semiannual groundwater monitoring event.



Naturally Occurring Boron in Texas Soils

The Texas Commission on Environmental Quality (TCEQ) Texas-Specific Soil Background Concentration (TSBC) for boron is 30 mg/kg (equivalent mg/L) in soil (see attached TCEQ TSBC guidance). Note that the naturally-occurring median boron concentration expected in Texas soils is much greater than the concentration that is the subject of this ASD, detected in groundwater on December 10, 2019.

Statistical Analysis

Initial statistical analysis of boron in MW-3 included the use of a non-parametric prediction limit, using background data collected from MW-3. This test is appropriate because the background data pool for boron in MW-3 is non-normally distributed. Therefore, the intrawell statistical limit is represented as the highest of the eight background values from boron in MW-3 (see "Intrawell Limit" in Table 1).

Since the December 2019 laboratory result for boron in MW-3 exceeded its respective intrawell limit, additional statistical evaluation was performed in accordance with 40 CFR §257.94(e)(2). This additional analysis consisted of calculating an interwell parametric prediction limit (see "Interwell Limit" in Table 1 and attachments). This test is commonly used to provide a comparison between a detection in a downgradient monitoring well and a statistical limit derived from background data from one or more upgradient monitoring wells. If the detection falls below the interwell statistical limit, this is evidence that the detection is representative of background data.

Table 1 – December 2019 Unconfirmed SSIs (mg/L)

MW- ID	Constituent	Lab Result	Intrawell Limit	Interwell Limit
MW-3	Boron	1.26	1.2	4.268

Conclusion

As a result of this analysis comparing upgradient to downgradient data, the interwell statistical limit is higher than the December 2019 laboratory result for boron in MW-3. Attached are the interwell statistical graph and data, demonstrating the comparison between the upgradient and downgradient wells. The detection appears to be coming from a non-landfill, upgradient source, so no further action is recommended. The detection is most likely a naturally-derived component of the site geology, which can result in a natural variation in groundwater quality. The detected concentration is consistent with expected naturally-occurring boron concentrations in regional groundwater.

Closing

SCS recommends that the facility remain in detection monitoring, in accordance with 40 CFR §257.94, as these ASDs satisfy the 90-day demonstration period requirement outlined in 40 CFR §257.94(e)(2). Please contact Jim Lawrence at (817) 358-6106 if you have comments or require additional information.

Sincerely,

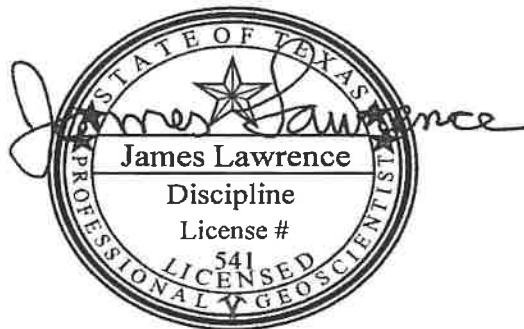


Tyson Milbrand
Staff Professional
SCS ENGINEERS
TBPE Registration No. F-3407



James Lawrence, P.G.
Project Director
SCS ENGINEERS

Attachments: Interwell Statistical Graph and Data
TCEQ Texas-Specific Soil Background Concentrations Guidance

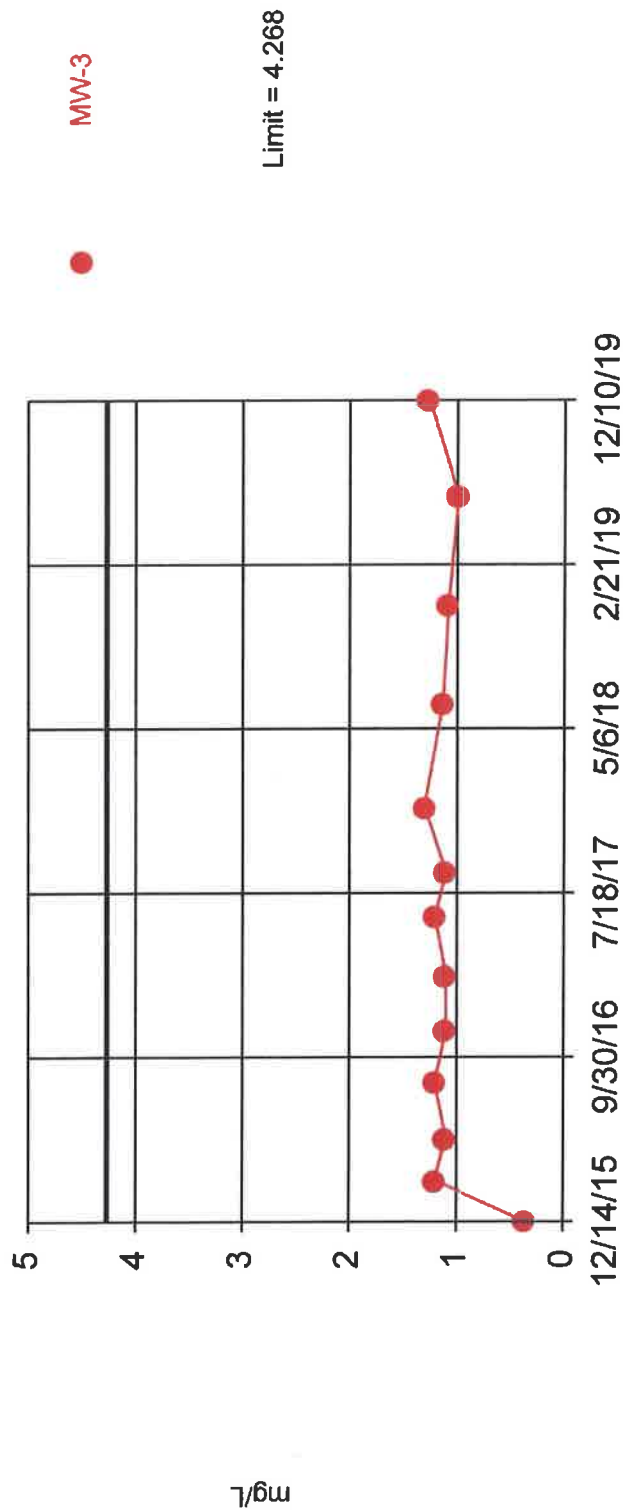


1.31.2020

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=3.249, Std. Dev.=0.5509, n=13. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8952, critical = 0.866. Report alpha = 0.05. Most recent point compared to limit.

Constituent: Boron Analysis Run 1/21/2020 12:23 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/21/2020 12:24 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

	BW-1 (bg)	MW-3
12/14/2015	1.8	0.35
2/25/2016	3.5	1.2
5/11/2016	4	1.1
8/16/2016	3.7	1.2
11/17/2016	2.8	1.1
2/23/2017	3.1	1.1
6/7/2017	3.8	1.2
8/24/2017	3.4	1.1
12/20/2017	3.5	1.3
6/21/2018	3.31	1.13
12/13/2018	3.25	1.08
6/24/2019	3.1	0.99
12/10/2019	2.98	1.26

Non-Parametric ANOVA

Constituent: Boron Analysis Run 1/21/2020 12:23 PM
Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas)_1.21.2020

For observations made between 12/14/2015 and 12/10/2019, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 18.88

Tabulated Chi-Squared value = 3.841 with 1 degree of freedom at the 5% significance level.

There were 4 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.

Kruskal-Wallis statistic (H) = 18.78

Adjusted Kruskal-Wallis statistic (H') = 18.88

The contrast test was performed to determine if any compliance group concentration was significantly higher than the background concentration. The contrast test indicates statistical significance in none of the compliance wells.

Contrast table:

Well	Difference	Contrast	Significant?
MW-3	-13	4.932	No

The critical (contrast) value was computed with 1 degree of freedom and a 5% error level for each well comparison. (Note: In this case, with Anova indicating differences that are not reflected in the contrast test, It should be concluded that it is the median of the Background data which is significantly higher.)

Non-parametric test used in lieu of parametric anova because the Shapiro Wilk normality test showed the residuals to be non-normal at the 0.01 alpha level.

Non-Parametric ANOVA

Constituent: Boron (mg/L) Analysis Run 1/21/2020 12:23 PM

Sandy Creek Energy Station Client: Sandy Creek Data: Sandy Creek GWdata (Sanitas) 1/21/2020

	BW-1 (bg)	MW-3
12/14/2015	1.8	0.35
2/25/2016	3.5	1.2
5/11/2016	4	1.1
8/16/2016	3.7	1.2
11/17/2016	2.8	1.1
2/23/2017	3.1	1.1
6/7/2017	3.8	1.2
8/24/2017	3.4	1.1
12/20/2017	3.5	1.3
6/21/2018	3.31	1.13
12/13/2018	3.25	1.08
6/24/2019	3.1	0.99
12/10/2019	2.98	1.26

Texas-Specific Soil Background Concentrations milligrams per kilogram (mg/kg) ¹	
Metal	Median Background Concentration (mg/kg)
Aluminum	30,000
Antimony	1
Arsenic	5.9
Barium	300
Beryllium	1.5
Boron	30
Total Chromium	30
Cobalt	7
Copper	15
Fluoride	190
Iron	15,000
Lead	15
Manganese	300
Mercury	0.04
Nickel	10
Selenium	0.3
Strontium	100
Tin	0.9
Titanium	2,000
Thorium	9.3
Vanadium	50
Zinc	30

¹ Source: "Background Geochemistry of Some Rocks, Soils, Plants, and Vegetables in the Conterminous United States", by Jon J. Connor, Hansford T. Shacklette, et al., Geological Survey Professional Paper 574-F, US Geological Survey.