2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CCR LANDFILL
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

Presented To:
KCP&L Greater Missouri Operations Company

SCS ENGINEERS

27213169.18 | January 2019, Revised December 16, 2022

8575 W 110th Street, Suite 100
Overland Park, Kansas 66210
913-681-0030

CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and Registered Geologist in the State of Missouri, do hereby certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

John R. Rockhold, R.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Missouri, do hereby certify that the 2018 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

Douglas L. Doerr, P.E.

SCS Engineers

Revision Number	Revision Date	Revision Section	Summary of Revisions
0	January 2019	NA	Original Report.
1	December 16, 2022	Addendum 1	Added Addendum 1

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Appendices

1 INTRODUCTION

This 2018 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the "Coal Combustion Residuals (CCR) Final Rule" (Rule) published by the United States Environmental Protection Agency (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (USEPA, 2015). Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90 (e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2018 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station.

2 § 257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:*

2.1 § 257.90(E)(1) SITE MAP

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

A site map with an aerial image showing the CCR Landfill and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR Landfill groundwater monitoring program is provided as **Figure 1** in **Appendix A**.

2.2 § 257.90(E)(2) MONITORING SYSTEM CHANGES

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

No new monitoring wells were installed and no wells were decommissioned as part of the CCR groundwater monitoring program for the CCR Landfill in 2018.

2.3 § 257.90(E)(3) SUMMARY OF SAMPLING EVENTS

In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and

downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

Only detection monitoring was conducted during the reporting period (2018). Samples collected in 2018 were collected and analyzed for Appendix III detection monitoring constituents as indicated in **Appendix B**, **Table 1** (Appendix III Detection Monitoring Results, and **Table 2** (Detection Monitoring Field Measurements). The dates of sample collection, the monitoring program requiring the sample, and the results of the analyses are also provided in these tables. These tables include both the Spring 2018 semiannual detection monitoring data and the Fall 2018 semiannual detection monitoring data.

2.4 § 257.90(E)(4) MONITORING TRANSITION NARRATIVE

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

There was no transition between monitoring programs in 2018. Only detection monitoring was conducted in 2018.

2.5 § 257.90(e)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

A summary of potentially required information and the corresponding section of the Rule is provided in the following sections. In addition, the information, if applicable, is provided.

2.5.1 § 257.90(e) Program Status

Status of Groundwater Monitoring and Corrective Action Program.

The groundwater monitoring and corrective action program is in detection monitoring.

Summary of Key Actions Completed.

a. completion of the statistical evaluation of the initial Fall 2017 semiannual detection monitoring event per the certified statistical method,

b. completion of the 2017 Annual Groundwater Monitoring and Corrective Action Report,

c. completion of a successful alternative source demonstration for the Fall 2017 semiannual detection monitoring event,

d. completion of the Spring 2018 semiannual detection monitoring sampling and analysis event, and subsequent verification sampling per the certified statistical method,

e. completion of the statistical evaluation of the Spring 2018 semiannual detection monitoring event per the certified statistical method,

f. completion of a successful alternative source demonstration for the Spring 2018 semiannual

detection monitoring event, and

g. initiation of the Fall 2018 semiannual detection monitoring sampling and analysis event.

Description of Any Problems Encountered.

No noteworthy problems were encountered.

Discussion of Actions to Resolve the Problems.

Not applicable because no noteworthy problems were encountered.

Projection of Key Activities for the Upcoming Year (2019).

Semiannual Spring and Fall 2019 groundwater sampling and analysis. Completion of verification sampling and analyses and statistical evaluation of Fall 2018 and Spring 2019 detection monitoring data and, if required, alternative source demonstration(s).

2.5.2 § 257.94(d)(3) Demonstration for Alternative Detection Monitoring Frequency

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable because no alternative monitoring frequency for detection monitoring and certification was pursued.

2.5.3 § 257.94(e)(2) Detection Monitoring Alternate Source Demonstration

Demonstration that a source other than the CCR unit caused the statistically significant increase (SSI) over background levels for a constituent or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.

The following reports are included in **Appendix C**:

C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (April 2018).

C.2. Supplemental Data for CCR Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (April 2018).

C.3 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (December 2018).

C.4 Supplemental Data for Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (December 2018).

2.5.4 § 257.95(c)(3) Demonstration for Alternative Assessment Monitoring Frequency

The owner or operator must obtain a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority stating that the demonstration for an alternative groundwater sampling and analysis frequency meets the requirements of this section. The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable because there was no assessment monitoring conducted.

2.5.5 § 257.95(d)(3) Assessment Monitoring Concentrations and Groundwater Protection Standards

Include the concentrations of Appendix III and detected Appendix IV constituents from the assessment monitoring, the established background concentrations, and the established groundwater protection standards.

Not applicable because there was no assessment monitoring conducted.

2.5.6 § 257.95(g)(3)(ii) Assessment Monitoring Alternate Source Demonstration

Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in appendices III and IV to this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

Not applicable because there was no assessment monitoring conducted.

2.5.7 § 257.96(a) Demonstration for Additional Time for Assessment of Corrective Measures

Within 90 days of finding that any constituent listed in appendix IV to this part has been detected at a statistically significant level exceeding the groundwater protection standard defined under § 257.95(h), or immediately upon detection of a release from a CCR unit, the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases

and to restore affected area to original conditions. The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for no longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or approval from EPA where EPA is the permitting authority.

Not applicable because there was no assessment monitoring conducted.

3 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. The information contained in this report is a reflection of the conditions encountered at the Sibley Generating Station at the time of fieldwork. This report includes a review and compilation of the required information and does not reflect any variations of the subsurface, which may occur between sampling locations. Actual subsurface conditions may vary and the extent of such variations may not become evident without further investigation.

Conclusions drawn by others from the result of this work should recognize the limitation of the methods used. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of KCP&L Greater Missouri Operations Company for specific application to the Sibley Generating Station CCR Landfill. No warranties, express or implied, are intended or made.

APPENDIX A

FIGURES

Figure 1: Site Map

LEGEND:

506 CCR GROUNDWATER MONITORING SYSTEM WELLS

CCR LANDFILL UNIT BOUNDARY

NOTES:

1. HORIZONTAL & VERTICAL DATUM: URS PLANS FOR CONSTRUCTION, KCP&L SIBLEY GENERATING STATION, DESIGN FILE 16530511.00001, DATED JANUARY 2010
2. GOOGLE EARTH AERIAL IMAGE, MARCH 2015. MONITOR WELL LOCATIONS ARE APPROXIMATE.
3. BOUNDARY AND MONITORING WELL LOCATIONS SHOWN ARE APPROXIMATE.

200 0 200 400

SCALE FEET

REV.	DATE
-	-

SHEET TITLE
SITE MAP
CCR LANDFILL
CCR GROUNDWATER MONITORING SYSTEM

PROJECT TITLE
2018 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CLIENT
KCP&L GREATER MISSOURI OPERATIONS CO.
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
8575 W. 110th St., Ste. 100
Overland Park, Kansas 66210
PH: (913) 681-0030 FAX: (913) 681-0012

PROJ. NO.	DWN. BY:	Q/A RVW BY:	
27213167.18	TGW	JRF	
DSN. BY:	CHK. BY:	PROJ. MGR.	
TGW	JRF	JRF	

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FIG 1 - SIBLEY LF V0.02.DWG

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FIGURE NO.
1

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APPENDIX B

TABLES

Table 1: Appendix III Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

Table 1
CCR Landfill
Appendix III Detection Monitoring Results
KCP&L GMO Sibley Generating Station

Well Number	Sample Date	Appendix III Constituents						
		Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	pH (S.U.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
MW-504	5/17/2018	<0.200	33.3	1.11	0.216	6.41	32.8	193
MW-504	6/27/2018	---	---	---	*0.135	**6.70	*31.8	---
MW-504	8/8/2018	---	---	---	---	**6.62	*32.3	---
MW-504	11/15/2018	<0.200	45.0	<1.00	0.208	7.01	33.9	211
MW-505	5/17/2018	<0.200	28.2	1.09	0.247	6.60	14.0	170
MW-505	6/27/2018	---	*25.8	---	---	**6.82	---	---
MW-505	11/15/2018	<0.200	30.8	<1.00	0.212	7.09	14.6	167
MW-506	5/17/2018	<0.200	94.9	6.69	0.32	6.97	75.7	442
MW-506	6/27/2018	---	---	*5.80	---	**7.02	---	---
MW-506	11/15/2018	<0.200	93.4	6.69	0.199	7.08	70.8	426
MW-510	5/17/2018	<0.200	120	3.44	0.348	6.82	17.3	494
MW-510	6/27/2018	---	---	---	*0.282	**7.01	---	---
MW-510	11/15/2018	<0.200	120	3.15	0.204	7.05	17.5	478
MW-512	5/17/2018	<0.200	104	3.64	0.328	6.85	29.6	419
MW-512	6/27/2018	---	---	---	---	**6.95	*30.3	---
MW-512	8/8/2018	---	---	---	---	**6.78	*30.9	---
MW-512	11/15/2018	<0.200	110	3.89	0.192	7.09	51.4	452
MW-601	5/17/2018	<0.200	104	4.02	0.275	6.72	28.3	431
MW-601	6/27/2018	---	---	*2.82	---	**6.98	*10.3	---
MW-601	11/15/2018	<0.200	105	3.35	0.158	6.96	13.3	397

* Verification sample obtained per certified statistical method and Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, March 2009.
**Extra Sample for Quality Control Validation or per Standard Sampling Procedure
mg/L - miligrams per liter
S.U. - Standard Units
--- Not Sampled

Table 2
CCR Landfill
Detection Monitoring Field Measurements
KCP&L GMO Sibley Generating Station

Well Number	Sample Date	pH (S.U.)	Specific Conductivity (µS)	Temperature (°C)	ORP (mV)	Turbidity (NTU)	DO (mg/L)	Water Level (ft btoc)	Groundwater Elevation (ft NGVD)
MW-504	5/17/2018	6.41	300	16.96	183	0.0	4.66	21.86	794.46
MW-504	6/27/2018	**6.70	257	15.96	157	0.0	3.95	22.48	793.84
MW-504	8/8/2018	**6.62	255	18.77	141	0.0	4.52	23.32	793.00
MW-504	11/15/2018	7.01	380	11.13	190	0.0	0.00	21.73	794.59
MW-505	5/17/2018	6.60	228	17.16	220	0.0	8.25	27.81	787.16
MW-505	6/27/2018	**6.82	249	16.19	166	0.0	5.09	28.10	786.87
MW-505	11/15/2018	7.09	278	12.27	183	0.0	0.00	27.38	787.59
MW-506	5/17/2018	6.97	693	18.61	217	0.0	6.52	BTP	NA
MW-506	6/27/2018	**7.02	710	21.45	161	0.0	6.12	BTP	NA
MW-506	11/15/2018	7.08	727	12.13	189	0.0	0.20	BTP	NA
MW-510	5/17/2018	6.82	748	17.00	229	0.0	3.10	45.50	740.29
MW-510	6/27/2018	**7.01	752	17.39	165	0.0	0.54	45.88	739.91
MW-510	11/15/2018	7.05	898	12.47	101	1.4	4.00	45.91	739.88
MW-512	5/17/2018	6.85	683	17.00	107	0.0	3.09	32.35	737.78
MW-512	6/27/2018	**6.95	658	19.95	163	0.0	0.29	32.99	737.14
MW-512	8/8/2018	**6.78	583	26.27	39	0.0	3.96	34.00	736.13
MW-512	11/15/2018	7.09	792	13.36	120	0.0	0.00	29.90	740.23
MW-601	5/17/2018	6.72	656	16.77	189	0.0	1.14	46.35	734.55
MW-601	6/27/2018	**6.98	603	16.48	169	0.0	0.56	46.57	734.33
MW-601	11/15/2018	6.96	753	12.86	105	0.0	0.00	46.14	734.76

**Extra Sample for Quality Control Validation or per Standard Sampling Procedure
S.U. - Standard Units
µS - microsiemens
°C - Degrees Celsius
ft btoc - Feet Below Top of Casing
ft NGVD - National Geodetic Vertical Datum (NAVD 88)
NTU - Nephelometric Turbidity Unit
BTP - Below Top of Pump
NA - Not Applicable

APPENDIX C

ALTERNATIVE SOURCE DEMONSTRATIONS

C.1 Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event

C.2. Supplemental Data, Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event

C.3 Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event

C.4 Supplemental Data, Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event

C.1 Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event

CCR GROUNDWATER MONITORING
ALTERNATIVE SOURCE DEMONSTRATION REPORT
OCTOBER 2017 GROUNDWATER MONITORING EVENT

CCR LANDFILL
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

Presented To:

KCP&L Greater Missouri Operations Company

Presented By:

SCS ENGINEERS
7311 West 130th Street, Suite 100
Overland Park, Kansas 66213
(913) 681-0030

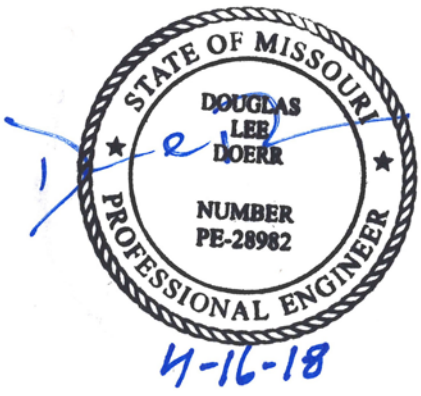
April 2018
File No. 27213169.17

CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and Registered Geologist in the State of Missouri, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

John R. Rockhold, R.G.
SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Missouri, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted engineering practices and the local standard of care.



Douglas L. Doerr, P.E.
SCS Engineers

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Appendices

1 REGULATORY FRAMEWORK

In accordance with the Coal Combustion Residuals (CCR) Final Rule § 257.94(e)(2), the owner or operator of the CCR unit may demonstrate that a source other than the CCR unit caused the statistically significant increase (SSI) over background levels for a constituent, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a SSI over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under § 257.94. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at KCP&L Greater Missouri Operations Company's Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification by a Qualified Professional Engineer" document dated October 12, 2017. Groundwater samples were collected and analyzed by October 17, 2017. A statistical analysis was conducted to determine whether there is a SSI over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring.

If an SSI is preliminarily identified by the prediction limit analysis, verification retesting will be performed in accordance with the certified statistical method and the resampling plan to verify the result is not due to an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Up to two rounds of verification sampling and retesting may be conducted. Verification retesting with a "1 of 2" or "1 of 3" resampling plan is performed by collecting a verification sample(s) and comparing it to the calculated prediction limit. If the resulting concentration of any verification sample is not above the prediction limit, then an SSI has not occurred.

Determinations of SSIs for the CCR Landfill at the Sibley Generating Station were completed no later than January 15, 2018 and placed into the CCR Operating Record.

The completed statistical evaluation identified Appendix III constituent, chloride, above its prediction limit in monitoring wells MW-505 and MW-601. The prediction limit for chloride in upgradient monitoring well MW-505 is 1.19 mg/L. The detection monitoring sample was reported at 3.13 mg/L. The first verification sample was collected on November 16, 2017 with a result of 1.59 mg/L. The second verification sample was collected on December 28, 2017 with a result of 2.12 mg/L.

The prediction limit for chloride in monitoring well MW-601 is 3.58 mg/L. The detection monitoring sample was reported at 6.1 mg/L. The first verification sample was collected on November 16, 2017 with a result of 3.87 mg/L. The second verification sample was collected on December 28, 2017 with a result of 3.95 mg/L.

Therefore, in accordance with the procedures outlined in the Statistical Method Certification, the detection monitoring samples for chloride from monitoring wells MW-505 and MW-601 exceed their prediction limits and are confirmed SSIs over background.

3 ALTERNATIVE SOURCE DEMONSTRATION

An Alternative Source Demonstration (ASD) is a means to provide supporting lines of evidence that something other than a release from a regulated CCR unit caused an SSI. For the above identified SSIs for the CCR Landfill at the Sibley Generating Station, there are multiple lines of supporting evidence to indicate the above SSIs were not caused by a release from the CCR Landfill. Select multiple lines of supporting evidence are described as follows.

3.1 UPGRADIENT WELL LOCATION

Figure 1 in **Appendix A** shows a potentiometric surface contour map indicating the direction of groundwater flow at and near the CCR Landfill at the time of sampling. Although the groundwater flow directions indicated are for the October 2017 groundwater monitoring event, the flow directions shown are typical. As seen in the map, monitoring well MW-505 is located upgradient from the CCR Landfill indicating the SSI is not caused by a release from the CCR Landfill. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels for chloride, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.2 BOX AND WHISKERS PLOTS

A commonly accepted method to demonstrate and visualize the distribution of data in a given data set is to construct box and whiskers plots. The basic box plotted graphically locates the median, 25th and 75th percentiles of the data set; the "whiskers" extend to the minimum and maximum values of the data set. The range between the ends of a box plot represents the Interquartile Range, which can be used as an estimate of spread or variability. The mean is denoted by a "+".

When comparing multiple wells or well groups, box plots for each well can be lined up on the same axes to roughly compare the variability in each well. This may be used as an exploratory screening for the test of homogeneity of variance across multiple wells.

Box and whiskers plots for chloride in monitoring wells MW-505 and MW-601 were compared to box and whisker plots for chloride in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes. The comparison indicates the chloride concentrations in both MW-505 and MW-601 are well within expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill. **Figure 1** in **Appendix A** shows these upgradient non-CCR monitoring system wells and their relationships

to groundwater flow near and beneath the CCR Landfill. Because the non-CCR monitoring system wells are located in a nearby area that has not been impacted by the landfill, and exhibit variability that includes chloride concentrations similar to those seen at MW-505 and MW-601, the observed chloride concentrations are within the range of expected natural spatial variation within and between wells. This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for chloride, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots are provided in **Appendix B**.

3.3 PIPER DIAGRAM PLOTS

Piper diagrams are a form of tri-linear diagram, and a widely-accepted method to provide a visual representation of the ion concentration of groundwater. Piper diagrams portray water compositions and facilitate the interpretation and presentation of chemical analysis. They may be used to visually compare the chemical composition of water quality across wells, and aid in determining whether the waters are similar or dis-similar, and can over time indicate whether the waters are mixing.

A piper diagram has two triangular plots on the right and left side of a 4-sided center field. The three major cations are plotted in the left triangle and anions in the right. Each of the three cation/anion variables, in milliequivalents, is divided by the sum of the three values, to produce a percent of total cation/anions. These percentages determine the location of the associated symbol. The data points in the center field are located by extending the points in the lower triangles to the point of intersection. In order for a piper diagram to be produced, the selected data file must contain the following constituents: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Chloride (Cl), Sulfate (SO4), Carbonate (CO3), and Bicarbonate (HCO3).

A piper diagram generated for MW-505, MW-601, and landfill leachate is provided in **Appendix C** and indicates the groundwater from these two wells does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSI over background levels for chloride, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.4 TIME SERIES PLOTS

Time series plots provide a graphical method to view changes in data at a particular well (monitoring point) or wells over time. Time series plots display the variability in concentration levels over time and can be used to indicate possible outliers or data errors (i.e. “spikes”). More than one well can be compared on the same plot to look for differences between wells. Non-detect data is plotted as censored data at one-half of the laboratory reporting limit. Time series plots can also be used to examine the data for trends.

Time series plots for the CCR monitoring system wells indicate parallel “spikes” in concentration levels from both upgradient and downgradient wells and from upgradient non-CCR monitoring

system wells. Time series plots for both CCR monitoring system wells and the non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes are provided in **Appendix D**. These "spikes", similar in magnitude but from different monitor wells, are an indication of an otherwise unidentifiable laboratory or sampling issue, problem or change, and that the spikes are not likely the result of a release from the CCR Landfill, since a release would not be expected to cause such an increase across multiple wells (including upgradient wells) simultaneously. This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for chloride, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the CCR Landfill caused the SSIs over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the CCR Landfill may continue with the detection monitoring program under § 257.94.

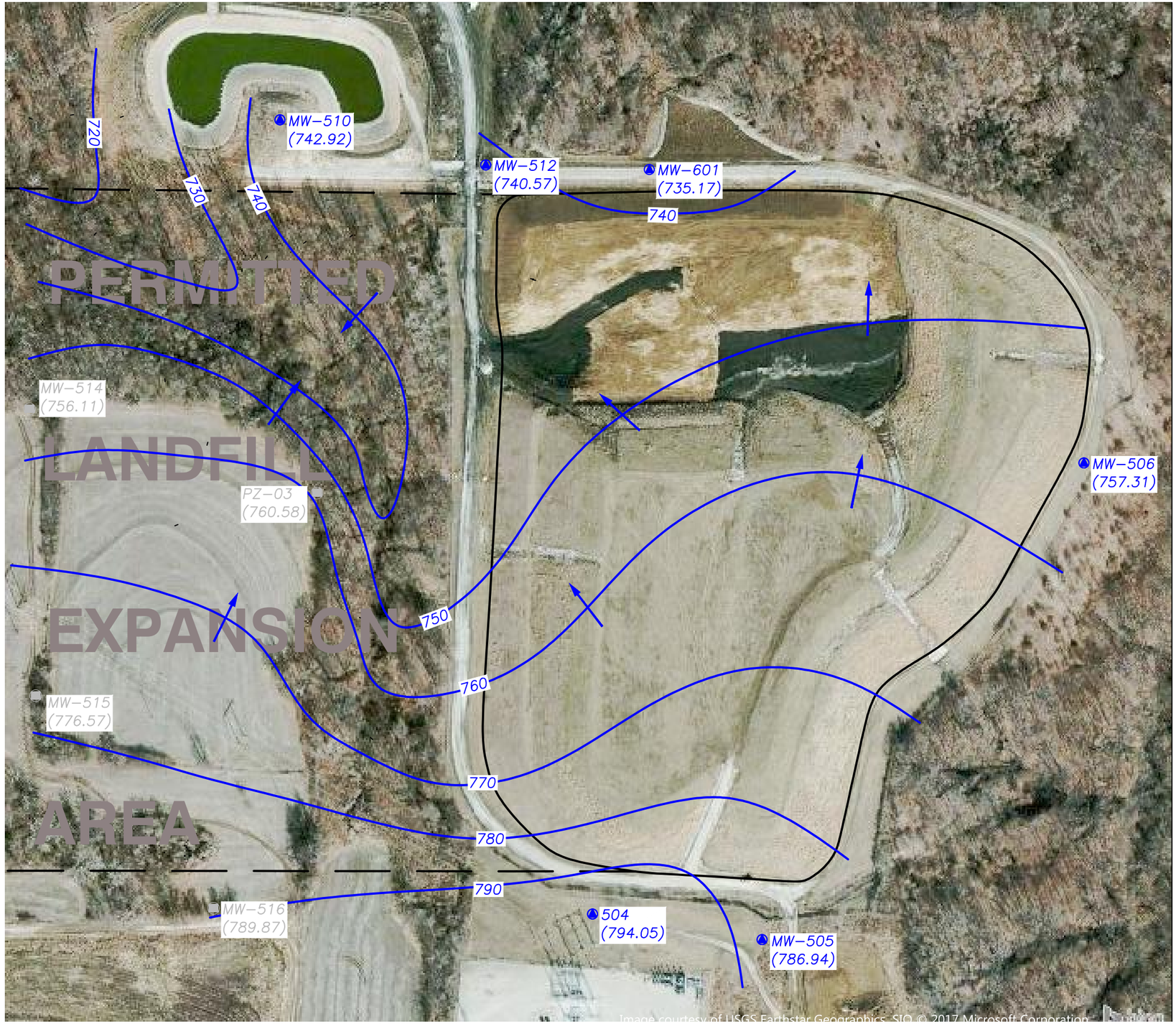
5 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of KCP&L Greater Missouri Operations Company for specific application to the Sibley Generating Station. No warranties, express or implied, are intended or made.

The signature of the certifying registered geologist and professional engineer on this document represents that to the best of his knowledge, information, and belief in the exercise of his professional judgement in accordance with the standard of practice, it is his professional opinion that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by him are made on the basis of his experience, qualifications, and professional judgement and are not to be construed as warranties or guaranties. In addition, opinions relating to regulatory, environmental, geologic, geochemical and geotechnical conditions interpretations or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Appendix A

Figure 1



LEGEND:

- 760 — GROUNDWATER SURFACE ELEVATIONS (REPRESENTATIVE OF THIS UNIT)
- MW–514 (756.11) CCR GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
- PERMITTED LANDFILL EXPANSION AREA
- PERMITTED LANDFILL EXPANSION AREA
- 514 (756.11) NON–CCR GROUNDWATER MONITORING WELLS

NOTES:

1. HORIZONTAL & VERTICAL DATUM: URS PLANS FOR CONSTRUCTION, KCP&L SIBLEY GENERATING STATION, DESIGN FILE 16530511.00001, DATED JANUARY 2010
2. GOOGLE EARTH AERIAL IMAGE, MARCH 2015.
3. MONITORING WELL AND UNIT BOUNDARY LOCATIONS SHOWN ARE APPROXIMATE.

200 0 200 400
SCALE FEET

REV.	DATE
-	-

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (OCT 2017) CCR LANDFILL

PROJECT TITLE: CCR ALTERNATE SOURCE DEMONSTRATION

CLIENT: KCP&L GREATER MISSOURI OPERATIONS CO.
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
7311 W. 130th St, Ste. 100
Overland Park, Kansas 66213
PH. (913) 681-0030 FAX. (913) 681-0012

PROJ. NO. 27213167.17
DSN. BY: RCW
DWN. BY: RCW
CHK. BY: JRR
QA REW BY: JRR
PROJ. MGR.: JRF

CADD FILE: 18-MAR_CCR ASD.DWG

DATE: 4/16/18

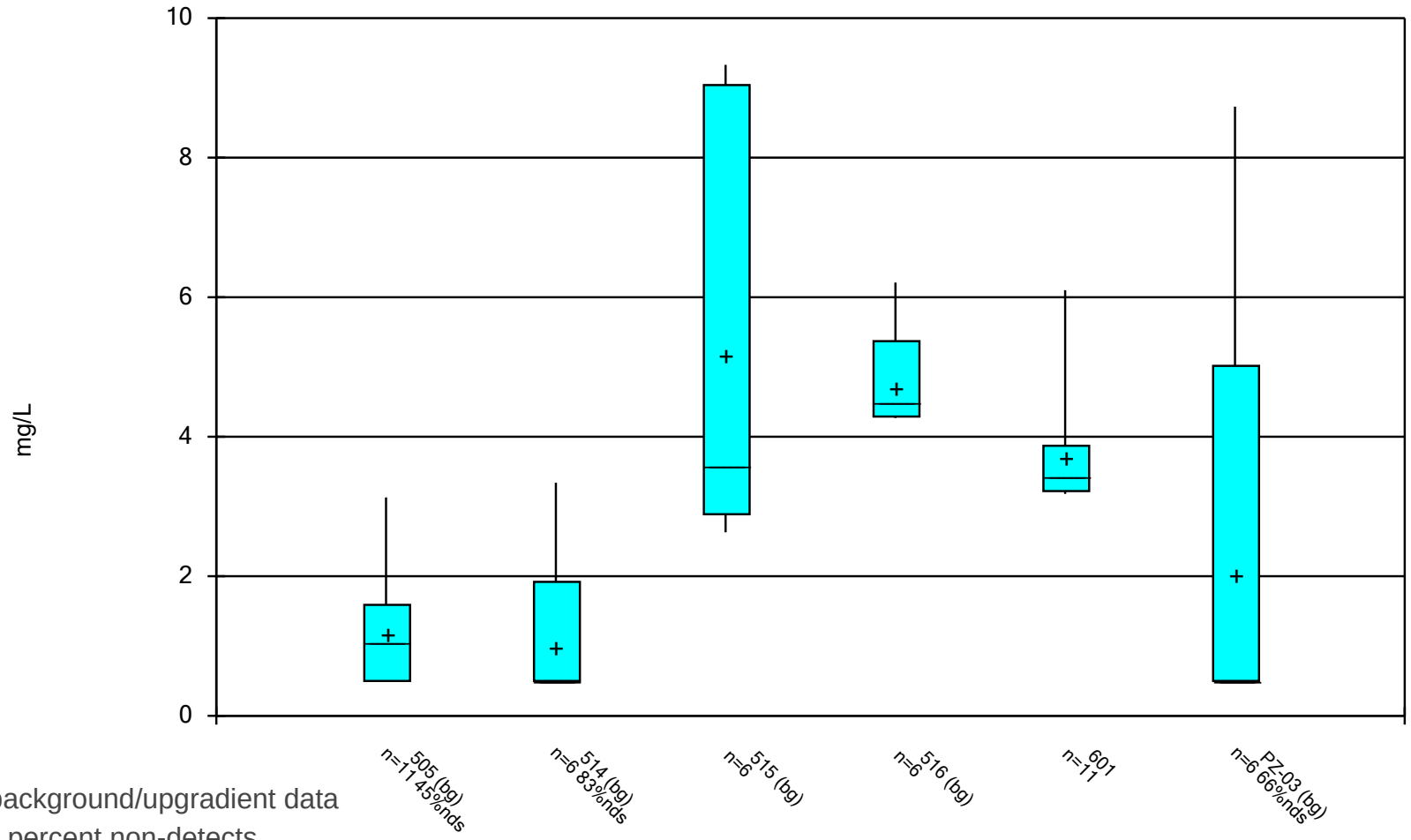
FIGURE NO. 1

N:\KCPL\Projects\Groundwater\DWG\Sibley\2018\03-20 _ CCR Alternative Source Demonstration\18-MAR_CCR ASD.dwg Apr 16, 2018 - 11:06am Layout Name: Fig 1 - Landfill By: 4121rcw

Appendix B

Box and Whiskers Plots

Box & Whiskers Plot



(bg) = background/upgradient data
%nds = percent non-detects
n = number of samples

Constituent: Chloride Analysis Run 3/5/2018 10:42 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

The basic box plot graphically locates the median, 25th and 75th percentiles of the data set; the "whiskers" extend to the minimum and maximum values of the data set. The range between the ends of a box plot represents the Interquartile Range. The mean is denoted by a "+".

Box & Whiskers Plot

Constituent: Chloride (mg/L) Analysis Run 3/5/2018 10:44 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505 (bg)	514 (bg)	515 (bg)	516 (bg)	601	PZ-03 (bg)
12/15/2015		<1	2.63	4.53	3.3	<1
12/16/2015	<1					
2/18/2016	1.05				3.22	
5/25/2016	<1					
5/26/2016		<1			3.18	<1
6/2/2016			3.46	4.27		
8/23/2016	1.19				3.41	
11/11/2016	<1	<1	3.69	4.31	3.51	<1
2/8/2017	<1				3.19	
5/3/2017					3.5	
5/4/2017	<1	<1	3.15	4.51		<1
8/1/2017	1.18				3.37	
10/3/2017	3.13	3.34	8.75	6.21	6.1	8.73
11/16/2017	1.59	<1	9.33	4.45	3.87	1.3
12/28/2017	2.12				3.95	
Median	1.05	0.5	3.58	4.48	3.41	0.5
LowerQ.	0.5	0.5	2.89	4.29	3.22	0.5
UpperQ.	1.59	1.92	9.04	5.37	3.87	5.02
Min	0.5	0.5	2.63	4.27	3.18	0.5
Max	3.13	3.34	9.33	6.21	6.1	8.73
Mean	1.16	0.973	5.17	4.71	3.69	2.01

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 3/5/2018, 10:44 AM

Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Chloride (mg/L)	505 (bg)	11	1.16	0.847	0.255	1.05	0.5	3.13	45.5
Chloride (mg/L)	514 (bg)	6	0.973	1.16	0.473	0.5	0.5	3.34	83.3
Chloride (mg/L)	515 (bg)	6	5.17	3.03	1.24	3.58	2.63	9.33	0
Chloride (mg/L)	516 (bg)	6	4.71	0.741	0.302	4.48	4.27	6.21	0
Chloride (mg/L)	601	11	3.69	0.839	0.253	3.41	3.18	6.1	0
Chloride (mg/L)	PZ-03 (bg)	6	2.01	3.31	1.35	0.5	0.5	8.73	66.7

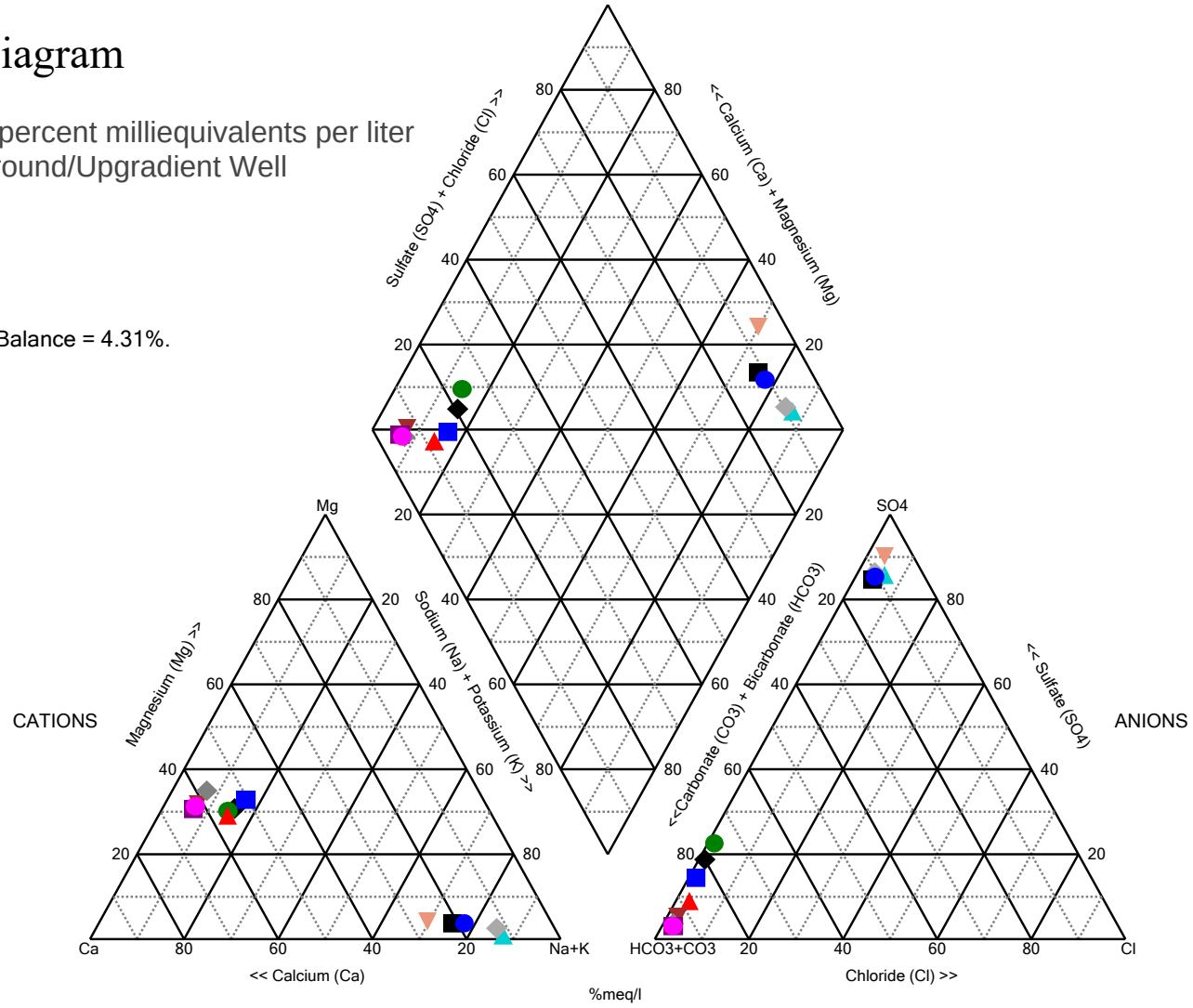
Appendix C

Piper Diagram

Piper Diagram

%meq/l = percent milliequivalents per liter
* = Background/Upgradient Well

Cation-Anion Balance = 4.31%.



505* 11/11/2016
505* 2/8/2017
505* 5/25/2016
505* 8/23/2016
601 11/11/2016
601 2/8/2017
601 5/26/2016
601 8/23/2016
LEACHATE 3/23/2018
LEACHATEPOND 11/10/2016
LEACHATEPOND 2/9/2017
LEACHATEPOND 5/25/2016
LEACHATEPOND 8/23/2016

Analysis Run 3/27/2018 11:34 AM View: LF III

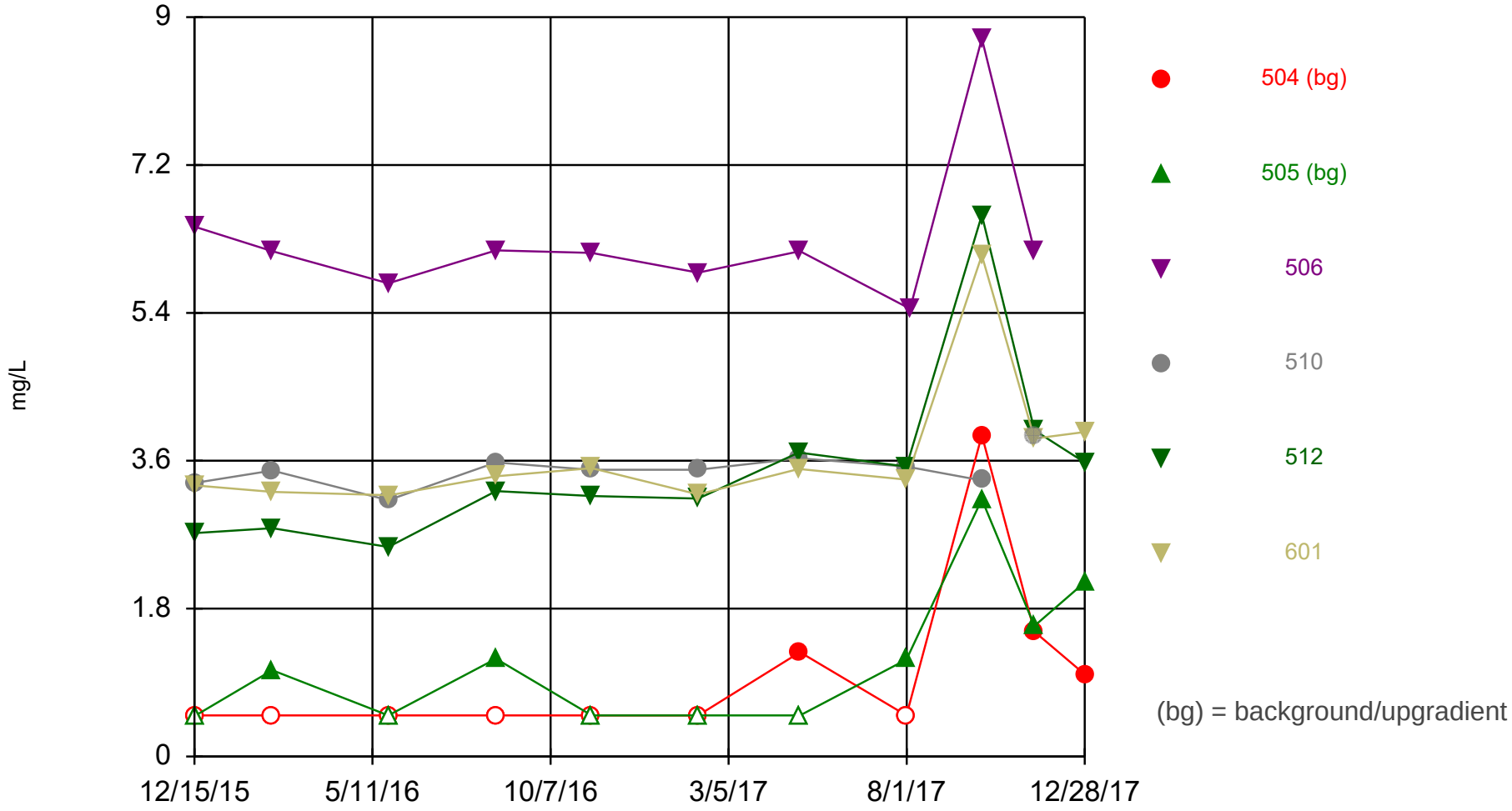
Sibley Client: SCS Engineers Data: Sibley

Appendix D

Time Series Plots

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Chloride Analysis Run 3/5/2018 11:58 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Time Series

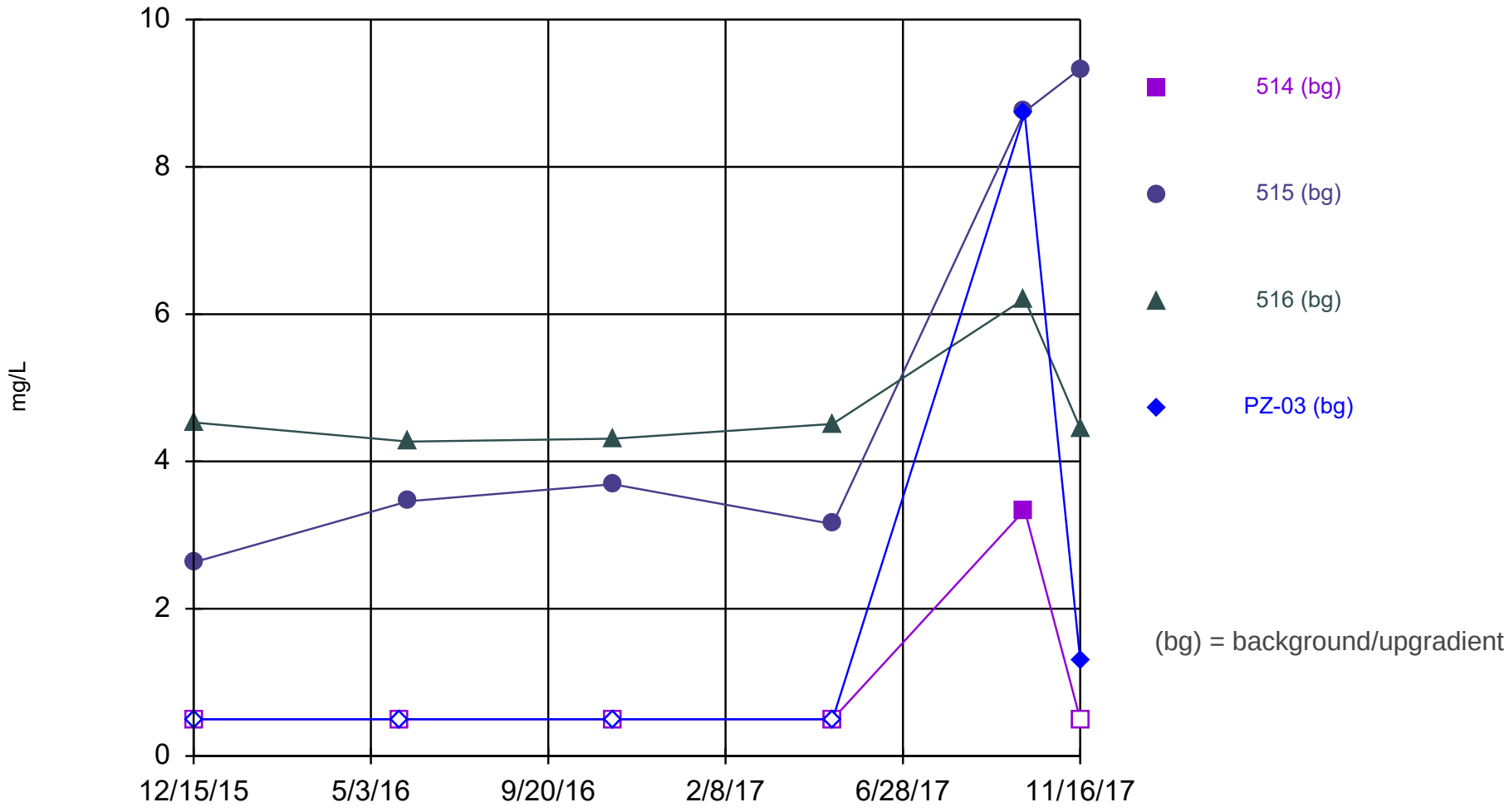
Constituent: Chloride (mg/L) Analysis Run 3/5/2018 11:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	506	510	512	601
12/15/2015			6.45	3.33	2.72	3.3
12/16/2015	<1	<1				
2/18/2016	<1	1.05	6.15	3.48	2.78	3.22
5/25/2016	<1	<1	5.76	3.12	2.55	
5/26/2016						3.18
8/23/2016	<1	1.19	6.16	3.58	3.23	3.41
11/10/2016				3.49		
11/11/2016	<1	<1	6.13		3.17	3.51
2/8/2017	<1	<1	5.89	3.49	3.14	3.19
5/3/2017				3.63	3.7	3.5
5/4/2017	1.27	<1	6.15			
8/1/2017	<1	1.18		3.53	3.53	3.37
8/4/2017			5.45			
10/3/2017	3.91	3.13	8.74	3.36	6.59	6.1
11/16/2017	1.52	1.59	6.15	3.91 (i)	3.97	3.87
12/28/2017	1	2.12			3.58	3.95

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Time Series



Constituent: Chloride Analysis Run 3/5/2018 11:54 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Time Series

Constituent: Chloride (mg/L) Analysis Run 3/5/2018 11:57 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015	<1	2.63	4.53	<1
5/26/2016	<1			<1
6/2/2016		3.46	4.27	
11/11/2016	<1	3.69	4.31	<1
5/4/2017	<1	3.15	4.51	<1
10/3/2017	3.34	8.75	6.21	8.73
11/16/2017	<1	9.33	4.45	1.3

C.2. Supplemental Data, Groundwater Monitoring Alternative Source Demonstration Report October 2017 Groundwater Monitoring Event

Piper Diagram

Analysis Run 1/24/2019 5:26 PM View: Pipers ASD

Sibley Client: SCS Engineers Data: Sibley

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
505* 5/25/2016	6.93	0.5	24.6	8.05	0.5	21.9	75.3	10
505* 8/23/2016	7.28	0.5	25.7	7.97	1.19	9.73	101	10
505* 11/11/2016	6.91	0.5	21.6	7.39	0.5	15.9	68.5	10
505* 2/8/2017	8.52	0.5	23.5	9.3	0.5	14.9	94	10
601 5/26/2016	11.9	1.55	103	30.4	3.18	8.85	361	10
601 8/23/2016	12.2	1.32	102	30.8	3.41	9.11	379	10
601 11/11/2016	12.9	1.78	105	32.8	3.51	16.1	359	10
601 2/8/2017	12.1	1.36	87.5	31.8	3.19	10.5	361	10
LEACHATEPOND 5/25/2016	499	58.6	129	12.9	44.1	1440	10	119
LEACHATEPOND 8/23/2016	479	56.8	108	12.8	42.8	1320	10	104
LEACHATEPOND 11/10/2016	651	75.3	224	22.5	50.4	1820	30.5	68.3
LEACHATEPOND 2/9/2017	678	66.2	89.4	10.8	64.5	2200	38.9	146
LEACHATE 3/23/2018	741	70.3	88.5	4.66	79.1	1690	10	108

C.3 Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event

CCR GROUNDWATER MONITORING

ALTERNATIVE SOURCE DEMONSTRATION REPORT

MAY 2018 GROUNDWATER MONITORING EVENT

CCR LANDFILL

SIBLEY GENERATING STATION

SIBLEY, MISSOURI

Presented To:

KCP&L Greater Missouri Operations Company

Presented By:

SCS ENGINEERS

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

(913) 681-0030

December 2018

File No. 27213169.18

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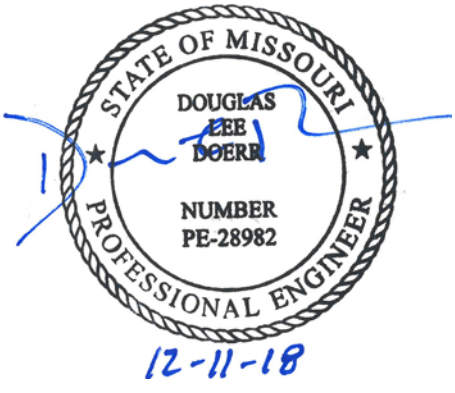
CERTIFICATIONS

I, John R. Rockhold, being a qualified groundwater scientist and Registered Geologist in the State of Missouri, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

John R. Rockhold, R.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Missouri, do hereby certify the accuracy of the information in the CCR Groundwater Monitoring Alternative Source Demonstration Report for the CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted engineering practices and the local standard of care.



Douglas L. Doerr, P.E.

SCS Engineers

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Appendices

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1 REGULATORY FRAMEWORK

Certain owners or operators of Coal Combustion Residuals (CCR) units are required to complete groundwater monitoring activities to evaluate whether a release from the unit has occurred. Included in the activities is the completion of a statistical analysis of the groundwater quality data as prescribed in § 257.93(h) of the CCR Final Rule. If the initial analysis indicates a statistically significant increase (SSI) over background levels, the owner or operator may perform an alternate source demonstration (ASD). In accordance with § 257.94(e)(2), the owner or operator of the CCR unit may demonstrate that a source other than the CCR unit caused the SSI over background levels for a constituent, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a SSI over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under § 257.94. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at KCP&L Greater Missouri Operations Company's Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification by a Qualified Professional Engineer" document dated October 12, 2017. Detection monitoring groundwater samples were collected on May 17, 2018. Review and validation of the results from the May 2018 Detection Monitoring Event was completed on June 15, 2018, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on June 27, 2018 and August 8, 2018.

If an SSI is preliminarily identified by the prediction limit analysis, verification retesting is performed in accordance with the certified statistical method and the resampling plan to verify the result is not due to an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Up to two rounds of verification sampling and retesting may be conducted. Verification retesting with a "1 of 2" or "1 of 3" resampling plan is performed by collecting a verification sample(s) and comparing it to the calculated prediction limit. If the resulting concentration of any verification sample is not above the prediction limit, then an SSI is not confirmed.

Determinations of SSIs for the CCR Landfill at the Sibley Generating Station were completed September 12, 2018 and placed into the CCR Operating Record.

The completed statistical evaluation identified Appendix III constituent, sulfate, above its respective prediction limit in monitoring wells MW-504 and MW-512.

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The prediction limit for sulfate in upgradient monitoring well MW-504 is 24.6 milligrams per liter (mg/L). The detection monitoring sample was reported at 32.8 mg/L. The first verification re-sample was collected on June 27, 2018 with a result of 31.8 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 32.3 mg/L.

The prediction limit for sulfate in monitoring well MW-512 is 29.6 mg/L. The detection monitoring sample was reported at 29.6 mg/L. The first verification re-sample was collected on June 27, 2018 with a result of 30.3 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 30.9 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for sulfate from monitoring wells MW-504 and MW-512 exceed their respective prediction limits and are confirmed statistically significant increases (SSIs) over background.

Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation identified two SSIs above the background prediction limits for sulfate in upgradient monitoring well MW-504 and downgradient monitor well MW-512.

3 ALTERNATIVE SOURCE DEMONSTRATION

An Alternative Source Demonstration (ASD) is a means to provide supporting lines of evidence that something other than a release from a regulated CCR unit caused an SSI. For the above-identified SSIs for the CCR Landfill at the Sibley Generating Station, there are multiple lines of supporting evidence to indicate the above SSIs were not caused by a release from the CCR Landfill. Select multiple lines of supporting evidence are described as follows.

3.1 UPGRADIENT WELL LOCATION

Figure 1 in **Appendix A** shows a potentiometric surface contour map indicating the direction of groundwater flow at and near the CCR Landfill at the time of sampling. As seen on the map, monitoring well MW-504 is located upgradient from the CCR Landfill indicating the SSI is not caused by a release from the CCR Landfill. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels for sulfate, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.2 BOX AND WHISKERS PLOTS

A commonly accepted method to demonstrate and visualize the distribution of data in a given data set is to construct box and whiskers plots. The basic box plotted graphically locates the median, 25th and 75th percentiles of the data set; the "whiskers" extend to the minimum and maximum values of the data set. The range between the ends of a box plot represents the Interquartile Range, which can be used as an estimate of spread or variability. The mean is denoted by a "+".

When comparing multiple wells or well groups, box plots for each well can be lined up on the same axes to roughly compare the variability in each well. This may be used as an exploratory screening for the test of homogeneity of variance across multiple wells.

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Box and whiskers plots for sulfate in monitoring wells MW-504 and MW-512 were compared to box and whisker plots for sulfate in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes. The comparison indicates the sulfate concentrations in both MW-504 and MW-512 are well within expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill. **Figure 1** in **Appendix A** shows these upgradient non-CCR monitoring system wells and their relationships to groundwater flow near and beneath the CCR Landfill. Because the non-CCR monitoring system wells are located in a nearby area that has not been impacted by the landfill, and exhibit variability that includes sulfate concentrations similar to those seen at MW-504 and MW-512, the observed sulfate concentrations are within the range of expected natural spatial variation within and between wells. This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots for sulfate are provided in **Appendix B**.

3.3 PIPER DIAGRAM PLOTS

Piper diagrams are a form of tri-linear diagram, and a widely accepted method to provide a visual representation of the ion concentration of groundwater. Piper diagrams portray water compositions and facilitate the interpretation and presentation of chemical analysis. They may be used to visually compare the chemical composition of water quality across wells, and aid in determining whether the waters are similar or dis-similar, and can over time indicate whether the waters are mixing.

A piper diagram has two triangular plots on the right and left side of a 4-sided center field. The three major cations are plotted in the left triangle and anions in the right. Each of the three cation/anion variables, in milliequivalents, is divided by the sum of the three values, to produce a percent of total cation/anions. These percentages determine the location of the associated symbol. The data points in the center field are located by extending the points in the lower triangles to the point of intersection. In order for a piper diagram to be produced, the selected data file must contain the following constituents: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Chloride (Cl), Sulfate (SO4), Carbonate (CO3), and Bicarbonate (HCO3).

A piper diagram generated for MW-504, MW-512, and landfill leachate is provided in **Appendix C** and indicates the groundwater from these two wells does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.4 TIME SERIES PLOTS

Time series plots provide a graphical method to view changes in data at a particular well (monitoring point) or wells over time. Time series plots display the variability in concentration levels over time and can be used to indicate possible outliers or data errors (i.e. “spikes”). More than one well can be compared on the same plot to look for differences between wells. Non-detect data is plotted as censored data at one-half of the laboratory reporting limit. Time series plots can also be used to examine the data for trends.

Sulfate concentrations for MW-504 and MW-512 were plotted against sulfate concentrations in several upgradient and side-gradient non-CCR monitoring system wells. The comparison indicates the sulfate concentrations in both upgradient well MW-504 and downgradient well MW-512 exhibit similar

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trends are well within expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill. **Figure 1** in **Appendix A** shows these upgradient and side-gradient non-CCR monitoring system wells and their relationships to groundwater flow near and beneath the CCR Landfill. Because the non-CCR monitoring system wells are located in a nearby area that has not been impacted by the landfill, and exhibit variability that includes sulfate concentrations similar to those seen at MW-504 and MW-512 (including similar but small upward trends), and a significant upward trend in upgradient well MW-515, the observed sulfate concentrations are within the range of expected natural spatial variation within and between wells. A release from the CCR Landfill would not be expected to cause an increase across multiple wells (including upgradient wells) simultaneously. This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots for sulfate are provided in **Appendix D**.

This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the CCR Landfill caused the SSIs over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the CCR Landfill may continue with the detection monitoring program under § 257.94.

5 GENERAL COMMENTS

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of KCP&L Greater Missouri Operations Company for specific application to the Sibley Generating Station. No warranties, express or implied, are intended or made.

The signature of the certifying registered geologist and professional engineer on this document represents that to the best of their knowledge, information, and belief in the exercise of his professional judgement in accordance with the standard of practice, it is his professional opinion that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by them are made on the basis of his experience, qualifications, and professional judgement and are not to be construed as warranties or guaranties. In addition, opinions relating to regulatory, environmental, geologic, geochemical and geotechnical conditions interpretations or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

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Appendix A

Figure 1

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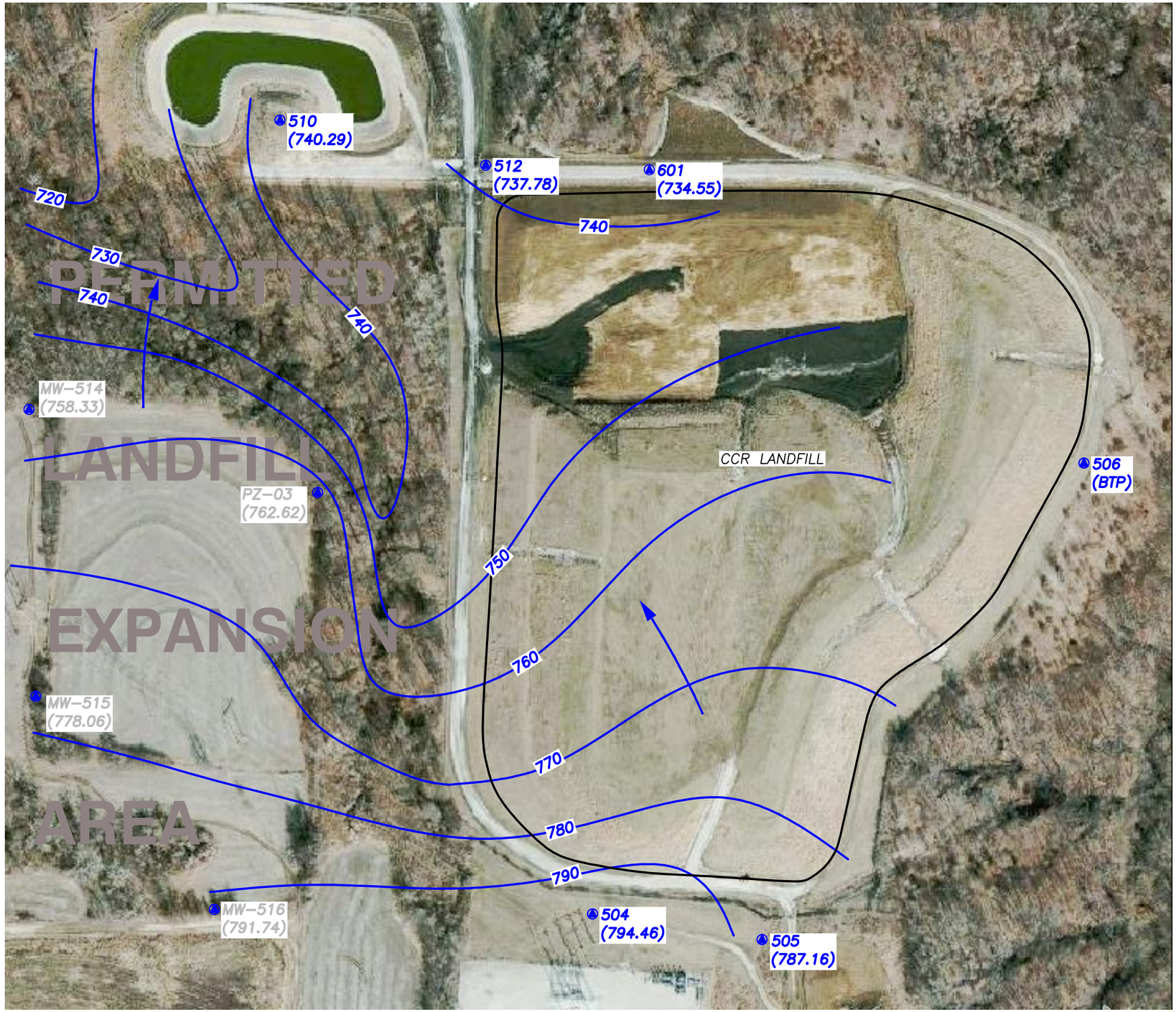

LEGEND:

– 760 –	GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS (REPRESENTATIVE OF THIS UNIT)
601 (734.55)	GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
	CCR LANDFILL UNIT BOUNDARY
	GROUNDWATER FLOW DIRECTION
BTP	BELOW TOP OF PUMP
MW–514 (758.33)	NON–CCR GROUNDWATER MONITORING WELLS (GROUNDWATER ELEVATION)

NOTES:

1. HORIZONTAL & VERTICAL DATUM: URS PLANS FOR CONSTRUCTION, KCP&L SIBLEY GENERATING STATION, DESIGN FILE 16530511.00001, DATED JANUARY 2010
2. GOOGLE EARTH AERIAL IMAGE. MARCH 2015.
3. BOUNDARY AND MONITORING WELL LOCATIONS SHOWN ARE APPROXIMATE.

200 0 200 400
SCALE FEET

REV.	DATE
-	-

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (MAY 2018) CCR LANDFILL

PROJECT TITLE: CCR ALTERNATIVE SOURCE DEMONSTRATION

CLIENT: KCP&L GREATER MISSOURI OPERATIONS CO.
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
8575 W. 110th St. Ste. 100
Overland Park, Kansas 66210
PH. (913) 681-0030 FAX. (913) 681-0012

PROJ. NO. 27213167.18	DWN. BY: TGW
DSN. BY: JRR	CHK. BY: JRR
	Q/A RVW BY: JRR
	PROJ. MGR: JRR

CADD FILE: CCR ALTERNATIVE SOURCE DEMO.DWG

DATE: 10/25/18

FIGURE NO. 1

T:\27213167.18\AutoCAD\CCR Alternative Source Demo.dwg Dec 10, 2018 - 12:16pm Layout Name: #1 By: 4338t_w

Appendix B

Box and Whiskers Plots

Internal Use Only

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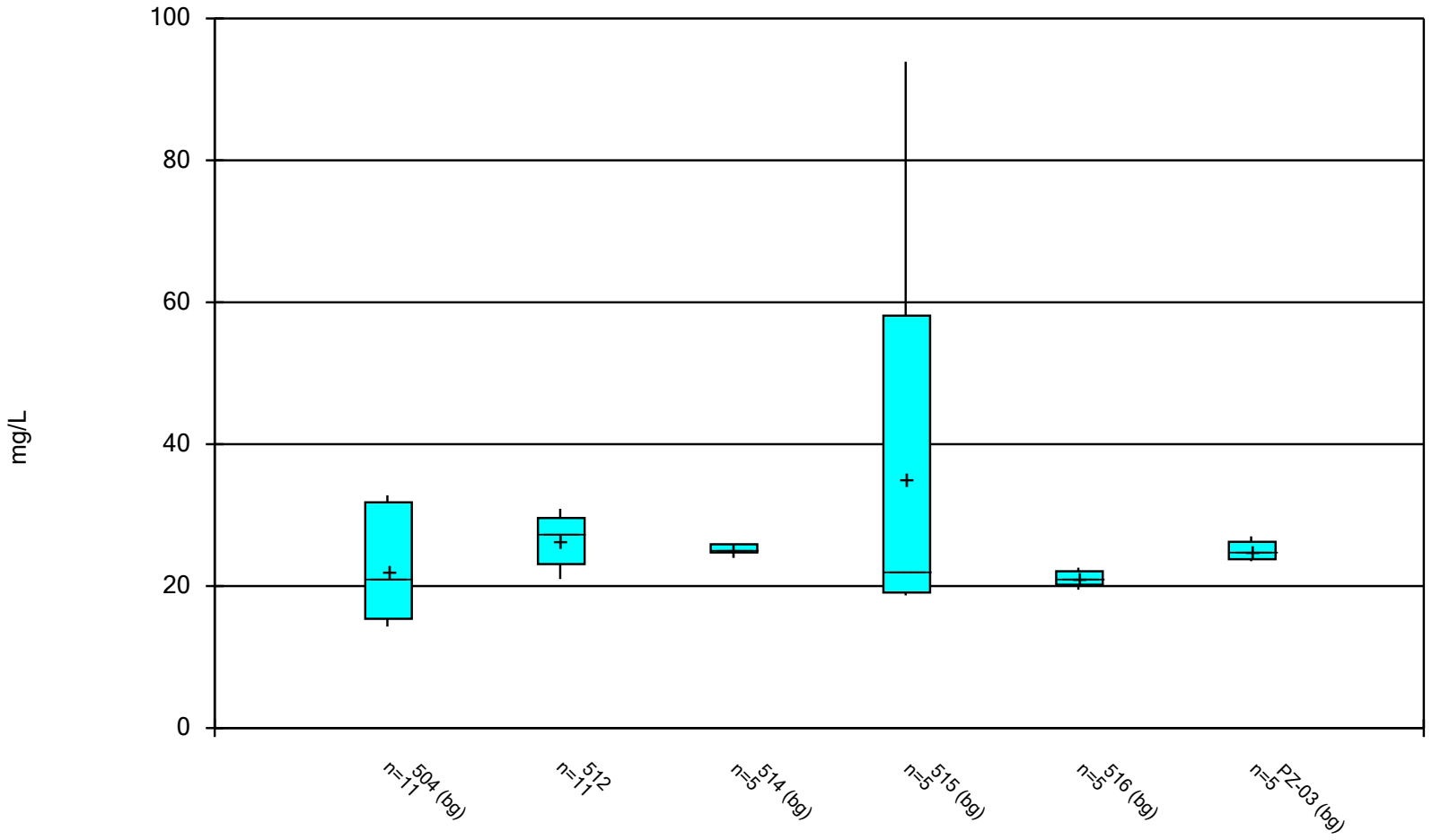
Box & Whiskers Plot



Constituent: Sulfate Analysis Run 8/20/2018 12:25 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Box & Whiskers Plot

Constituent: Sulfate (mg/L) Analysis Run 8/20/2018 12:25 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015		23	25.9	22.1	22.6	25.5
12/16/2015	14.3					
2/18/2016	14.7	21				
5/25/2016	18.9	23.1				
5/26/2016			24.9			23.5
6/2/2016				22.3	21.6	
8/23/2016	15.4	24.4				
11/11/2016	17.4	24	25.2	19.5	21.1	24.7
2/8/2017	21	27.8				
5/3/2017		27.3				
5/4/2017	21.8		24.6	18.7	19.5	24.1
8/1/2017	23.3	28.1				
5/16/2018			25.9	93.9	20.9	27
5/17/2018	32.8	29.6				
6/27/2018	31.8	30.3				
8/8/2018	32.3	30.9				
Median	21	27.3	25.2	22.1	21.1	24.7
LowerQ.	15.4	23.1	24.8	19.1	20.2	23.8
UpperQ.	31.8	29.6	25.9	58.1	22.1	26.3
Min	14.3	21	24.6	18.7	19.5	23.5
Max	32.8	30.9	25.9	93.9	22.6	27
Mean	22.2	26.3	25.3	35.3	21.1	25

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 8/20/2018, 12:25 PM

Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Sulfate (mg/L)	504 (bg)	11	22.2	7.13	2.15	21	14.3	32.8	0
Sulfate (mg/L)	512	11	26.3	3.36	1.01	27.3	21	30.9	0
Sulfate (mg/L)	514 (bg)	5	25.3	0.587	0.263	25.2	24.6	25.9	0
Sulfate (mg/L)	515 (bg)	5	35.3	32.8	14.7	22.1	18.7	93.9	0
Sulfate (mg/L)	516 (bg)	5	21.1	1.13	0.505	21.1	19.5	22.6	0
Sulfate (mg/L)	PZ-03 (bg)	5	25	1.36	0.608	24.7	23.5	27	0

Appendix C

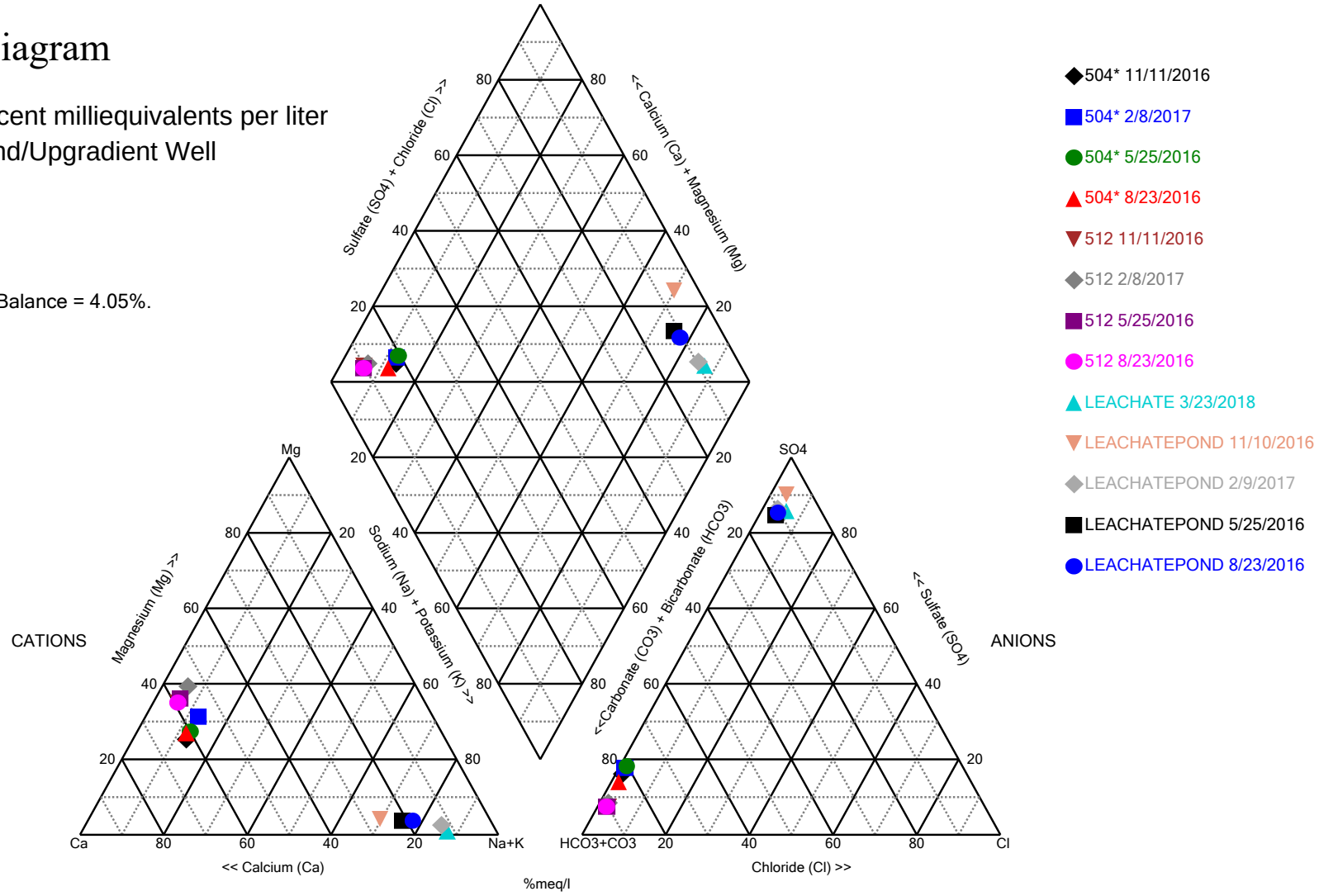
Piper Diagram

Internal Use Only

Piper Diagram

%meq/l = percent milliequivalents per liter
* = Background/Upgradient Well

Cation-Anion Balance = 4.05%.



Analysis Run 8/20/2018 1:23 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Appendix D

Time Series Plots

Internal Use Only

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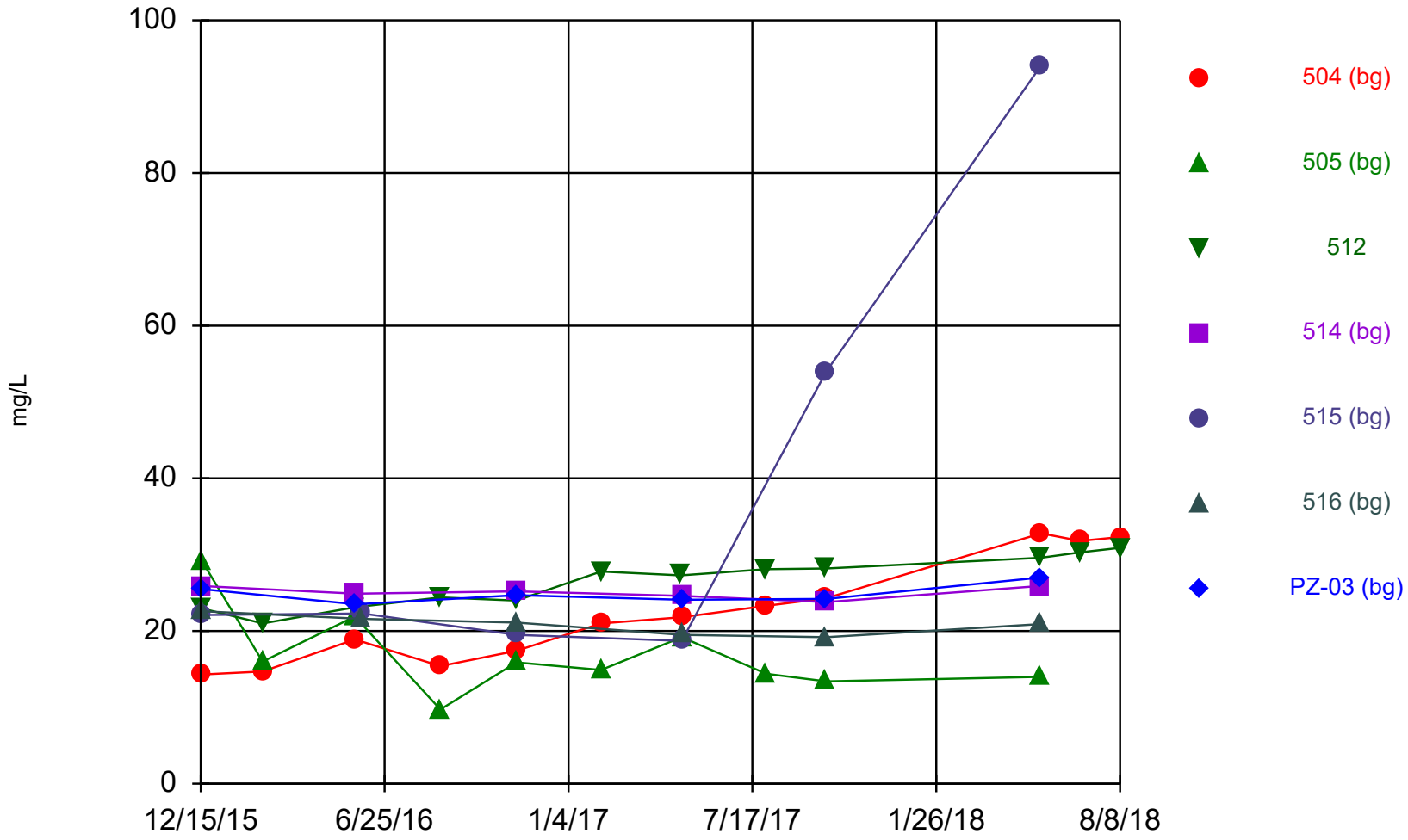
Time Series



Constituent: Sulfate Analysis Run 11/7/2018 3:06 PM View: LF III Sibley Client: SCS Engineers Data: Sibley

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/7/2018 3:07 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			23	25.9	22.1	22.6	25.5
12/16/2015	14.3	29.2					
2/18/2016	14.7	16	21				
5/25/2016	18.9	21.9	23.1				
5/26/2016				24.9			23.5
6/2/2016					22.3	21.6	
8/23/2016	15.4	9.73	24.4				
11/11/2016	17.4	15.9	24	25.2	19.5	21.1	24.7
2/8/2017	21	14.9	27.8				
5/3/2017			27.3				
5/4/2017	21.8	19.2		24.6	18.7	19.5	24.1
8/1/2017	23.3	14.4	28.1				
10/3/2017	24.3	13.4	28.2	23.8	54	19.2	24.2
5/16/2018				25.9	93.9	20.9	27
5/17/2018	32.8	14	29.6				
6/27/2018	31.8		30.3				
8/8/2018	32.3		30.9				

C.4 Supplemental Data, Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event

Piper Diagram

Analysis Run 1/24/2019 5:29 PM View: Pipers ASD

Sibley Client: SCS Engineers Data: Sibley

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
504* 5/25/2016	6.54	1.27	30.2	8.36	0.5	18.9	89	10
504* 8/23/2016	6.61	1.15	32.2	8.56	0.5	15.4	99.5	10
504* 11/11/2016	8.17	1.3	36.9	8.97	0.5	17.4	94.7	10
504* 2/8/2017	6.83	1.28	29.6	9.94	0.5	21	105	10
512 5/25/2016	10	2.24	98.9	36.8	2.55	23.1	356	10
512 8/23/2016	10.3	2.13	103	36.9	3.23	24.4	384	10
512 11/11/2016	9.96	2.16	100	35.6	3.17	24	352	10
512 2/8/2017	10	2.35	86.4	37.9	3.14	27.8	358	10
LEACHATEPOND 5/25/2016	499	58.6	129	12.9	44.1	1440	10	119
LEACHATEPOND 8/23/2016	479	56.8	108	12.8	42.8	1320	10	104
LEACHATEPOND 11/10/2016	651	75.3	224	22.5	50.4	1820	30.5	68.3
LEACHATEPOND 2/9/2017	678	66.2	89.4	10.8	64.5	2200	38.9	146
LEACHATE 3/23/2018	741	70.3	88.5	4.66	79.1	1690	10	108

Addendum 1

2018 Groundwater Monitoring and Corrective Action Report
Addendum 1

December 16, 2022
File No. 27213167.18

To: Evergy Metro, Inc.
Jared Morrison – Director, Water and Waste Programs

From: SCS Engineers
Douglas L. Doerr, P.E.
John R. Rockhold, P.G.

Subject: 2018 Annual Groundwater Monitoring and Corrective Action Report Addendum 1
Evergy Missouri West, Inc.
CCR Landfill
Sibley Generating Station – Sibley, Missouri

The CCR Landfill at the Sibley Generating Station is subject to the groundwater monitoring and corrective action requirements of the "Coal Combustion Residuals (CCR) Final Rule" (Rule); as described in CFR 40 257.90 through CFR 40 257.98. An Annual Groundwater Monitoring and Corrective Action (GWMCA) Report documenting activities completed in 2018 for the CCR Landfill was completed and placed in the facility's operating record on January 30, 2019, as required by the Rule. The Annual GWMCA report was to fulfill the requirements specified in 40 CFR 257.90(e).

This Addendum has been prepared to supplement the operating record in recognition of comments received by Evergy from the U.S. Environmental Protection Agency (USEPA) on January 11, 2022. In addition to the information listed in 40 CFR 257.90(e), the USEPA indicated in their comments that the GWMCA Report contain the following:

- Results of laboratory analysis of groundwater or other environmental media samples for 40 CFR 257 Appendix III and Appendix IV constituents or other constituents, such as those supporting characterization of site conditions that may ultimately affect a remedy'
- Required statistical analysis performed on laboratory analysis results; and
- Calculated groundwater flow rate and direction.

This information is not specifically referred to in 40 CFR 257.90(e) for inclusion in the GWMCA Reports; however, it is routinely collected, determined and maintained in Evergy's files and is being provided in the attachments to this addendum.

The attachments to this addendum are as follows:

- Attachment 1 – Laboratory Analytical Reports:

  Includes laboratory data packages with supporting information such as case narrative, sample and method summary, analytical results, quality control, and chain-of-custody documentation. The laboratory data packages for the following sampling events are provided:

  - May 2018 – Spring 2018 semiannual detection monitoring sampling event.
  - June 2018 – First verification sampling for the Spring 2018 detection monitoring sampling event.
  - August 2018 – Second verification sampling for the Spring 2018 detection monitoring sampling event.
  - November 2018 - Fall 2018 semiannual detection monitoring sampling event.

- Attachment 2 - Statistical Analyses:

  Includes summary of statistical results, prediction limit plots, prediction limit background data, detection sample results, first and second verification re-sample results (when applicable), extra sample results for pH (collected as part of the approved sampling procedures), input parameters, and a Prediction Limit summary table. Statistical analyses completed in 2018 included the following:

  - Fall 2017 semiannual detection monitoring statistical analyses.
  - Spring 2018 semiannual detection monitoring statistical analyses.

- Attachment 3 - Groundwater Potentiometric Surface Maps:

  Includes groundwater potentiometric surface maps with the measured groundwater elevations at each well and the generalized groundwater flow direction and the calculated groundwater flow rate. Maps for the following sampling events are provided:

  - May 2018 - Spring 2018 semiannual detection monitoring sampling event.
  - November 2018 - Fall 2018 semiannual detection monitoring sampling event.

Jared Morrison
December 16, 2022

ATTACHMENT 1

Laboratory Analytical Reports

Jared Morrison
December 16, 2022

ATTACHMENT 1-1

May 2018 Sampling Event Laboratory Report

ANALYTICAL REPORT

May 29, 2018

SCS Engineers - KS

Sample Delivery Group:	L995364
Samples Received:	05/19/2018
Project Number:	27213169.18
Description:	KCP&L Sibley Generating Station

Report To: Jason Franks
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Entire Report Reviewed By:

Jeff Carr
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

MW-504 L995364-01 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 14:00 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114106	1	05/22/18 07:19	05/22/18 07:19	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:16	ST

MW-505 L995364-02 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 10:15 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114106	1	05/22/18 07:34	05/22/18 07:34	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:19	ST

MW-506 L995364-03 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 10:05 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114106	1	05/22/18 07:50	05/22/18 07:50	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:22	ST

MW-510 L995364-04 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 13:50 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114107	1	05/23/18 00:36	05/23/18 00:36	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:24	ST

MW-512 L995364-05 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 12:55 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114107	1	05/23/18 01:22	05/23/18 01:22	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:27	ST

MW-601 L995364-06 GW

Collected by: Whit Martin | Collected date/time: 05/17/18 11:25 | Received date/time: 05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114107	1	05/23/18 01:37	05/23/18 01:37	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 17:27	ST

DUPLICATE L995364-07 GW

Collected by	Collected date/time	Received date/time
Whit Martin	05/17/18 00:00	05/19/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1114722	1	05/23/18 17:13	05/23/18 17:38	BS
Wet Chemistry by Method 9056A	WG1114107	1	05/23/18 01:53	05/23/18 01:53	MAJ
Metals (ICP) by Method 6010B	WG1113971	1	05/24/18 07:33	05/24/18 18:30	ST

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Technical Service Representative

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	193000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	1110		1000	1	05/22/2018 07:19	WG1114106
Fluoride	216		100	1	05/22/2018 07:19	WG1114106
Sulfate	32800		5000	1	05/22/2018 07:19	WG1114106

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:16	WG1113971
Calcium	33300		1000	1	05/24/2018 18:16	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	170000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	1090		1000	1	05/22/2018 07:34	WG1114106
Fluoride	247		100	1	05/22/2018 07:34	WG1114106
Sulfate	14000		5000	1	05/22/2018 07:34	WG1114106

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:19	WG1113971
Calcium	28200		1000	1	05/24/2018 18:19	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	442000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	6690		1000	1	05/22/2018 07:50	WG1114106
Fluoride	320		100	1	05/22/2018 07:50	WG1114106
Sulfate	75700		5000	1	05/22/2018 07:50	WG1114106

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:22	WG1113971
Calcium	94900		1000	1	05/24/2018 18:22	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	494000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3440		1000	1	05/23/2018 00:36	WG1114107
Fluoride	348		100	1	05/23/2018 00:36	WG1114107
Sulfate	17300		5000	1	05/23/2018 00:36	WG1114107

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:24	WG1113971
Calcium	120000		1000	1	05/24/2018 18:24	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	419000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3640		1000	1	05/23/2018 01:22	WG1114107
Fluoride	328		100	1	05/23/2018 01:22	WG1114107
Sulfate	29600		5000	1	05/23/2018 01:22	WG1114107

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:27	WG1113971
Calcium	104000		1000	1	05/24/2018 18:27	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	431000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	4020		1000	1	05/23/2018 01:37	WG1114107
Fluoride	275		100	1	05/23/2018 01:37	WG1114107
Sulfate	28300		5000	1	05/23/2018 01:37	WG1114107

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 17:27	WG1113971
Calcium	104000		1000	1	05/24/2018 17:27	WG1113971

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	399000		10000	1	05/23/2018 17:38	WG1114722

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3440		1000	1	05/23/2018 01:53	WG1114107
Fluoride	273		100	1	05/23/2018 01:53	WG1114107
Sulfate	9840		5000	1	05/23/2018 01:53	WG1114107

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	05/24/2018 18:30	WG1113971
Calcium	102000		1000	1	05/24/2018 18:30	WG1113971

Method Blank (MB)

(MB) R3313267-1 05/23/18 17:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Dissolved Solids	U		2820	10000

L995364-01 Original Sample (OS) • Duplicate (DUP)

(OS) L995364-01 05/23/18 17:38 • (DUP) R3313267-4 05/23/18 17:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Dissolved Solids	193000	192000	1	0.519		5

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

(LCS) R3313267-2 05/23/18 17:38 • (LCSD) R3313267-3 05/23/18 17:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Dissolved Solids	8800000	8600000	8750000	97.7	99.4	85.0-115			1.73	5

Method Blank (MB)

(MB) R3311871-1 05/21/18 18:02

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Chloride	U		51.9	1000
Fluoride	U		9.90	100
Sulfate	U		77.4	5000

L995361-01 Original Sample (OS) • Duplicate (DUP)

(OS) L995361-01 05/22/18 03:58 • (DUP) R3311871-4 05/22/18 04:14

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	2500	2500	1	0.232		15
Fluoride	209	194	1	7.51		15
Sulfate	46800	46600	1	0.537		15

L995361-05 Original Sample (OS) • Duplicate (DUP)

(OS) L995361-05 05/22/18 06:17 • (DUP) R3311871-7 05/22/18 06:33

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3950	3990	1	1.03		15
Fluoride	235	213	1	9.96		15
Sulfate	20900	21000	1	0.267		15

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

(LCS) R3311871-2 05/21/18 18:17 • (LCSD) R3311871-3 05/21/18 18:33

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40000	39800	39800	99.6	99.5	80.0-120			0.121	15
Fluoride	8000	8270	8330	103	104	80.0-120			0.721	15
Sulfate	40000	40200	40300	101	101	80.0-120			0.226	15

L995361-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L995361-01 05/22/18 03:58 • (MS) R3311871-5 05/22/18 04:29 • (MSD) R3311871-6 05/22/18 04:45

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	2500	57200	56600	109	108	1	80.0-120			1.08	15
Fluoride	5000	209	5630	5780	108	112	1	80.0-120			2.79	15
Sulfate	50000	46800	96800	100000	100	107	1	80.0-120		E	3.52	15

L995361-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L995361-05 05/22/18 06:17 • (MS) R3311871-8 05/22/18 06:48

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50000	3950	59800	112	1	80.0-120	
Fluoride	5000	235	5720	110	1	80.0-120	
Sulfate	50000	20900	73800	106	1	80.0-120	

Method Blank (MB)

(MB) R3312329-1 05/22/18 11:31

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Chloride	222	J	51.9	1000
Fluoride	U		9.90	100
Sulfate	233	J	77.4	5000

L995364-04 Original Sample (OS) • Duplicate (DUP)

(OS) L995364-04 05/23/18 00:36 • (DUP) R3312329-4 05/23/18 00:51

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3440	3380	1	1.76		15
Fluoride	348	338	1	2.91		15
Sulfate	17300	17300	1	0.123		15

L995367-06 Original Sample (OS) • Duplicate (DUP)

(OS) L995367-06 05/23/18 04:12 • (DUP) R3312329-6 05/23/18 04:27

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	49300	49500	1	0.302		15
Fluoride	249	242	1	2.85		15
Sulfate	33900	34000	1	0.0907		15

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

(LCS) R3312329-2 05/22/18 11:47 • (LCSD) R3312329-3 05/22/18 12:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40000	39800	39800	99.6	99.5	80.0-120			0.145	15
Fluoride	8000	7950	7960	99.3	99.5	80.0-120			0.200	15
Sulfate	40000	39900	40000	99.7	99.9	80.0-120			0.225	15

L995364-04 Original Sample (OS) • Matrix Spike (MS)

(OS) L995364-04 05/23/18 00:36 • (MS) R3312329-5 05/23/18 01:07

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50000	3440	53500	100	1	80.0-120	
Fluoride	5000	348	5250	98.0	1	80.0-120	
Sulfate	50000	17300	62900	91.1	1	80.0-120	

L995367-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L995367-06 05/23/18 04:12 • (MS) R3312329-7 05/23/18 04:42 • (MSD) R3312329-8 05/23/18 04:58

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	49300	98300	98100	97.9	97.5	1	80.0-120			0.211	15
Fluoride	5000	249	5070	5430	96.4	104	1	80.0-120			6.91	15
Sulfate	50000	33900	77900	81900	87.8	95.9	1	80.0-120			5.05	15

Method Blank (MB)

(MB) R3312956-1 05/24/18 17:09

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Boron	U		12.6	200
Calcium	U		46.3	1000

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

(LCS) R3312956-2 05/24/18 17:12 • (LCSD) R3312956-3 05/24/18 17:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Boron	1000	979	977	97.9	97.7	80.0-120			0.185	20
Calcium	10000	9970	9930	99.7	99.3	80.0-120			0.468	20

L995361-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L995361-12 05/24/18 17:17 • (MS) R3312956-5 05/24/18 17:22 • (MSD) R3312956-6 05/24/18 17:24

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Boron	1000	ND	1130	1100	101	98.4	1	75.0-125			2.52	20
Calcium	10000	104000	114000	114000	96.6	95.6	1	75.0-125			0.0871	20

L995364-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L995364-06 05/24/18 17:27 • (MS) R3312956-7 05/24/18 17:29 • (MSD) R3312956-8 05/24/18 17:32

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Boron	1000	ND	1110	1120	99.2	99.6	1	75.0-125			0.394	20
Calcium	10000	104000	113000	112000	95.7	86.2	1	75.0-125			0.839	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

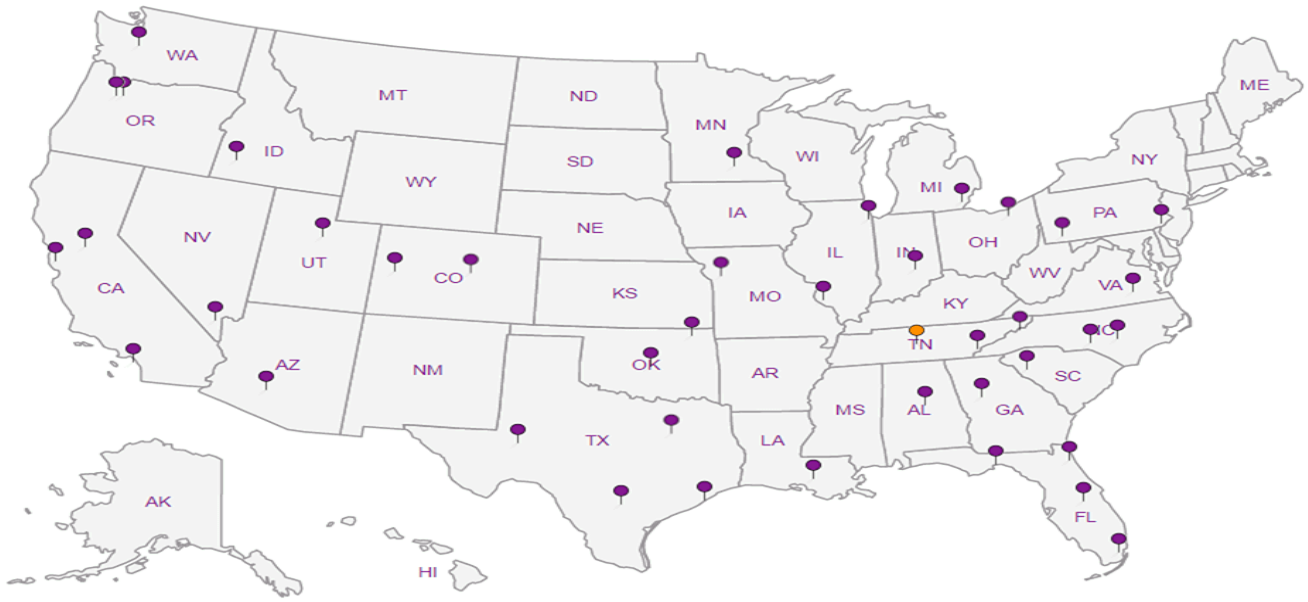
Third Party Federal Accreditations

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

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

Our Locations

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



SCS Engineers - KS

7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Billing Information:
Accounts Payable
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Pres Chk

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCP&L Sibley Generating Station**

City/State Collected: **Sibley, MO**

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27213169.18**

Lab Project # **AQUAOPKS-SIBLEY**

Collected by (print): **Whit Martin**

Site/Facility ID #

P.O. #

Collected by (signature): **Whit Martin**

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: **Std**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No of Cntrs	Anions (Cld, F, SO4) 125mlHDPE-NoPres	B, Ca - 6010 250mlHDPE-HNO3	TDS 250mlHDPE-NoPres								Remarks	Sample # (lab only)
MW-504	Grab	GW		5/17/18	1400	3	X	X	X									-01
MW-505	Grab	GW		5/17/18	1015	3	X	X	X									-02
MW-506	Grab	GW		5/17/18	1005	3	X	X	X									-03
MW-510	Grab	GW		5/17/18	1350	3	X	X	X									-04
MW-512	Grab	GW		5/17/18	1255	3	X	X	X									-05
MW-601	Grab	GW		5/17/18	1125	3	X	X	X									-06
DUPLICATE 2	Grab	GW		5/17/18	-	3	X	X	X									-07
601 MS 2	Grab	GW		5/17/18	1135	3	X	X	X									
601 MSD 2	Grab	GW		5/17/18	1140	3	X	X	X									

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

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

L# L995364

C235

Acctnum: AQUAOPKS
Template: T136014
Prelogin: P653010
TSR: 206 - Jeff Carr
PB:
Shipped Via:

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

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 7215 4520 2564

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Whit Martin	5/18/18	1130	Brandi L. Haight
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			Kelly Thurman 841

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 5.1 °C Bottles Received: 27

Date: 5/19/18 Time: 0845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Jared Morrison
December 16, 2022

ATTACHMENT 1-2

June 2018 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

July 10, 2018

SCS Engineers - KS

Sample Delivery Group:	L1005344
Samples Received:	06/28/2018
Project Number:	27213169.18
Description:	KCP&LSibley Generating Station

Report To: Jason Franks
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Entire Report Reviewed By:

Jason Romer
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

MW-510 L1005344-01 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 13:50 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133124	1	07/04/18 06:19	07/04/18 06:19	MCG

MW-512 L1005344-02 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 13:25 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1135360	1	07/09/18 16:15	07/09/18 16:15	DR

MW-601 L1005344-03 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 12:55 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133124	1	07/04/18 06:55	07/04/18 06:55	MCG
Wet Chemistry by Method 9056A	WG1135360	1	07/09/18 16:30	07/09/18 16:30	DR

MW-504 L1005344-04 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 11:05 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133124	1	07/04/18 07:14	07/04/18 07:14	MCG
Wet Chemistry by Method 9056A	WG1135360	1	07/09/18 17:16	07/09/18 17:16	DR

DUPLICATE 1 L1005344-05 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 11:05 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133124	1	07/04/18 09:03	07/04/18 09:03	MCG
Wet Chemistry by Method 9056A	WG1135360	1	07/09/18 18:18	07/09/18 18:18	DR

MW-506 L1005344-06 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 12:05 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133124	1	07/04/18 09:21	07/04/18 09:21	MCG

MW-801 L1005344-07 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 12:01 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133125	5	07/03/18 20:51	07/03/18 20:51	DR

DUPLICATE 3 L1005344-08 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 00:00 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1133125	1	07/03/18 21:05	07/03/18 21:05	DR

MW-505 L1005344-09 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 11:35 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1131931	1	06/29/18 15:19	06/30/18 11:27	TRB

MW-802 L1005344-10 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 11:30 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1131931	1	06/29/18 15:19	06/30/18 09:10	TRB

DUPLICATE 2 L1005344-11 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 00:00 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1131931	1	06/29/18 15:19	06/30/18 11:30	TRB

MW-804 L1005344-12 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 12:55 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1131931	1	06/29/18 15:19	06/30/18 09:23	TRB

DUPLICATE 5 L1005344-13 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 00:00 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1131931	1	06/29/18 15:19	06/30/18 12:31	TRB

MW-701 L1005344-14 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 10:05 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1132955	1	07/04/18 09:51	07/04/18 12:10	MCG

MW-702 L1005344-15 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 10:50 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1132955	1	07/04/18 09:51	07/04/18 12:10	MCG

MW-805 L1005344-16 GW

Collected by: Jason Franks | Collected date/time: 06/27/18 13:35 | Received date/time: 06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1132955	1	07/04/18 09:51	07/04/18 12:10	MCG

DUPLICATE 4 L1005344-17 GW

Collected by	Collected date/time	Received date/time
Jason Franks	06/27/18 00:00	06/28/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1132955	1	07/04/18 09:51	07/04/18 12:10	MCG

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Technical Service Representative

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Fluoride	282		100	1	07/04/2018 06:19	WG1133124

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Sulfate	30300		5000	1	07/09/2018 16:15	WG1135360

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	2820		1000	1	07/04/2018 06:55	WG1133124
Sulfate	10300		5000	1	07/09/2018 16:30	WG1135360

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Fluoride	135		100	1	07/04/2018 07:14	WG1133124
Sulfate	31800		5000	1	07/09/2018 17:16	WG1135360

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Fluoride	121		100	1	07/04/2018 09:03	WG1133124
Sulfate	31900		5000	1	07/09/2018 18:18	WG1135360

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	5800		1000	1	07/04/2018 09:21	WG1133124

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	109000		5000	5	07/03/2018 20:51	WG1133125

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	6070		1000	1	07/03/2018 21:05	WG1133125

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	25800		1000	1	06/30/2018 11:27	WG1131931

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	65500		1000	1	06/30/2018 09:10	WG1131931

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	66200		1000	1	06/30/2018 11:30	WG1131931

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	7060		200	1	06/30/2018 09:23	WG1131931

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	7580		200	1	06/30/2018 12:31	WG1131931

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	297000		10000	1	07/04/2018 12:10	WG1132955

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	297000		10000	1	07/04/2018 12:10	WG1132955

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	349000		10000	1	07/04/2018 12:10	WG1132955

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	294000		10000	1	07/04/2018 12:10	WG1132955

Method Blank (MB)

(MB) R3323687-1 07/04/18 12:10

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Dissolved Solids	U		2820	10000

L1005172-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1005172-01 07/04/18 12:10 • (DUP) R3323687-4 07/04/18 12:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Dissolved Solids	163000	158000	1	3.12		5

L1005704-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1005704-04 07/04/18 12:10 • (DUP) R3323687-5 07/04/18 12:10

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Dissolved Solids	296000	295000	1	0.338		5

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

(LCS) R3323687-2 07/04/18 12:10 • (LCSD) R3323687-3 07/04/18 12:10

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Dissolved Solids	8800000	8390000	7990000	95.3	90.8	85.0-115			4.88	5

Method Blank (MB)

(MB) R3323295-1 07/03/18 19:25

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Chloride	U		51.9	1000
Fluoride	11.2	J	9.90	100

L1005331-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1005331-02 07/04/18 00:34 • (DUP) R3323295-4 07/04/18 01:28

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	7350	7180	1	2.32		15
Fluoride	320	363	1	12.5		15

L1005344-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1005344-04 07/04/18 07:14 • (DUP) R3323295-9 07/04/18 07:32

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	ND	217	1	0.000		15
Fluoride	135	140	1	3.72		15

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

(LCS) R3323295-2 07/03/18 19:43 • (LCSD) R3323295-3 07/03/18 20:01

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloride	40000	38500	38500	96.2	96.3	80.0-120			0.0733	15
Fluoride	8000	7860	7850	98.2	98.2	80.0-120			0.0636	15

L1005331-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005331-02 07/04/18 00:34 • (MS) R3323295-5 07/04/18 01:47 • (MSD) R3323295-6 07/04/18 02:05

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	7350	61800	59800	109	105	1	80.0-120			3.15	15
Fluoride	5000	320	5400	5580	102	105	1	80.0-120			3.13	15

L1005335-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005335-05 07/04/18 03:54 • (MS) R3323295-7 07/04/18 05:06 • (MSD) R3323295-8 07/04/18 05:25

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Fluoride	5000	1330	6520	7080	104	115	1	80.0-120			8.29	15

L1005344-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-04 07/04/18 07:14 • (MS) R3323295-10 07/04/18 07:50 • (MSD) R3323295-11 07/04/18 08:44

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	ND	54500	52400	108	104	1	80.0-120			3.91	15
Fluoride	5000	135	5160	5310	101	104	1	80.0-120			2.83	15

L1005344-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-06 07/04/18 09:21 • (MS) R3323295-12 07/04/18 09:39 • (MSD) R3323295-13 07/04/18 09:57

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	5800	59800	59100	108	107	1	80.0-120			1.18	15
Fluoride	5000	318	5210	5510	97.9	104	1	80.0-120			5.50	15

Method Blank (MB)

(MB) R3323293-1 07/03/18 12:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Chloride	U		51.9	1000

L1005344-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1005344-08 07/03/18 21:05 • (DUP) R3323293-4 07/03/18 21:21

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Chloride	6070	6060	1	0.211		15

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

(LCS) R3323293-2 07/03/18 12:21 • (LCSD) R3323293-3 07/03/18 12:36

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Chloride	40000	38300	38200	95.7	95.5	80.0-120			0.181	15

L1005344-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-08 07/03/18 21:05 • (MS) R3323293-5 07/03/18 21:36 • (MSD) R3323293-6 07/03/18 21:52

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Chloride	50000	6070	57300	61700	102	111	1	80.0-120			7.42	15

Method Blank (MB)

(MB) R3324204-1 07/09/18 12:23

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Sulfate	U		77.4	5000

L1005344-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1005344-04 07/09/18 17:16 • (DUP) R3324204-4 07/09/18 17:32

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Sulfate	31800	31900	1	0.119		15

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

(LCS) R3324204-9 07/09/18 22:18 • (LCSD) R3324204-3 07/09/18 12:54

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Sulfate	40000	39100	38900	97.8	97.3	80.0-120			0.522	15

L1005344-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-04 07/09/18 17:16 • (MS) R3324204-5 07/09/18 17:47 • (MSD) R3324204-6 07/09/18 18:03

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Sulfate	50000	31800	78500	78300	93.3	93.0	1	80.0-120			0.204	15

Method Blank (MB)

(MB) R3322172-1 06/30/18 09:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Boron	U		12.6	200
Calcium	U		46.3	1000

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

(LCS) R3322172-2 06/30/18 09:04 • (LCSD) R3322172-3 06/30/18 09:07

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Boron	1000	985	982	98.5	98.2	80.0-120			0.320	20
Calcium	10000	10000	9950	100	99.5	80.0-120			0.751	20

L1005344-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-10 06/30/18 09:10 • (MS) R3322172-5 06/30/18 09:17 • (MSD) R3322172-6 06/30/18 09:20

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Boron	1000	ND	1050	1050	95.3	95.7	1	75.0-125			0.350	20
Calcium	10000	65500	74100	74200	85.8	86.4	1	75.0-125			0.0873	20

L1005344-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1005344-12 06/30/18 09:23 • (MS) R3322172-7 06/30/18 09:26 • (MSD) R3322172-8 06/30/18 09:29

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Boron	1000	7060	7860	7940	80.4	87.8	1	75.0-125			0.945	20
Calcium	10000	153000	160000	161000	71.5	77.6	1	75.0-125	V		0.376	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

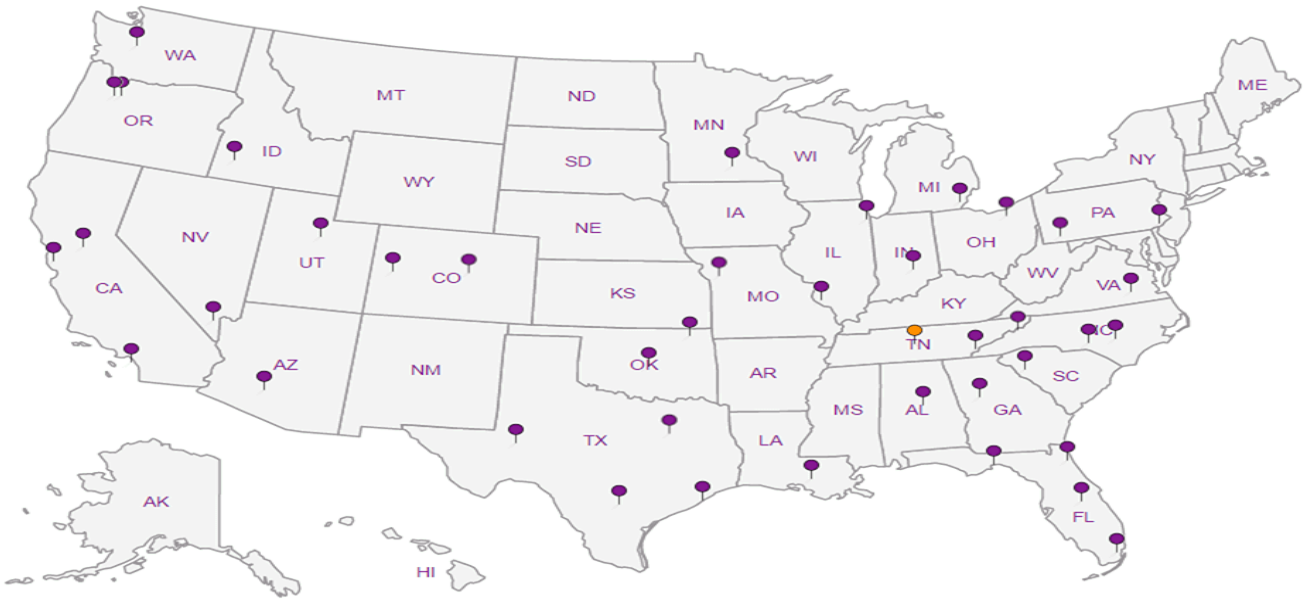
Third Party Federal Accreditations

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

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

Our Locations

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



SCS Engineers - KS

7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Billing Information:
Accounts Payable
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Pres Chk

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCP&L Sibley Generating Station**

City/State Collected:

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27213169.18**

Lab Project # **AQUAOPKS-SIBLEY**

Collected by (print): Jason R. Franks

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N___ Y✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: Std

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Boron - 6010 250mlHDPE-HNO3	Calcium - 6010 250mlHDPE-HNO3	Chloride 125mlHDPE-NoPres	Chloride, SO4 125mlHDPE-NoPres	Fluoride 125mlHDPE-NoPres	Fluoride, SO4 125mlHDPE-NoPres	SO4 125mlHDPE-NoPres	TDS 250mlHDPE-NoPres	Remarks	Sample # (lab only)
MW-510	GRAB	GW	–	6/27/18	1350	1					X					-01
MW-512		GW	–		1325	1							X			-02
MW-601		GW	–		1255	1				X						-03
MW-504		GW	–		1105	1						X				-04
DUPLICATE 1		GW	–		1105	1						X				-05
MW504 MS/MSD		GW	–		1105	1						X			–	
MW-506		GW	–		1205	1			X							-06
MW-801		GW	–		1201	1			X							-07
DUPLICATE 3		GW	–		–	1			X							-08
506 MS/MSD		GW	–		1205	1			X						–	

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 4361 6933 8672

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	6/27/18	1532	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 3.7 °C Bottles Received: 22

Date: 6/28/18 Time: 845

Hold:

Condition: NCF / OK

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N

If preservation required by Login: Date/Time

Analysis / Container / Preservative

Chain of Custody Page 1 of 3

ESC

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

L# 100534

A005

Acctnum: **AQUAOPKS**
Template: **T117427**
Prelogin: **P659505**
TSR: **206 - Jeff Carr**
PB:

Shipped Via:

Page 2 of 3

SCS Engineers - KS

7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Billing Information:
Accounts Payable
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Report to: **Jason Franks**

Email To: jfranks@scsengineers.com; jay.martin@kcpl.com;

Project Description: **KCP&L Sibley Generating Station**

City/State Collected: SIBLEY, MO

Phone: 913-681-0030
Fax: 913-681-0012

Client Project # **27213169.18**

Lab Project # **AQUAOPKS-SIBLEY**

Collected by (print): JASON R. FRANKS

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: Std

Chain of Custody

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

L# 1005344

Table #

Acctnum: **AQUAOPKS**

Template: **T117427**

Prelogin: **P659505**

TSR: **206 - Jeff Carr**

PB:

Shipped Via:

Analysis / Container / Preservative

Pres Chk	J	J								
	Boron - 6010 250mlHDPE-HNO3	Calcium - 6010 250mlHDPE-HNO3	Chloride 125mlHDPE-NoPres	Chloride, SO4 125mlHDPE-NoPres	Fluoride 125mlHDPE-NoPres	Fluoride, SO4 125mlHDPE-NoPres	SO4 125mlHDPE-NoPres	TDS 250mlHDPE-NoPres		

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs										Remarks	Sample # (lab only)
MW-505	GRAB	GW	—	6/27/18	1135	1		X									-09
MW-802		GW	—		1130	1		X									-10
DUPLICATE 2		GW	—		—	1		X									-11
MW-802 MS/MSD		GW	—		1135	1		X								—	
MW-804		GW	—		1255	1	X										-12
DUPLICATE 5		GW	—		—	1	X										-13
MW804 MS/MSD		GW	—		1300	1	X									—	
MW-701		GW	—		1005	1								X			-14
MW-702		GW	—		1050	1								X			-15
MW-805		GW	—		1335	1								X			-16

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 4361 9933 8672

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Jason R Franks	6/27/18	1532			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.7 °C Bottles Received: 22	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 6/28/18 Time: 845	Hold: / Condition: NCF / OK

Chain of Custody Page 3 of 3

SCS Engineers - KS
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Billing Information:
Accounts Payable
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Pres Chk

Report to: Jason Franks

Email To: jfranks@scsengineers.com; jay.martin@kcpl.com;

Project Description: KCP&L Sibley Generating Station

City/State Collected: Sibley, MO

Phone: 913-681-0030
Fax: 913-681-0012

Client Project # 27213169.18

Lab Project # AQUAOPKS-SIBLEY

Collected by (print): Whit Martin

Site/Facility ID #

P.O. #

Collected by (signature): Whit Martin
Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: Std

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Boron - 6010 250mlHDPE-HNO3	Calcium - 6010 250mlHDPE-HNO3	Chloride 125mlHDPE-NoPres	Chloride, SO4 125mlHDPE-NoPres	Fluoride 125mlHDPE-NoPres	Fluoride, SO4 125mlHDPE-NoPres	SO4 125mlHDPE-NoPres	TDS 250mlHDPE-NoPres			Remarks	Sample # (lab only)
DUPLICATE 4	Grab	GW		6/27/18	–	1								X				-017
MW702 MS/MSD	Grab	GW		6/27/18	1055	1								X				

Analysis / Container / Preservative

Chain of Custody

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

L# 1005394

Table #

Acctnum: AQUAOPKS

Template: T117427

Prelogin: P659505

TSR: 206 - Jeff Carr

PB:

Shipped Via:

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking # 4361 6933 8672

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Whit Martin	6/27/18	1532	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCl / MeoH
TBR

Temp: 3.7 °C Bottles Received: 22

Date: 6/28/18 Time: 845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Jared Morrison
December 16, 2022

ATTACHMENT 1-3

August 2018 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

August 16, 2018

SCS Engineers - KS

Sample Delivery Group:	L1016255
Samples Received:	08/09/2018
Project Number:	27213169.18
Description:	KCP&L Sibley Generating Station

Report To: Jason Franks
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Entire Report Reviewed By:

Jeff Carr
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

MW-504 L1016255-01 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 11:20 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1150933	1	08/11/18 13:35	08/11/18 13:35	DR

MW-512 L1016255-02 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 12:00 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1150933	1	08/11/18 14:52	08/11/18 14:52	DR

DUPLICATE 1 L1016255-03 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 00:00 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1150933	1	08/11/18 15:08	08/11/18 15:08	DR

MW-801 L1016255-04 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 12:40 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1151269	5	08/13/18 21:59	08/13/18 21:59	ELN

DUPLICATE 2 L1016255-05 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 00:00 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 9056A	WG1150933	5	08/11/18 16:10	08/11/18 16:10	DR

MW-804 L1016255-06 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 13:10 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1149499	1	08/11/18 08:58	08/14/18 16:59	ST

DUPLICATE 3 L1016255-07 GW

Collected by: Whit Martin | Collected date/time: 08/08/18 00:00 | Received date/time: 08/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1149499	1	08/11/18 08:58	08/14/18 18:11	ST

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Sulfate	32300		5000	1	08/11/2018 13:35	WG1150933

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Sulfate	30900		5000	1	08/11/2018 14:52	WG1150933

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Sulfate	31400		5000	1	08/11/2018 15:08	WG1150933

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	106000		5000	5	08/13/2018 21:59	WG1151269

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	108000		5000	5	08/11/2018 16:10	WG1150933

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	7000		200	1	08/14/2018 16:59	WG1149499

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	7110		200	1	08/14/2018 18:11	WG1149499

Method Blank (MB)

(MB) R3332885-1 08/11/18 08:45

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Chloride	60.5	J	51.9	1000
Sulfate	U		77.4	5000

L1016155-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1016155-01 08/11/18 13:04 • (DUP) R3332885-4 08/11/18 13:20

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Chloride	13700	13800	1	0.412		15

L1016342-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1016342-01 08/11/18 16:25 • (DUP) R3332885-9 08/11/18 16:40

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Chloride	13100	13100	1	0.287		15
Sulfate	28900	28800	1	0.192		15

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

(LCS) R3332885-2 08/11/18 09:13 • (LCSD) R3332885-3 08/11/18 09:28

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Chloride	40000	39100	39000	97.7	97.6	80.0-120			0.110	15
Sulfate	40000	39600	39400	99.1	98.6	80.0-120			0.504	15

L1016255-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1016255-01 08/11/18 13:35 • (MS) R3332885-5 08/11/18 14:22 • (MSD) R3332885-6 08/11/18 14:37

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Chloride	50000	ND	50200	50400	98.5	98.9	1	80.0-120			0.353	15
Sulfate	50000	32300	79000	79200	93.4	93.7	1	80.0-120			0.222	15

L1016255-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1016255-04 08/11/18 15:23 • (MS) R3332885-7 08/11/18 15:39 • (MSD) R3332885-8 08/11/18 15:54

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sulfate	50000	53300	99800	99700	92.9	92.6	1	80.0-120			0.112	15

Method Blank (MB)

(MB) R3333310-1 08/13/18 12:24

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Chloride	U		51.9	1000

L1015843-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1015843-01 08/13/18 18:23 • (DUP) R3333310-4 08/13/18 18:38

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Chloride	15300	15300	1	0.251		15

L1015986-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1015986-01 08/13/18 20:11 • (DUP) R3333310-7 08/13/18 20:57

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Chloride	9440	9270	1	1.81		15

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

(LCS) R3333310-2 08/13/18 12:40 • (LCSD) R3333310-3 08/13/18 12:55

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Chloride	40000	38500	38700	96.1	96.8	80.0-120			0.670	15

L1015843-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1015843-01 08/13/18 18:23 • (MS) R3333310-5 08/13/18 18:54 • (MSD) R3333310-6 08/13/18 19:09

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Chloride	50000	15300	65200	65300	99.8	100	1	80.0-120			0.176	15

Method Blank (MB)

(MB) R3333613-1 08/14/18 16:51

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Boron	U		12.6	200

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

(LCS) R3333613-2 08/14/18 16:54 • (LCSD) R3333613-3 08/14/18 16:57

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Boron	1000	1020	1010	102	101	80.0-120			1.25	20

L1016255-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1016255-06 08/14/18 16:59 • (MS) R3333613-5 08/14/18 17:05 • (MSD) R3333613-6 08/14/18 17:07

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Boron	1000	7000	7840	7830	83.6	83.2	1	75.0-125			0.0467	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

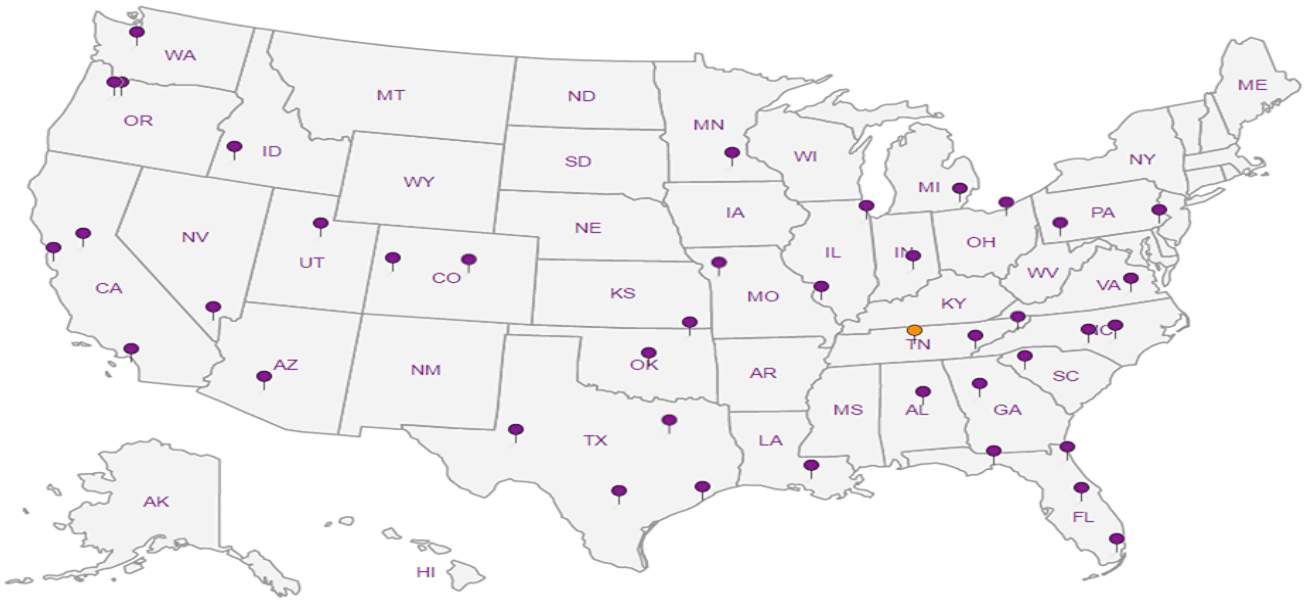
Third Party Federal Accreditations

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

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

Our Locations

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



SCS Engineers - KS
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Billing Information:
Accounts Payable
7311 West 130th Street, Ste. 100
Overland Park, KS 66213

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCP&L Sibley Generating Station**

City/State Collected: **Sibley, MO**

Phone: **913-681-0030** Fax: **913-681-0012**

Client Project # **27213169.18**

Lab Project # **AQUAOPKS-SIBLEY**

Collected by (print): **Whit Martin**

Site/Facility ID #

P.O. #

Collected by (signature): **Whit Martin**

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: **Std**

Chain of Custody Page 1 of 1

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

L# L1016755

F068

Acctnum: **AQUAOPKS**
Template: **T136014**
Prelogin: **P666113**
TSR: **206 - Jeff Carr**
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Boron 250mlHDPE-HNO3	CHLORIDE 125mlHDPE-NoPres	SO4 125mlHDPE-NoPres	Remarks	Sample # (lab only)
MW-504	Grab	GW		8/8/18	1120	1			X		-01
MW-512	Grab	GW			1200	1			X		02
DUPLICATE 1	Grab	GW			—	1			X		03
504 MS / MSD #1	Grab	GW			1125	1			X		01
MW-801	Grab	GW			1240	1		X			04
DUPLICATE 2	Grab	GW			—	1		X			05
801 MS / MSD	Grab	GW			1245	1		X			04
MW-804	Grab	GW			1310	1	X				06
DUPLICATE 3	Grab	GW			—	1	X				07
804 MS / MSD	Grab	GW		↓	1315	1	X				06

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

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __UPS X FedEx __Courier _____

Tracking # 4510 1051 3233

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
<2 MR/HR

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Whit Martin	8/8/18	1650	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			AM

Trip Blank Received: Yes / (No) HCL / MeoH TBR

Temp: 2.3 °C Bottles Received: 10

Date: 8/9/18 Time: 845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

Jared Morrison
December 16, 2022

ATTACHMENT 1-4

November 2018 Sampling Event Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 03, 2018

SCS Engineers - KS

Sample Delivery Group:	L1045463
Samples Received:	11/17/2018
Project Number:	27213169.18
Description:	KCP&L Sibley Generating Station

Report To: Jason Franks
8575 W. 110th Street
Overland Park, KS 66210

Entire Report Reviewed By:

Jeff Carr
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

MW-504 L1045463-01 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 11:05 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199018	1	11/20/18 14:08	11/20/18 14:36	AJS
Wet Chemistry by Method 9056A	WG1199283	1	11/23/18 22:26	11/23/18 22:26	MAJ
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 22:54	ST

MW-505 L1045463-02 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 10:20 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199018	1	11/20/18 14:08	11/20/18 14:36	AJS
Wet Chemistry by Method 9056A	WG1199283	1	11/23/18 22:42	11/23/18 22:42	MAJ
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 22:57	ST

MW-506 L1045463-03 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 11:55 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199018	1	11/20/18 14:08	11/20/18 14:36	AJS
Wet Chemistry by Method 9056A	WG1199286	1	11/21/18 18:22	11/21/18 18:22	NJM
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 23:05	ST

MW-510 L1045463-04 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 11:50 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199018	1	11/20/18 14:08	11/20/18 14:36	AJS
Wet Chemistry by Method 9056A	WG1199286	1	11/21/18 18:33	11/21/18 18:33	NJM
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 23:08	ST

MW-512 L1045463-05 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 14:00 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199020	1	11/21/18 11:15	11/21/18 11:47	JD
Wet Chemistry by Method 9056A	WG1199286	1	11/21/18 18:44	11/21/18 18:44	NJM
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 23:11	ST

MW-601 L1045463-06 GW

Collected by: G. Penaflor | Collected date/time: 11/15/18 13:50 | Received date/time: 11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199018	1	11/20/18 14:08	11/20/18 14:36	JD
Wet Chemistry by Method 9056A	WG1199286	1	11/21/18 18:55	11/21/18 18:55	NJM
Metals (ICP) by Method 6010B	WG1199229	1	11/20/18 15:43	11/21/18 20:40	JDG

DUPLICATE L1045463-07 GW

Collected by	Collected date/time	Received date/time
G. Penaflor	11/15/18 15:35	11/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Gravimetric Analysis by Method 2540 C-2011	WG1199020	1	11/21/18 11:15	11/21/18 11:47	JD
Wet Chemistry by Method 9056A	WG1199286	1	11/21/18 20:00	11/21/18 20:00	NJM
Metals (ICP) by Method 6010B	WG1199219	1	11/21/18 13:25	11/21/18 23:13	ST

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jeff Carr
Project Manager

Project Narrative

This report has been revised. The metals and TDS results for samples MW-601 (L1045463-06) and MW-804 (L1045462-08) have been switched as a result of the MS and MSD containers for these samples being mislabeled in login.

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	211000		10000	1	11/20/2018 14:36	WG1199018

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	ND		1000	1	11/23/2018 22:26	WG1199283
Fluoride	208		100	1	11/23/2018 22:26	WG1199283
Sulfate	33900		5000	1	11/23/2018 22:26	WG1199283

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 22:54	WG1199219
Calcium	45000		1000	1	11/21/2018 22:54	WG1199219

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	167000		10000	1	11/20/2018 14:36	WG1199018

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	ND		1000	1	11/23/2018 22:42	WG1199283
Fluoride	212		100	1	11/23/2018 22:42	WG1199283
Sulfate	14600		5000	1	11/23/2018 22:42	WG1199283

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 22:57	WG1199219
Calcium	30800		1000	1	11/21/2018 22:57	WG1199219

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	426000		10000	1	11/20/2018 14:36	WG1199018

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	6690		1000	1	11/21/2018 18:22	WG1199286
Fluoride	199		100	1	11/21/2018 18:22	WG1199286
Sulfate	70800		5000	1	11/21/2018 18:22	WG1199286

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 23:05	WG1199219
Calcium	93400		1000	1	11/21/2018 23:05	WG1199219

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	478000		10000	1	11/20/2018 14:36	WG1199018

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3150		1000	1	11/21/2018 18:33	WG1199286
Fluoride	204		100	1	11/21/2018 18:33	WG1199286
Sulfate	17500		5000	1	11/21/2018 18:33	WG1199286

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 23:08	WG1199219
Calcium	120000		1000	1	11/21/2018 23:08	WG1199219

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	452000		10000	1	11/21/2018 11:47	WG1199020

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3890		1000	1	11/21/2018 18:44	WG1199286
Fluoride	192		100	1	11/21/2018 18:44	WG1199286
Sulfate	51400		5000	1	11/21/2018 18:44	WG1199286

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 23:11	WG1199219
Calcium	110000		1000	1	11/21/2018 23:11	WG1199219

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	397000		10000	1	11/20/2018 14:36	WG1199018

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3350		1000	1	11/21/2018 18:55	WG1199286
Fluoride	158	P1	100	1	11/21/2018 18:55	WG1199286
Sulfate	13300		5000	1	11/21/2018 18:55	WG1199286

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 20:40	WG1199229
Calcium	105000		1000	1	11/21/2018 20:40	WG1199229

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Dissolved Solids	390000		10000	1	11/21/2018 11:47	WG1199020

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	3450		1000	1	11/21/2018 20:00	WG1199286
Fluoride	162		100	1	11/21/2018 20:00	WG1199286
Sulfate	15000		5000	1	11/21/2018 20:00	WG1199286

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	ND		200	1	11/21/2018 23:13	WG1199219
Calcium	102000		1000	1	11/21/2018 23:13	WG1199219

Method Blank (MB)

(MB) R3362742-1 11/20/18 14:36

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Dissolved Solids	U		2820	10000

L1045462-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1045462-06 11/20/18 14:36 • (DUP) R3362742-3 11/20/18 14:36

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	412000	421000	1	2.16		5

Laboratory Control Sample (LCS)

(LCS) R3362742-2 11/20/18 14:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800000	8330000	94.7	85.0-115	

Method Blank (MB)

(MB) R3362743-4 11/21/18 11:47

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Dissolved Solids	U		2820	10000

L1045463-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1045463-05 11/21/18 11:47 • (DUP) R3362743-3 11/21/18 11:47

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	452000	453000	1	0.221		5

Laboratory Control Sample (LCS)

(LCS) R3362743-2 11/21/18 11:47

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800000	8610000	97.8	85.0-115	

Method Blank (MB)

(MB) R3363048-1 11/23/18 10:04

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Chloride	U		51.9	1000
Fluoride	U		9.90	100
Sulfate	U		77.4	5000

L1045445-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1045445-03 11/23/18 15:30 • (DUP) R3363048-3 11/23/18 15:45

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	6800	6790	1	0.128		15
Fluoride	156	157	1	0.447		15
Sulfate	14600	14600	1	0.392		15

L1045462-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1045462-08 11/23/18 20:38 • (DUP) R3363048-6 11/23/18 20:54

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3900	3820	1	2.09		15
Fluoride	260	255	1	1.79		15
Sulfate	25800	25800	1	0.276		15

Laboratory Control Sample (LCS)

(LCS) R3363048-2 11/23/18 10:19

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40000	39800	99.4	80.0-120	
Fluoride	8000	8110	101	80.0-120	
Sulfate	40000	40800	102	80.0-120	

L1045445-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045445-03 11/23/18 15:30 • (MS) R3363048-4 11/23/18 16:01 • (MSD) R3363048-5 11/23/18 16:16

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	6800	56800	56300	99.9	98.9	1	80.0-120			0.905	15
Fluoride	5000	156	5310	5260	103	102	1	80.0-120			0.952	15
Sulfate	50000	14600	63900	63300	98.7	97.5	1	80.0-120			0.934	15

L1045462-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045462-08 11/23/18 20:38 • (MS) R3363048-7 11/23/18 21:09 • (MSD) R3363048-8 11/23/18 21:25

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	3900	52600	54100	97.4	100	1	80.0-120			2.78	15
Fluoride	5000	260	4870	5390	92.2	103	1	80.0-120			10.1	15
Sulfate	50000	25800	72200	73500	92.7	95.3	1	80.0-120			1.77	15

Method Blank (MB)

(MB) R3362567-1 11/21/18 17:37

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Chloride	U		51.9	1000
Fluoride	U		9.90	100
Sulfate	U		77.4	5000

L1045463-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1045463-06 11/21/18 18:55 • (DUP) R3362567-4 11/21/18 19:06

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	3350	3350	1	0.0119		15
Fluoride	158	234	1	38.9	P1	15
Sulfate	13300	13300	1	0.387		15

L1045479-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1045479-06 11/21/18 21:05 • (DUP) R3362567-7 11/21/18 21:16

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	ND	510	1	0.000		15
Fluoride	222	322	1	36.7	P1	15
Sulfate	25400	25800	1	1.65		15

Laboratory Control Sample (LCS)

(LCS) R3362567-3 11/21/18 18:09

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40000	39700	99.3	80.0-120	
Fluoride	8000	8110	101	80.0-120	
Sulfate	40000	40100	100	80.0-120	

L1045463-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045463-06 11/21/18 18:55 • (MS) R3362567-5 11/21/18 19:17 • (MSD) R3362567-6 11/21/18 19:27

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chloride	50000	3350	52300	53300	97.9	99.9	1	80.0-120			1.89	15
Fluoride	5000	158	4920	5170	95.3	100	1	80.0-120			4.94	15
Sulfate	50000	13300	62000	62400	97.3	98.1	1	80.0-120			0.711	15

L1045479-06 Original Sample (OS) • Matrix Spike (MS)

(OS) L1045479-06 11/21/18 21:05 • (MS) R3362567-8 11/21/18 21:27

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50000	ND	50000	98.8	1	80.0-120	
Fluoride	5000	222	5100	97.6	1	80.0-120	
Sulfate	50000	25400	74200	97.7	1	80.0-120	

Method Blank (MB)

(MB) R3362279-6 11/22/18 00:49

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Boron	U		12.6	200
Calcium	61.4	J	46.3	1000

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

(LCS) R3362279-1 11/21/18 22:02 • (LCSD) R3362279-2 11/21/18 22:05

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1000	946	976	94.6	97.6	80.0-120			3.14	20
Calcium	10000	9840	9880	98.4	98.8	80.0-120			0.404	20

L1045462-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045462-08 11/21/18 22:07 • (MS) R3362279-10 11/21/18 22:13 • (MSD) R3362279-11 11/21/18 22:15

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1000	8070	8790	8820	72.0	75.2	1	75.0-125	V		0.364	20
Calcium	10000	155000	160000	160000	50.6	53.5	1	75.0-125	V	V	0.180	20

Method Blank (MB)

(MB) R3362229-1 11/21/18 20:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Boron	U		12.6	200
Calcium	57.4	J	46.3	1000

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

(LCS) R3362229-2 11/21/18 20:35 • (LCSD) R3362229-3 11/21/18 20:37

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Boron	1000	982	960	98.2	96.0	80.0-120			2.29	20
Calcium	10000	9770	9750	97.7	97.5	80.0-120			0.267	20

L1045463-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1045463-06 11/21/18 20:40 • (MS) R3362229-10 11/21/18 20:45 • (MSD) R3362229-11 11/21/18 20:47

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Boron	1000	ND	1130	1110	99.9	98.2	1	75.0-125			1.51	20
Calcium	10000	105000	113000	113000	85.4	87.9	1	75.0-125			0.219	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
V	The sample concentration is too high to evaluate accurate spike recoveries.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

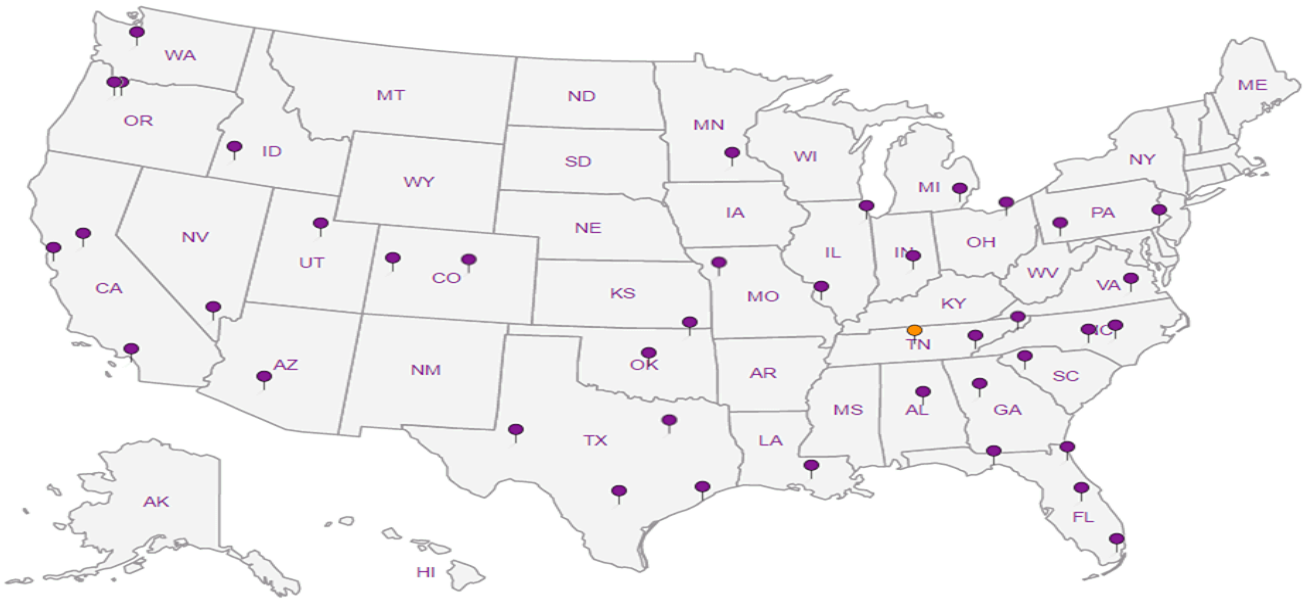
Third Party Federal Accreditations

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

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

Our Locations

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



SCS Engineers - KS
8575 W. 110th Street
Overland Park, KS 66210

Billing Information:
Accounts Payable
8575 W. 110th Street
Overland Park, KS 66210

Pres Chk

Report to: **Jason Franks**

Email To: **jfranks@scsengineers.com; jay.martin@kcpl.com;**

Project Description: **KCP&L Sibley Generating Station**

City/State Collected:

Phone: **913-681-0030**
Fax: **913-681-0012**

Client Project # **27213169.18**

Lab Project # **AQUAOPKS-SIBLEY**

Collected by (print): G. Penaflor

Site/Facility ID #

P.O. #

Collected by (signature): Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: STD

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Anions (Cld, F, SO4) 125mlHDPE-NoPres	B, Ca - 6010 250mlHDPE-HNO3	TDS 250mlHDPE-NoPres	Remarks	Sample # (lab only)
MW-504	Comp	GW		11/15	1105	3	X	X	X		01
MW-505		GW			1020	3	X	X	X		02
MW-506		GW			1155	3	X	X	X		03
MW-510		GW			1150	3	X	X	X		04
MW-512		GW			1400	3	X	X	X		05
MW-601		GW			1350	3	X	X	X		06
DUPLICATE		GW		11/15	1535	3	X	X	X		07
601 MS		GW		11/15	1540	3	X	X	X		08
601 MSD		GW		11/15	1545	3	X	X	X		09

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

Remarks:

Samples returned via: ___ UPS ___ FedEx ___ Courier SWA

Tracking #

pH _____ Temp _____
Flow _____ Other _____

Relinquished by : (Signature) — Date: 11/16/18 Time: 1547 — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 1.2 °C Bottles Received: 27

Date: 11/17/18 Time: 0845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Sample Receipt Checklist
COC Seal Present/Intact: NP ___Y ___N
COC Signed/Accurate: ___Y ___N
Bottles arrive intact: ___Y ___N
Correct bottles used: ___Y ___N
Sufficient volume sent: ___Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ___Y ___N
RAD SCREEN: <0.5 mR/hr

Chain of Custody Page 1 of 1

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

L# 1045463
H106

Acctnum: AQUAOPKS
Template: T136014
Prelogin: P680732
TSR: 206 - Jeff Carr
PB:
Shipped Via:

Jared Morrison
December 16, 2022

ATTACHMENT 2

Statistical Analyses

Jared Morrison
December 16, 2022

ATTACHMENT 2-1

Fall 2017 Semiannual Detection Monitoring Statistical Analyses

MEMORANDUM

January 31, 2018

To: Sibley Generating Station
33200 E Johnson Road
Sibley, Missouri 64088
KCP&L Greater Missouri Operations Company

From: SCS Engineers

RE: Revision to January 15, 2018 Memorandum
Determination of Statistically Significant Increases - CCR Landfill

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at the Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification By A Qualified Professional Engineer" dated October 12, 2017. Groundwater samples were collected and analyzed by October 17, 2017. A statistical analysis was conducted to determine whether there is a statistically significant increase over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring.

The completed statistical evaluation identified Appendix III constituent, chloride, above its prediction limit in monitoring wells MW-505 and MW-601, respectively. The prediction limit for chloride in upgradient monitoring well MW-505 is 1.19 mg/L. The detection monitoring sample was reported at 3.13 mg/L. The first verification re-sample was collected on November 16, 2017 with a result of 1.59 mg/L. The second verification re-sample was collected on December 28, 2017 with a result of 2.12 mg/L. The prediction limit for chloride in monitoring well MW-601 is 3.58 mg/L. The detection monitoring sample was reported at 6.1 mg/L. The first verification re-sample was collected on November 16, 2017 with a result of 3.87 mg/L. The second verification re-sample was collected on December 28, 2017 with a result of 3.95 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for chloride from monitoring wells MW-505 and MW-601 exceed their prediction limits and are confirmed statistically significant increases (SSIs) over background.

Attached to this memorandum are the following backup information:

Attachment 1: Sanitas™ Output:

Statistical evaluation output from Sanitas™ for the prediction limit analysis. This includes prediction limit plots, prediction limit background data, detection sample result, 1st verification re-sample result (when applicable), 2nd verification re-sample result (when applicable), extra sample result for quality control (if applicable), and a Prediction Limit summary table. Output documentation includes the analytical data used for the statistical analyses.

Attachment 2: Sanitas™ Configuration Settings:

Screen shots of the applicable Sanitas™ configuration settings for the statistical prediction limit analysis. This includes data configuration, output configuration, prediction limit configuration and other tests configuration.

Revision Number	Revision Date	Attachment Revised	Summary of Revisions
1	1/22/2018	Cover letter	Revision table added. No changes to text regarding statistical analyses. Attachment 1 description was revised to match the revisions made in the attachment.
1	1/22/2018	1	Sanitas™ Output was revised to report boron in mg/L instead of ug/L. Some samples previously identified as verification re-samples are now more appropriately identified as "extra samples". These samples were taken as part of the quality control process, and were not required as part of verification re-sampling.
2	1/31/2018	Cover letter	Addition to Revision table. No changes to text regarding statistical analyses. Attachment 1 was revised.
2	1/31/2018	1	Sanitas™ Output was revised. The 12/15/2015 calcium concentration for MW-512 was corrected from 101 mg/L to 98.1 mg/L. The duplicate quality control result was initially reported instead of the original sample result.

Sibley Generating Station
Determination of Statistically Significant Increases
CCR Landfill
January 31, 2018

ATTACHMENT 1

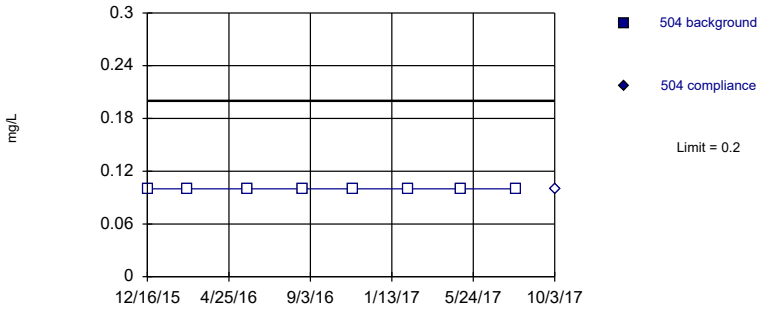
Sanitas™ Output

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

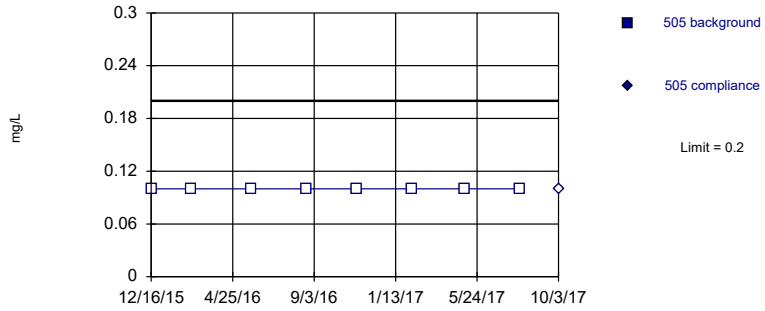
Constituent: Boron Analysis Run 1/31/2018 10:55 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

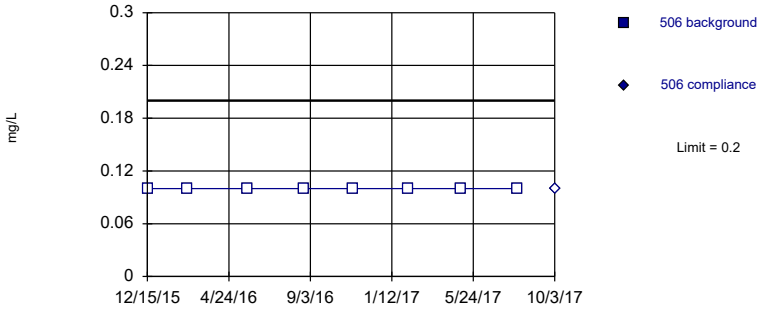
Constituent: Boron Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

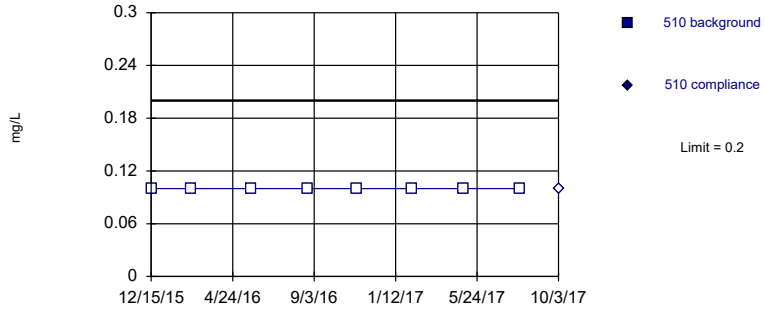
Constituent: Boron Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/1/2017	<0.2	
10/3/2017		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/1/2017	<0.2	
10/3/2017		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/4/2017	<0.2	
10/3/2017		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

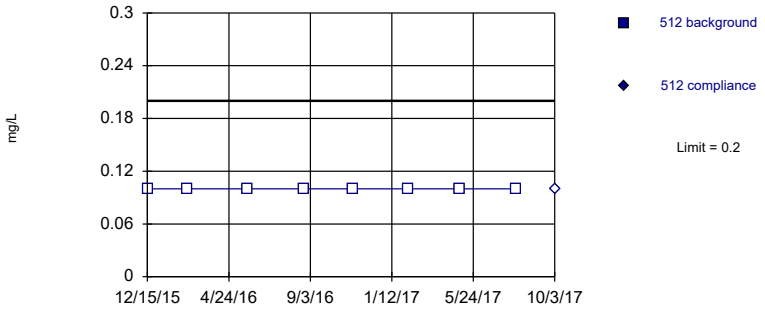
	510	510
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/10/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
10/3/2017		<0.2

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

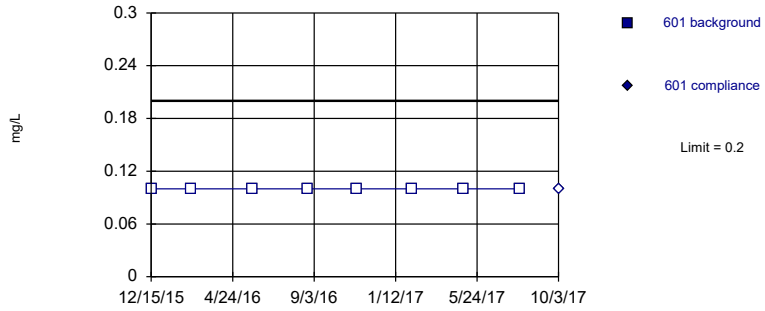
Constituent: Boron Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

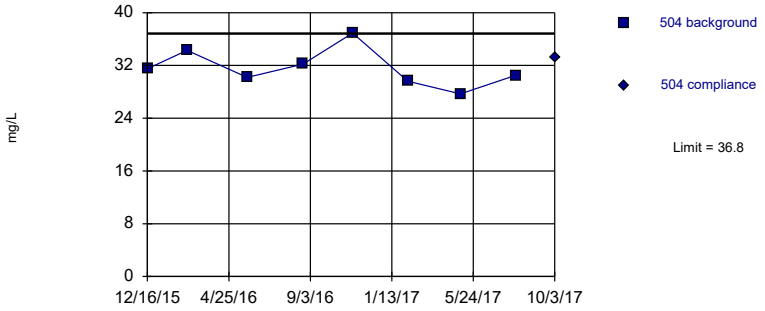
Constituent: Boron Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=31.6, Std. Dev.=2.88, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.957, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

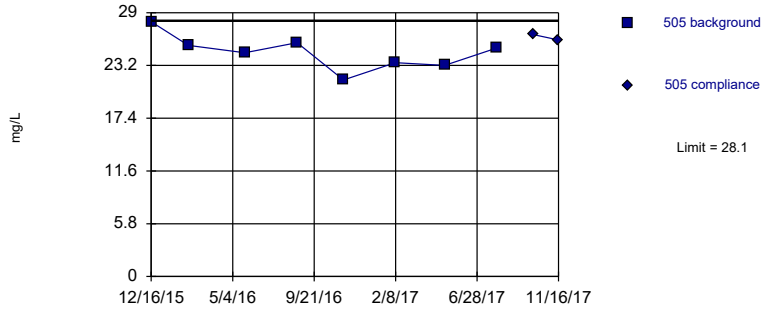
Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.5.32 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=24.6, Std. Dev.=1.92, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.977, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
10/3/2017		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	<0.2	
2/18/2016	<0.2	
5/26/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
10/3/2017		<0.2

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	31.5	
2/18/2016	34.3	
5/25/2016	30.2	
8/23/2016	32.2	
11/11/2016	36.9	
2/8/2017	29.6	
5/4/2017	27.7	
8/1/2017	30.5	
10/3/2017		33.2

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505	
12/16/2015	28		
2/18/2016	25.4		
5/25/2016	24.6		
8/23/2016	25.7		
11/11/2016	21.6		
2/8/2017	23.5		
5/4/2017	23.2		
8/1/2017	25.1		
10/3/2017		26.6	
11/16/2017		26	extra sample

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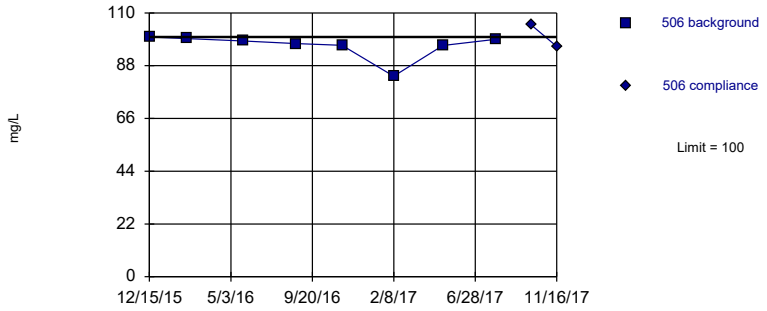
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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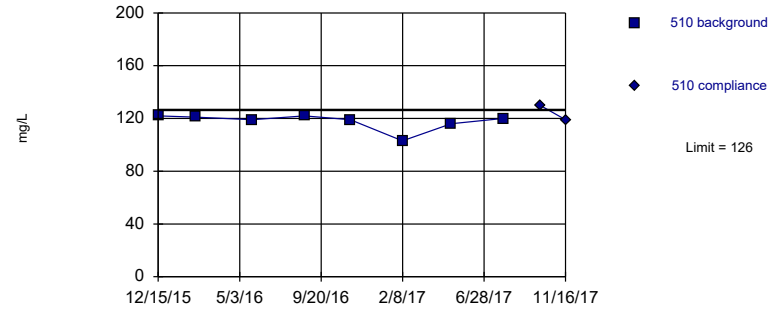
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^5 transformation): Mean=2.3e10, Std. Dev.=5.1e9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.756, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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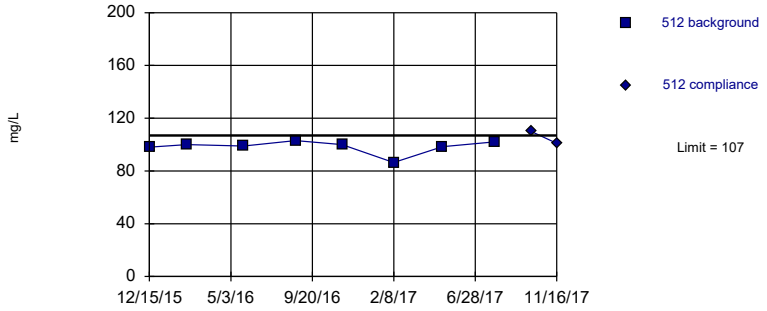
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square transformation): Mean=9696, Std. Dev.=964, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.755, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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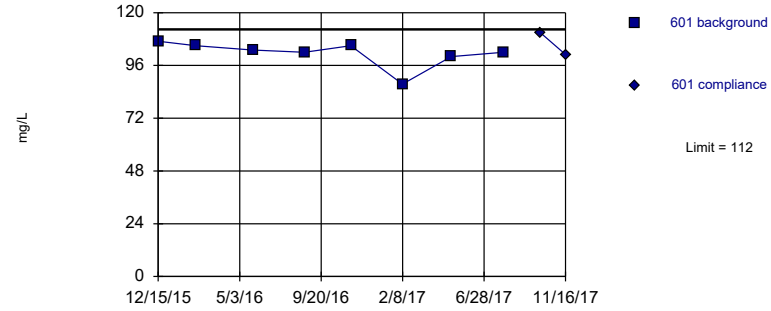
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=101, Std. Dev.=6.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.762, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506	
12/15/2015	100		
2/18/2016	99.3		
5/25/2016	98.3		
8/23/2016	97.2		
11/11/2016	96.5		
2/8/2017	83.6		
5/4/2017	96.4		
8/4/2017	99		
10/3/2017		105	
11/16/2017		96	1st verification re-sample

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510	
12/15/2015	122		
2/18/2016	121		
5/25/2016	119		
8/23/2016	122		
11/10/2016	119		
2/8/2017	103		
5/3/2017	116		
8/1/2017	120		
10/3/2017		130	
11/16/2017		119	1st verification re-sample

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512	
12/15/2015	98.1		
2/18/2016	100		
5/25/2016	98.9		
8/23/2016	103		
11/11/2016	100		
2/8/2017	86.4		
5/3/2017	98.4		
8/1/2017	102		
10/3/2017		110	
11/16/2017		101	1st verification re-sample

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	107		
2/18/2016	105		
5/26/2016	103		
8/23/2016	102		
11/11/2016	105		
2/8/2017	87.5		
5/3/2017	100		
8/1/2017	102		
10/3/2017		111	
11/16/2017		101	extra sample

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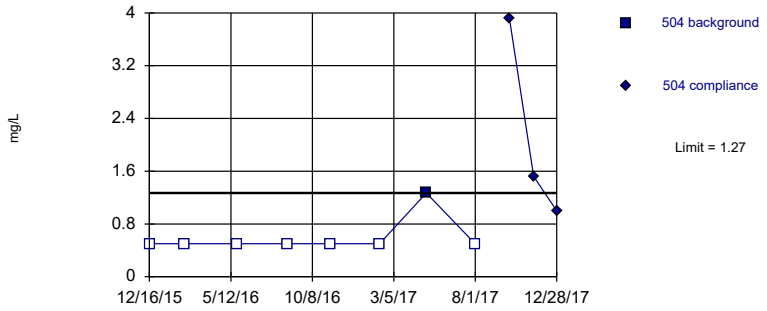
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 87.5% NDs. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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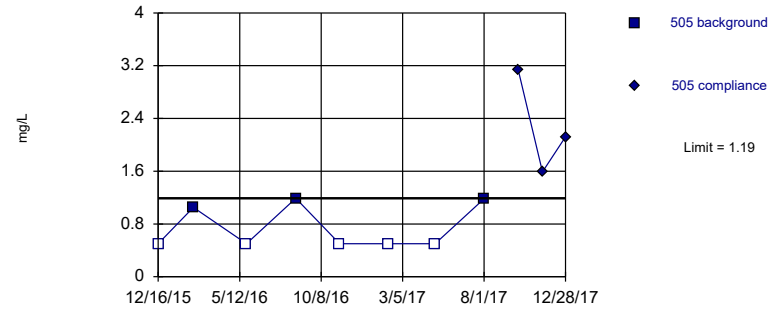
Hollow symbols indicate censored values.

Exceeds Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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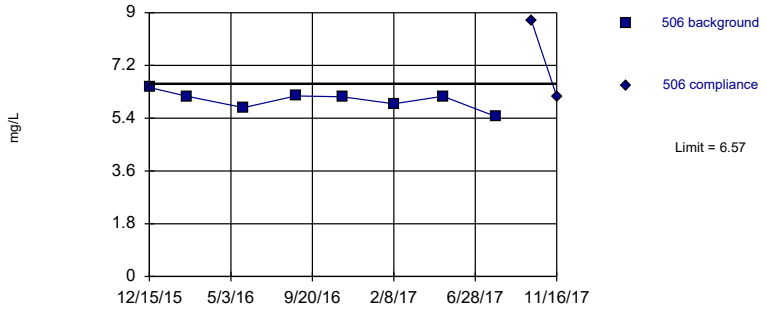
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.02, Std. Dev.=0.307, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.918, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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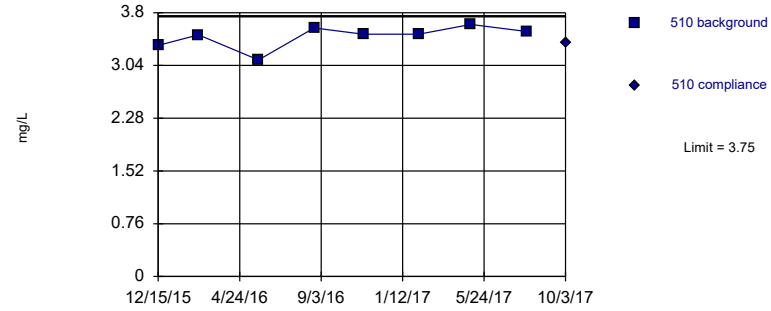
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.46, Std. Dev.=0.162, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.86, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504	
12/16/2015	<1		
2/18/2016	<1		
5/25/2016	<1		
8/23/2016	<1		
11/11/2016	<1		
2/8/2017	<1		
5/4/2017	1.27		
8/1/2017	<1		
10/3/2017		3.91	
11/16/2017		1.52	1st verification re-sample
12/28/2017		1	2nd verification re-sample

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505	
12/16/2015	<1		
2/18/2016	1.05		
5/25/2016	<1		
8/23/2016	1.19		
11/11/2016	<1		
2/8/2017	<1		
5/4/2017	<1		
8/1/2017	1.18		
10/3/2017		3.13	
11/16/2017		1.59	1st verification re-sample
12/28/2017		2.12	2nd verification re-sample

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506	
12/15/2015	6.45		
2/18/2016	6.15		
5/25/2016	5.76		
8/23/2016	6.16		
11/11/2016	6.13		
2/8/2017	5.89		
5/4/2017	6.15		
8/4/2017	5.45		
10/3/2017		8.74	
11/16/2017		6.15	1st verification re-sample

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	3.33	
2/18/2016	3.48	
5/25/2016	3.12	
8/23/2016	3.58	
11/10/2016	3.49	
2/8/2017	3.49	
5/3/2017	3.63	
8/1/2017	3.53	
10/3/2017		3.36

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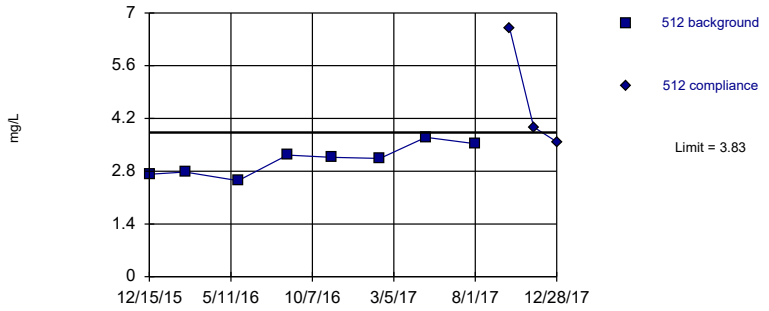
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.1, Std. Dev.=0.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.954, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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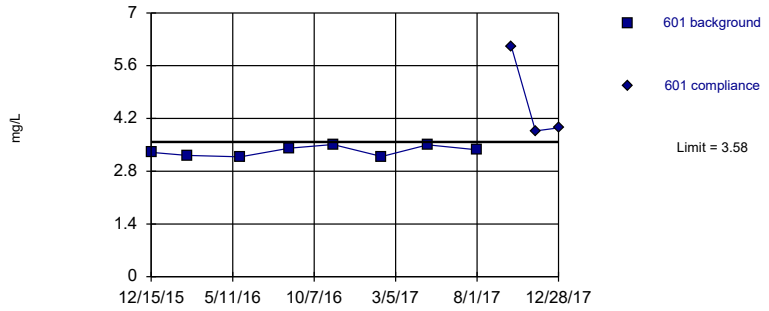
Exceeds Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.34, Std. Dev.=0.133, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.903, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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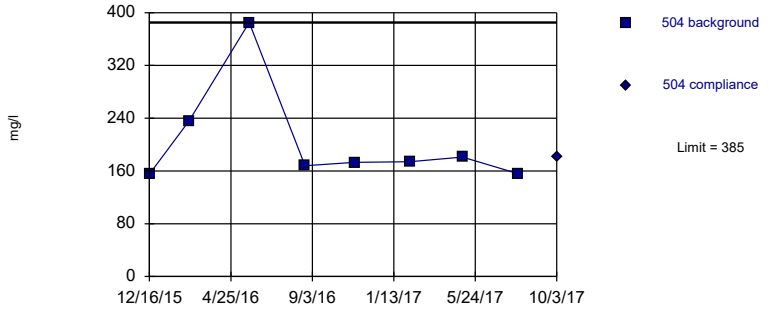
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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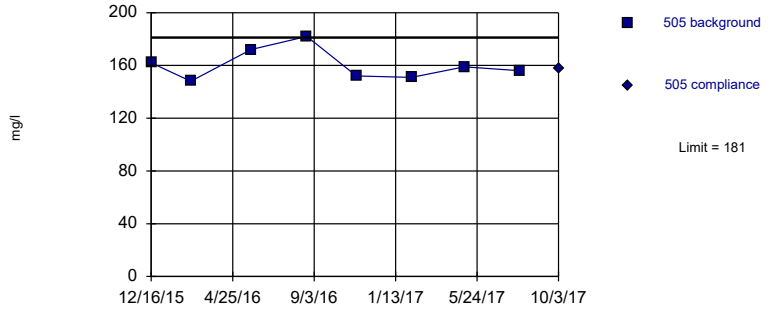
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=160, Std. Dev.=11.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.905, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512	
12/15/2015	2.72		
2/18/2016	2.78		
5/25/2016	2.55		
8/23/2016	3.23		
11/11/2016	3.17		
2/8/2017	3.14		
5/3/2017	3.7		
8/1/2017	3.53		
10/3/2017		6.59	
11/16/2017		3.97	1st verification re-sample
12/28/2017		3.58	2nd verification re-sample

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	3.3		
2/18/2016	3.22		
5/26/2016	3.18		
8/23/2016	3.41		
11/11/2016	3.51		
2/8/2017	3.19		
5/3/2017	3.5		
8/1/2017	3.37		
10/3/2017		6.1	
11/16/2017		3.87	1st verification re-sample
12/28/2017		3.95	2nd verification re-sample

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	155	
2/18/2016	236	
5/25/2016	385	
8/23/2016	168	
11/11/2016	173	
2/8/2017	174	
5/4/2017	181	
8/1/2017	156	
10/3/2017		181

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	162	
2/18/2016	148	
5/25/2016	172	
8/23/2016	182	
11/11/2016	152	
2/8/2017	151	
5/4/2017	159	
8/1/2017	156	
10/3/2017		158

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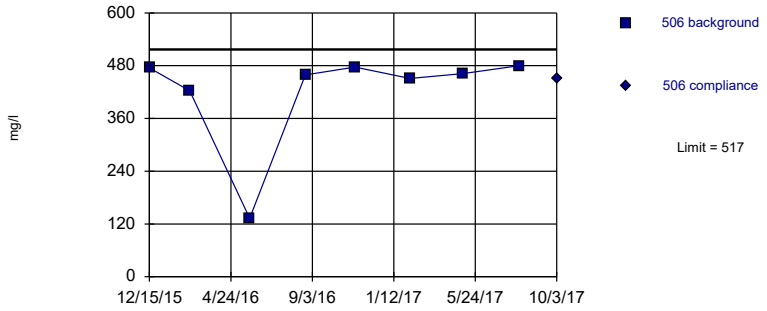
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=4.0e10, Std. Dev.=1.7e10, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.752, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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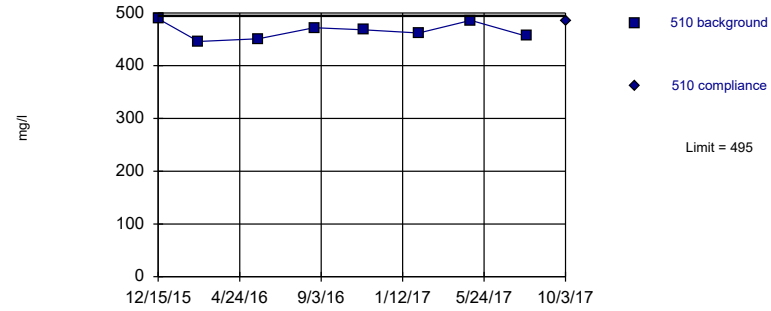
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=466, Std. Dev.=15.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.946, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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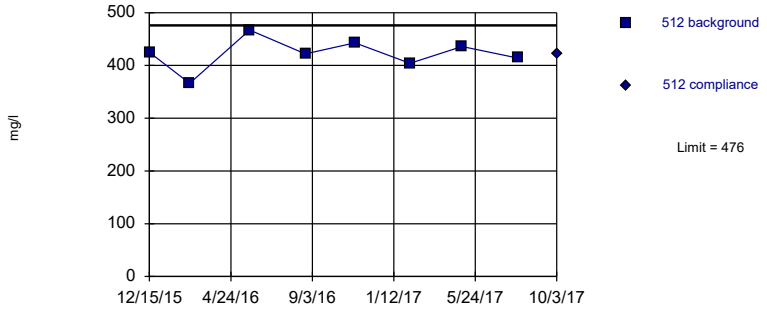
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=422, Std. Dev.=29.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.969, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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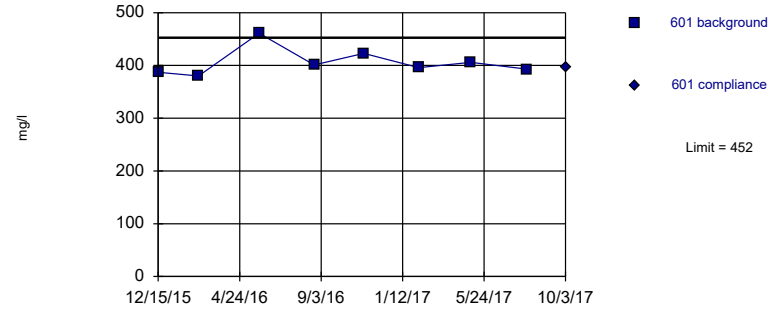
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=406, Std. Dev.=25.8, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.853, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	475	
2/18/2016	423	
5/25/2016	133	
8/23/2016	459	
11/11/2016	477	
2/8/2017	451	
5/4/2017	462	
8/4/2017	480	
10/3/2017		450

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	489	
2/18/2016	446	
5/25/2016	451	
8/23/2016	472	
11/10/2016	468	
2/8/2017	462	
5/3/2017	486	
8/1/2017	456	
10/3/2017		485

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	425	
2/18/2016	366	
5/25/2016	467	
8/23/2016	422	
11/11/2016	443	
2/8/2017	404	
5/3/2017	436	
8/1/2017	414	
10/3/2017		423

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	387	
2/18/2016	380	
5/26/2016	461	
8/23/2016	401	
11/11/2016	423	
2/8/2017	396	
5/3/2017	406	
8/1/2017	393	
10/3/2017		397

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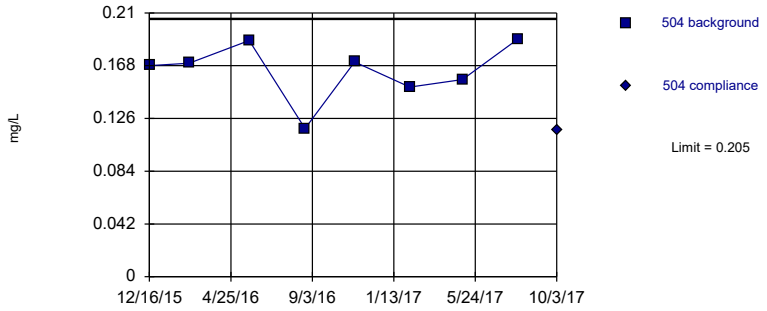
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.164, Std. Dev.=0.0228, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.901, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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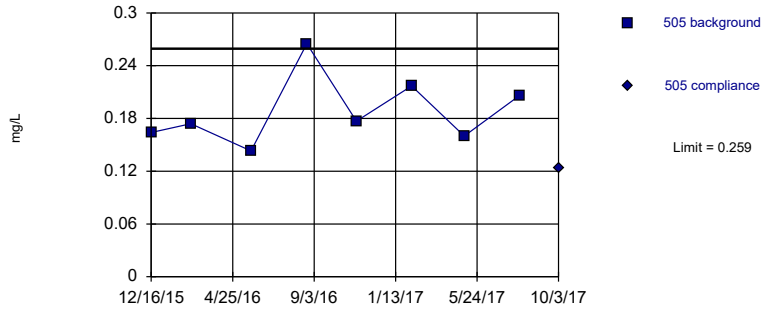
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.188, Std. Dev.=0.0393, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.914, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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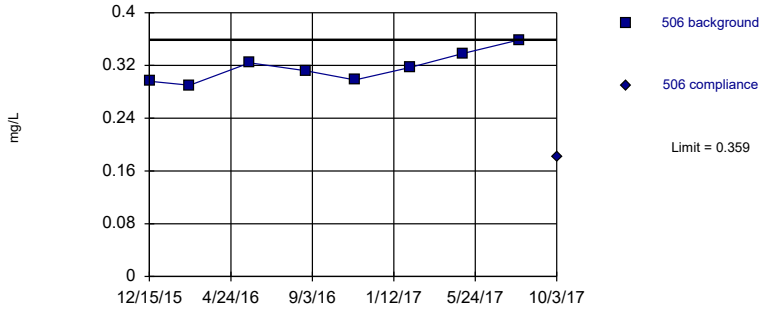
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.317, Std. Dev.=0.0233, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.941, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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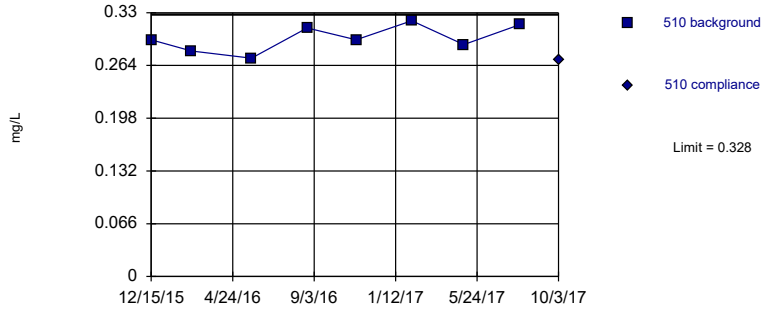
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.298, Std. Dev.=0.0165, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.955, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	0.168	
2/18/2016	0.17	
5/25/2016	0.188	
8/23/2016	0.118	
11/11/2016	0.171	
2/8/2017	0.151	
5/4/2017	0.157	
8/1/2017	0.189	
10/3/2017		0.117

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	0.164	
2/18/2016	0.174	
5/25/2016	0.143	
8/23/2016	0.265	
11/11/2016	0.177	
2/8/2017	0.217	
5/4/2017	0.16	
8/1/2017	0.206	
10/3/2017		0.124

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	0.296	
2/18/2016	0.29	
5/25/2016	0.324	
8/23/2016	0.312	
11/11/2016	0.298	
2/8/2017	0.317	
5/4/2017	0.338	
8/4/2017	0.359	
10/3/2017		0.182

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	0.296	
2/18/2016	0.282	
5/25/2016	0.273	
8/23/2016	0.311	
11/10/2016	0.296	
2/8/2017	0.32	
5/3/2017	0.29	
8/1/2017	0.315	
10/3/2017		0.271

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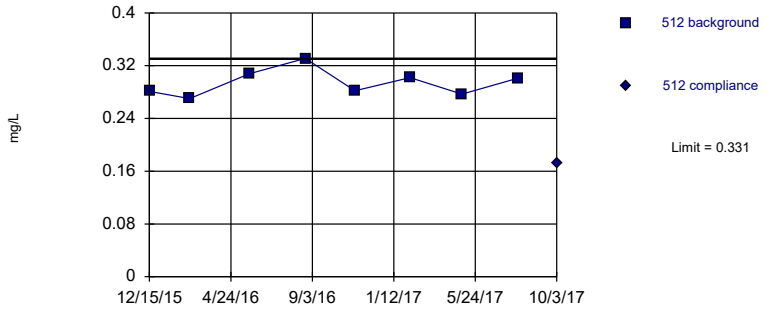
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.294, Std. Dev.=0.0202, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.927, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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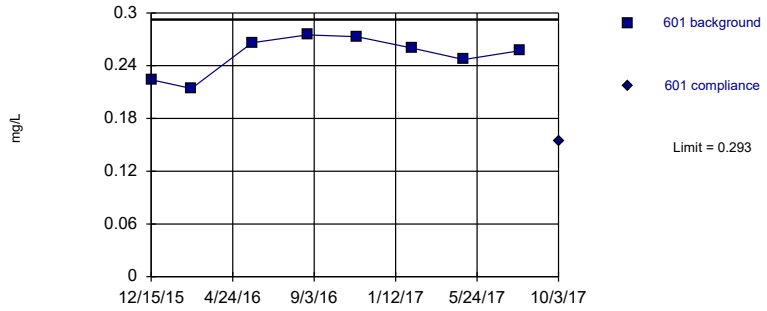
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.252, Std. Dev.=0.0224, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.891, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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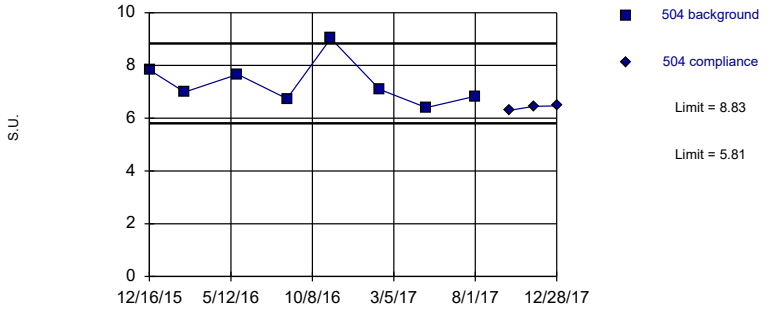
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.32, Std. Dev.=0.835, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.892, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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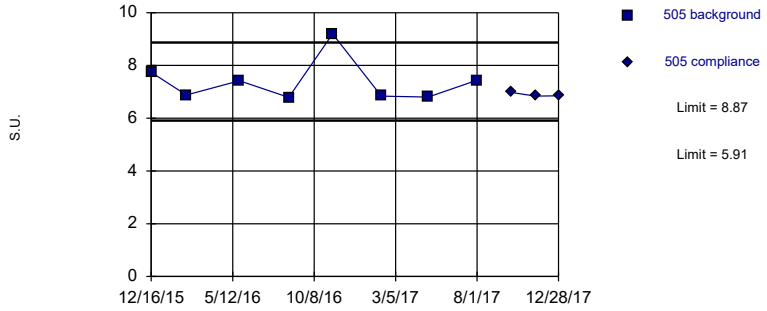
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.39, Std. Dev.=0.817, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.765, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	0.281	
2/18/2016	0.27	
5/25/2016	0.308	
8/23/2016	0.331	
11/11/2016	0.282	
2/8/2017	0.302	
5/3/2017	0.277	
8/1/2017	0.301	
10/3/2017		0.172

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	0.224	
2/18/2016	0.214	
5/26/2016	0.266	
8/23/2016	0.275	
11/11/2016	0.273	
2/8/2017	0.26	
5/3/2017	0.247	
8/1/2017	0.257	
10/3/2017		0.154

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504	
12/16/2015	7.83		
2/18/2016	6.99		
5/25/2016	7.66		
8/23/2016	6.74		
11/11/2016	9.03		
2/8/2017	7.09		
5/4/2017	6.4		
8/1/2017	6.83		
10/3/2017		6.3	
11/16/2017		6.45	extra sample
12/28/2017		6.47	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505	
12/16/2015	7.74		
2/18/2016	6.88		
5/25/2016	7.42		
8/23/2016	6.79		
11/11/2016	9.2		
2/8/2017	6.84		
5/4/2017	6.8		
8/1/2017	7.44		
10/3/2017		6.98	
11/16/2017		6.84	extra sample
12/28/2017		6.85	extra sample

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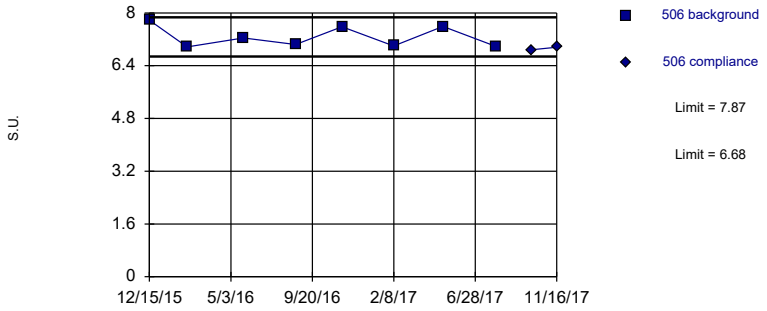
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.27, Std. Dev.=0.329, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.833, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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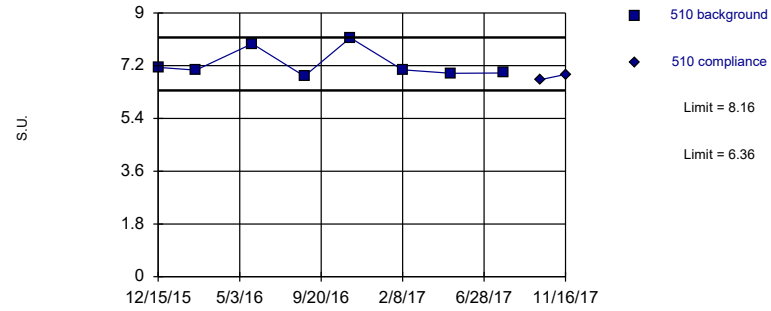
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.26, Std. Dev.=0.499, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.754, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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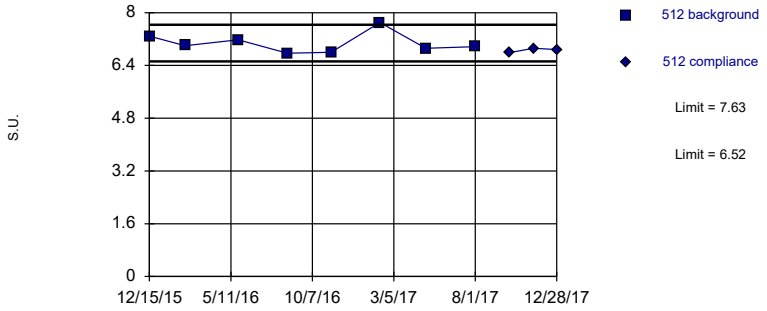
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.08, Std. Dev.=0.306, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.89, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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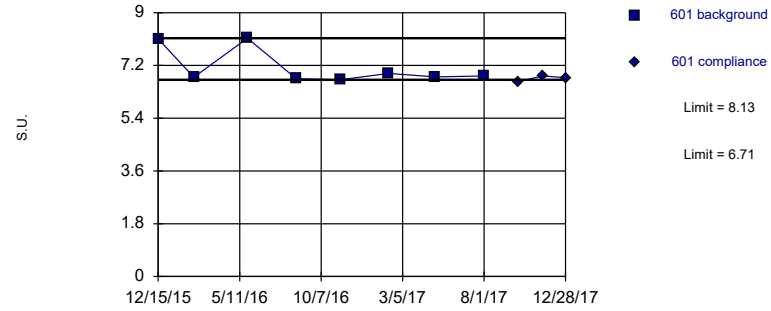
Within Limits

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.0236. Individual comparison alpha = 0.0118 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 1/31/2018 10:56 AM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506	
12/15/2015	7.78		
2/18/2016	6.97		
5/25/2016	7.24		
8/23/2016	7.04		
11/11/2016	7.58		
2/8/2017	7		
5/4/2017	7.59		
8/4/2017	6.98		
10/3/2017		6.88	
11/16/2017		6.96	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510	
12/15/2015	7.14		
2/18/2016	7.05		
5/25/2016	7.95		
8/23/2016	6.84		
11/10/2016	8.15		
2/8/2017	7.06		
5/3/2017	6.94		
8/1/2017	6.95		
10/3/2017		6.72	
11/16/2017		6.9	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512	
12/15/2015	7.29		
2/18/2016	7		
5/25/2016	7.18		
8/23/2016	6.77		
11/11/2016	6.8		
2/8/2017	7.7		
5/3/2017	6.92		
8/1/2017	6.97		
10/3/2017		6.79	
11/16/2017		6.92	extra sample
12/28/2017		6.88	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	8.11		
2/18/2016	6.8		
5/26/2016	8.13		
8/23/2016	6.75		
11/11/2016	6.71		
2/8/2017	6.93		
5/4/2017	6.81		
8/1/2017	6.84		
10/3/2017		6.65	
11/16/2017		6.84	1st Verification re-sample
12/28/2017		6.78	extra sample

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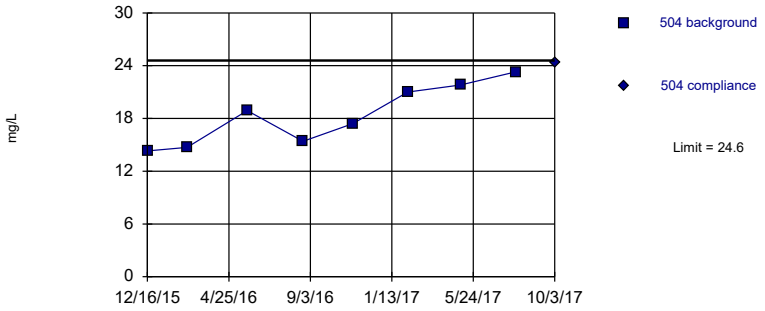
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=18.4, Std. Dev.=3.44, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.923, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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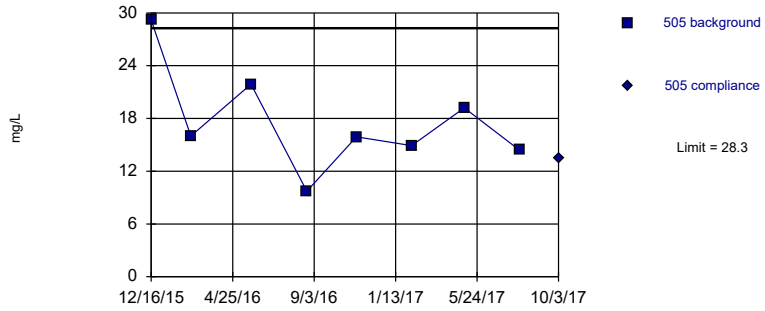
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=17.7, Std. Dev.=5.86, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.925, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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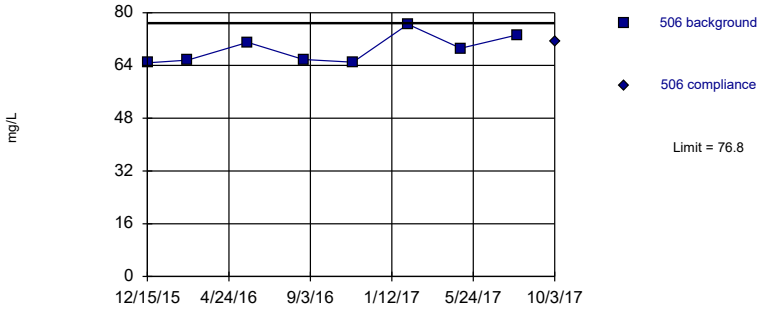
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=68.9, Std. Dev.=4.38, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.876, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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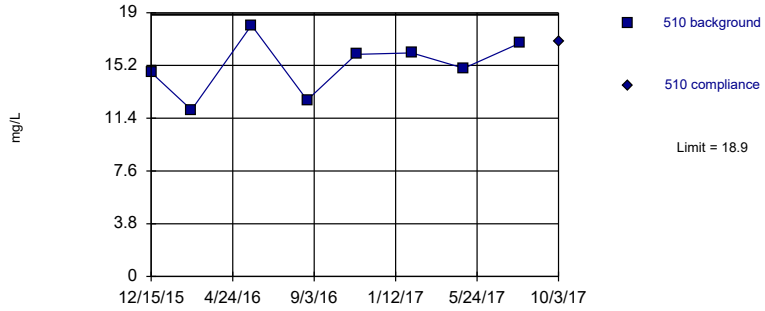
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=15.2, Std. Dev.=2.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.958, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	14.3	
2/18/2016	14.7	
5/25/2016	18.9	
8/23/2016	15.4	
11/11/2016	17.4	
2/8/2017	21	
5/4/2017	21.8	
8/1/2017	23.3	
10/3/2017		24.3

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	29.2	
2/18/2016	16	
5/25/2016	21.9	
8/23/2016	9.73	
11/11/2016	15.9	
2/8/2017	14.9	
5/4/2017	19.2	
8/1/2017	14.4	
10/3/2017		13.4

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	64.8	
2/18/2016	65.6	
5/25/2016	71	
8/23/2016	65.8	
11/11/2016	65	
2/8/2017	76.5	
5/4/2017	69.2	
8/4/2017	73.3	
10/3/2017		71.3

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

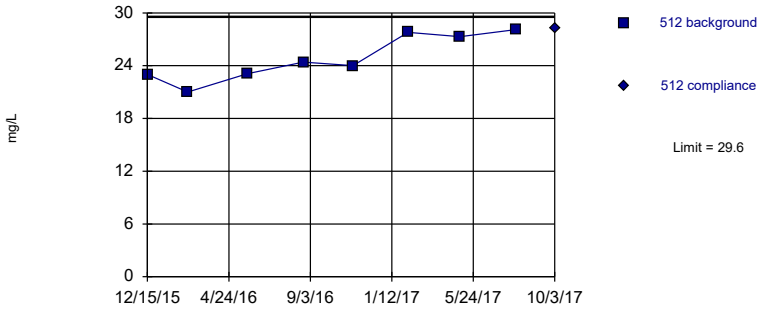
Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	14.7	
2/18/2016	12	
5/25/2016	18.1	
8/23/2016	12.7	
11/10/2016	16	
2/8/2017	16.1	
5/3/2017	15	
8/1/2017	16.8	
10/3/2017		16.9

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=24.8, Std. Dev.=2.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.909, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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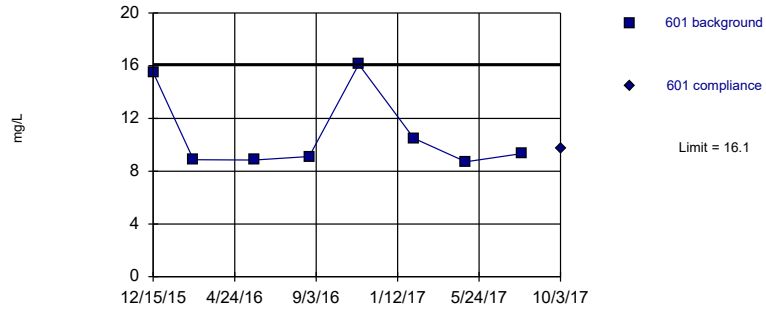
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Sulfate Analysis Run 1/31/2018 10:56 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	23	
2/18/2016	21	
5/25/2016	23.1	
8/23/2016	24.4	
11/11/2016	24	
2/8/2017	27.8	
5/3/2017	27.3	
8/1/2017	28.1	
10/3/2017		28.2

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 1/31/2018 10:59 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	15.5	
2/18/2016	8.87	
5/26/2016	8.85	
8/23/2016	9.11	
11/11/2016	16.1	
2/8/2017	10.5	
5/3/2017	8.71	
8/1/2017	9.33	
10/3/2017		9.76

Prediction Limit

Sibley Client: SCS Engineers Data: Sibley Printed 1/31/2018, 10:59 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	504	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	505	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	506	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	510	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	512	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	601	0.2	n/a	10/3/2017	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Calcium (mg/L)	504	36.8	n/a	10/3/2017	33.2	No	8	0	No	0.00188	Param Intra 1 of 3
Calcium (mg/L)	505	28.1	n/a	11/16/2017	26	No	8	0	No	0.00188	Param Intra 1 of 3
Calcium (mg/L)	506	100	n/a	11/16/2017	96	No	8	0	n/a	0.00591	NP Intra (normality) ...
Calcium (mg/L)	510	126	n/a	11/16/2017	119	No	8	0	x^5	0.00188	Param Intra 1 of 3
Calcium (mg/L)	512	107	n/a	11/16/2017	101	No	8	0	x^2	0.00188	Param Intra 1 of 3
Calcium (mg/L)	601	112	n/a	11/16/2017	101	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	504	1.27	n/a	12/28/2017	1	No	8	87.5	n/a	0.00591	NP Intra (NDs) 1 of 3
Chloride (mg/L)	**505**	**1.19**	**n/a**	**12/28/2017**	**2.12**	**Yes**	**8**	**62.5**	**n/a**	**0.00591**	**NP Intra (NDs) 1 of 3**
Chloride (mg/L)	506	6.57	n/a	11/16/2017	6.15	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	510	3.75	n/a	10/3/2017	3.36	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	512	3.83	n/a	12/28/2017	3.58	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	**601**	**3.58**	**n/a**	**12/28/2017**	**3.95**	**Yes**	**8**	**0**	**No**	**0.00188**	**Param Intra 1 of 3**
Dissolved Solids (mg/l)	504	385	n/a	10/3/2017	181	No	8	0	n/a	0.00591	NP Intra (normality) ...
Dissolved Solids (mg/l)	505	181	n/a	10/3/2017	158	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	506	517	n/a	10/3/2017	450	No	8	0	x^4	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	510	495	n/a	10/3/2017	485	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	512	476	n/a	10/3/2017	423	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	601	452	n/a	10/3/2017	397	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	504	0.205	n/a	10/3/2017	0.117	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	505	0.259	n/a	10/3/2017	0.124	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	506	0.359	n/a	10/3/2017	0.182	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	510	0.328	n/a	10/3/2017	0.271	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	512	0.331	n/a	10/3/2017	0.172	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	601	0.293	n/a	10/3/2017	0.154	No	8	0	No	0.00188	Param Intra 1 of 3
pH (S.U.)	504	8.83	5.81	12/28/2017	6.47	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	505	8.87	5.91	12/28/2017	6.85	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	506	7.87	6.68	11/16/2017	6.96	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	510	8.16	6.36	11/16/2017	6.9	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	512	7.63	6.52	12/28/2017	6.88	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	601	8.13	6.71	12/28/2017	6.78	No	8	0	n/a	0.0118	NP Intra (normality) ...
Sulfate (mg/L)	504	24.6	n/a	10/3/2017	24.3	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	505	28.3	n/a	10/3/2017	13.4	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	506	76.8	n/a	10/3/2017	71.3	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	510	18.9	n/a	10/3/2017	16.9	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	512	29.6	n/a	10/3/2017	28.2	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	601	16.1	n/a	10/3/2017	9.76	No	8	0	n/a	0.00591	NP Intra (normality) ...

ATTACHMENT 2

Sanitas™ Configuration Settings

Options

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

Exclude data flags: i

Observations with flags containing the following characters will be deselected: 'i', 'l',

Data Reading Options

- (•) Individual Observations
- ( ) Mean of Each: ( ) Month
- ( ) Median of Each: ( ) Season

Non-Detect / Trace Handling...

Setup Seasons...

[ ] Automatically Process Resamples...

OK | Cancel | Save Settings As... | Load Saved Settings... | Defaults... | Edit INI File | 

Options

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

- [ ] Black and White Output
- [x] Four Plots Per Page
  - [ ] Always Combine Data Pages...
  - [x] Include Tick Marks on Data Page
  - [ ] Use Constituent Name for Graph Title
- [ ] Draw Border Around Text Reports and Data Pages
- [x] Enlarge/Reduce Fonts (Graphs): 100%
- [x] Enlarge/Reduce Fonts (Data/Text Reports): 100%
- [x] Wide Margins (on reports without explicit setting)
- [ ] Use CAS# (Not Const. Name)
- [ ] Truncate File Names to 20 Characters
- [ ] Include Limit Lines when found in Database...
- [x] Show Deselected Data on Time Series Lighter
- [x] Show Deselected Data on all Data Pages Lighter

Setup Symbols and Colors...

- [x] Prompt to Overwrite/Append Summary Tables
- [ ] Round Limits to 2 Sig. Digits (when not set in data file)
- [ ] User-Set Scale
- [x] Indicate Background Data
- [ ] Show Exact Dates
- [ ] Thick Plot Lines

Zoom Factor: 200%

Output Decimal Precision

- (•) Less Precision
- ( ) Normal Precision
- ( ) More Precision

- [x] Store Print Jobs in Multiple Constituent Mode

Store All Print Jobs...

Printer: Adobe PDF

Printers...

OK | Cancel | Save Settings As... | Load Saved Settings... | Defaults... | Edit INI File

Options

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

☑ Test for Normality using Shapiro-Wilk/Francia at Alpha = 0.01

☑ Use Non-Parametric Test when Non-Detects Percent > 50

Use Aitchison's Adjustment when Non-Detects Percent > 15

☐ Optional Further Refinement: Use Aitchison's when NDs % > 50

☐ Use Poisson Prediction Limit when Non-Detects Percent > 90

Transformation

- ◉ Use Ladder of Powers
- ○ Natural Log or No Transformation
- ○ Never Transform
- ○ Use Specific Transformation: Natural Log

☐ Use Best W Statistic

☐ Plot Transformed Values

Deseasonalize (Intra- and InterWell)

- ◉ If Seasonality Is Detected
- ○ If Seasonality Is Detected Or Insufficient to Test
- ○ Always (When Sufficient Data) ○ Never

☐ Always Use Non-Parametric

Facility α

Statistical Evaluations per Year: 2

Constituents Analyzed: 7

Downgradient (Compliance) Wells: 4

Sampling Plan

Comparing Individual Observations

○ 1 of 1 ○ 1 of 2 ◉ 1 of 3 ○ 1 of 4

○ 2 of 4 ("Modified California")

IntraWell Other

☐ Stop if Background Trend Detected at Alpha = 0.05

☑ Plot Background Data

Override Standard Deviation:

Override DF: Override Kappa:

☐ Automatically Remove Background Outliers

☐ 2-Tailed Test Mode...

☑ Show Deselected Data Lighter

Non-Parametric Limit = Highest Background Value

Non-Parametric Limit when 100% Non-Detects:

- ○ Highest/Second Highest Background Value
- ◉ Most Recent PQL if available, or MDL
- ○ Most Recent Background Value (subst. method)

OK | Cancel | Save Settings As... | Load Saved Settings... | Defaults... | Edit INI File | 

Options

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

Rank Von Neumann, Wilcoxon Rank Sum / Mann-Whitney

- [ ] Use Modified Alpha...
- [ ] 2-Tailed Test Mode...

Outlier Tests

- ( ) EPA 1989 Outlier Screening (fixed alpha of 0.05)
- (•) Dixon's at α= 0.05 or if n > 22 Rosner's at α= 0.01 [x] Use EPA Screening to establish Suspected Outliers
- ( ) Tukey's Outlier Screening, with IQR Multiplier = 3.0 [ ] Use Ladder of Powers to achieve Best W Stat
- [x] Test For Normality using Shapiro-Wilk/Francia at Alpha = 0.1
  - (•) Stop if Non-Normal
  - ( ) Continue with Parametric Test if Non-Normal
  - ( ) Tukey's if Non-Normal, with IQR Multiplier = 3.0 [ ] Use Ladder of Powers to achieve Best W Stat
- [x] No Outlier If Less Than 3.0 Times Median
- [ ] Apply Rules found in Ohio Guidance Document 0715
- [ ] Combine Background Wells on the Outlier Report...

Piper, Stiff Diagram

- [ ] Combine Wells
- [ ] Combine Dates
- (•) Use Default Constituent Names
- ( ) Use Constituent Definition File Edit
- [x] Label Constituents
- [x] Label Axes
- [x] Note Cation-Anion Balance (Piper only)

OK | Cancel | Save Settings As... | Load Saved Settings... | Defaults... | Edit INI File

Jared Morrison
December 16, 2022

ATTACHMENT 2-2

Spring 2018 Semiannual Detection Monitoring Statistical Analyses

MEMORANDUM

September 12, 2018

To: Sibley Generating Station
33200 E Johnson Road
Sibley, Missouri 64088
KCP&L Greater Missouri Operations Company

From: SCS Engineers

RE: Determination of Statistically Significant Increases - CCR Landfill
Spring 2018 Semiannual Detection Monitoring 40 CFR 257.94

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at the Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Detection monitoring groundwater samples were collected on May 17, 2018. Review and validation of the results from the May 2018 Detection Monitoring Event was completed on June 15, 2018, which constitutes completion and finalization of detection monitoring laboratory analyses. A statistical analysis was then conducted to determine whether there was a statistically significant increase (SSI) over background values for each constituent listed in Appendix III to Part 257-Constituents for Detection Monitoring. Two rounds of verification sampling were conducted for certain constituents on June 27, 2018 and August 8, 2018.

The completed statistical evaluation identified Appendix III constituent, sulfate, above its respective prediction limit in monitoring wells MW-504 and MW-512.

The prediction limit for sulfate in upgradient monitoring well MW-504 is 24.6 mg/L. The detection monitoring sample was reported at 32.8 mg/L. The first verification re-sample was collected on June 27, 2018 with a result of 31.8 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 32.3 mg/L.

The prediction limit for sulfate in monitoring well MW-512 is 29.6 mg/L. The detection monitoring sample was reported at 29.6 mg/L. The first verification re-sample was collected on June 27, 2018 with a result of 30.3 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 30.9 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for sulfate from monitoring wells MW-504 and MW-512 exceed their respective prediction limits and are confirmed statistically significant increases (SSIs) over background.

Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation identified two SSIs above the background prediction limits for sulfate in upgradient monitor well MW-504 and downgradient monitor well MW-512.

Attached to this memorandum are the following backup information:

Attachment 1: Sanitas™ Output:

Statistical evaluation output from Sanitas™ for the prediction limit analysis. This includes prediction limit plots, prediction limit background data, detection sample result, 1st verification re-sample result (when applicable), 2nd verification re-sample result (when applicable), extra sample results for pH because pH is collected as part of the sampling procedure, and a Prediction Limit summary table. Output documentation includes the analytical data used for the statistical analyses.

Attachment 2: Sanitas™ Configuration Settings:

Screen shots of the applicable Sanitas™ configuration settings for the statistical prediction limit analysis. This includes data configuration, output configuration, prediction limit configuration and other tests configuration.

Revision Number	Revision Date	Attachment Revised	Summary of Revisions

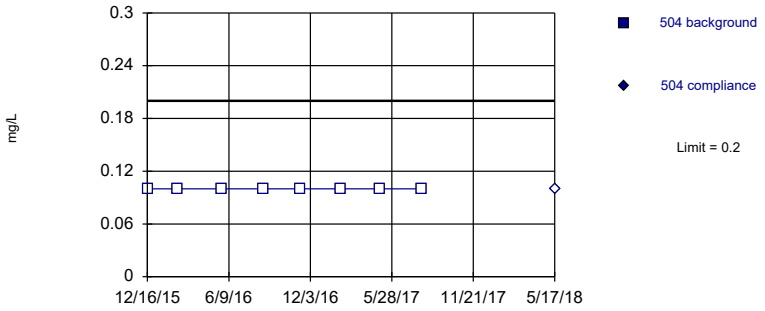
ATTACHMENT 1

Sanitas™ Output

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



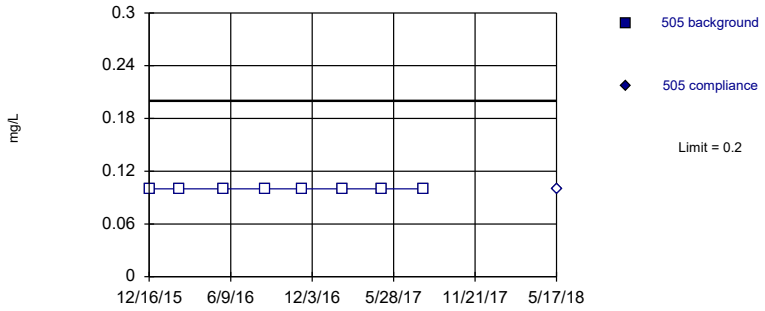
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



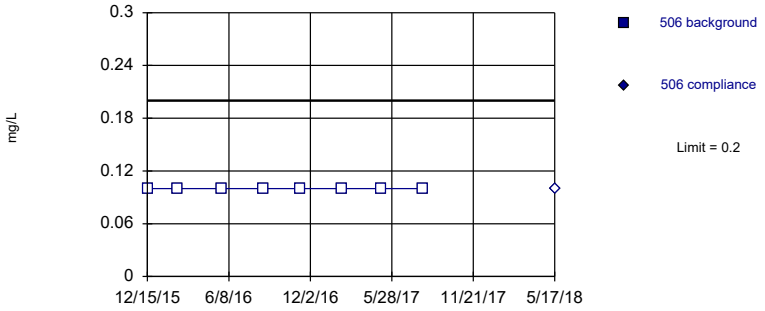
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



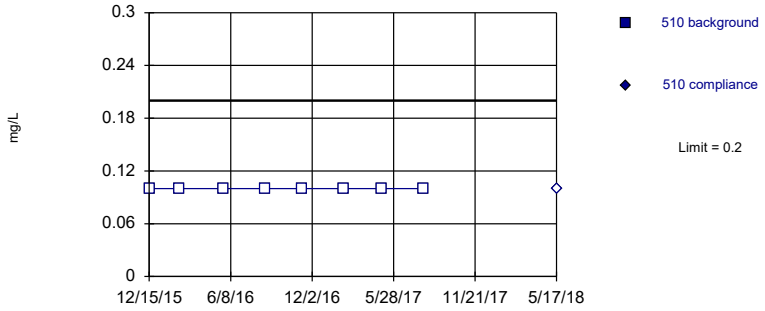
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/1/2017	<0.2	
5/17/2018		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/1/2017	<0.2	
5/17/2018		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/4/2017	<0.2	
8/4/2017	<0.2	
5/17/2018		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

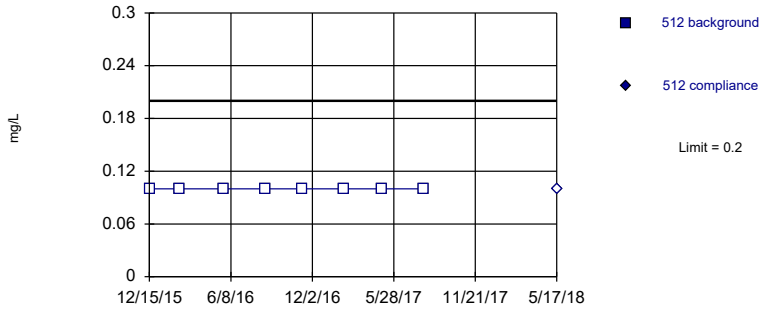
	510	510
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/10/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
5/17/2018		<0.2

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III

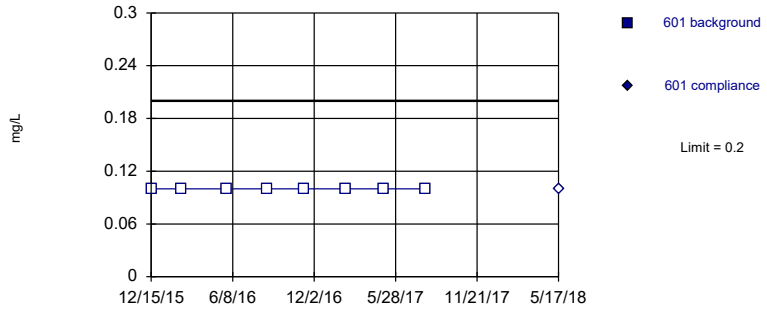
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 8) were censored; limit is most recent reporting limit. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Boron Analysis Run 8/17/2018 2:37 PM View: LF III

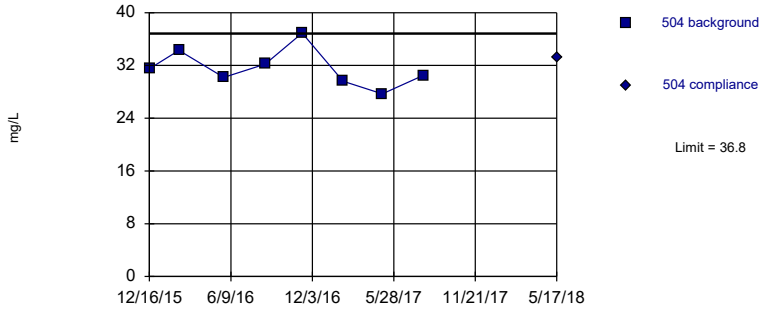
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=31.6, Std. Dev.=2.88, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.957, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

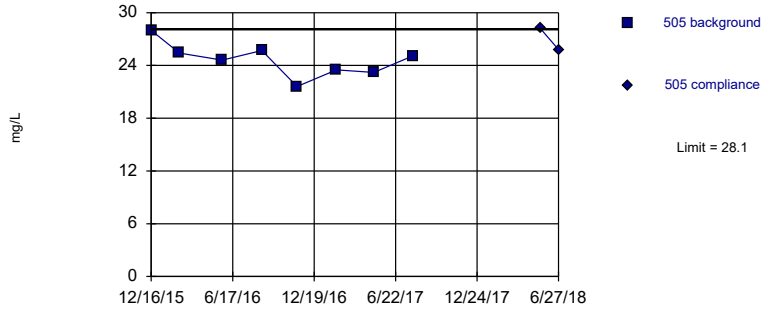
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=24.6, Std. Dev.=1.92, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.977, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	<0.2	
2/18/2016	<0.2	
5/25/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
5/17/2018		<0.2

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	<0.2	
2/18/2016	<0.2	
5/26/2016	<0.2	
8/23/2016	<0.2	
11/11/2016	<0.2	
2/8/2017	<0.2	
5/3/2017	<0.2	
8/1/2017	<0.2	
5/17/2018		<0.2

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	31.5	
2/18/2016	34.3	
5/25/2016	30.2	
8/23/2016	32.2	
11/11/2016	36.9	
2/8/2017	29.6	
5/4/2017	27.7	
8/1/2017	30.5	
5/17/2018		33.3

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505	
12/16/2015	28		
2/18/2016	25.4		
5/25/2016	24.6		
8/23/2016	25.7		
11/11/2016	21.6		
2/8/2017	23.5		
5/4/2017	23.2		
8/1/2017	25.1		
5/17/2018		28.2	
6/27/2018		25.8	1st verification re-sample

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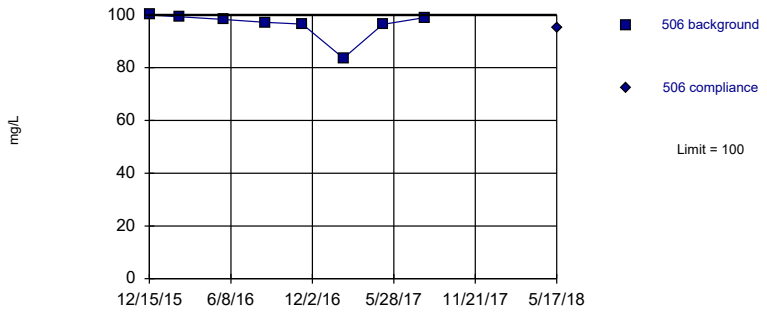
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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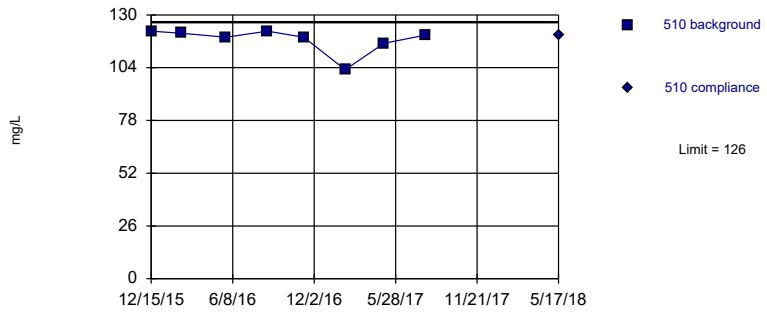
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^5 transformation): Mean=2.3e10, Std. Dev.=5.1e9, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.756, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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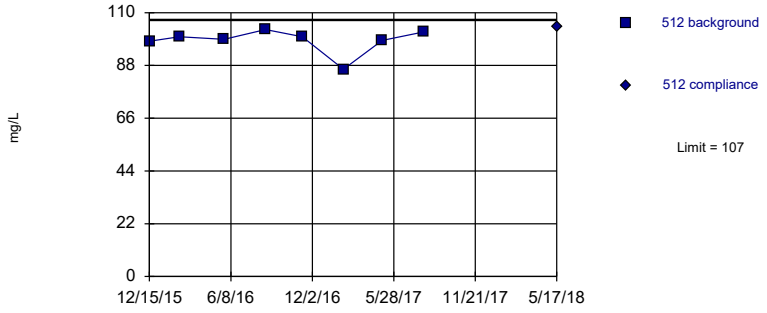
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on square transformation): Mean=9696, Std. Dev.=964, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.755, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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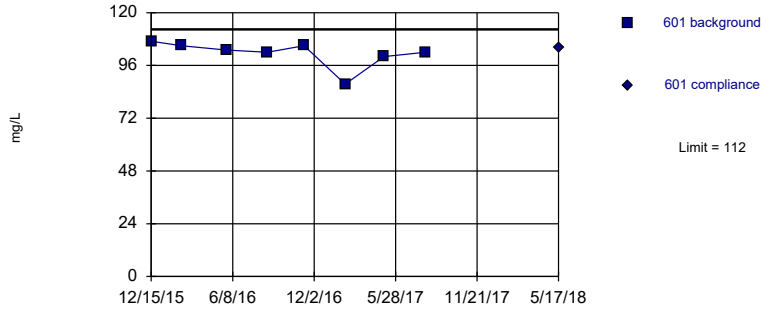
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=101, Std. Dev.=6.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.762, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Calcium Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	100	
2/18/2016	99.3	
5/25/2016	98.3	
8/23/2016	97.2	
11/11/2016	96.5	
2/8/2017	83.6	
5/4/2017	96.4	
8/4/2017	99	
5/17/2018		94.9

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	122	
2/18/2016	121	
5/25/2016	119	
8/23/2016	122	
11/10/2016	119	
2/8/2017	103	
5/3/2017	116	
8/1/2017	120	
5/17/2018		120

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	98.1	
2/18/2016	100	
5/25/2016	98.9	
8/23/2016	103	
11/11/2016	100	
2/8/2017	86.4	
5/3/2017	98.4	
8/1/2017	102	
5/17/2018		104

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	107	
2/18/2016	105	
5/26/2016	103	
8/23/2016	102	
11/11/2016	105	
2/8/2017	87.5	
5/3/2017	100	
8/1/2017	102	
5/17/2018		104

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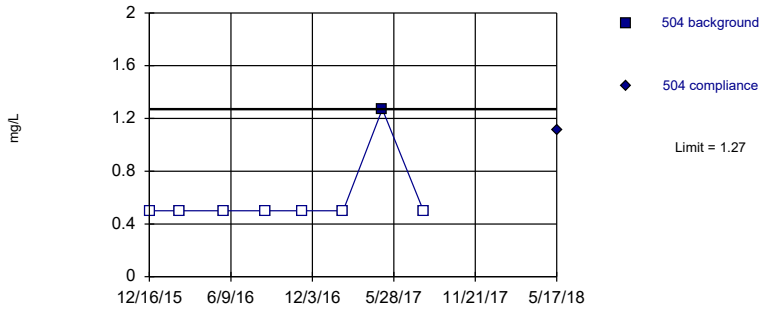
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 87.5% NDs. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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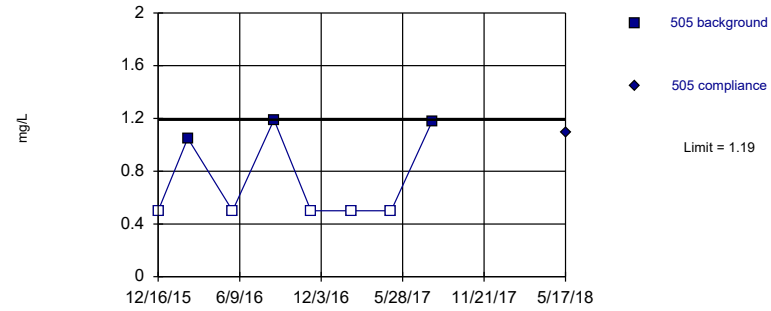
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 8 background values. 62.5% NDs. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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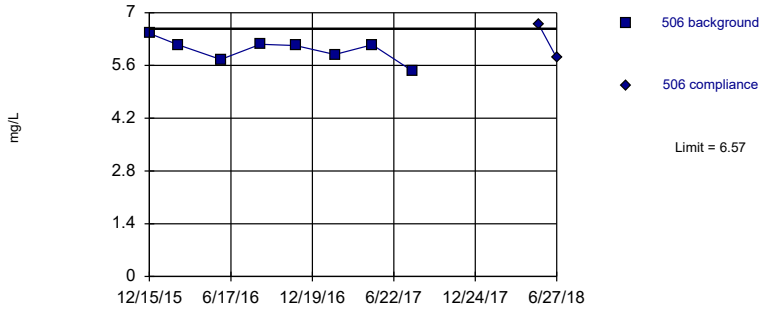
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=6.02, Std. Dev.=0.307, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.918, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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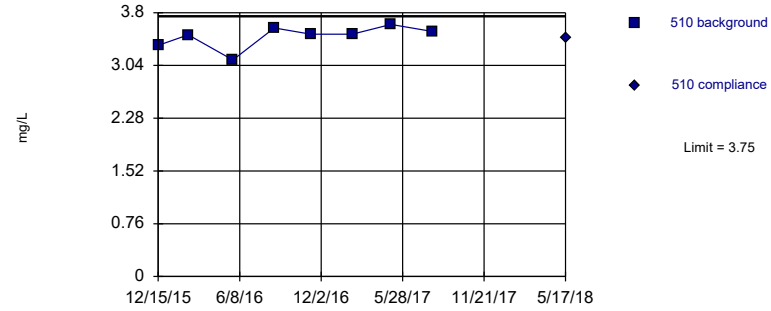
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.46, Std. Dev.=0.162, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.86, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	<1	
2/18/2016	<1	
5/25/2016	<1	
8/23/2016	<1	
11/11/2016	<1	
2/8/2017	<1	
5/4/2017	1.27	
8/1/2017	<1	
5/17/2018		1.11

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	<1	
2/18/2016	1.05	
5/25/2016	<1	
8/23/2016	1.19	
11/11/2016	<1	
2/8/2017	<1	
5/4/2017	<1	
8/1/2017	1.18	
5/17/2018		1.09

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506	
12/15/2015	6.45		
2/18/2016	6.15		
5/25/2016	5.76		
8/23/2016	6.16		
11/11/2016	6.13		
2/8/2017	5.89		
5/4/2017	6.15		
8/4/2017	5.45		
5/17/2018		6.69	
6/27/2018		5.8	1st verification re-sample

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	3.33	
2/18/2016	3.48	
5/25/2016	3.12	
8/23/2016	3.58	
11/10/2016	3.49	
2/8/2017	3.49	
5/3/2017	3.63	
8/1/2017	3.53	
5/17/2018		3.44

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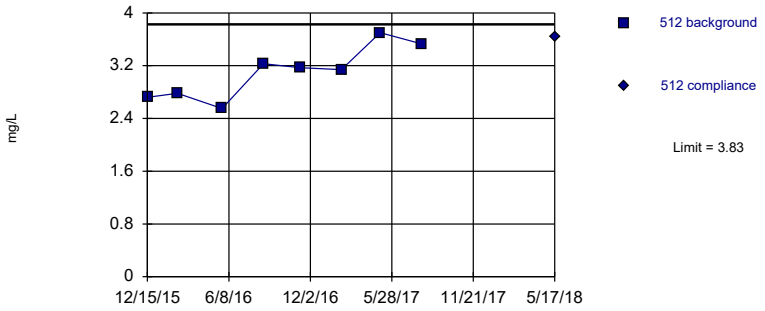
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.1, Std. Dev.=0.4, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.954, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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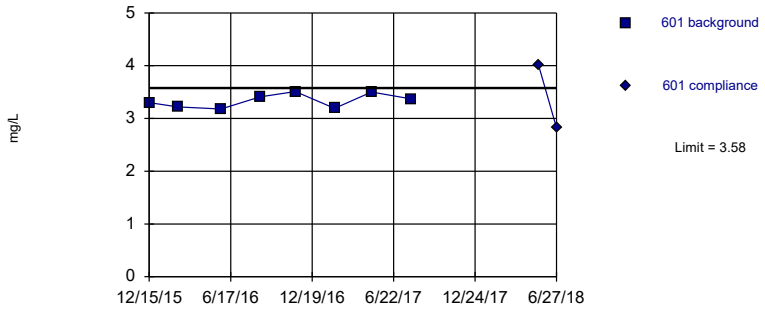
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=3.34, Std. Dev.=0.133, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.903, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Chloride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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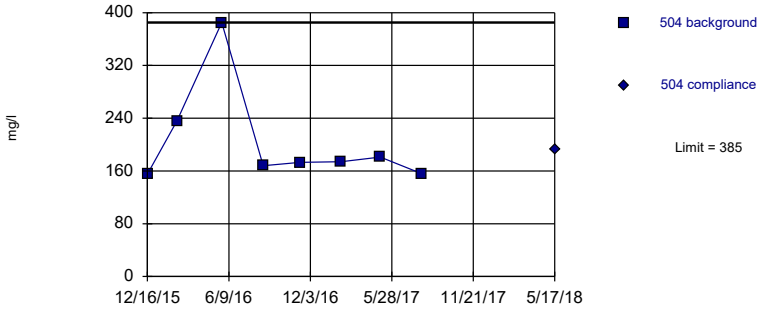
Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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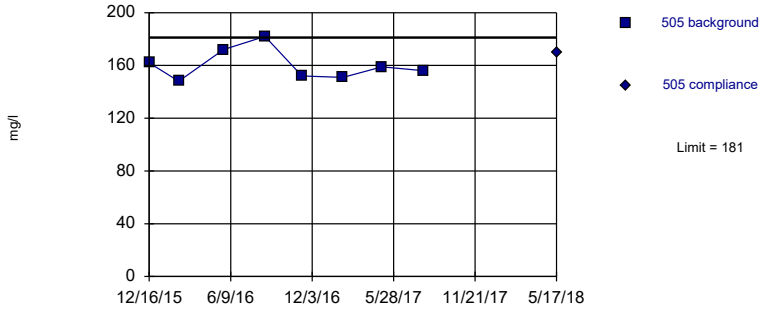
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=160, Std. Dev.=11.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.905, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	2.72	
2/18/2016	2.78	
5/25/2016	2.55	
8/23/2016	3.23	
11/11/2016	3.17	
2/8/2017	3.14	
5/3/2017	3.7	
8/1/2017	3.53	
5/17/2018		3.64

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	3.3		
2/18/2016	3.22		
5/26/2016	3.18		
8/23/2016	3.41		
11/11/2016	3.51		
2/8/2017	3.19		
5/3/2017	3.5		
8/1/2017	3.37		
5/17/2018		4.02	
6/27/2018		2.82	1st verification re-sample

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504
12/16/2015	155	
2/18/2016	236	
5/25/2016	385	
8/23/2016	168	
11/11/2016	173	
2/8/2017	174	
5/4/2017	181	
8/1/2017	156	
5/17/2018		193

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	162	
2/18/2016	148	
5/25/2016	172	
8/23/2016	182	
11/11/2016	152	
2/8/2017	151	
5/4/2017	159	
8/1/2017	156	
5/17/2018		170

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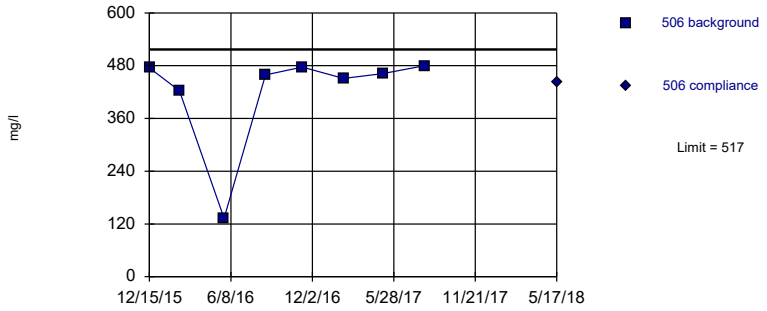
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary (based on x^4 transformation): Mean=4.0e10, Std. Dev.=1.7e10, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.752, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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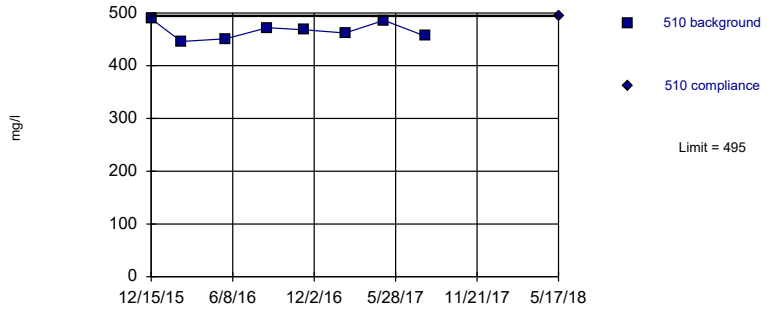
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=466, Std. Dev.=15.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.946, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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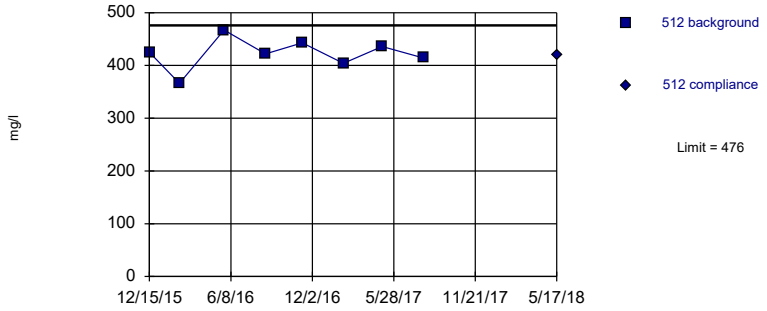
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=422, Std. Dev.=29.7, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.969, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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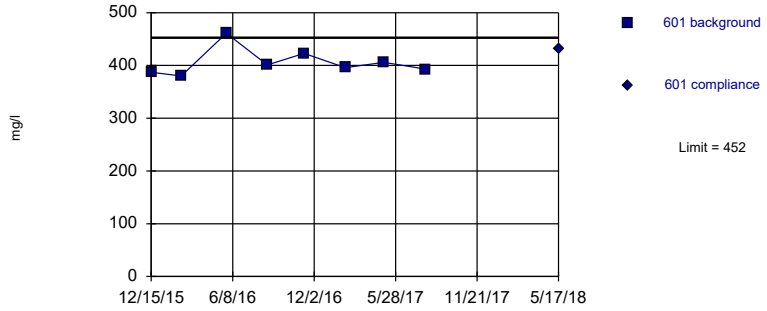
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=406, Std. Dev.=25.8, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.853, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Dissolved Solids Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	475	
2/18/2016	423	
5/25/2016	133	
8/23/2016	459	
11/11/2016	477	
2/8/2017	451	
5/4/2017	462	
8/4/2017	480	
5/17/2018		442

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	489	
2/18/2016	446	
5/25/2016	451	
8/23/2016	472	
11/10/2016	468	
2/8/2017	462	
5/3/2017	486	
8/1/2017	456	
5/17/2018		494

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	425	
2/18/2016	366	
5/25/2016	467	
8/23/2016	422	
11/11/2016	443	
2/8/2017	404	
5/3/2017	436	
8/1/2017	414	
5/17/2018		419

Prediction Limit

Constituent: Dissolved Solids (mg/l) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	387	
2/18/2016	380	
5/26/2016	461	
8/23/2016	401	
11/11/2016	423	
2/8/2017	396	
5/3/2017	406	
8/1/2017	393	
5/17/2018		431

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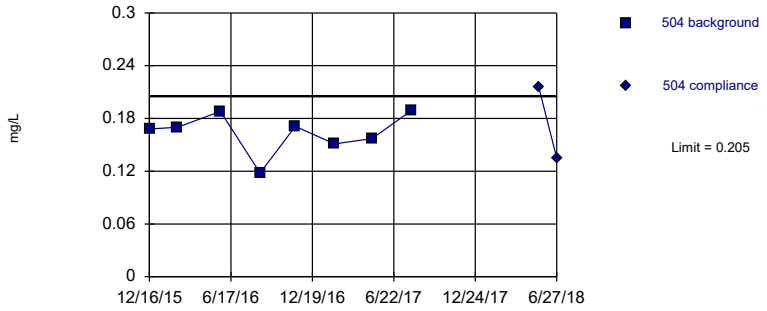
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.164, Std. Dev.=0.0228, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.901, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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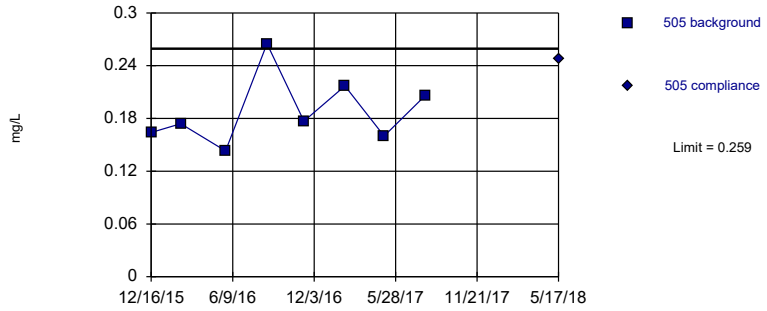
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.188, Std. Dev.=0.0393, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.914, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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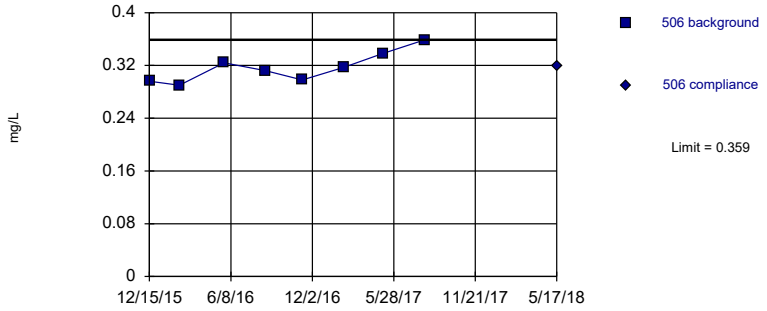
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.317, Std. Dev.=0.0233, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.941, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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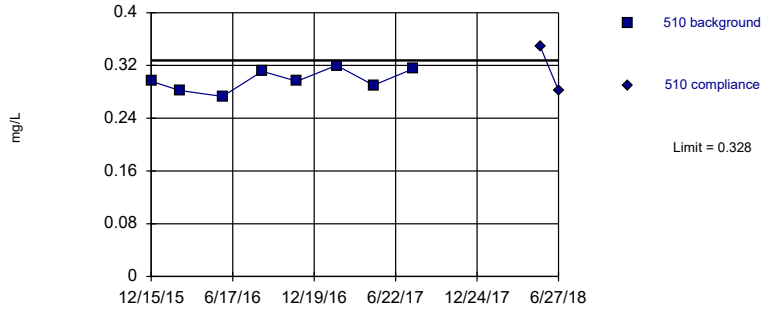
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.298, Std. Dev.=0.0165, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.955, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504	
12/16/2015	0.168		
2/18/2016	0.17		
5/25/2016	0.188		
8/23/2016	0.118		
11/11/2016	0.171		
2/8/2017	0.151		
5/4/2017	0.157		
8/1/2017	0.189		
5/17/2018		0.216	
6/27/2018		0.135	1st verification re-sample

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	0.164	
2/18/2016	0.174	
5/25/2016	0.143	
8/23/2016	0.265	
11/11/2016	0.177	
2/8/2017	0.217	
5/4/2017	0.16	
8/1/2017	0.206	
5/17/2018		0.247

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	0.296	
2/18/2016	0.29	
5/25/2016	0.324	
8/23/2016	0.312	
11/11/2016	0.298	
2/8/2017	0.317	
5/4/2017	0.338	
8/4/2017	0.359	
5/17/2018		0.32

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510	
12/15/2015	0.296		
2/18/2016	0.282		
5/25/2016	0.273		
8/23/2016	0.311		
11/10/2016	0.296		
2/8/2017	0.32		
5/3/2017	0.29		
8/1/2017	0.315		
5/17/2018		0.348	
6/27/2018		0.282	1st verification re-sample

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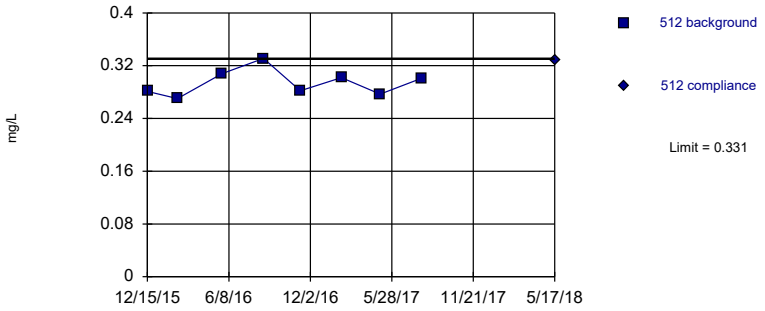
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.294, Std. Dev.=0.0202, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.927, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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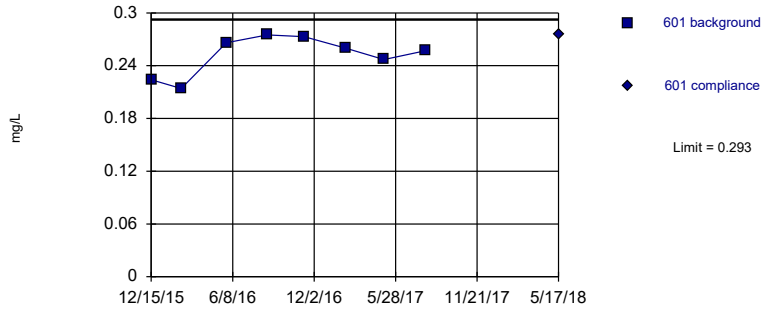
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=0.252, Std. Dev.=0.0224, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.891, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Fluoride Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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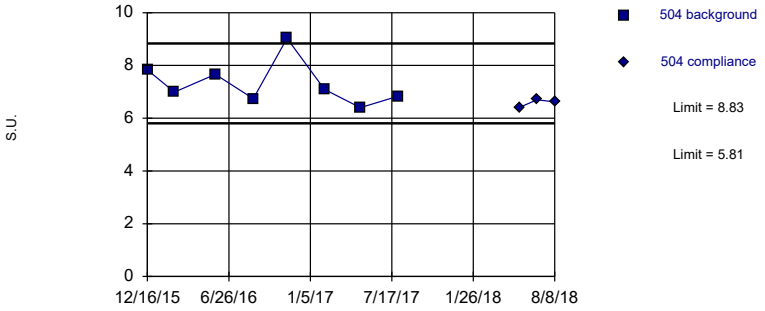
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.32, Std. Dev.=0.835, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.892, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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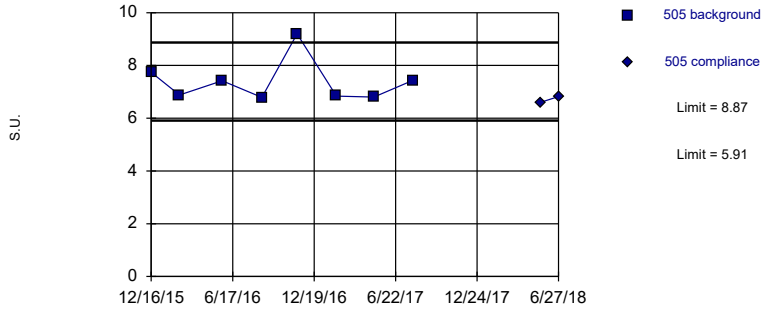
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.39, Std. Dev.=0.817, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.765, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 8/17/2018 2:37 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512
12/15/2015	0.281	
2/18/2016	0.27	
5/25/2016	0.308	
8/23/2016	0.331	
11/11/2016	0.282	
2/8/2017	0.302	
5/3/2017	0.277	
8/1/2017	0.301	
5/17/2018		0.328

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601
12/15/2015	0.224	
2/18/2016	0.214	
5/26/2016	0.266	
8/23/2016	0.275	
11/11/2016	0.273	
2/8/2017	0.26	
5/3/2017	0.247	
8/1/2017	0.257	
5/17/2018		0.275

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504	
12/16/2015	7.83		
2/18/2016	6.99		
5/25/2016	7.66		
8/23/2016	6.74		
11/11/2016	9.03		
2/8/2017	7.09		
5/4/2017	6.4		
8/1/2017	6.83		
5/17/2018		6.41	
6/27/2018		6.7	extra sample
8/8/2018		6.62	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505	
12/16/2015	7.74		
2/18/2016	6.88		
5/25/2016	7.42		
8/23/2016	6.79		
11/11/2016	9.2		
2/8/2017	6.84		
5/4/2017	6.8		
8/1/2017	7.44		
5/17/2018		6.6	
6/27/2018		6.82	extra sample

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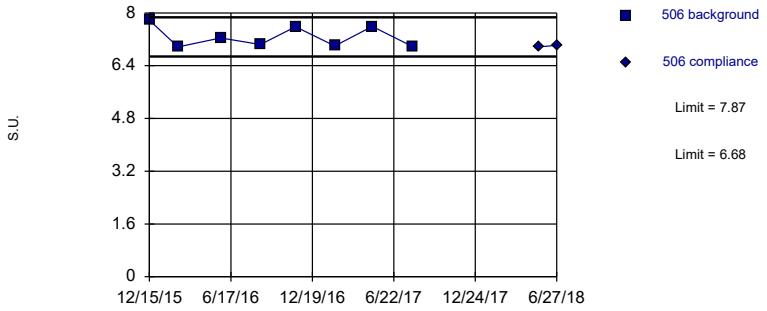
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.27, Std. Dev.=0.329, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.833, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 8/17/2018 2:38 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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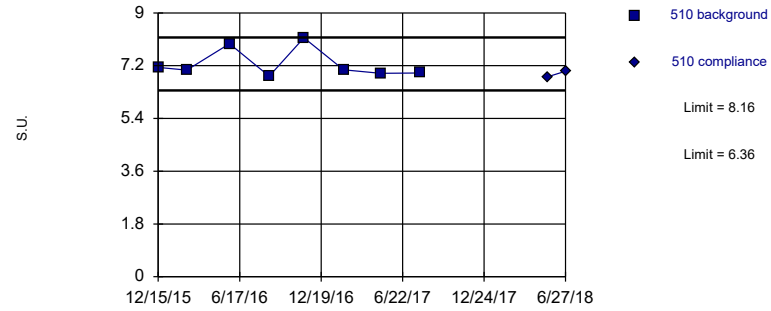
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.26, Std. Dev.=0.499, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.754, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 8/17/2018 2:38 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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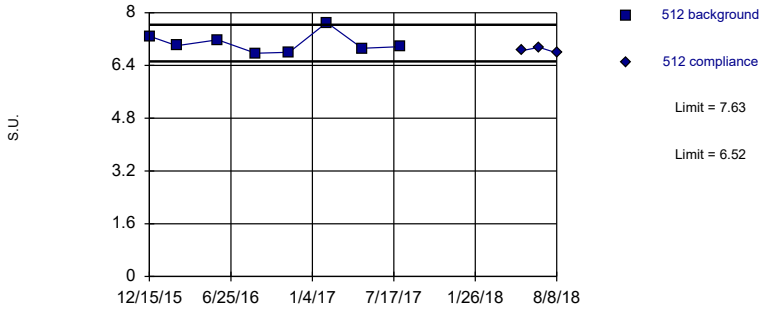
Within Limits

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=7.08, Std. Dev.=0.306, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.89, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: pH Analysis Run 8/17/2018 2:38 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

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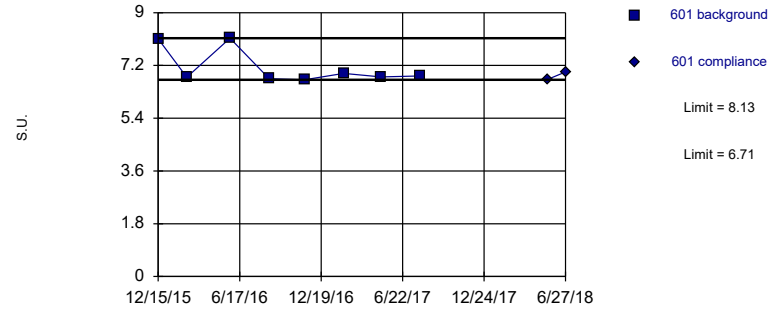
Within Limits

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 8 background values. Well-constituent pair annual alpha = 0.0236. Individual comparison alpha = 0.0118 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: pH Analysis Run 8/17/2018 2:38 PM View: LF III
Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506	
12/15/2015	7.78		
2/18/2016	6.97		
5/25/2016	7.24		
8/23/2016	7.04		
11/11/2016	7.58		
2/8/2017	7		
5/4/2017	7.59		
8/4/2017	6.98		
5/17/2018		6.97	
6/27/2018		7.02	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	510	510	
12/15/2015	7.14		
2/18/2016	7.05		
5/25/2016	7.95		
8/23/2016	6.84		
11/10/2016	8.15		
2/8/2017	7.06		
5/3/2017	6.94		
8/1/2017	6.95		
5/17/2018		6.82	
6/27/2018		7.01	extra sammple

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512	
12/15/2015	7.29		
2/18/2016	7		
5/25/2016	7.18		
8/23/2016	6.77		
11/11/2016	6.8		
2/8/2017	7.7		
5/3/2017	6.92		
8/1/2017	6.97		
5/17/2018		6.85	
6/27/2018		6.95	extra sample
8/8/2018		6.78	extra sample

Prediction Limit

Constituent: pH (S.U.) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	8.11		
2/18/2016	6.8		
5/26/2016	8.13		
8/23/2016	6.75		
11/11/2016	6.71		
2/8/2017	6.93		
5/4/2017	6.81		
8/1/2017	6.84		
5/17/2018		6.72	
6/27/2018		6.98	extra sample

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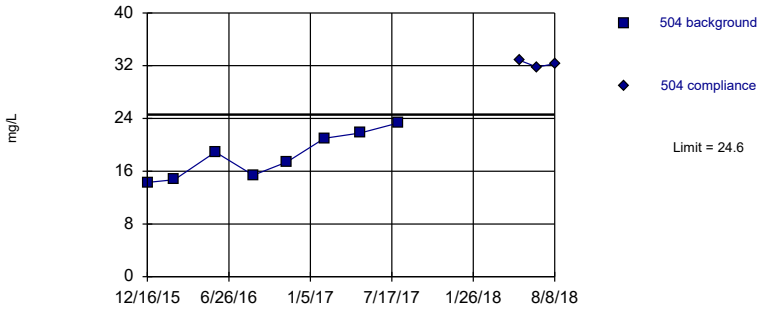
Exceeds Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=18.4, Std. Dev.=3.44, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.923, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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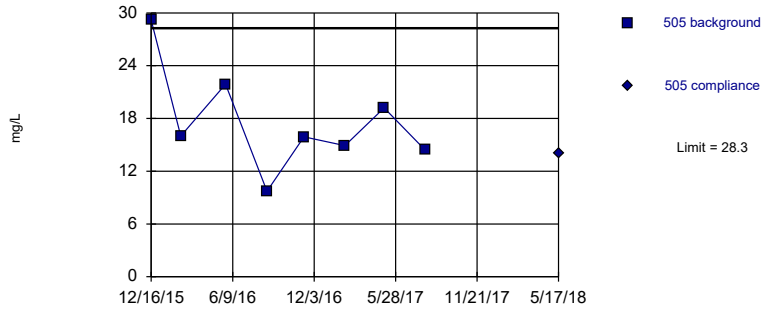
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=17.7, Std. Dev.=5.86, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.925, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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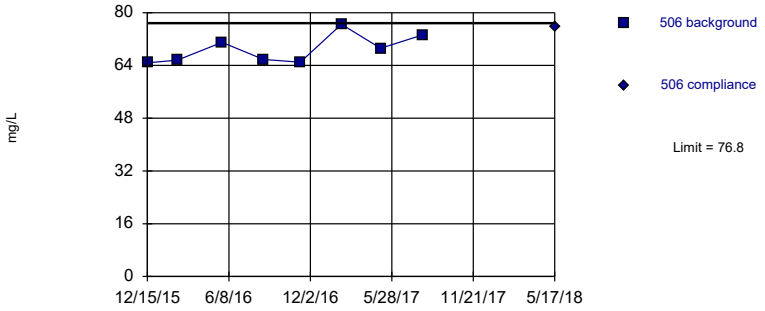
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=68.9, Std. Dev.=4.38, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.876, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

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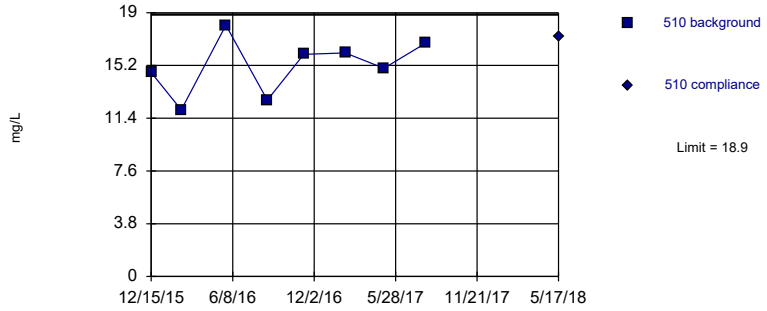
Within Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=15.2, Std. Dev.=2.04, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.958, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504	504	
12/16/2015	14.3		
2/18/2016	14.7		
5/25/2016	18.9		
8/23/2016	15.4		
11/11/2016	17.4		
2/8/2017	21		
5/4/2017	21.8		
8/1/2017	23.3		
5/17/2018		32.8	
6/27/2018		31.8	1st verification re-sample
8/8/2018		32.3	2nd verification re-sample

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	505	505
12/16/2015	29.2	
2/18/2016	16	
5/25/2016	21.9	
8/23/2016	9.73	
11/11/2016	15.9	
2/8/2017	14.9	
5/4/2017	19.2	
8/1/2017	14.4	
5/17/2018		14

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	506	506
12/15/2015	64.8	
2/18/2016	65.6	
5/25/2016	71	
8/23/2016	65.8	
11/11/2016	65	
2/8/2017	76.5	
5/4/2017	69.2	
8/4/2017	73.3	
5/17/2018		75.7

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

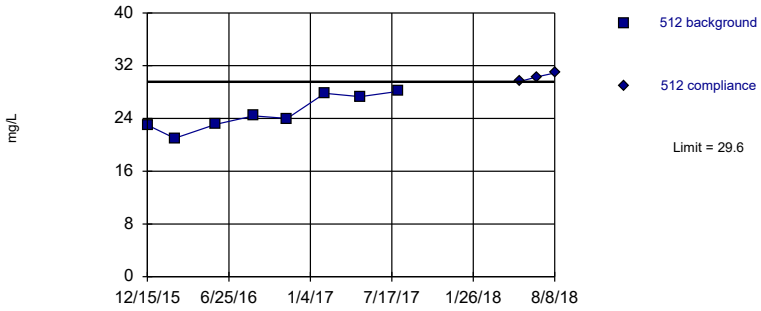
Sibley Client: SCS Engineers Data: Sibley

	510	510
12/15/2015	14.7	
2/18/2016	12	
5/25/2016	18.1	
8/23/2016	12.7	
11/10/2016	16	
2/8/2017	16.1	
5/3/2017	15	
8/1/2017	16.8	
5/17/2018		17.3

Exceeds Limit

Prediction Limit

Intrawell Parametric



Background Data Summary: Mean=24.8, Std. Dev.=2.6, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.909, critical = 0.749. Kappa = 1.81 (c=7, w=4, 1 of 3, event alpha = 0.0513). Report alpha = 0.00188.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

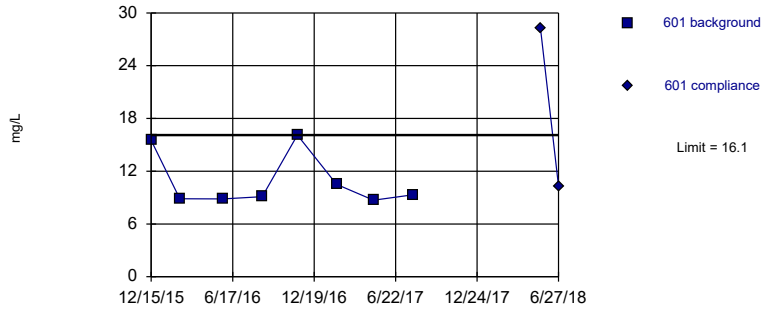
Sibley Client: SCS Engineers Data: Sibley

Sanitas™ v.9.6.09 Sanitas software licensed to SCS Engineers. UG

Within Limit

Prediction Limit

Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 8 background values. Well-constituent pair annual alpha = 0.0118. Individual comparison alpha = 0.00591 (1 of 3). Insufficient data to test for seasonality: data were not deseasonalized.

Constituent: Sulfate Analysis Run 8/17/2018 2:38 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	512	512	
12/15/2015	23		
2/18/2016	21		
5/25/2016	23.1		
8/23/2016	24.4		
11/11/2016	24		
2/8/2017	27.8		
5/3/2017	27.3		
8/1/2017	28.1		
5/17/2018		29.6	
6/27/2018		30.3	1st verification re-sample
8/8/2018		30.9	2nd verification re-sample

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 8/17/2018 2:41 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	601	601	
12/15/2015	15.5		
2/18/2016	8.87		
5/26/2016	8.85		
8/23/2016	9.11		
11/11/2016	16.1		
2/8/2017	10.5		
5/3/2017	8.71		
8/1/2017	9.33		
5/17/2018		28.3	
6/27/2018		10.3	1st verification re-sample

Prediction Limit

Sibley Client: SCS Engineers Data: Sibley Printed 8/17/2018, 2:41 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Boron (mg/L)	504	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	505	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	506	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	510	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	512	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Boron (mg/L)	601	0.2	n/a	5/17/2018	0.1ND	No	8	100	n/a	0.00591	NP Intra (NDs) 1 of 3
Calcium (mg/L)	504	36.8	n/a	5/17/2018	33.3	No	8	0	No	0.00188	Param Intra 1 of 3
Calcium (mg/L)	505	28.1	n/a	6/27/2018	25.8	No	8	0	No	0.00188	Param Intra 1 of 3
Calcium (mg/L)	506	100	n/a	5/17/2018	94.9	No	8	0	n/a	0.00591	NP Intra (normality) ...
Calcium (mg/L)	510	126	n/a	5/17/2018	120	No	8	0	x^5	0.00188	Param Intra 1 of 3
Calcium (mg/L)	512	107	n/a	5/17/2018	104	No	8	0	x^2	0.00188	Param Intra 1 of 3
Calcium (mg/L)	601	112	n/a	5/17/2018	104	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	504	1.27	n/a	5/17/2018	1.11	No	8	87.5	n/a	0.00591	NP Intra (NDs) 1 of 3
Chloride (mg/L)	505	1.19	n/a	5/17/2018	1.09	No	8	62.5	n/a	0.00591	NP Intra (NDs) 1 of 3
Chloride (mg/L)	506	6.57	n/a	6/27/2018	5.8	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	510	3.75	n/a	5/17/2018	3.44	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	512	3.83	n/a	5/17/2018	3.64	No	8	0	No	0.00188	Param Intra 1 of 3
Chloride (mg/L)	601	3.58	n/a	6/27/2018	2.82	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	504	385	n/a	5/17/2018	193	No	8	0	n/a	0.00591	NP Intra (normality) ...
Dissolved Solids (mg/l)	505	181	n/a	5/17/2018	170	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	506	517	n/a	5/17/2018	442	No	8	0	x^4	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	510	495	n/a	5/17/2018	494	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	512	476	n/a	5/17/2018	419	No	8	0	No	0.00188	Param Intra 1 of 3
Dissolved Solids (mg/l)	601	452	n/a	5/17/2018	431	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	504	0.205	n/a	6/27/2018	0.135	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	505	0.259	n/a	5/17/2018	0.247	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	506	0.359	n/a	5/17/2018	0.32	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	510	0.328	n/a	6/27/2018	0.282	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	512	0.331	n/a	5/17/2018	0.328	No	8	0	No	0.00188	Param Intra 1 of 3
Fluoride (mg/L)	601	0.293	n/a	5/17/2018	0.275	No	8	0	No	0.00188	Param Intra 1 of 3
pH (S.U.)	504	8.83	5.81	8/8/2018	6.62	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	505	8.87	5.91	6/27/2018	6.82	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	506	7.87	6.68	6/27/2018	7.02	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	510	8.16	6.36	6/27/2018	7.01	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	512	7.63	6.52	8/8/2018	6.78	No	8	0	No	0.00094	Param Intra 1 of 3
pH (S.U.)	601	8.13	6.71	6/27/2018	6.98	No	8	0	n/a	0.0118	NP Intra (normality) ...
Sulfate (mg/L)	**504**	**24.6**	**n/a**	**8/8/2018**	**32.3**	**Yes**	**8**	**0**	**No**	**0.00188**	**Param Intra 1 of 3**
Sulfate (mg/L)	505	28.3	n/a	5/17/2018	14	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	506	76.8	n/a	5/17/2018	75.7	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	510	18.9	n/a	5/17/2018	17.3	No	8	0	No	0.00188	Param Intra 1 of 3
Sulfate (mg/L)	**512**	**29.6**	**n/a**	**8/8/2018**	**30.9**	**Yes**	**8**	**0**	**No**	**0.00188**	**Param Intra 1 of 3**
Sulfate (mg/L)	601	16.1	n/a	6/27/2018	10.3	No	8	0	n/a	0.00591	NP Intra (normality) ...

ATTACHMENT 2

Sanitas™ Configuration Settings

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

Exclude data flags: i

Data Reading Options

- (•) Individual Observations
- ( ) Mean of Each: ( ) Month
- ( ) Median of Each: ( ) Season

Non-Detect / Trace Handling...

Setup Seasons...

[ ] Automatically Process Resamples...

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

- [ ] Black and White Output
- [x] Four Plots Per Page
  - [ ] Always Combine Data Pages...
  - [x] Include Tick Marks on Data Page
  - [ ] Use Constituent Name for Graph Title
- [ ] Draw Border Around Text Reports and Data Pages
- [x] Enlarge/Reduce Fonts (Graphs): 100%
- [x] Enlarge/Reduce Fonts (Data/Text Reports): 100%
- [x] Wide Margins (on reports without explicit setting)
- [ ] Use CAS# (Not Const. Name)
- [ ] Truncate File Names to 20 Characters
- [ ] Include Limit Lines when found in Database...
- [x] Show Deselected Data on Time Series: Lighter
- [x] Show Deselected Data on all Data Pages: Light

Setup Symbols and Colors...

- [x] Prompt to Overwrite/Append Summary Tables
- [ ] Round Limits to 2 Sig. Digits (when not set in data file)
- [ ] User-Set Scale
- [x] Indicate Background Data
- [ ] Show Exact Dates
- [ ] Thick Plot Lines

Zoom Factor: 200%

Output Decimal Precision

- (•) Less Precision
- ( ) Normal Precision
- ( ) More Precision

- [x] Store Print Jobs in Multiple Constituent Mode

Store All Print Jobs...

Printer: Adobe PDF

Printers...

Data | Output | Trend Test | Control Cht | **Prediction Lim** | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

☑ Test for Normality using Shapiro-Wilk/Francia at Alpha = 0.01

☑ Use Non-Parametric Test when Non-Detects Percent > 50

Use Aitchison's Adjustment when Non-Detects Percent > 15

☐ Optional Further Refinement: Use Aitchison's when NDs % > 50

☐ Use Poisson Prediction Limit when Non-Detects Percent > 90

Transformation

- ◉ Use Ladder of Powers
- ○ Natural Log or No Transformation
- ○ Never Transform
- ○ Use Specific Transformation: Natural Log

☐ Use Best W Statistic

☐ Plot Transformed Values

Deseasonalize (Intra- and InterWell)

- ◉ If Seasonality Is Detected
- ○ If Seasonality Is Detected Or Insufficient to Test
- ○ Always (When Sufficient Data)
- ○ Never

☐ Always Use Non-Parametric

Facility α

Statistical Evaluations per Year: 2

Constituents Analyzed: 7

Downgradient (Compliance) Wells: 4

Sampling Plan

Comparing Individual Observations

○ 1 of 1 ○ 1 of 2 ◉ 1 of 3 ○ 1 of 4

○ 2 of 4 ("Modified California")

IntraWell Other

☐ Stop if Background Trend Detected at Alpha = 0.05

☑ Plot Background Data

Override Standard Deviation:

Override DF: Override Kappa:

☐ Automatically Remove Background Outliers

☐ 2-Tailed Test Mode...

☑ Show Deselected Data Lighter

Non-Parametric Limit = Highest Background Value

Non-Parametric Limit when 100% Non-Detects:

- ○ Highest/Second Highest Background Value
- ◉ Most Recent PQL if available, or MDL
- ○ Most Recent Background Value (subst. method)

Data | Output | Trend Test | Control Cht | Prediction Lim | Tolerance Lim | Conf/Tol Int | ANOVA | Welchs | Other Tests

Rank Von Neumann, Wilcoxon Rank Sum / Mann-Whitney

- [ ] Use Modified Alpha...
- [ ] 2-Tailed Test Mode...

Outlier Tests

- ( ) EPA 1989 Outlier Screening (fixed alpha of 0.05)
- (•) Dixon's at α= 0.05 or if n > 22 Rosner's at α= 0.01 [x] Use EPA Screening to establish Suspected Outliers
- ( ) Tukey's Outlier Screening, with IQR Multiplier = 3.0 [ ] Use Ladder of Powers to achieve Best W Stat
- [x] Test For Normality using Shapiro-Wilk/Francia at Alpha = 0.1
  - (•) Stop if Non-Normal
  - ( ) Continue with Parametric Test if Non-Normal
  - ( ) Tukey's if Non-Normal, with IQR Multiplier = 3.0 [ ] Use Ladder of Powers to achieve Best W Stat
- [x] No Outlier If Less Than 3.0 Times Median
- [ ] Apply Rules found in Ohio Guidance Document 0715
- [ ] Combine Background Wells on the Outlier Report...

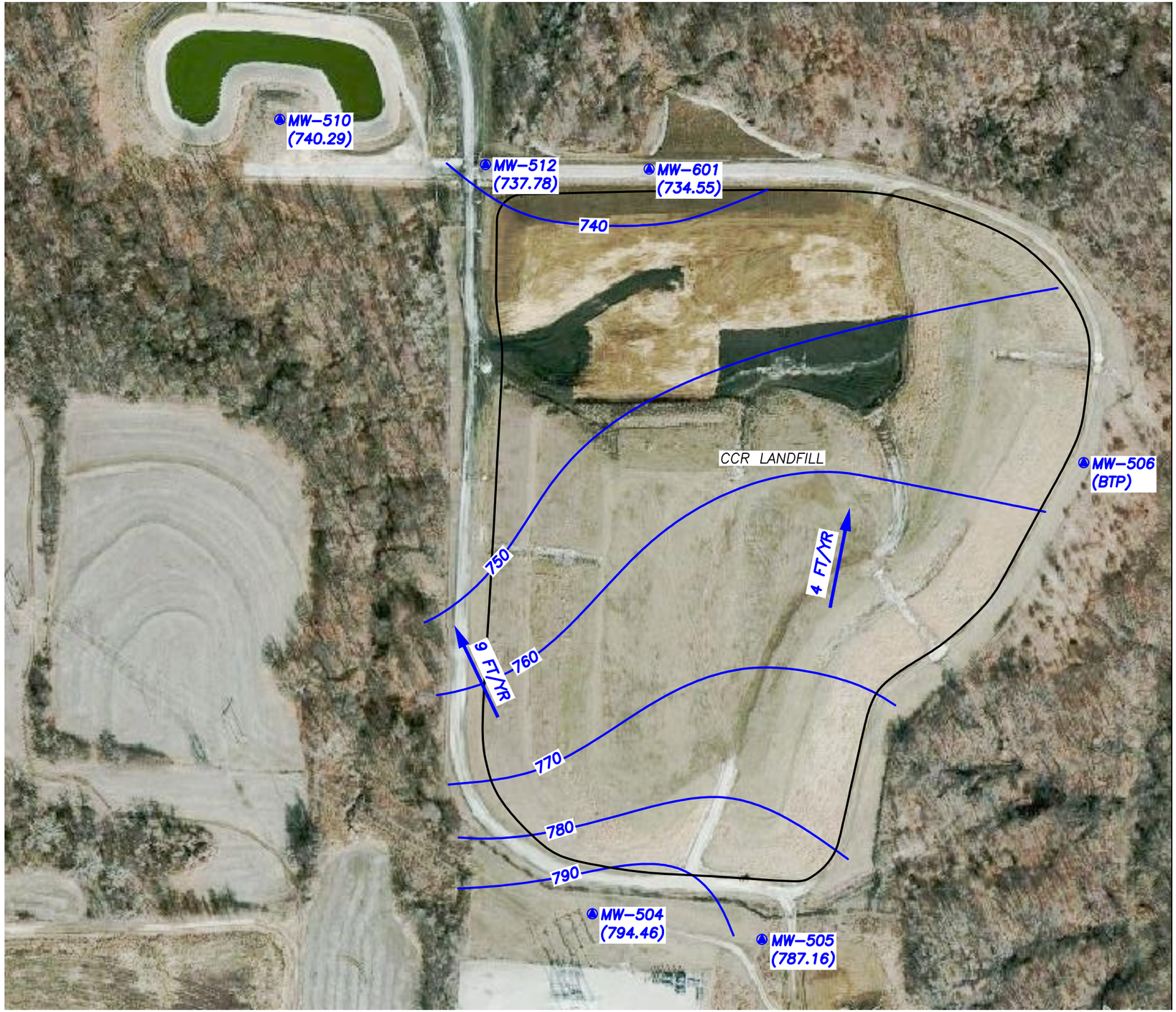
Piper, Stiff Diagram

- [ ] Combine Wells
- [ ] Combine Dates
- (•) Use Default Constituent Names
- ( ) Use Constituent Definition File Edit
- [x] Label Constituents
- [x] Label Axes
- [x] Note Cation-Anion Balance (Piper only)

Jared Morrison
December 16, 2022

ATTACHMENT 3

Groundwater Potentiometric Surface Maps



LEGEND:

- 760 — GROUNDWATER SURFACE ELEVATIONS (REPRESENTATIVE OF THIS UNIT)
- 601 (734.55) GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
- CCR LANDFILL UNIT BOUNDARY
- 9 FT/YR GROUNDWATER FLOW DIRECTION AND FLOW RATE (FEET/YEAR)
- BTP BELOW TOP OF PUMP

NOTES:

1. HORIZONTAL & VERTICAL DATUM: URS PLANS FOR CONSTRUCTION, KCP&L SIBLEY GENERATING STATION, DESIGN FILE 16530511.00001, DATED JANUARY 2010
2. GOOGLE EARTH AERIAL IMAGE. MARCH 2015.
3. BOUNDARY AND MONITORING WELL LOCATIONS SHOWN ARE APPROXIMATE.
4. WATER LEVEL MEASUREMENTS COMPLETED ON MAY 17, 2018.

200 0 200 400
SCALE FEET

REV. | DATE
- | -

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (MAY 2018) CCR LANDFILL

PROJECT TITLE: 2018 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT ADDENDUM

CLIENT: EVERGY MISSOURI WEST, INC.
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
7311 W. 130th St, Ste. 100
Overland Park, Kansas 66213
PH. (913) 681-0030 FAX. (913) 681-0012

PROJ. NO. 27213167.17 | DWN. BY: RCW | CHK. BY: JRR | QA REVW BY: JRR | PROJ. MGR: JRF
DSN. BY: RCW

CADD FILE: 18-MAY_GWLDWG

DATE: 12/13/22

FIGURE NO. 1

N:\KCPL\Projects\Groundwater\DWG\Sibley\2018\GW\18-MAY_GW.dwg Dec 13, 2022 - 5:31pm Layout Name: Fig 2 By: swyly

LEGEND:

– 760 –	GROUNDWATER SURFACE ELEVATIONS (REPRESENTATIVE OF THIS UNIT)
601 (734.55)	GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
	CCR LANDFILL UNIT BOUNDARY
11 FT/YR	GROUNDWATER FLOW DIRECTION AND FLOW RATE (FEET/YEAR)
BTP	BELOW TOP OF PUMP

NOTES:

1. HORIZONTAL & VERTICAL DATUM: URS PLANS FOR CONSTRUCTION, KCP&L SIBLEY GENERATING STATION, DESIGN FILE 16530511.00001, DATED JANUARY 2010
2. GOOGLE EARTH AERIAL IMAGE. MARCH 2015.
3. BOUNDARY AND MONITORING WELL LOCATIONS SHOWN ARE APPROXIMATE.
4. WATER LEVEL MEASUREMENTS COMPLETED ON NOVEMBER 15, 2018.

200 0 200 400

SCALE FEET

REV. | DATE

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (NOV. 2018) CCR LANDFILL

PROJECT TITLE: 2018 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT ADDENDUM

CLIENT: EVERGY MISSOURI WEST, INC.
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
8575 W. 110th St, Ste. 100
Overland Park, Kansas 66210
PH. (913) 681-0030 FAX. (913) 681-0012

PROJ. NO. 27213167.17 | DSN. BY: TGW | DWN. BY: TGW | CHK. BY: JRR | QA RVW BY: JRR | PROJ. MGR. JRF

CADD FILE: 18-NOV_GW.DWG

DATE:

FIGURE NO. 2

N:\KCPL\Projects\Groundwater\DWG\Sibley\2018\GW\18-NOV_GW.dwg Dec 13, 2022 - 5:31pm Layout Name: Fig 2 By: swyly