2018 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

FLY ASH IMPOUNDMENT
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

Presented To:
KCP&L Greater Missouri Operations Company

SCS ENGINEERS

27213169.18 | January 2019

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 Fly Ash Impoundment 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 Fly Ash Impoundment 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

Digitally signed by Douglas L. Doerr
Date: 2019.01.30 15:39:04 -06'00'

Douglas L. Doerr, P.E.

SCS Engineers

Revision Number	Revision Date	Revision Section	Summary of Revisions

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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 Fly Ash Impoundment 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 Fly Ash Impoundment and all background (or upgradient) and downgradient monitoring wells with identification numbers for the Fly Ash Impoundment 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 Fly Ash Impoundment 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 as **Appendix C:**

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

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

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

C.4 Supplemental Data for CCR Groundwater Monitoring Alternative Source Demonstration Report May 2018 Groundwater Monitoring Event, Fly Ash Impoundment, 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 Fly Ash Impoundment. No warranties, express or implied, are intended or made.

APPENDIX A

FIGURES

Figure 1: Site Map

LEGEND:

- 506 — CCR GROUNDWATER MONITORING SYSTEM WELLS
- CCR 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 ARE APPROXIMATE.

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SCALE FEET

REV.	DATE
-	-

SHEET TITLE
SITE MAP
FLY ASH IMPOUNDMENT
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
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PROJ. NO. 27213169.18
DSN. BY: TGW
DWN. BY: TGW
CHK. BY: JRF
Q/A RVW BY: JRF
PROJ. MGR: JRF

CADD FILE:
FIG 1 – SIBLEY FLY ASH IMP.DWG

DATE: 1/21/19

FIGURE NO. 1

N:\KCPL\PROJECTS\GROUNDWATER\DWG\SIBLEY\ANNUAL CCR REPORTING\2018\FIG 1 - SIBLEY FLY ASH IMP.DWG

APPENDIX B

TABLES

Table 1: Appendix III Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

Table 1
Fly Ash Impoundment
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)	Dissolved Solids (mg/L)
MW-801	5/16/2018	0.310	146	117	0.187	7.00	57.7	609
MW-801	6/27/2018	---	---	*109	---	**6.90	---	---
MW-801	8/8/2018	---	---	*106	---	**6.49	---	---
MW-801	11/15/2018	0.285	143	115	0.172	6.78	53.4	586
MW-802	5/16/2018	<0.200	117	49.3	0.249	6.89	33.9	285
MW-802	6/27/2018	---	*65.5	---	---	**6.68	---	---
MW-802	11/15/2018	<0.200	101	52.3	0.222	6.68	34.0	412
MW-803	5/16/2018	2.72	118	15.9	0.301	7.04	124	301
MW-803	11/15/2018	2.90	114	17.2	0.278	7.26	116	480
MW-804	5/16/2018	5.61	172	17.5	0.222	6.83	<5.00	393
MW-804	6/27/2018	*7.06	---	---	---	**7.23	---	---
MW-804	8/8/2018	*7.00	---	---	---	**6.85	---	---
MW-804	11/15/2018	8.07	155	3.9	0.260	7.09	25.8	625
MW-805	5/16/2018	<0.200	98.5	9.88	0.203	7.06	53.7	491
MW-805	6/27/2018	---	---	---	---	**7.78	---	*349
MW-805	11/15/2018	<0.200	98.5	9.45	0.196	7.18	53.2	339
MW-806R	5/16/2018	4.64	145	27.7	0.229	7.26	157	345
MW-806R	11/15/2018	5.56	168	29.0	0.202	7.05	236	699

* 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
Fly Ash Impoundment
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-801	5/16/2018	7.00	882	16.93	133	0.0	7.17	21.19	709.17
MW-801	6/27/2018	**6.90	930	18.39	111	0.0	1.95	21.15	709.21
MW-801	8/8/2018	**6.49	843	18.26	128	0.0	2.95	21.26	709.10
MW-801	11/15/2018	6.78	1060	11.66	121	0.0	4.23	20.29	710.07
MW-802	5/16/2018	6.89	665	18.51	61	0.0	1.45	14.23	716.94
MW-802	6/27/2018	**6.68	597	17.49	115	0.0	3.62	14.41	716.76
MW-802	11/15/2018	6.68	805	11.90	119	0.0	0.00	13.98	717.19
MW-803	5/16/2018	7.04	744	16.95	-124	2.0	1.31	25.00	701.89
MW-803	11/15/2018	7.26	788	13.16	-80	0.0	0.00	22.87	704.02
MW-804	5/16/2018	6.83	1040	17.98	-137	8.4	0.30	29.46	699.00
MW-804	6/27/2018	**7.23	1090	19.66	-178	8.7	0.19	27.33	701.13
MW-804	8/8/2018	**6.85	901	22.14	-149	6.7	0.10	28.42	700.04
MW-804	11/15/2018	7.09	1080	13.75	-119	16.2	0.00	27.81	700.65
MW-805	5/16/2018	7.06	524	18.01	-67	3.0	0.96	26.47	702.32
MW-805	6/27/2018	**7.78	558	21.88	-152	0.0	0.10	24.80	703.99
MW-805	11/15/2018	7.18	586	14.66	-50	6.9	4.37	24.10	704.69
MW-806R	5/16/2018	7.26	805	18.31	-88	17.6	2.98	22.99	706.17
MW-806R	11/15/2018	7.05	1050	14.77	-134	4.0	0.38	21.67	707.49

**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

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

FLY ASH IMPOUNDMENT
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 Fly Ash Impoundment 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 Fly Ash Impoundment 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 Fly Ash Impoundment 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 Fly Ash Impoundment 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 one Appendix III constituent above its prediction limit. The prediction limit for chloride in monitoring well MW-801 is 104 mg/L. The detection monitoring sample was reported at 119 mg/L. The first verification sample was collected on November 16, 2017 with a result of 125 mg/L. The second verification sample was collected on December 28, 2017 with a result of 136 mg/L. Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for chloride from monitoring well MW-801 exceeds its prediction limit and is a confirmed SSI 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 Fly Ash Impoundment 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 Fly Ash Impoundment. 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 Fly Ash Impoundment 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-801 is located upgradient from the Fly Ash Impoundment indicating the SSI is not caused by a release from the Fly Ash Impoundment. This demonstrates that a source other than the Fly Ash Impoundment 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.

Although an SSI was only identified in upgradient well MW-801, box and whiskers plots for chloride in both upgradient monitoring wells MW-801 and MW-802 were compared to box and whisker plots for chloride in the downgradient wells and surface water from the Fly Ash Impoundment and surface water from the permitted Fly Ash Impoundment outfall discharge. The comparison indicates the chloride concentrations in upgradient wells MW-801 and MW-802 are greater than chloride concentrations in each of the downgradient wells and water in and from the impoundment. This demonstrates that a source other than the Fly Ash Impoundment 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. 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-801 and surface impoundment water from the Fly Ash Impoundment is provided in **Appendix C** and indicates the groundwater from these well does not exhibit the same geochemical characteristics as the impoundment water. The groundwater and the impoundment water plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and impoundment water). This demonstrates that a source other than the Fly Ash Impoundment 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. 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 chloride concentrations in both of the upgradient wells exceed chloride concentrations in the downgradient wells. This demonstrates that a source other than the Fly Ash Impoundment 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. Time series plots are provided in **Appendix D**.

4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the Fly Ash Impoundment caused the SSI over background levels, or that

the SSI 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 Fly Ash Impoundment 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–503 (699.84) — *CCR GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATIONS)*
- *CCR (SURFACE IMPOUNDMENT UNIT BOUNDARY (EXISTING)*
- *GROUNDWATER FLOW DIRECTION*

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 ARE APPROXIMATE.*

200 0 200 400

SCALE FEET

REV.	DATE
-	-

SHEET TITLE
POTENTIOMETRIC SURFACE MAP (OCT 2017)
FLY ASH IMPOUNDMENT

PROJECT TITLE
CCR ALTERNATIVE 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 | DWN. BY: RCW | Q/A RVW BY: JRF
DSN. BY: RCW | CHK. BY: JRF | PROJ. MGR.: JRF

CADD FILE: 18-MAR_CCR ASD.DWG

DATE: 4/16/18

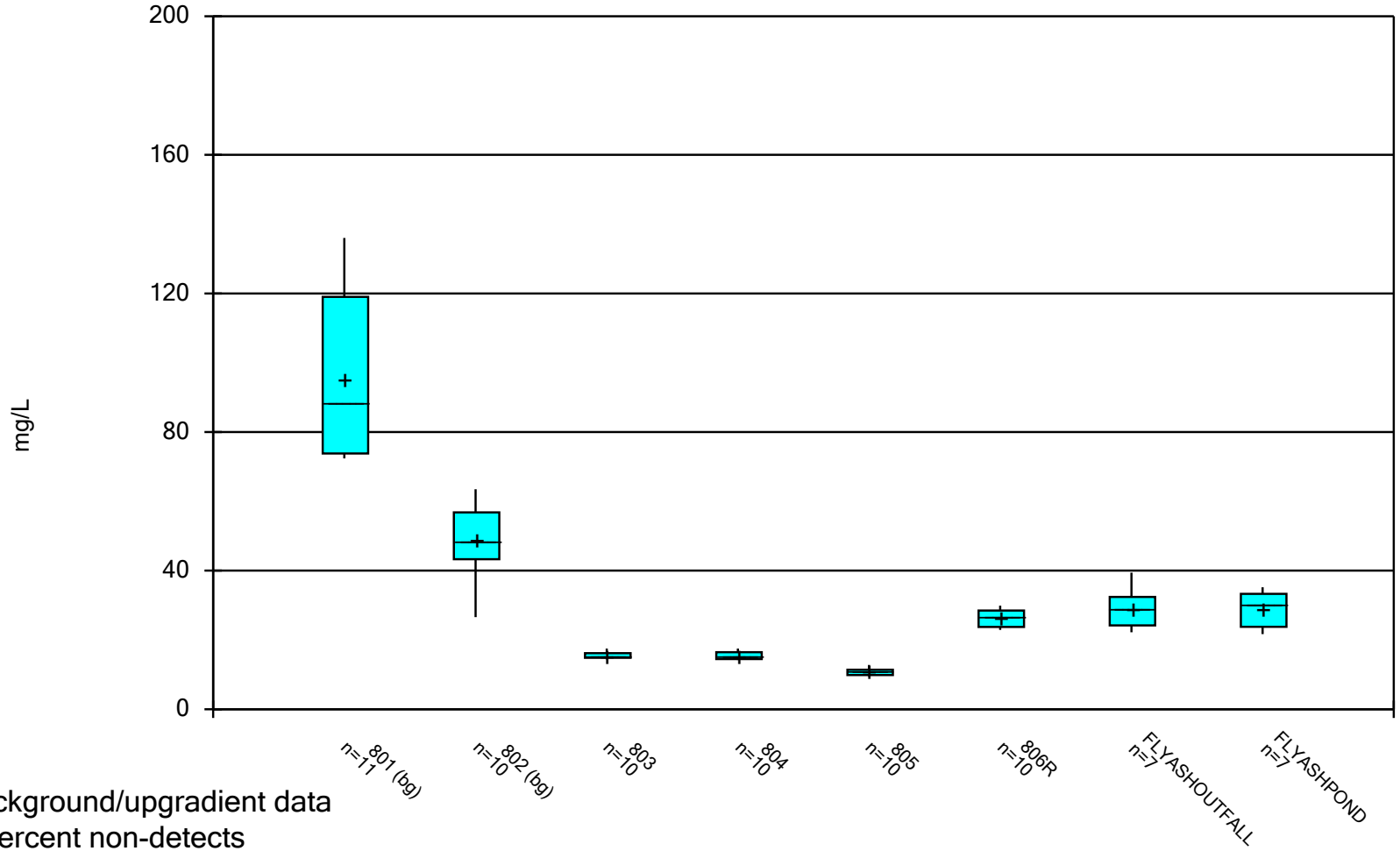
FIGURE NO. **1**

N:\KCPL\Projects\Groundwater\DWG\Sibley\2018\03-20 _ CCR Alternative Source Demonstration\18-MAR_CCR ASD.dwg Apr 16, 2018 - 10:38am Layout Name: Fig 1 - Fly Ash Impoundment 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 5:11 PM View: Ash Pond 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 5:12 PM View: Ash Pond III

Sibley Client: SCS Engineers Data: Sibley

	801 (bg)	802 (bg)	803	804	805	806R	FLYASHOUTFALL	FLYASHPOND
12/15/2015			14.9	17.5	9.51			
12/16/2015	73.6	63.5						
2/17/2016	72.4	55	14.8	14.6	9.86			
5/25/2016							22.2	
5/26/2016	88.2	50.5	14.4	15.5	9.85			21.7
6/2/2016						28.6		
7/19/2016						28.4		
8/23/2016	73.8	46.3	14.9	14.4	10.9	22.9	27	26.1
11/10/2016	88.2	26.6	15	14.2	10.9		32.4	30.5
11/11/2016						22.9		
2/9/2017	78.6	58.6	15.1	15.2	11.2	24.6	39.4	35.2
3/22/2017						28.1		
5/3/2017	101	53.9	15.9	15	11.5	25.6		
5/4/2017							24.2	23.8
8/1/2017	91.8	43.5	16.3	17.1	10.8	27.3	28.9	33.3
10/4/2017	119	43.1	17.5	15.8	12.8	29.9	30	32
11/16/2017	125		16.1	14.7	11.3			
11/17/2017		46.7				26.3		
12/28/2017	136							
Median	88.2	48.6	15.1	15.1	10.9	26.8	28.9	30.5
LowerQ.	73.8	43.3	14.9	14.5	9.86	23.8	24.2	23.8
UpperQ.	119	56.8	16.2	16.5	11.4	28.5	32.4	33.3
Min	72.4	26.6	14.4	14.2	9.51	22.9	22.2	21.7
Max	136	63.5	17.5	17.5	12.8	29.9	39.4	35.2
Mean	95.2	48.8	15.5	15.4	10.9	26.5	29.2	28.9

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 3/5/2018, 5:12 PM

Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Chloride (mg/L)	801 (bg)	11	95.2	22.3	6.73	88.2	72.4	136	0
Chloride (mg/L)	802 (bg)	10	48.8	10.2	3.24	48.6	26.6	63.5	0
Chloride (mg/L)	803	10	15.5	0.942	0.298	15.1	14.4	17.5	0
Chloride (mg/L)	804	10	15.4	1.12	0.353	15.1	14.2	17.5	0
Chloride (mg/L)	805	10	10.9	0.962	0.304	10.9	9.51	12.8	0
Chloride (mg/L)	806R	10	26.5	2.43	0.768	26.8	22.9	29.9	0
Chloride (mg/L)	FLYASHOUT...	7	29.2	5.68	2.15	28.9	22.2	39.4	0
Chloride (mg/L)	FLYASHPOND	7	28.9	5.11	1.93	30.5	21.7	35.2	0

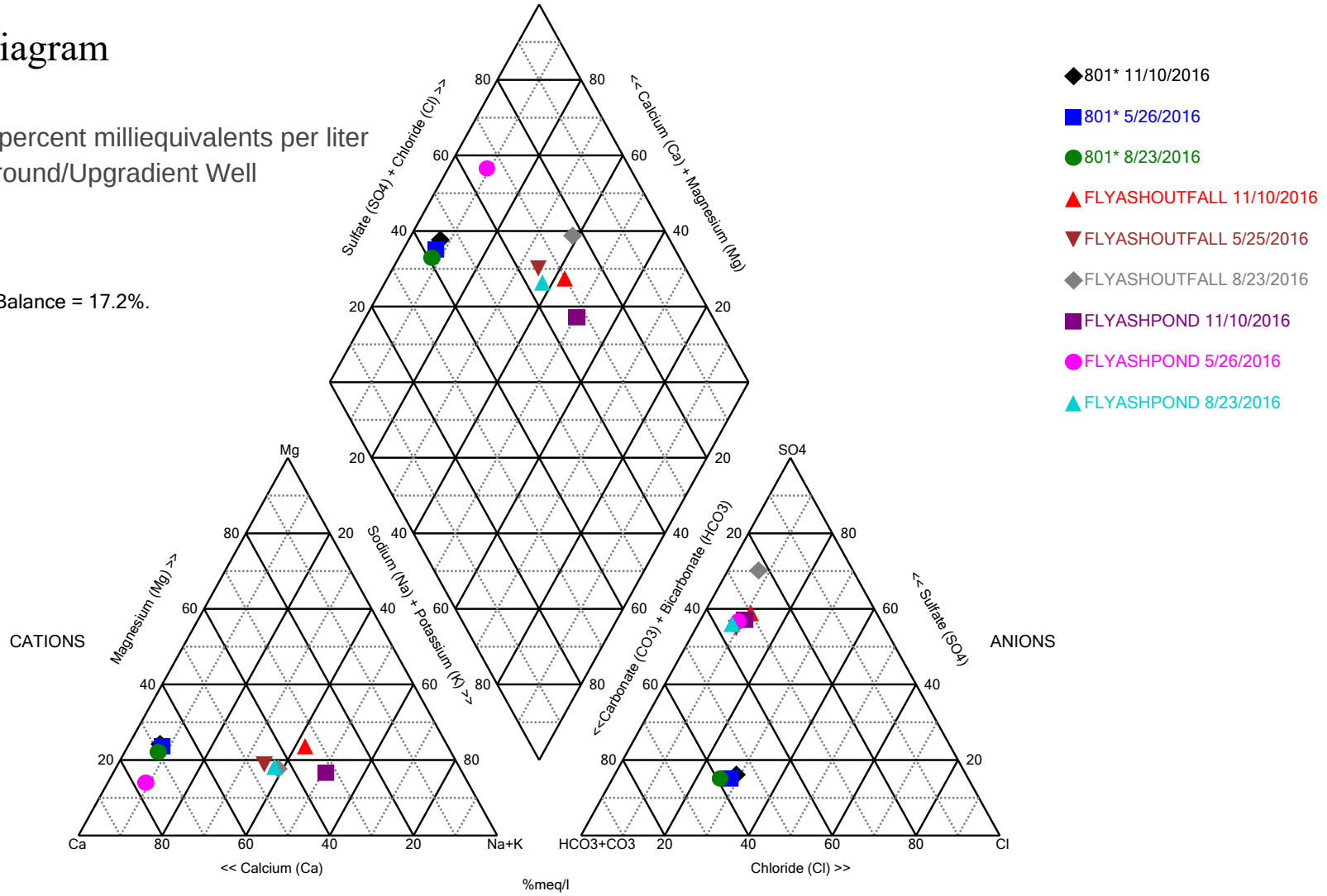
Appendix C

Piper Diagram

Piper Diagram

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

Cation-Anion Balance = 17.2%.



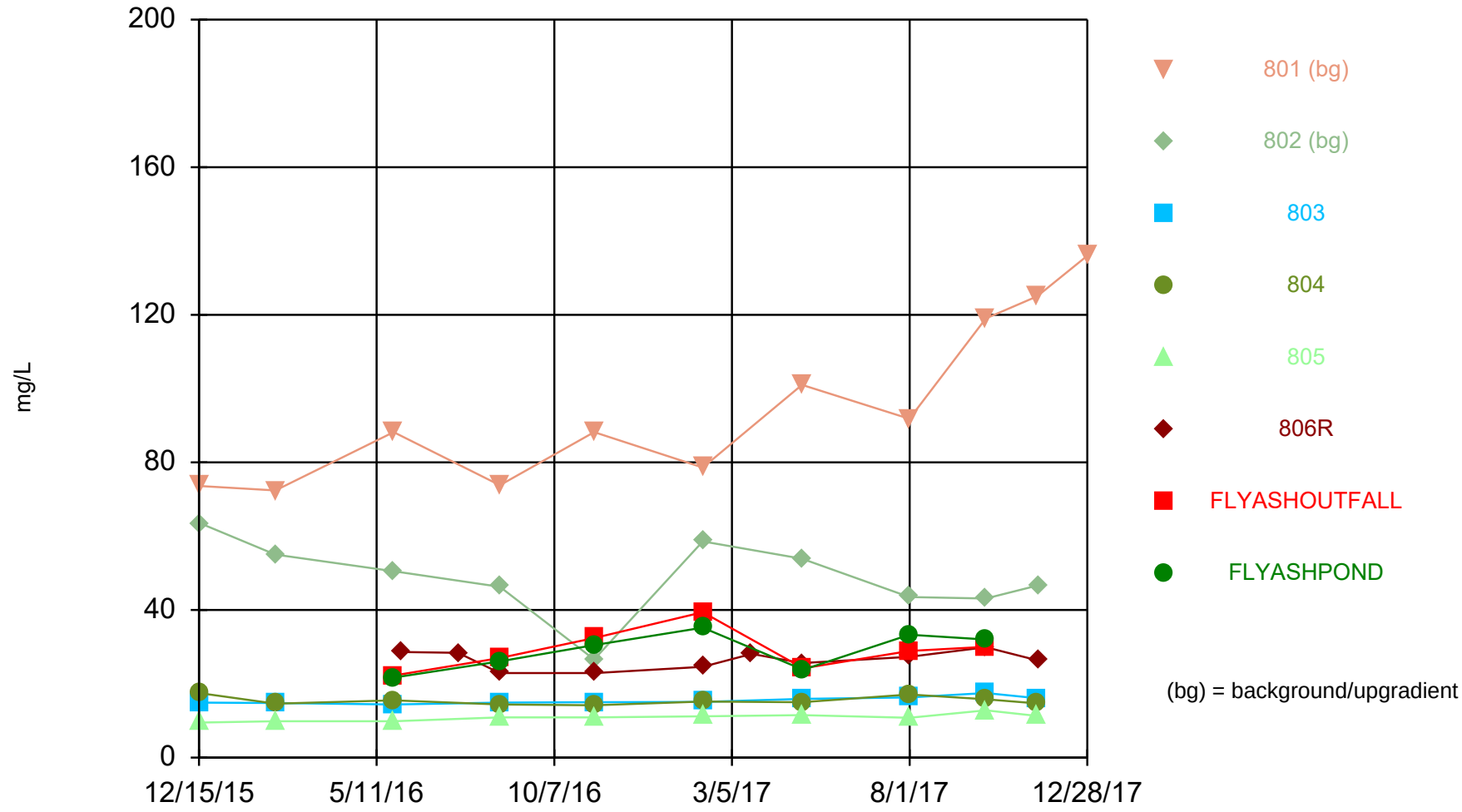
Analysis Run 3/5/2018 5:30 PM View: Ash Pond III

Sibley Client: SCS Engineers Data: Sibley

Appendix D

Time Series Plots

Time Series



Constituent: Chloride Analysis Run 4/11/2018 2:51 PM View: Ash Pond III

Sibley Client: SCS Engineers Data: Sibley

Time Series

Constituent: Chloride (mg/L) Analysis Run 4/11/2018 2:52 PM View: Ash Pond III

Sibley Client: SCS Engineers Data: Sibley

	801 (bg)	802 (bg)	803	804	805	806R	FLYASHOUTFALL	FLYASHPOND
12/15/2015			14.9	17.5	9.51			
12/16/2015	73.6	63.5						
2/17/2016	72.4	55	14.8	14.6	9.86			
5/25/2016							22.2	
5/26/2016	88.2	50.5	14.4	15.5	9.85			21.7
6/2/2016						28.6		
7/19/2016						28.4		
8/23/2016	73.8	46.3	14.9	14.4	10.9	22.9	27	26.1
11/10/2016	88.2	26.6	15	14.2	10.9		32.4	30.5
11/11/2016						22.9		
2/9/2017	78.6	58.6	15.1	15.2	11.2	24.6	39.4	35.2
3/22/2017						28.1		
5/3/2017	101	53.9	15.9	15	11.5	25.6		
5/4/2017							24.2	23.8
8/1/2017	91.8	43.5	16.3	17.1	10.8	27.3	28.9	33.3
10/4/2017	119	43.1	17.5	15.8	12.8	29.9	30	32
11/16/2017	125		16.1	14.7	11.3			
11/17/2017		46.7				26.3		
12/28/2017	136							

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

Piper Diagram

Analysis Run 1/23/2019 12:18 PM View: Pipers ASD

Sibley Client: SCS Engineers Data: Sibley

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
801* 5/26/2016	19.1	1.43	147	31	88.2	65.2	304	10
801* 8/23/2016	16.9	1.15	137	25.8	73.8	58.6	288	10
801* 11/10/2016	17	1.21	143	30	88.2	66.5	282	10
FLYASHOUTFALL 5/25/2016	57.2	10.6	73.5	17.9	22.2	187	135	10
FLYASHOUTFALL 8/23/2016	92.1	15.4	98.9	24.6	27	359	130	10
FLYASHOUTFALL 11/10/2016	85.9	12.5	66.1	27.3	32.4	243	144	10
FLYASHPOND 5/26/2016	56.7	13.7	476	52.4	21.7	190	96.6	26.4
FLYASHPOND 8/23/2016	87.9	12.3	97	24.1	26.1	273	171	28.2
FLYASHPOND 11/10/2016	104	14.6	63.8	19.2	30.5	233	113	29.1

C.3 Groundwater Monitoring Alternative Source Demonstration Report May 2018

CCR GROUNDWATER MONITORING

ALTERNATIVE SOURCE DEMONSTRATION REPORT

MAY 2018 GROUNDWATER MONITORING EVENT

FLY ASH IMPOUNDMENT

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

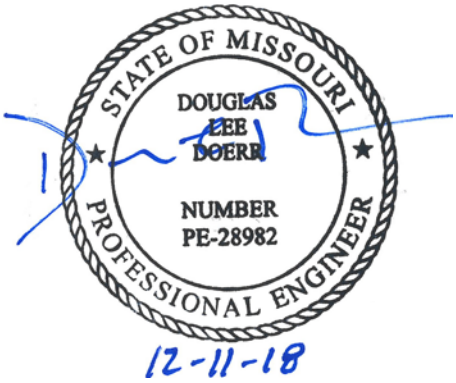
File No. 27213169.18

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 Fly Ash Impoundment 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 Fly Ash Impoundment 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

Table of Contents

Section **Page**

Appendices

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 Fly Ash Impoundment 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 Fly Ash Impoundment at the Sibley Generating Station were completed September 12, 2018 and placed into the CCR Operating Record.

The completed statistical evaluation identified two Appendix III constituents above their respective prediction limits. The prediction limit for boron in monitoring well MW-804 is 5.133 mg/L. The detection monitoring sample was reported at 5.61 mg/L. The first verification re-sample was

collected on June 27, 2018 with a result of 7.06 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 7.0 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for boron from monitoring well MW-804 exceeds its prediction limit and is a confirmed statistically significant increase (SSI) over background.

The prediction limit for chloride in upgradient monitoring well MW-801 is 104.1 mg/L. The detection monitoring sample was reported at 117 mg/L. The first verification re-sample was collected on June 27, 2018 with a result of 109 mg/L. The second verification re-sample was collected on August 8, 2018 with a result of 106 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for chloride from upgradient monitoring well MW-801 exceeds its prediction limit and is a confirmed statistically significant increase (SSI) 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 an SSI above the background prediction limit for boron in monitor well MW-804 and an SSI above the background prediction limit for chloride in upgradient monitor well MW-801.

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 Fly Ash Impoundment 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 Fly Ash Impoundment. 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 Fly Ash Impoundment at the time of sampling. As seen on the map, monitoring well MW-801 is located upgradient from the Fly Ash Impoundment indicating the SSI is not caused by a release from the Fly Ash Impoundment. This demonstrates that a source other than the Fly Ash Impoundment 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.

The box and whiskers plot for chloride in upgradient monitoring well MW-801 was compared to box and whiskers plots for chloride in the other monitoring system wells. The comparison indicates the chloride concentration in upgradient well MW-801 is higher than the chloride concentrations in the downgradient wells. This demonstrates that a source other than the Fly Ash Impoundment 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 for chloride are provided in **Appendix B**.

3.3 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.

Chloride concentrations for MW-801 were plotted against chloride concentrations in the other monitoring system wells. The comparison indicates the chloride concentration in upgradient well MW-801 is higher than the chloride concentrations in the downgradient wells. This demonstrates that a source other than the Fly Ash Impoundment 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. Time series plots for chloride are provided in **Appendix C**.

3.4 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 with plots for MW-804 was compared to piper diagram plots for three ash pore water samples (ASD-1, ASD-2, and ASD-3) collected in the Fly Ash Impoundment with a Geoprobe® screen-point 15 groundwater sampler. Sample locations are shown on **Figure 1** in **Appendix A**. Samples were collected on the same day for the ash pore water and the well. The analytical reports are provided in **Appendix D** along with the piper diagram. The piper diagram plots indicate the groundwater from MW-804 does not exhibit the same geochemical characteristics as the ash pore water. The groundwater

and the ash pore water plot in different hydrochemical facies indicating there are two types of water (groundwater and ash pore water). This helps demonstrate that a source other than the Fly Ash Impoundment caused the SSI over background levels for boron, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.5 BORON STABLE ISOTOPE RATIO EVALUATION

The boron stable isotope ratio in coal and coal ash generally vary significantly from the boron stable isotope ratio found in naturally occurring groundwater. The National Bureau of Standards standard reference material 951 (NBS SRM-951), which is a boric acid, is used as the isotopic standard for boron. Boron has two stable isotopes, ^{10}B and ^{11}B. Isotopic ratios of samples are reported as per mil (‰) differences from NBS SRM-951. The delta value for $^{11}B/^{10}B$ is expressed as $\delta^{11}B$, ‰. Previous studies have found $\delta^{11}B$ values for coal ash and coal ash leachate samples between -40 ‰ and +6.6 ‰ and most natural groundwaters have $\delta^{11}B$ values between +10 ‰ and +30 ‰ (Refs. 1, 2, and 3).

A groundwater sample was collected from MW-804 for boron and $\delta^{11}B$ analysis on November 8, 2018. Additionally, ash pore water samples (ASD-1, ASD-2, and ASD-3) were collected with a Geoprobe® screen-point 15 groundwater sampler on the same day and for the same analysis. Sample locations are shown on **Figure 1** in **Appendix A**. The laboratory reports for the analysis are provided in **Appendix E**.

Boron concentration plotted against $\delta^{11}B$, ‰ for each of the samples are provided in Appendix E. The boron concentrations in ASD-1 (3.3 mg/L) and ASD-2 (3.56 mg/L) were less than the boron concentration in MW-804 (8.37 mg/L). The ash pore water from ASD-3 had the highest boron concentration at 18.8 mg/L. Although groundwater from MW-804 had a boron concentration less than one of the ash pore water samples, the $\delta^{11}B$ for the boron from MW-804 was +12.9 ‰ and significantly greater than the $\delta^{11}B$ for the ash pore water which ranged from -6.18 ‰ to -10.11 ‰. The positive $\delta^{11}B$ for groundwater from MW-804 demonstrates an alternative source of boron other than the Fly Ash Impoundment.

Below the boron vs $\delta^{11}B$ plot in **Appendix E**, is a figure (Ref. 4) showing $\delta^{11}B$ ranges for natural waters from various natural materials and waters impacted by anthropogenic sources. The figure further demonstrates based on $\delta^{11}B$ values for MW-804 that there is an alternative source of boron other than the Fly Ash Impoundment.

4 CONCLUSION

Our opinion is that a sufficient body of evidence is available and presented above to demonstrate that a source other than the Fly Ash Impoundment 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 ASDs, the owner or operator of the Fly Ash Impoundment may continue with the detection monitoring program under § 257.94.

5 REFERENCES

1. **Buska, Paul M., Fitzpatrick, John and Watson, Lee R. and Kay, Robert T.** *Evaluation of Ground-Water and Boron Sources by Use of Boron Stable-Isotope Ratios,Tritium, and Selected Water Chemistry Constituents near Beverly Shores, Northwestern Indiana*, 2004. U.S. Geological Survey Scientific Investigations Report 2007-5166. 2007).

2. *A Twenty-Month Geochemical and Isotopic Investigation into Environmental Impacts of the 2008 TVA Coal Ash Spill, - May*. **Ruhl, Laura S. and Vengosh, Avner and Dwyer, Gary S. and Hsu-Kim, Heileen and Deonarine, Amrika**. Denver, CO, USA : s.n., 2011. 2011 World of Coal Ash (WOCA) Conference - May 9-12, 2011.

3. *Boron and Strontium Isotopic Characterization of Coal Combustion Residuals: Validation of Novel Environmental Tracers,* Paper No. 30616-208920. **Ruhl, Laura.** Charlotte, NC : s.n., 2012. 2012 Geological Society of America Annual Meeting and Exposition, 4-7 November.

4. **Ruhl, Laura.** *Geochemical and Isotopic Characterization of Coal Combustion Residuals: Implications for Potential Environmental Impacts.* Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Earth and Ocean Sciences in the Graduate School of Duke University, 2012.

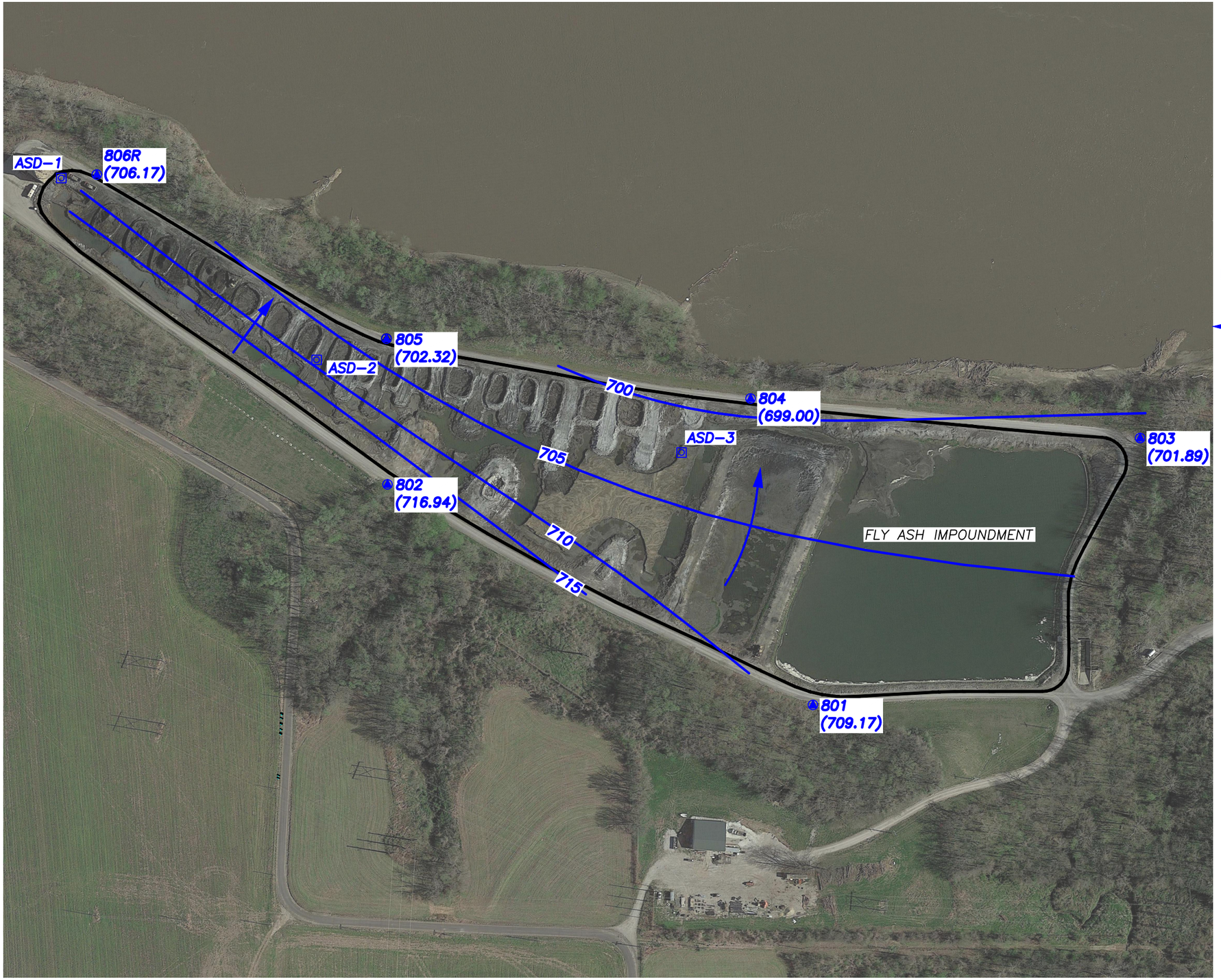
6 GENERAL COMMENTS

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.

Appendix A

Figure 1



LEGEND:

- 760 — GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS (REPRESENTATIVE OF THIS UNIT)
- 601 (734.55) GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
- ASD–2 GEOPROBE® PORE WATER SAMPLE LOCATION
- FLY ASH IMPOUNDMENT UNIT BOUNDARY
- GROUNDWATER FLOW DIRECTION

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. APRIL 2018.
3. BOUNDARY AND MONITORING WELL WELL LOCATIONS SHOWN ARE APPROXIMATE.

200 0 200 400
SCALE FEET

REV.	DATE
-	-

SHEET TITLE
POTENTIOMETRIC SURFACE MAP (MAY 2018)
FLY ASH IMPOUNDEMENT
CCR GROUNDWATER MONITORING SYSTEM

PROJECT TITLE
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
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PROJ. NO.	DWN. BY:	Q/A RVW BY:
27213167.18	TCW	DLD
CSK. BY:	CHK. BY:	PROJ. MGR.
TCW	JRR	JRF

CADD FILE:
18-MAY_DR_ALT.SOURCE DEMO.DWG

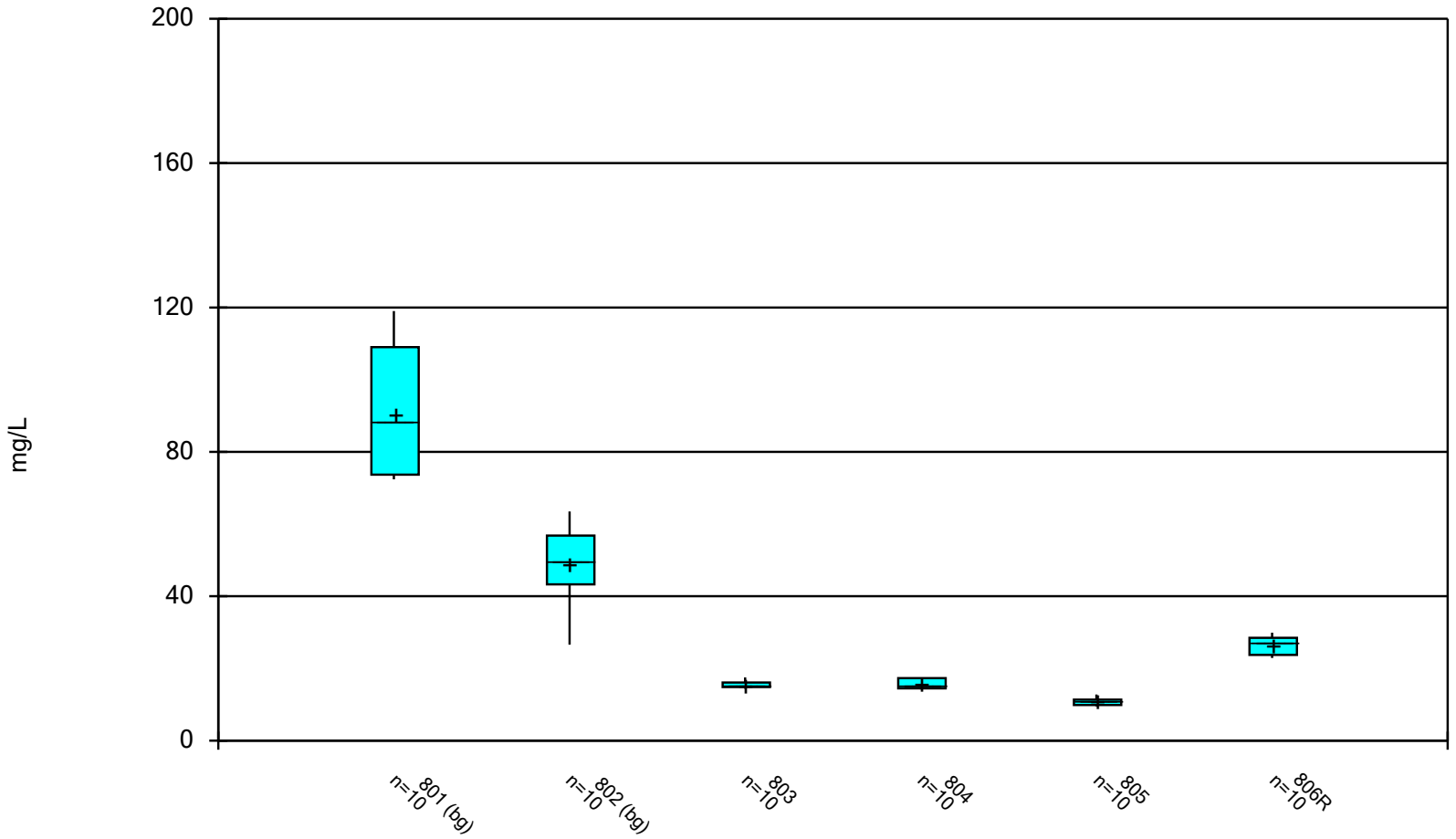
DATE:
12/07/18

FIGURE NO.
1

Appendix B

Box and Whiskers Plots

Box & Whiskers Plot



Constituent: Chloride Analysis Run 12/6/2018 4:49 PM View: Ash Pond III

Sibley Client: SCS Engineers Data: Sibley

Box & Whiskers Plot

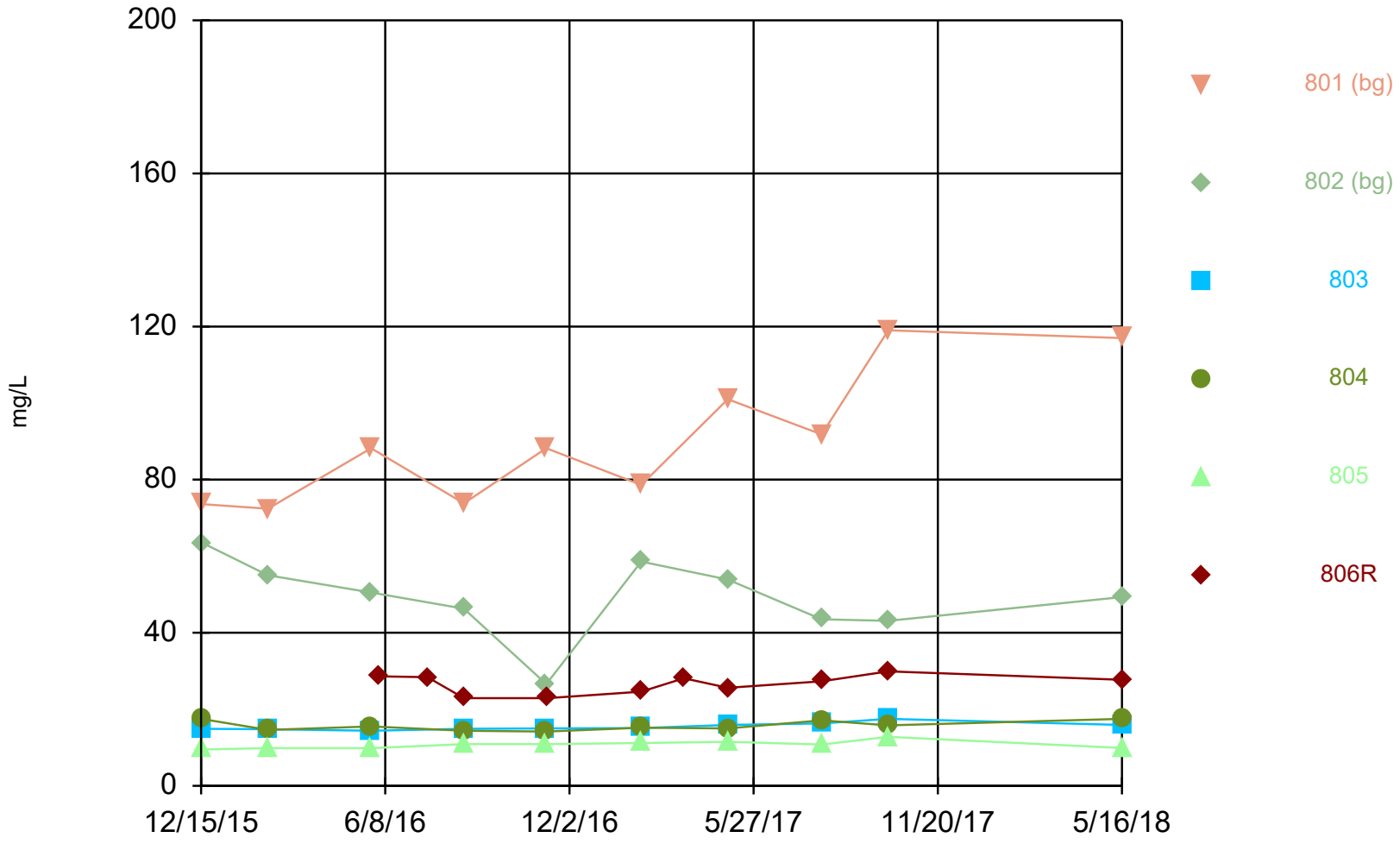
Sibley Client: SCS Engineers Data: Sibley Printed 12/6/2018, 4:50 PM

Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Chloride (mg/L)	801 (bg)	10	90.36	17.23	5.447	88.2	72.4	119	0
Chloride (mg/L)	802 (bg)	10	49.03	10.21	3.23	49.9	26.6	63.5	0
Chloride (mg/L)	803	10	15.47	0.9298	0.294	15.05	14.4	17.5	0
Chloride (mg/L)	804	10	15.68	1.264	0.3997	15.35	14.2	17.5	0
Chloride (mg/L)	805	10	10.72	0.9946	0.3145	10.85	9.51	12.8	0
Chloride (mg/L)	806R	10	26.6	2.46	0.7779	27.5	22.9	29.9	0

Appendix C

Time Series Plots

Time Series



Constituent: Chloride Analysis Run 12/6/2018 4:56 PM View: Ash Pond III

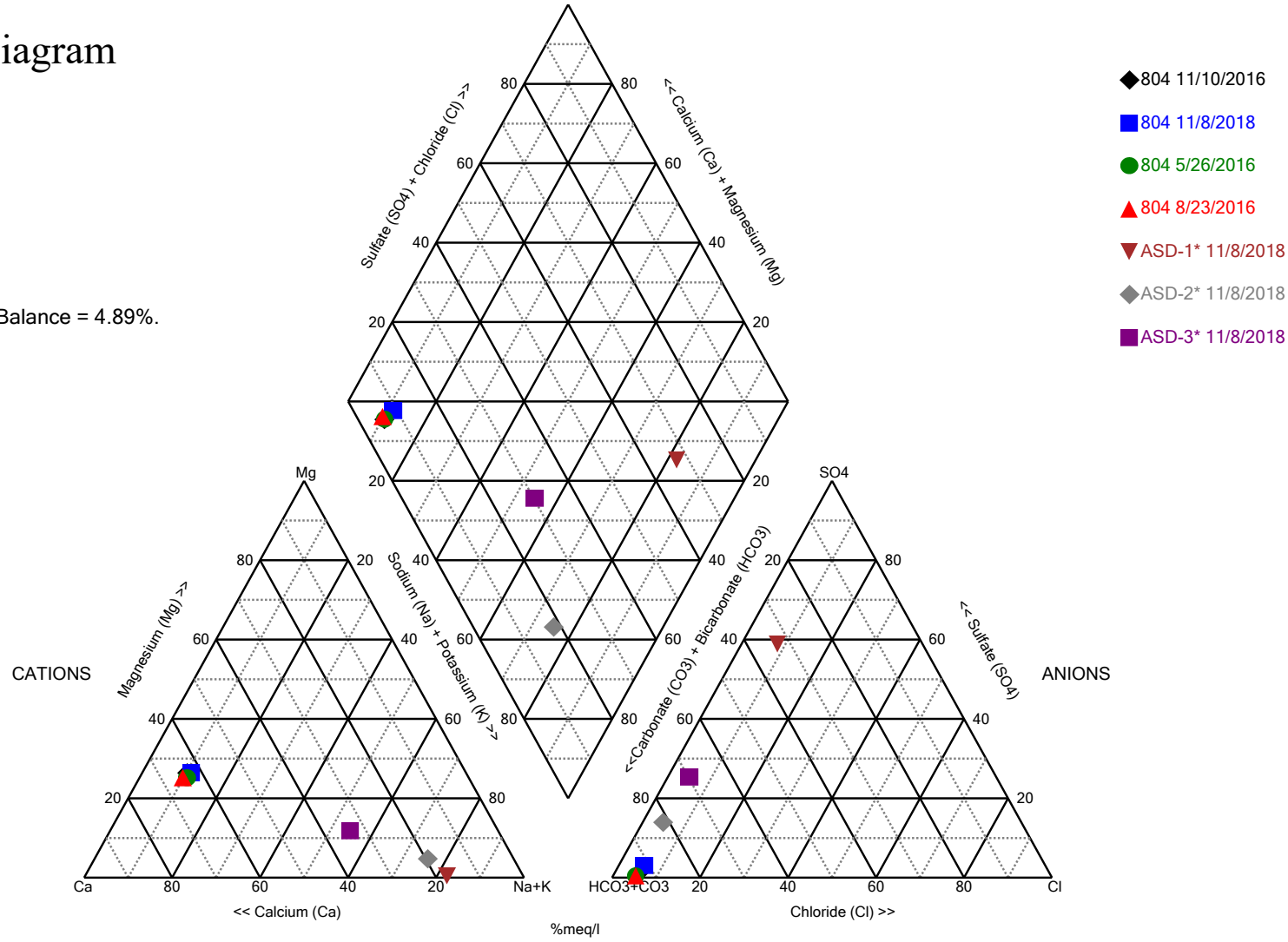
Sibley Client: SCS Engineers Data: Sibley

Appendix D

Piper Diagram and Laboratory Results

Piper Diagram

Cation-Anion Balance = 4.89%.



Analysis Run 12/7/2018 11:04 AM View: Pipers ASD

Sibley Client: SCS Engineers Data: Sibley

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 16, 2018

SCS Engineers - KS

Sample Delivery Group:	L1042988
Samples Received:	11/09/2018
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

TABLE OF CONTENTS

MW-804 L1042988-01 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 15:35
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/15/18 18:18	11/15/18 18:18	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 03:09	11/13/18 03:09	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:37	ST

MW-805 L1042988-02 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 14:55
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/15/18 18:25	11/15/18 18:25	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 03:20	11/13/18 03:20	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:39	ST

MW-806R L1042988-03 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 14:10
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/15/18 18:33	11/15/18 18:33	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 04:03	11/13/18 04:03	ELN
Wet Chemistry by Method 9056A	WG1194539	5	11/13/18 08:41	11/13/18 08:41	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:42	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 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	561000		20000	1	11/15/2018 18:18	WG1196769
Alkalinity,Carbonate	ND		20000	1	11/15/2018 18:18	WG1196769

Sample Narrative:

L1042988-01 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	18300		1000	1	11/13/2018 03:09	WG1194539
Fluoride	139		100	1	11/13/2018 03:09	WG1194539
Sulfate	14100		5000	1	11/13/2018 03:09	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	158000		1000	1	11/14/2018 13:37	WG1194483
Magnesium	39800		1000	1	11/14/2018 13:37	WG1194483
Potassium	5760		1000	1	11/14/2018 13:37	WG1194483
Sodium	30100		1000	1	11/14/2018 13:37	WG1194483

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	250000		20000	1	11/15/2018 18:25	WG1196769
Alkalinity,Carbonate	ND		20000	1	11/15/2018 18:25	WG1196769

Sample Narrative:

L1042988-02 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	9120		1000	1	11/13/2018 03:20	WG1194539
Fluoride	137		100	1	11/13/2018 03:20	WG1194539
Sulfate	50100		5000	1	11/13/2018 03:20	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	97600		1000	1	11/14/2018 13:39	WG1194483
Magnesium	14000		1000	1	11/14/2018 13:39	WG1194483
Potassium	ND		1000	1	11/14/2018 13:39	WG1194483
Sodium	8850		1000	1	11/14/2018 13:39	WG1194483

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	287000		20000	1	11/15/2018 18:33	WG1196769
Alkalinity,Carbonate	ND		20000	1	11/15/2018 18:33	WG1196769

Sample Narrative:

L1042988-03 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	27200		1000	1	11/13/2018 04:03	WG1194539
Fluoride	150		100	1	11/13/2018 04:03	WG1194539
Sulfate	184000		25000	5	11/13/2018 08:41	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	153000		1000	1	11/14/2018 13:42	WG1194483
Magnesium	21400		1000	1	11/14/2018 13:42	WG1194483
Potassium	3460		1000	1	11/14/2018 13:42	WG1194483
Sodium	29000		1000	1	11/14/2018 13:42	WG1194483

Method Blank (MB)

(MB) R3360673-1 11/15/18 16:00

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Alkalinity,Bicarbonate	U		2710	20000
Alkalinity,Carbonate	U		2710	20000

Sample Narrative:

BLANK: Endpoint pH 4.5

Method Blank (MB)

(MB) R3359264-1 11/12/18 17:12

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

L1043056-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1043056-07 11/13/18 05:19 • (DUP) R3359264-6 11/13/18 05:30

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	16800	17900	1	6.23		15
Fluoride	ND	70.5	1	0.000		15
Sulfate	21200	21700	1	2.55		15

L1042988-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1042988-02 11/13/18 03:20 • (DUP) R3359264-3 11/13/18 03:31

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	9120	9540	1	4.50		15
Fluoride	137	196	1	16.9	P1	15
Sulfate	50100	50900	1	1.65		15

Laboratory Control Sample (LCS)

(LCS) R3359264-2 11/12/18 17:23

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40000	39200	97.9	80.0-120	
Fluoride	8000	7910	98.8	80.0-120	
Sulfate	40000	40000	100	80.0-120	

L1043056-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L1043056-07 11/13/18 05:19 • (MS) R3359264-7 11/13/18 05:41

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50000	16800	65400	97.1	1	80.0-120	
Fluoride	5000	ND	4980	98.6	1	80.0-120	
Sulfate	50000	21200	70100	97.8	1	80.0-120	

L1042988-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1042988-02 11/13/18 03:20 • (MS) R3359264-4 11/13/18 03:41 • (MSD) R3359264-5 11/13/18 03:52

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	9120	58000	58900	97.8	99.5	1	80.0-120			1.45	15
Fluoride	5000	137	5140	5250	99.4	102	1	80.0-120			2.11	15
Sulfate	50000	50100	98100	98600	96.0	97.0	1	80.0-120			0.474	15

Method Blank (MB)

(MB) R3359958-1 11/14/18 12:59

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Calcium	U		46.3	1000
Magnesium	U		11.1	1000
Potassium	111	J	102	1000
Sodium	356	J	98.5	1000

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

(LCS) R3359958-2 11/14/18 13:01 • (LCSD) R3359958-3 11/14/18 13:03

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 %
Calcium	10000	10200	10200	102	102	80.0-120			0.00148	20
Magnesium	10000	10300	10300	103	103	80.0-120			0.366	20
Potassium	10000	9480	9510	94.8	95.1	80.0-120			0.377	20
Sodium	10000	9870	9830	98.7	98.3	80.0-120			0.417	20

L1043056-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1043056-10 11/14/18 13:06 • (MS) R3359958-5 11/14/18 13:11 • (MSD) R3359958-6 11/14/18 13:13

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 %
Calcium	10000	30800	40000	40100	92.1	92.7	1	75.0-125			0.169	20
Magnesium	10000	6480	16400	16600	99.5	102	1	75.0-125			1.30	20
Potassium	10000	ND	9650	9670	94.0	94.2	1	75.0-125			0.146	20
Sodium	10000	19200	30300	30500	111	113	1	75.0-125			0.629	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.

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

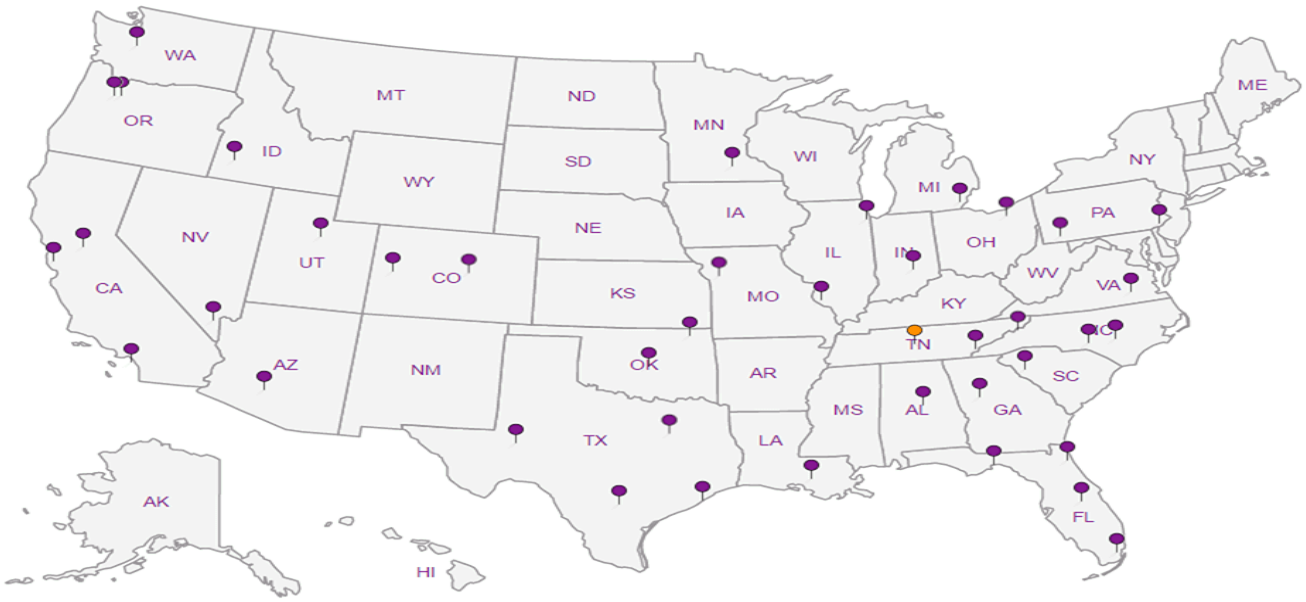
Third Party Federal Accreditations

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.



Chain of Custody Page 1 of 1

Pace Analytical®
National Center for Testing & Innovation

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

L# L1042988

C186

Acctnum: AQUAOPKS

Template:

Prelogin:

TSR:

PB:

Shipped Via:

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

Billing Information:

Pres Chk

Report to: **Jason Franks**

Email To: **Jfranks@scsengineers.com**

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

City/State Collected: SIBLEY, MO

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

Client Project #

Lab Project #

Collected by (print): JASON 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

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBI, ALKCA 125mlhdpe -NoPres	Ca,K, MgNa 250ml HDPE - HNO3	Anions (Cl SO4) 125 ml HDPE -N0Pres	Remarks	Sample # (lab only)
MW-804	GRAB	GW	–	11/3/18	1535	3	X	X	X		-01
MW-805	↓	GW	–	↓	1455	3	X	X	X		02
MW-806R	↓	GW	–	↓	1410	3	X	X	X		03

RAD SCREEN: <0.5 mR/hr

* 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 # 451016611507

Sample Receipt Checklist

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

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

Temp: 2.1 ICT-1 °C 2.0 Bottles Received: 9

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	11/8/18	1647	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Date: 11/4/18 Time: 845

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 16, 2018

SCS Engineers - KS

Sample Delivery Group:	L1042994
Samples Received:	11/09/2018
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

TABLE OF CONTENTS

ASD-1 L1042994-01 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 11:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/15/18 18:47	11/15/18 18:47	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 07:08	11/13/18 07:08	ELN
Wet Chemistry by Method 9056A	WG1194539	5	11/13/18 08:52	11/13/18 08:52	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:45	ST

ASD-2 L1042994-02 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 12:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/16/18 12:53	11/16/18 12:53	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 07:19	11/13/18 07:19	ELN
Wet Chemistry by Method 9056A	WG1194539	5	11/13/18 09:02	11/13/18 09:02	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:47	ST

ASD-3 L1042994-03 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 13:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 2320 B-2011	WG1196769	1	11/16/18 13:07	11/16/18 13:07	GB
Wet Chemistry by Method 9056A	WG1194539	1	11/13/18 07:29	11/13/18 07:29	ELN
Wet Chemistry by Method 9056A	WG1194539	5	11/13/18 09:13	11/13/18 09:13	ELN
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:50	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 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	ND		20000	1	11/15/2018 18:47	WG1196769
Alkalinity,Carbonate	104000		20000	1	11/15/2018 18:47	WG1196769

Sample Narrative:

L1042994-01 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	29300		1000	1	11/13/2018 07:08	WG1194539
Fluoride	1560		100	1	11/13/2018 07:08	WG1194539
Sulfate	303000		25000	5	11/13/2018 08:52	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	37100		1000	1	11/14/2018 13:45	WG1194483
Magnesium	ND		1000	1	11/14/2018 13:45	WG1194483
Potassium	38600		1000	1	11/14/2018 13:45	WG1194483
Sodium	178000		1000	1	11/14/2018 13:45	WG1194483

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	ND		20000	1	11/16/2018 12:53	WG1196769
Alkalinity,Carbonate	795000		20000	1	11/16/2018 12:53	WG1196769

Sample Narrative:

L1042994-02 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	43800		1000	1	11/13/2018 07:19	WG1194539
Fluoride	4420		100	1	11/13/2018 07:19	WG1194539
Sulfate	211000		25000	5	11/13/2018 09:02	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	124000		1000	1	11/14/2018 13:47	WG1194483
Magnesium	17000		1000	1	11/14/2018 13:47	WG1194483
Potassium	82400		1000	1	11/14/2018 13:47	WG1194483
Sodium	497000		1000	1	11/14/2018 13:47	WG1194483

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Alkalinity,Bicarbonate	ND		20000	1	11/16/2018 13:07	WG1196769
Alkalinity,Carbonate	592000		20000	1	11/16/2018 13:07	WG1196769

Sample Narrative:

L1042994-03 WG1196769: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Chloride	41500		1000	1	11/13/2018 07:29	WG1194539
Fluoride	8540		100	1	11/13/2018 07:29	WG1194539
Sulfate	336000		25000	5	11/13/2018 09:13	WG1194539

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Calcium	208000		1000	1	11/14/2018 13:50	WG1194483
Magnesium	43800		1000	1	11/14/2018 13:50	WG1194483
Potassium	42200		1000	1	11/14/2018 13:50	WG1194483
Sodium	365000		1000	1	11/14/2018 13:50	WG1194483

Method Blank (MB)

(MB) R3360673-1 11/15/18 16:00

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Alkalinity,Bicarbonate	U		2710	20000
Alkalinity,Carbonate	U		2710	20000

Sample Narrative:

BLANK: Endpoint pH 4.5

Method Blank (MB)

(MB) R3359264-1 11/12/18 17:12

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

L1043056-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1043056-07 11/13/18 05:19 • (DUP) R3359264-6 11/13/18 05:30

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	16800	17900	1	6.23		15
Fluoride	ND	70.5	1	0.000		15
Sulfate	21200	21700	1	2.55		15

L1042988-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1042988-02 11/13/18 03:20 • (DUP) R3359264-3 11/13/18 03:31

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	9120	9540	1	4.50		15
Fluoride	137	196	1	16.9	P1	15
Sulfate	50100	50900	1	1.65		15

Laboratory Control Sample (LCS)

(LCS) R3359264-2 11/12/18 17:23

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40000	39200	97.9	80.0-120	
Fluoride	8000	7910	98.8	80.0-120	
Sulfate	40000	40000	100	80.0-120	

L1043056-07 Original Sample (OS) • Matrix Spike (MS)

(OS) L1043056-07 11/13/18 05:19 • (MS) R3359264-7 11/13/18 05:41

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50000	16800	65400	97.1	1	80.0-120	
Fluoride	5000	ND	4980	98.6	1	80.0-120	
Sulfate	50000	21200	70100	97.8	1	80.0-120	

L1042988-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1042988-02 11/13/18 03:20 • (MS) R3359264-4 11/13/18 03:41 • (MSD) R3359264-5 11/13/18 03:52

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	9120	58000	58900	97.8	99.5	1	80.0-120			1.45	15
Fluoride	5000	137	5140	5250	99.4	102	1	80.0-120			2.11	15
Sulfate	50000	50100	98100	98600	96.0	97.0	1	80.0-120			0.474	15

Method Blank (MB)

(MB) R3359958-1 11/14/18 12:59

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Calcium	U		46.3	1000
Magnesium	U		11.1	1000
Potassium	111	J	102	1000
Sodium	356	J	98.5	1000

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

(LCS) R3359958-2 11/14/18 13:01 • (LCSD) R3359958-3 11/14/18 13:03

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 %
Calcium	10000	10200	10200	102	102	80.0-120			0.00148	20
Magnesium	10000	10300	10300	103	103	80.0-120			0.366	20
Potassium	10000	9480	9510	94.8	95.1	80.0-120			0.377	20
Sodium	10000	9870	9830	98.7	98.3	80.0-120			0.417	20

L1043056-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1043056-10 11/14/18 13:06 • (MS) R3359958-5 11/14/18 13:11 • (MSD) R3359958-6 11/14/18 13:13

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 %
Calcium	10000	30800	40000	40100	92.1	92.7	1	75.0-125			0.169	20
Magnesium	10000	6480	16400	16600	99.5	102	1	75.0-125			1.30	20
Potassium	10000	ND	9650	9670	94.0	94.2	1	75.0-125			0.146	20
Sodium	10000	19200	30300	30500	111	113	1	75.0-125			0.629	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.

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

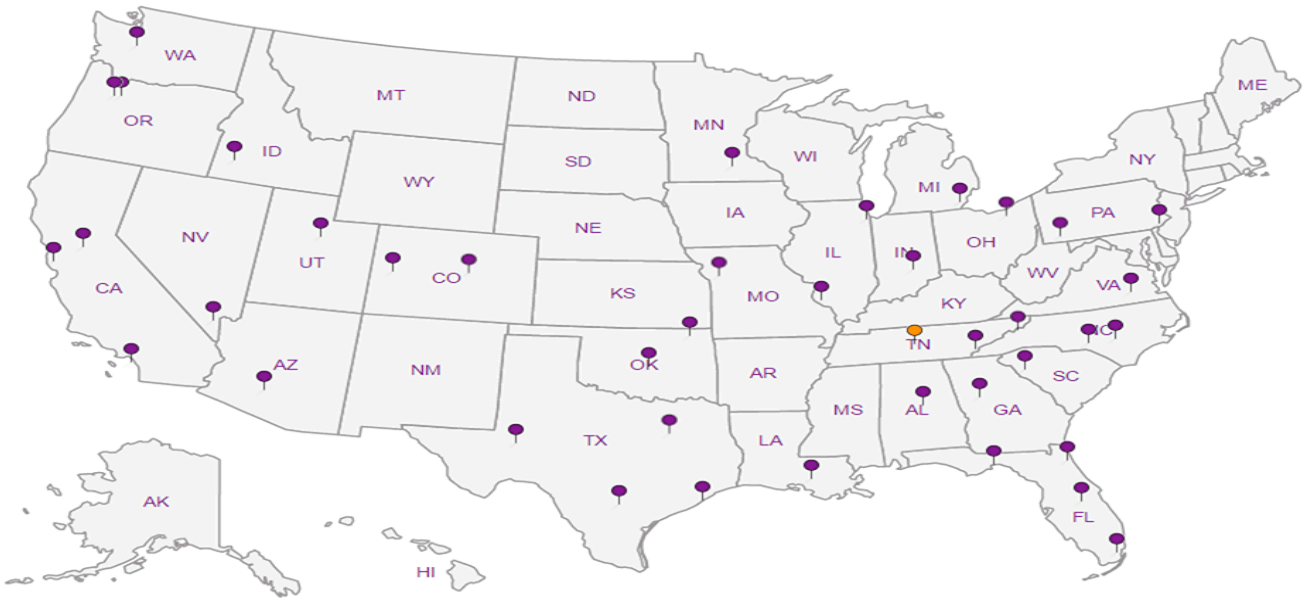
Third Party Federal Accreditations

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:

Report to: **Jason Franks**

Email To: **Jfranks@scsengineers.com**

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

City/State Collected: Sibley, MO

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

Client Project #

Lab Project #

Collected by (print): JASON 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

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBI, ALKCA 125mlhdpe -NoPres	Ca,K, MgNa 250ml HDPE - HNO3	Anions (Cl SO4) 125 ml HDPE -NOPres
ASD-1	GRAB	GW	—	11/8/18	1120	3	X	X	X
ASD-2	"	GW	—	"	1220	3	X	X	X
ASD-3	"	GW	—	"	1320	3	X	X	X

Chain of Custody Page 1 of 1

Pace Analytical* National Center For Testing & Innovation

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

L# L1042994

C187

Acctnum: AQUAOPKS

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks	Sample # (lab only)
	-01
	02
	03

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

Remarks: RAD SCREEN: <0.5 mR/hr

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier ____

Tracking # 451016617507

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)
	11/8/18	1647	
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: 2.1 °C Bottles Received: 9

Date: 11/9/18 Time: 845

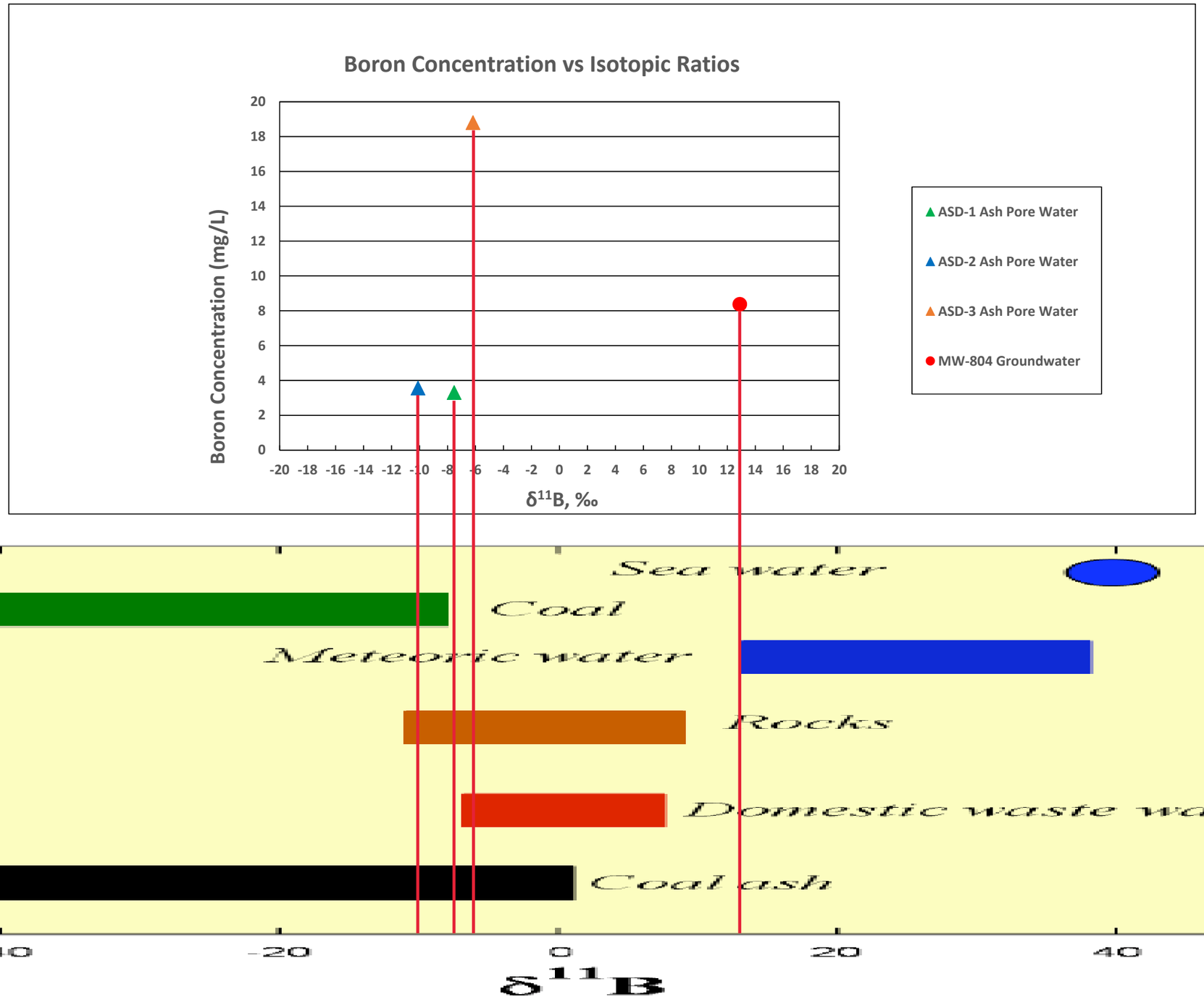
If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Appendix E

Boron and Stable Isotope Plots and Laboratory Results


Boron Concentration vs Isotopic Ratios
Boron Concentration (mg/L)
20
18
16
14
12
10
8
6
4
2
0
-20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20
δ11B, ‰
ASD-1 Ash Pore Water
ASD-2 Ash Pore Water
ASD-3 Ash Pore Water
MW-804 Groundwater
Sea water
Coal
Meteoric water
Rocks
Domestic waste water
Coal ash
-40
-20
0
20
40
δ11B

Report

L1836000

17HVXQ17MHY

Date received **2018-11-22**
Issued **2018-12-07**

SCS Engineers
Jason R. Franks

8575 West 110 Street Suit 100
Overland Park, Kansas 66210
United States

Project **913-749-0716**

Analysis: IR

Your ID	**MW-804**
Sampler	**Jason R. Franks**
Sampled	**2018-11-08**
LabID	U11535495

Analysis	Results	Unit	Method	Issuer	Sign
Report in Excel *	**yes**		1	I	IR

ALS Scandinavia AB
Aurorum 10
977 75 Luleå
Sweden

Web: www.alsglobal.se
Email: info.lu@alsglobal.com
Tel: + 46 920 28 9900
Fax: + 46 920 28 9940

	Method specification
1	Analysed according to see separate report in excel.

	Approver
IR	Ilia Rodioushkine

	Issuer[1]
I	Man.Inm.

* indicates unaccredited analysis.

[1] The technical unit within ALS Scandinavia where the analysis was carried out, alternatively the subcontractor for the analysis.

REPORT OF ANALYSIS

Issued by:	ALS Scandinavia AB, Aurorum 10, S-977 75 Luleå, Sweden
Client:	SCS Engineers
Date of receipt:	2018-11-22
Date of analysis:	2018-12-03
Order number (our):	L1836000
Your reference:	Jason R. Franks
Our reference:	Ilia Rodushkin

Sample ID	Lab ID	$\delta^{11}B$, ‰	2 SD
MW-804	**U11535495**	**12.89**	*0.74*
MW-804, r.2	**U11535495**	**13.26**	*0.82*

Comments

The analysis is carried out by MC-ICP-MS (MEPTUNE PLUS, ThermoScientific) and MC-ICP-MS (NEPTUNE PLUS) using internal standartization and external calibration with bracketing isotope SRMs

Analysis is carried out after ion exchange separation

Delta 11B values calculated to NIST SRM 951

SD calculated from two independent consequintive measurements

Signature

Ilia Rodushkin
Associate Professor
LABORATORY MANAGER
ALS Scandinavia AB

Report

L1833729

17HW78DG7V0

Date received **2018-11-22**
Issued **2018-12-07**

SCS Engineers
Jason R. Franks

8575 West 110 Street Suit 100
Overland Park, Kansas 66210
United States

Project **913-749-0716**

This report replaces any previous report with the same number.

Analysis: IR

Your ID	**ASD-1**
Sampler	**Jason R. Franks**
Sampled	**2018-11-08**
LabID	U11535491

Analysis	Results	Unit	Method	Issuer	Sign
Report in Excel *	**yes**		1	I	IR

Your ID	**ASD-2**
Sampler	**Jason R. Franks**
Sampled	**2018-11-08**
LabID	U11535492

Analysis	Results	Unit	Method	Issuer	Sign
Report in Excel *	**yes**		1	I	IR

Your ID	**ASD-3**
Sampler	**Jason R. Franks**
Sampled	**2018-11-08**
LabID	U11535493

Analysis	Results	Unit	Method	Issuer	Sign
Report in Excel *	**yes**		1	I	IR

	Method specification
1	Analysed according to see separate report in excel.

	Approver
IR	Ilia Rodioushkine

	Issuer[1]
I	Man.Inm.

* indicates unaccredited analysis.

[1] The technical unit within ALS Scandinavia where the analysis was carried out, alternatively the subcontractor for the analysis.

REPORT OF ANALYSIS

Issued by:	ALS Scandinavia AB, Aurorum 10, S-977 75 Luleå, Sweden
Client:	SCS Engineers
Date of receipt:	2018-11-22
Date of analysis:	2018-12-03
Order number (our):	L1833729
Your reference:	Jason R. Franks
Our reference:	Ilia Rodushkin

Sample ID	Lab ID	$\delta^{11}B$, ‰	2 SD
ASD-1	U11535491	-7.53	*0.89*
ASD-1, r.2	U11535491	-7.08	*0.77*
ASD-2	U11535492	-10.11	*0.90*
ASD-3	U11535493	-6.18	*0.81*

Comments

The analysis is carried out by MC-ICP-MS (MEPTUNE PLUS, ThermoScientific) and MC-ICP-MS (NEPTUNE PLUS) using internal standartization and external calibration with bracketing isotope SRMs

Analysis is carried out after ion exchange separation

Delta 11B values calculated to NIST SRM 951

SD calculated from two independent consequintive measurements

Signature Ilia Rodushkin

Ilia Rodushkin
Associate Professor
LABORATORY MANAGER
ALS Scandinavia AB

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 15, 2018

SCS Engineers - KS

Sample Delivery Group:	L1042982
Samples Received:	11/09/2018
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

TABLE OF CONTENTS

MW-804 L1042982-01 GW

Collected by	Collected date/time	Received date/time
Jason Franks	11/08/18 15:35	11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:32	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

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	8370		200	1	11/14/2018 13:32	WG1194483

Method Blank (MB)

(MB) R3359958-1 11/14/18 12:59

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) R3359958-2 11/14/18 13:01 • (LCSD) R3359958-3 11/14/18 13:03

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	1030	1040	103	104	80.0-120			0.658	20

L1043056-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1043056-10 11/14/18 13:06 • (MS) R3359958-5 11/14/18 13:11 • (MSD) R3359958-6 11/14/18 13:13

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	221	1240	1250	102	103	1	75.0-125			0.753	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

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

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

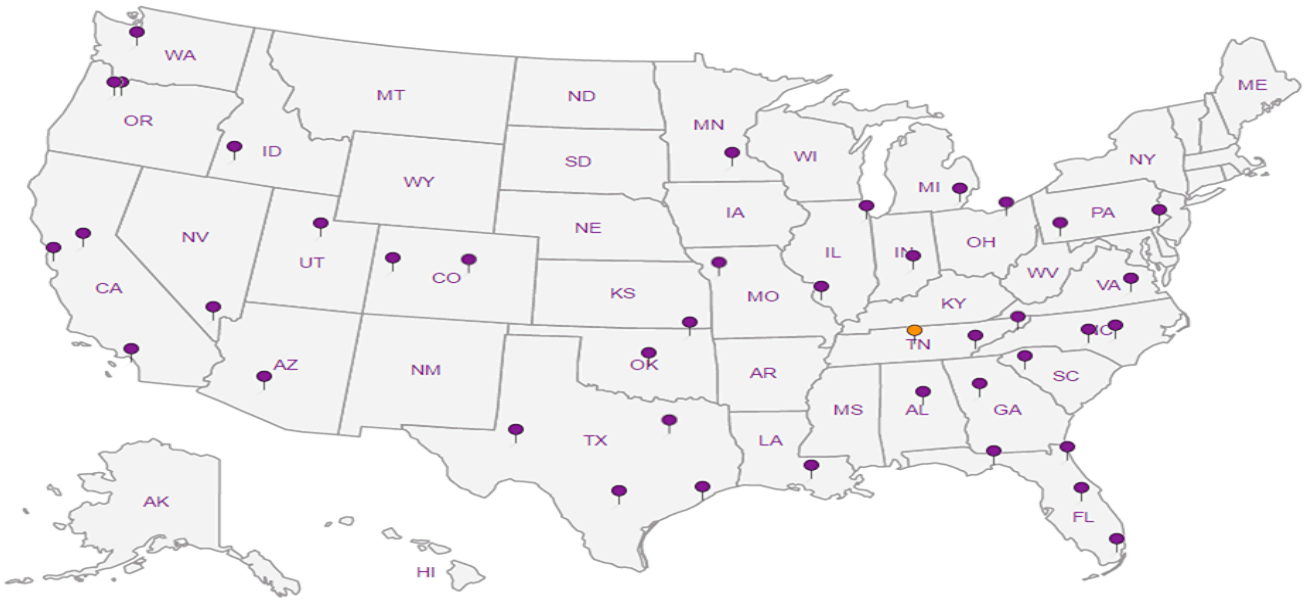
Third Party Federal Accreditations

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:

Report to: **Jason Franks**

Email To: **Jfranks@scsengineers.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 #

Collected by (print): JASON 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

Analysis / Container / Preservative

Pres Chk

Boron 250ml HDPE - HNO3

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Boron 250ml HDPE - HNO3	Remarks	Sample # (lab only)
MW-804	GRAB	GW	-	11/8/18	1535	1	X		-01

Chain of Custody Page 1 of 1

Pace Analytical®
National Center for Testing & Innovation

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

L# L1042982

C184

Acctnum: **AQUAOPKS**

Template:

Prelogin:

TSR:

PB:

Shipped Via:

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

Remarks:

RAD SCREEN: <0.5 mR/hr

pH ___ Temp ___

Flow ___ Other ___

Samples returned via:
__ UPS ✓ FedEx __ Courier ___

Tracking # 4510 1661 7507

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	11/8/18	1647	
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: 2.1 °C Bottles Received: 1 BR

Date: 11/9/18 Time: 845

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

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 15, 2018

SCS Engineers - KS

Sample Delivery Group:	L1042995
Samples Received:	11/09/2018
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

TABLE OF CONTENTS

ASD-1 L1042995-01 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 11:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 13:53	ST
Metals (ICP) by Method 6010B	WG1194495	1	11/10/18 10:52	11/10/18 15:56	WBD

ASD-2 L1042995-02 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 12:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 14:00	ST
Metals (ICP) by Method 6010B	WG1194495	1	11/10/18 10:52	11/10/18 15:59	WBD

ASD-3 L1042995-03 GW

Collected by: Jason Franks
Collected date/time: 11/08/18 13:20
Received date/time: 11/09/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010B	WG1194483	1	11/13/18 13:25	11/14/18 14:03	ST
Metals (ICP) by Method 6010B	WG1194495	1	11/10/18 10:52	11/10/18 16:02	WBD

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

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	3330		200	1	11/14/2018 13:53	WG1194483
Boron,Dissolved	3160		200	1	11/10/2018 15:56	WG1194495

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	3560		200	1	11/14/2018 14:00	WG1194483
Boron,Dissolved	2750		200	1	11/10/2018 15:59	WG1194495

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Boron	18800		200	1	11/14/2018 14:03	WG1194483
Boron,Dissolved	17600		200	1	11/10/2018 16:02	WG1194495

Method Blank (MB)

(MB) R3359958-1 11/14/18 12:59

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) R3359958-2 11/14/18 13:01 • (LCSD) R3359958-3 11/14/18 13:03

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	1030	1040	103	104	80.0-120			0.658	20

L1043056-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1043056-10 11/14/18 13:06 • (MS) R3359958-5 11/14/18 13:11 • (MSD) R3359958-6 11/14/18 13:13

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	221	1240	1250	102	103	1	75.0-125			0.753	20

Method Blank (MB)

(MB) R3358770-1 11/10/18 14:50

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

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

(LCS) R3358770-2 11/10/18 14:53 • (LCSD) R3358770-3 11/10/18 14:55

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	%	%	%			%	%
Boron,Dissolved	1000	1000	989	100	98.9	80.0-120			1.14	20

L1042719-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1042719-01 11/10/18 14:58 • (MS) R3358770-5 11/10/18 15:03 • (MSD) R3358770-6 11/10/18 15:06

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,Dissolved	1000	ND	1130	1180	95.7	101	1	75.0-125			4.35	20

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

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Qualifier	Description

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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

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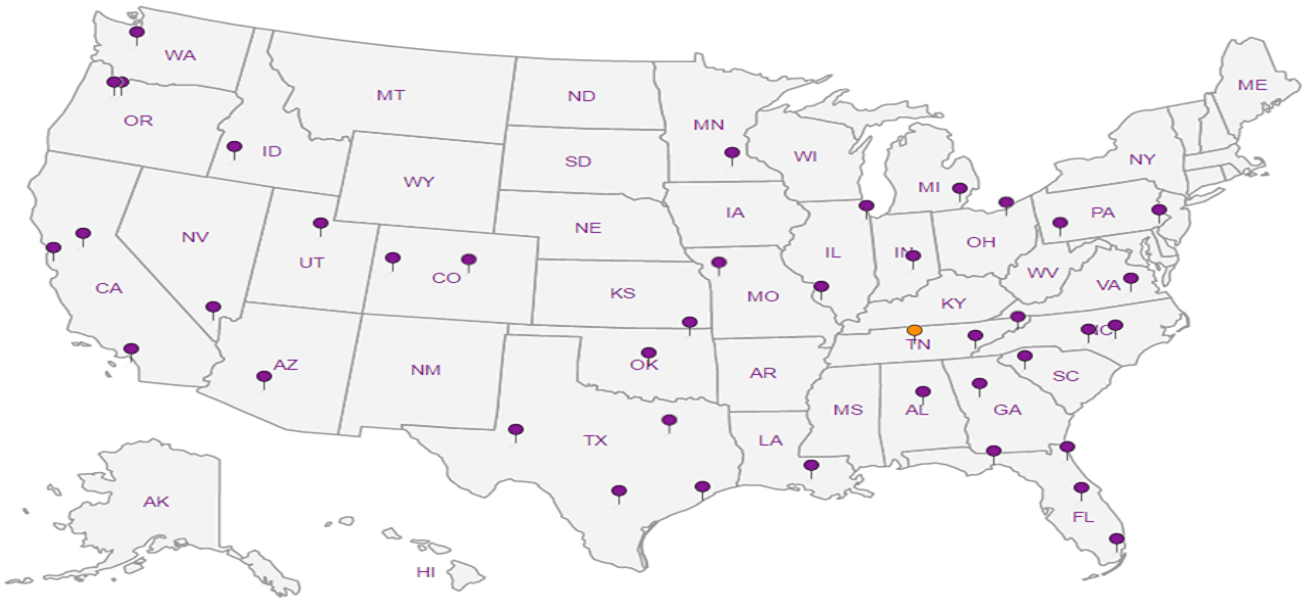

SCS Engineers - KS
8575W. 110th Street
Overland Park, KS 66210

Billing Information:

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

Pace Analytical®
National Center for Testing & Innovation

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

L# L1042995

C188

Report to: **Jason Franks**

Email To: **Jfranks@scsengineers.com**

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

City/State Collected: Sibley, MO

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

Client Project #

Lab Project #

Collected by (print): JASON 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

Acctnum: **AQUAOPKS**
Template:
Prelogin:
TSR:
PB:
Shipped Via:

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Boron 250ml HDPE - HNO3	Diss Boron 250ml HDPE - HNO3	Remarks	Sample # (lab only)
ASD-1	Grab	GW	-	11/8/18	1120	2	X	X		-01
ASD-2	↓	GW	-		1220	2	X	X		02
ASD-3	↓	GW	-	↓	1320	2	X	X		03

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

Remarks: RAD SCREEN: <0.5 mR/hr

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS ✓ FedEx __ Courier _____

Tracking # 4510 1661 7507

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)
	11/8/18	1647	
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: 2.1/1.2.0 °C Bottles Received: 6 BR

Date: 11/9/18 Time: 845

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

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

Piper Diagram

Analysis Run 1/23/2019 12:14 PM View: Pipers ASD

Sibley Client: SCS Engineers Data: Sibley

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
804 5/26/2016	27.8	5.99	167	39.8	15.5	2.5	596	10
804 8/23/2016	24.9	4.62	157	37	14.4	2.5	551	10
804 11/10/2016	26.2	4.71	155	39	14.2	2.5	525	10
804 11/8/2018	30.1	5.76	158	39.8	18.3	14.1	561	10
ASD-1* 11/8/2018	178	38.6	37.1	0.5	29.3	303	10	104
ASD-2* 11/8/2018	497	82.4	124	17	43.8	211	10	795
ASD-3* 11/8/2018	365	42.2	208	43.8	41.5	336	10	592