2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CCR LANDFILL
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

Presented To:
Evergy Missouri West, Inc. (f/k/a KCP&L Greater Missouri Operations Co.)

SCS ENGINEERS

27213169.19 | January 2020

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 2019 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

John R. Rockhold, R.G.

SCS Engineers

I, Douglas L. Doerr, being a qualified licensed Professional Engineer in the State of Missouri, do hereby certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station was prepared by me or under my direct supervision and fulfills the requirements of 40 CFR 257.90(e).

Douglas L. Doerr

Digitally signed by Douglas L. Doerr
Date: 2020.01.30 13:39:51 -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 2019 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 for Evergy Missouri West, Inc. (f/k/a KCP&L Greater Missouri Operations Company, Inc.) 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 2019 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Sibley Generating Station.

2 § 257.90(E) ANNUAL REPORT REQUIREMENTS

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

2.1 § 257.90(E)(1) SITE MAP

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

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

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

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

No new monitoring wells were installed and no wells were decommissioned as part of the CCR groundwater monitoring program for the CCR Landfill in 2019.

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 (2019). Samples collected in 2019 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 Fall 2018 semiannual detection monitoring event verification data taken in 2019; Spring 2019 semiannual detection monitoring data; and the initial Fall 2019 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 2019. Only detection monitoring was conducted in 2019.

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 Fall 2018 verification sampling and analyses per the certified statistical method,

b. completion of the statistical evaluation of the Fall 2018 semiannual detection monitoring sampling and analysis event per the certified statistical method,

c. completion of the 2018 Annual Groundwater Monitoring and Corrective Action Report,

d. completion of a successful alternative source demonstration for the Fall 2018 semiannual detection monitoring sampling and analysis event,

e. completion of the Spring 2019 semiannual detection monitoring sampling and analysis event, and subsequent verification sampling per the certified statistical method,

f. completion of the statistical evaluation of the Spring 2019 semiannual detection monitoring sampling and analysis event per the certified statistical method,

g. completion of a successful alternative source demonstration for the Spring 2019 semiannual detection monitoring sampling and analysis event, and

h. initiation of the Fall 2019 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 (2020).

Completion of verification sampling and data analysis, and the statistical evaluation of Fall 2019 detection monitoring sampling and analysis event. Semiannual Spring and Fall 2020 groundwater sampling and analysis. Completion of the statistical evaluation of the Spring 2020 detection monitoring sampling and analysis event, 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 demonstration reports are included in **Appendix C**:

C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (June 2019).

C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (December 2019).

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 Evergy Missouri West, Inc., for specific application to the Sibley Generating Station CCR Landfill. No warranties, express or implied, are intended or made.

APPENDIX A

FIGURES

Figure 1: Site Map

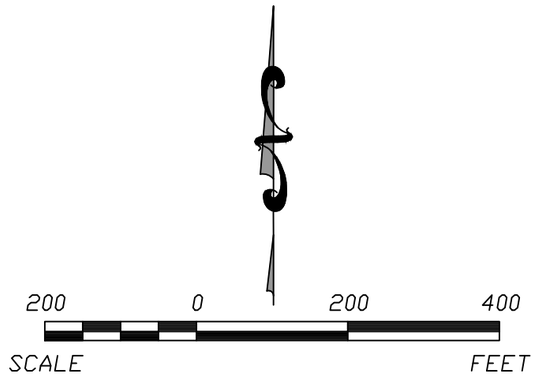
LEGEND:

506 CCR GROUNDWATER MONITORING SYSTEM WELLS

CCR LANDFILL UNIT BOUNDARY

NOTES:

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



REV.	DATE
-	-

SHEET TITLE
SITE MAP
CCR LANDFILL
CCR GROUNDWATER MONITORING SYSTEM

PROJECT TITLE
2019 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CLIENT
EVERGY MISSOURI WEST, INC
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

SCS ENGINEERS
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PROJ. NO.	DWN. BY:	CHK. BY:	Q/A RVW BY:	PROJ. MGR.
27213167.19	TGW	JRF	JRF	JRF
DSN. BY: TGW				

CADD FILE:
FIG 1 - SIBLEY LF V0.02.DWG

DATE:
1/07/20

FIGURE NO.
1

N:\KCPL\PROJECTS\GROUNDWATER\DWG\SIBLEY\ANNUAL CCR REPORTING\2017\FIG 1 - SIBLEY LF V0.02.DWG

APPENDIX B

TABLES

Table 1: Appendix III Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

Table 1
CCR Landfill
Appendix III Detection Monitoring Results
Evergy Sibley Generating Station

Well Number	Sample Date	Appendix III Constituents						
		Boron (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	pH (S.U.)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)
MW-504	1/11/2019	---	*39.3	---	*0.179	**7.15	*33.2	---
MW-504	3/12/2019	---	*35.4	---	---	**6.34	*35.1	---
MW-504	5/22/2019	<0.200	33.1	<1.00	0.176	6.70	36.3	197
MW-504	7/16/2019	---	---	---	---	**7.53	*36.3	---
MW-504	8/21/2019	---	---	---	---	**6.85	*35.6	---
MW-504	11/6/2019	<0.200	34.1	<1.00	0.182	6.45	35.4	177
MW-505	1/11/2019	---	*29.5	---	---	**7.08	---	---
MW-505	3/12/2019	---	*24.9	---	---	**6.78	---	---
MW-505	5/22/2019	<0.200	26.4	<1.00	0.151	6.85	22.7	180
MW-505	11/6/2019	<0.200	28.2	<1.00	0.198	6.75	17.1	146
MW-506	1/11/2019	---	---	*6.39	---	**7.40	---	---
MW-506	5/22/2019	<0.200	91.7	7.05	0.336	7.16	74.2	453
MW-506	7/16/2019	---	---	*7.33	---	**7.43	---	---
MW-506	8/21/2019	---	---	*7.17	---	**7.11	---	---
MW-506	11/6/2019	<0.200	93.7	6.66	0.309	7.20	76.8	410
MW-510	5/22/2019	<0.200	117	3.39	0.326	7.01	13.8	480
MW-510	11/6/2019	<0.200	120	3.08	0.298	6.97	14.6	427
MW-512	1/11/2019	---	*110	*3.85	---	**7.34	*43.3	---
MW-512	3/12/2019	---	*108	*4.38	---	**7.23	*44.2	---
MW-512	5/22/2019	<0.200	104	4.17	0.315	7.25	40.1	445
MW-512	7/16/2019	---	---	*4.35	---	**7.70	*42.1	---
MW-512	8/21/2019	---	---	*4.91	---	**7.01	*41.0	---
MW-512	11/6/2019	<0.200	105	4.48	0.286	7.02	45.0	403
MW-601	5/22/2019	<0.200	97.4	3.19	0.264	6.97	8.74	404
MW-601	11/6/2019	<0.200	101	3.09	0.248	6.65	11.4	361

* 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
pCi/L - picocuries per liter
S.U. - Standard Units
--- Not Sampled

Table 2
CCR Landfill
Detection Monitoring Field Measurements
Evergy Sibley Generating Station

Well Number	Sample Date	pH (S.U.)	Specific Conductivity (µS)	Temperature (°C)	Turbidity (NTU)	ORP (mV)	DO (mg/L)	Water Level (ft btoc)	Groundwater Elevation (ft NGVD)
MW-504	1/11/2019	**7.15	317	12.54	2.2	177	4.79	22.58	793.74
MW-504	3/12/2019	**6.34	440	13.12	0.4	213	4.89	21.38	794.94
MW-504	5/22/2019	6.70	789	15.93	0.0	225	5.21	9.87	806.45
MW-504	7/16/2019	**7.53	351	17.54	0.0	109	4.16	21.57	794.75
MW-504	8/21/2019	**6.85	297	16.20	0.0	214	3.36	21.54	794.78
MW-504	11/6/2019	6.45	436	15.41	0.0	204	3.32	21.78	794.54
MW-505	1/11/2019	**7.08	253	12.36	0.1	186	7.01	27.13	787.84
MW-505	3/12/2019	**6.78	338	12.80	0.0	219	6.08	25.95	789.02
MW-505	5/22/2019	6.85	254	15.68	0.0	256	9.00	12.41	802.56
MW-505	11/6/2019	6.75	359	15.80	0.0	226	7.23	27.52	787.45
MW-506	1/11/2019	**7.40	755	10.35	0.2	185	5.57	BTP	NA
MW-506	5/22/2019	7.16	745	17.98	0.0	204	7.96	BTP	NA
MW-506	7/16/2019	**7.43	772	19.01	0.0	102	6.55	BTP	NA
MW-506	8/21/2019	**7.11	703	21.17	0.0	218	5.24	BTP	NA
MW-506	11/6/2019	7.20	950	20.28	0.0	220	7.24	BTP	NA
MW-510	5/22/2019	7.01	850	14.75	0.0	10	0.00	36.70	749.09
MW-510	11/6/2019	6.97	799	19.55	15.2	-23	0.63	40.45	745.34
MW-512	1/11/2019	**7.34	805	10.76	3.9	134	3.52	31.05	739.08
MW-512	3/12/2019	**7.23	804	12.65	0.0	103	2.66	26.78	743.35
MW-512	5/22/2019	7.25	746	18.65	0.0	167	4.85	17.31	752.82
MW-512	7/16/2019	**7.70	788	18.48	0.0	100	5.54	26.49	743.64
MW-512	8/21/2019	**7.01	718	20.02	0.0	230	2.48	28.80	741.33
MW-512	11/6/2019	7.02	756	18.31	0.5	80	3.61	29.31	740.82
MW-601	5/22/2019	6.97	701	18.49	0.0	12	4.01	42.83	738.07
MW-601	11/6/2019	6.65	936	16.68	0.0	100	0.00	46.08	734.82

* 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

S.U. - Standard Units

µS - microsiemens

°C - Degrees Celsius

ft btoc - Feet Below Top of Casing

ft NGVD - National Geodetic Vertical Datum (NAVD 88)

NTU - Nephelometric Turbidity Unit

BTP - Below Top of Pump

APPENDIX C

ALTERNATIVE SOURCE DEMONSTRATIONS

C.1 Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (June 2019)

C.2 Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (December 2019)

C.1 Groundwater Monitoring Alternative Source Demonstration Report November 2018 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (June 2019)

CCR GROUNDWATER MONITORING

ALTERNATIVE SOURCE DEMONSTRATION REPORT

NOVEMBER 2018 GROUNDWATER MONITORING EVENT

CCR LANDFILL

SIBLEY GENERATING STATION

SIBLEY, MISSOURI

Presented To:

KCP&L Greater Missouri Operations Company

Presented By:

SCS ENGINEERS

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

June 2019

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 CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

John R. Rockhold, R.G.

SCS Engineers

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

Douglas L. Doerr, P.E.

SCS Engineers

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Appendices

1 REGULATORY FRAMEWORK

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

2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at the Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Detection monitoring groundwater samples were collected on November 15, 2018. Review and validation of the results from the November 2018 Detection Monitoring Event was completed on January 2, 2019, 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 January 11, 2019 and March 12, 2019.

The completed statistical evaluation identified four Appendix III constituents above their respective prediction limit in monitoring wells MW-504 and MW-512.

The prediction limit for calcium in monitoring well MW-512 is 107 mg/L. The detection monitoring sample was reported at 110 mg/L. The first verification re-sample was collected on January 11, 2019 with a result of 110 mg/L. The second verification re-sample was collected on March 12, 2019 with a result of 108 mg/L.

The prediction limit for chloride in monitoring well MW-512 is 3.826 mg/L. The detection monitoring sample was reported at 3.89 mg/L. The first verification re-sample was collected on January 11, 2019 with a result of 3.85 mg/L. The second verification re-sample was collected on March 12, 2019 with a result of 4.38 mg/L.

The prediction limit for sulfate in upgradient monitoring well MW-504 is 24.58 mg/L. The detection monitoring sample was reported at 33.9 mg/L. The first verification re-sample was collected on January 11, 2019 with a result of 33.2 mg/L. The second verification re-sample was collected on March 12, 2019 with a result of 35.1 mg/L.

The prediction limit for sulfate in monitoring well MW-512 is 29.55 mg/L. The detection monitoring sample was reported at 51.4 mg/L. The first verification re-sample was collected on January 11, 2019 with a result of 43.3 mg/L. The second verification re-sample was collected on March 12, 2019 with a result of 44.2 mg/L.

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

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

3 ALTERNATIVE SOURCE DEMONSTRATION

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

3.1 UPGRADIENT WELL LOCATION

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

3.2 BOX AND WHISKERS PLOTS

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

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

Box and whiskers plots for calcium, chloride, and sulfate in monitoring wells MW-504 and MW-512 were compared to box and whisker plots for calcium, chloride, and sulfate in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes. Sulfate comparisons indicate the concentrations in both MW-504 and MW-512 are well within or below expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill. Chloride comparisons indicate the concentration in MW-512 is well within or below expected

concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill. The calcium comparison indicates the calcium concentration in MW-512 is a little above the expected concentration level for non-impacted groundwater wells such as PZ-03 but believed to still be in the range for natural variability within and between wells, especially given the location of MW-512 relative to the limestone gravel road and construction activities, including building additional limestone gravel roads (containing significant amounts of calcium) around MW-512. Refer to dated photographs below.

May 2016

June 2017

April 2018

Figure 1 in **Appendix A** shows these upgradient non-CCR monitoring system wells and their relationships to groundwater flow near and beneath the CCR Landfill. Because the non-CCR monitoring system wells are located in a nearby area that has not been impacted by the landfill, and exhibit variability that includes calcium, chloride, and sulfate concentrations similar to those seen at MW-504 and MW-512, the observed concentrations are within the range of expected natural spatial variation within and between wells. This demonstrates that a source other than the CCR Landfill caused the SSIs over background level, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots for calcium, chloride, and sulfate are provided in **Appendix B**.

3.3 PIPER DIAGRAM PLOTS

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

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

A piper diagram generated for MW-504, MW-512, and landfill leachate is provided in **Appendix C** and indicates the groundwater from these two wells does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in different hydrochemical facies indicating

there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.4 TIME SERIES PLOTS

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

Times series plots for calcium, chloride, and sulfate in monitoring wells MW-504 and MW-512 were compared to time series plots for calcium, chloride, and sulfate in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes.

Sulfate concentrations for MW-504 and MW-512 were plotted against sulfate concentrations in several upgradient and side-gradient non-CCR monitoring system wells. The sulfate concentrations in both upgradient well MW-504 and downgradient well MW-512 exhibit similar trends, are well within expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill and are even below side-gradient non-CCR monitoring system well MW-516.

Chloride comparisons indicate the concentration in MW-512 tracks similarly to that of side-gradient non-CCR monitoring well MW-516 and that there is unexplained or natural fluctuations in concentration levels for many of the wells in the vicinity of the CCR Landfill beginning in 2017. The calcium comparison indicates the calcium concentration in MW-512 is a little above the expected concentration level for non-impacted groundwater wells such as PZ-03 but believed to still be in the range for natural variability within and between wells, especially given the location of MW-512 relative to the limestone gravel road and construction activities including the construction of additional limestone gravel roads around MW-512 as discussed above. Time series plots for calcium, chloride, and sulfate 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 CCR Landfill caused the SSIs over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the CCR Landfill may continue with the detection monitoring program under § 257.94.

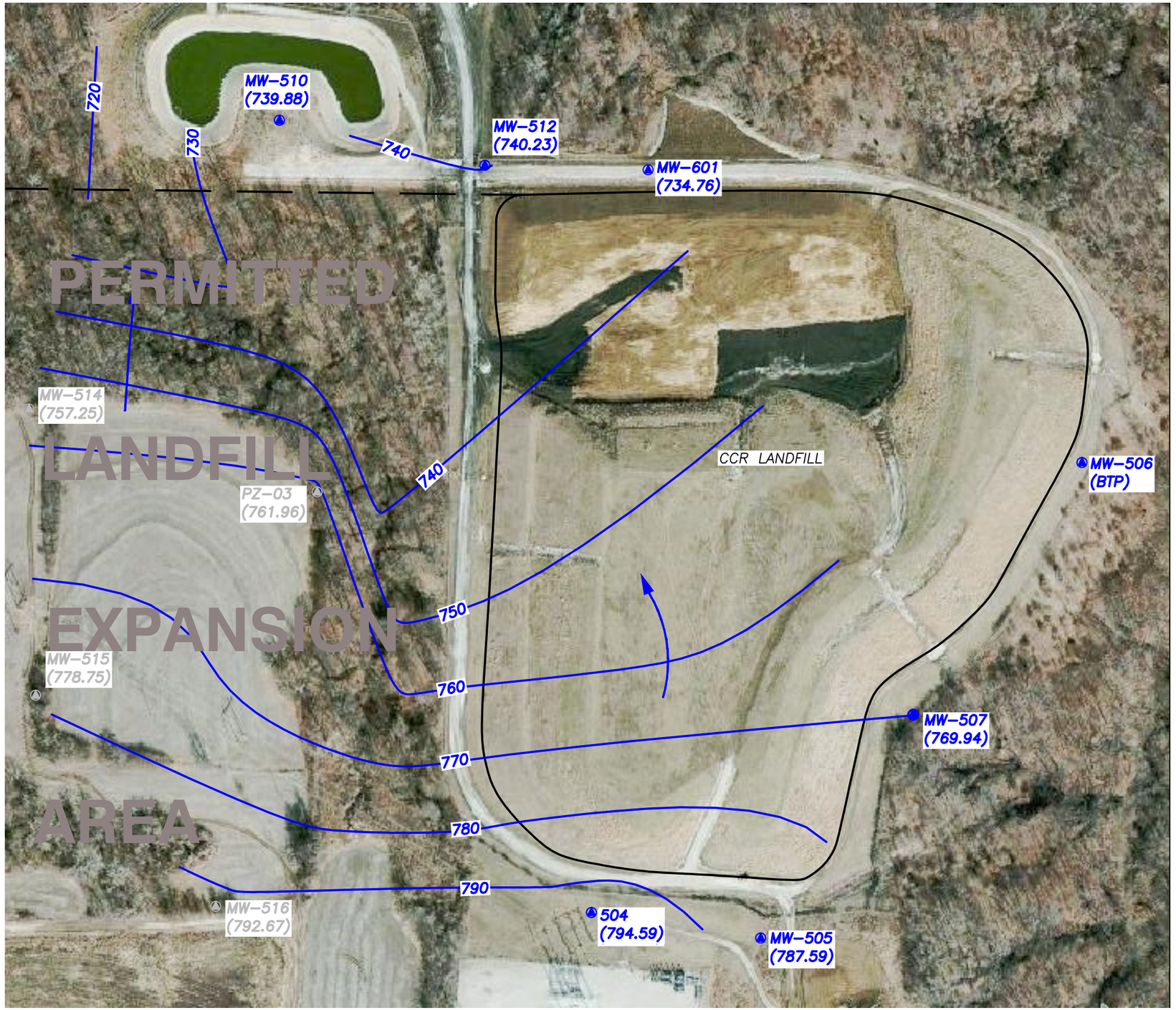
5 GENERAL COMMENTS

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

The signatures 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 their professional judgement in accordance with the standard of practice, it is their professional opinions 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 their 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)
- *601 (734.55)* — GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
- GROUNDWATER FLOW DIRECTION
- BTP — BELOW TOP OF PUMP
- PERMITTED LANDFILL EXPANSION AREA
- PERMITTED LANDFILL EXPANSION AREA
- *514 (756.11)* — NON–CCR GROUNDWATER MONITORING WELLS

NOTES:

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

200 0 200 400

SCALE FEET

REV.	DATE
-	-

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (NOV. 2018) CCR LANDFILL

PROJECT TITLE: CCR ALTERNATIVE SOURCE DEMONSTRATION

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

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

PROJ. NO. 27213169.18
DSN. BY: TGW
DWN. BY: TGW
CHK. BY: JRR
Q/A RVW BY: JRR
PROJ. MGR.: JRF

CADD FILE: 18–NOV_GW CCR ALTERNATIVE SOURCE DEMONSTRATION.DWG

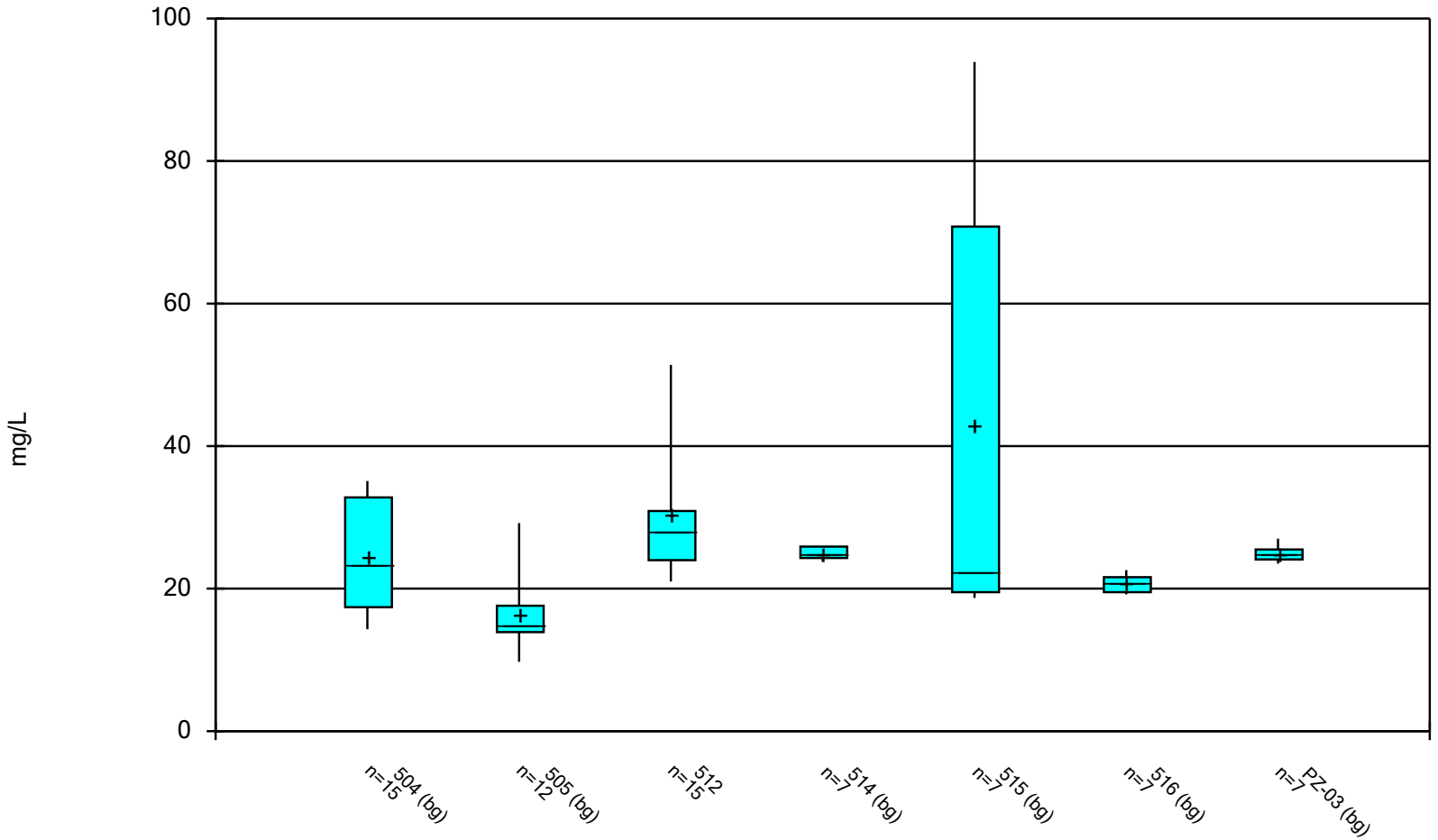
DATE:

FIGURE NO. 1

Appendix B

Box and Whiskers Plots

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 4/12/2019 11:29 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

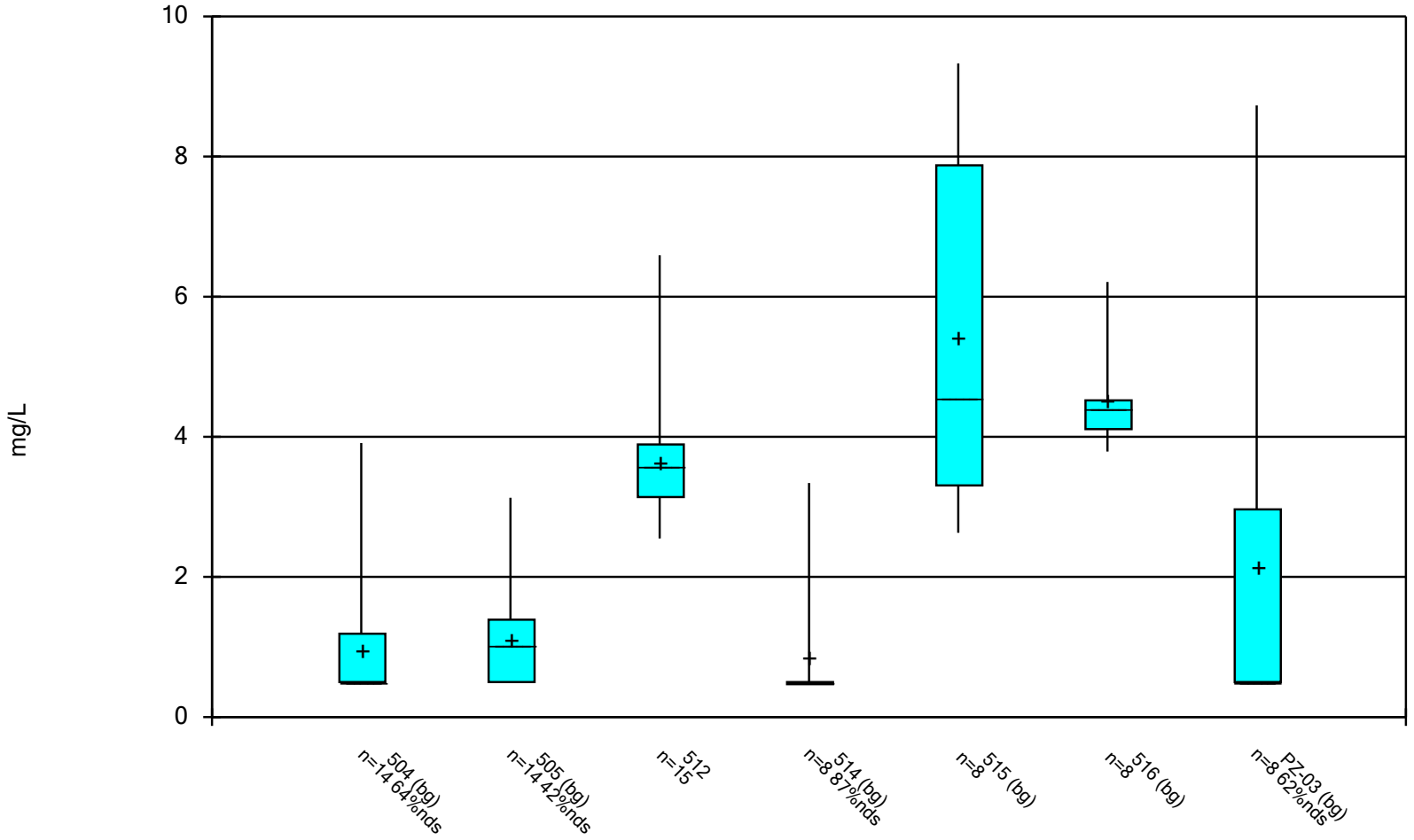
Box & Whiskers Plot

Constituent: Sulfate (mg/L) Analysis Run 4/12/2019 11:30 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			23	25.9	22.1	22.6	25.5
12/16/2015	14.3	29.2					
2/18/2016	14.7	16	21				
5/25/2016	18.9	21.9	23.1				
5/26/2016				24.9			23.5
6/2/2016					22.3	21.6	
8/23/2016	15.4	9.73	24.4				
11/11/2016	17.4	15.9	24	25.2	19.5	21.1	24.7
2/8/2017	21	14.9	27.8				
5/3/2017			27.3				
5/4/2017	21.8	19.2		24.6	18.7	19.5	24.1
8/1/2017	23.3	14.4	28.1				
10/3/2017	24.3	13.4	28.2	23.8	54	19.2	24.2
5/16/2018				25.9	93.9	20.9	27
5/17/2018	32.8	14	29.6				
6/27/2018	31.8		30.3				
8/8/2018	32.3		30.9				
11/14/2018				24.3	70.8	19.6	25.4
11/15/2018	33.9	14.6	51.4				
1/11/2019	33.2	13.8	43.3				
3/12/2019	35.1		44.2				
Median	23.3	14.75	28.1	24.9	22.3	20.9	24.7
LowerQ.	17.4	13.9	24	24.3	19.5	19.5	24.1
UpperQ.	32.8	17.6	30.9	25.9	70.8	21.6	25.5
Min	14.3	9.73	21	23.8	18.7	19.2	23.5
Max	35.1	29.2	51.4	25.9	93.9	22.6	27
Mean	24.68	16.42	30.44	24.94	43.04	20.64	24.91

Box & Whiskers Plot



Constituent: Chloride Analysis Run 4/12/2019 11:29 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

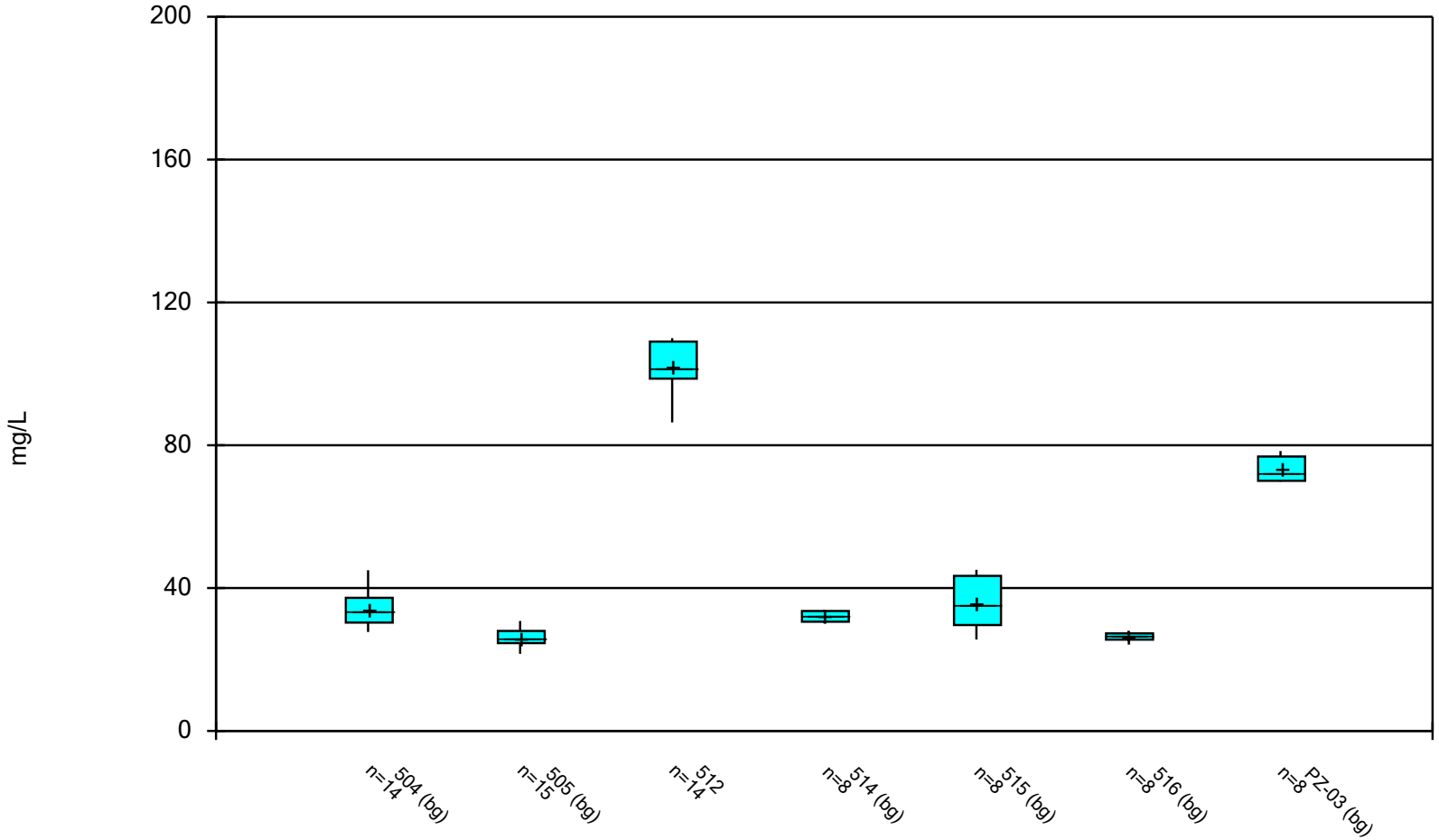
Box & Whiskers Plot

Constituent: Chloride (mg/L) Analysis Run 4/12/2019 11:30 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			2.72	<1	2.63	4.53	<1
12/16/2015	<1	<1					
2/18/2016	<1	1.05	2.78				
5/25/2016	<1	<1	2.55				
5/26/2016				<1			<1
6/2/2016					3.46	4.27	
8/23/2016	<1	1.19	3.23				
11/11/2016	<1	<1	3.17	<1	3.69	4.31	<1
2/8/2017	<1	<1	3.14				
5/3/2017			3.7				
5/4/2017	1.27	<1		<1	3.15	4.51	<1
8/1/2017	<1	1.18	3.53				
10/3/2017	3.91	3.13	6.59	3.34	8.75	6.21	8.73
11/16/2017	1.52	1.59	3.97	<1	9.33	4.45	1.3
12/28/2017	1	2.12	3.58				
5/16/2018				<1	7	3.95	4.63
5/17/2018	1.11	1.09	3.64				
11/14/2018				<1	5.43	3.79	<1
11/15/2018	<1	<1	3.89				
1/11/2019	<1	1	3.85				
3/12/2019			4.38				
Median	0.5	1.025	3.58	0.5	4.56	4.38	0.5
LowerQ.	0.5	0.5	3.14	0.5	3.305	4.11	0.5
UpperQ.	1.19	1.39	3.89	0.5	7.875	4.52	2.965
Min	0.5	0.5	2.55	0.5	2.63	3.79	0.5
Max	3.91	3.13	6.59	3.34	9.33	6.21	8.73
Mean	0.9507	1.096	3.648	0.855	5.43	4.503	2.145

Box & Whiskers Plot



Constituent: Calcium Analysis Run 4/12/2019 11:29 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Box & Whiskers Plot

Constituent: Calcium (mg/L) Analysis Run 4/12/2019 11:30 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			98.1	33.4	32	27.2	78.4
12/16/2015	31.5	28					
2/18/2016	34.3	25.4	100				
5/25/2016	30.2	24.6	98.9				
5/26/2016				33.9			77.6
6/2/2016					29.9	27.4	
8/23/2016	32.2	25.7	103				
11/11/2016	36.9	21.6	100	32.8	29.4	26.9	69.8
2/8/2017	29.6	23.5	86.4				
5/3/2017			98.4				
5/4/2017	27.7	23.2		30.2	25.6	25.1	70.3
8/1/2017	30.5	25.1	102				
10/3/2017	33.2	26.6	110	33.8	38.4	28	73.7
11/16/2017	37.6 (i)	26	101	30.5	44.9	25.1	71
5/16/2018				31.1	45.1	26.2	69.8
5/17/2018	33.3	28.2	104				
6/27/2018		25.8					
11/14/2018				30.7	41.9	26	76.1
11/15/2018	45	30.8	110				
1/11/2019	39.3	29.5	110				
3/12/2019	35.4	24.9	108				
Median	33.25	25.7	101.5	31.95	35.2	26.55	72.35
LowerQ.	30.35	24.6	98.65	30.6	29.65	25.55	70.05
UpperQ.	37.25	28	109	33.6	43.4	27.3	76.85
Min	27.7	21.6	86.4	30.2	25.6	25.1	69.8
Max	45	30.8	110	33.9	45.1	28	78.4
Mean	34.05	25.93	102.1	32.05	35.9	26.49	73.34

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 4/12/2019, 11:30 AM

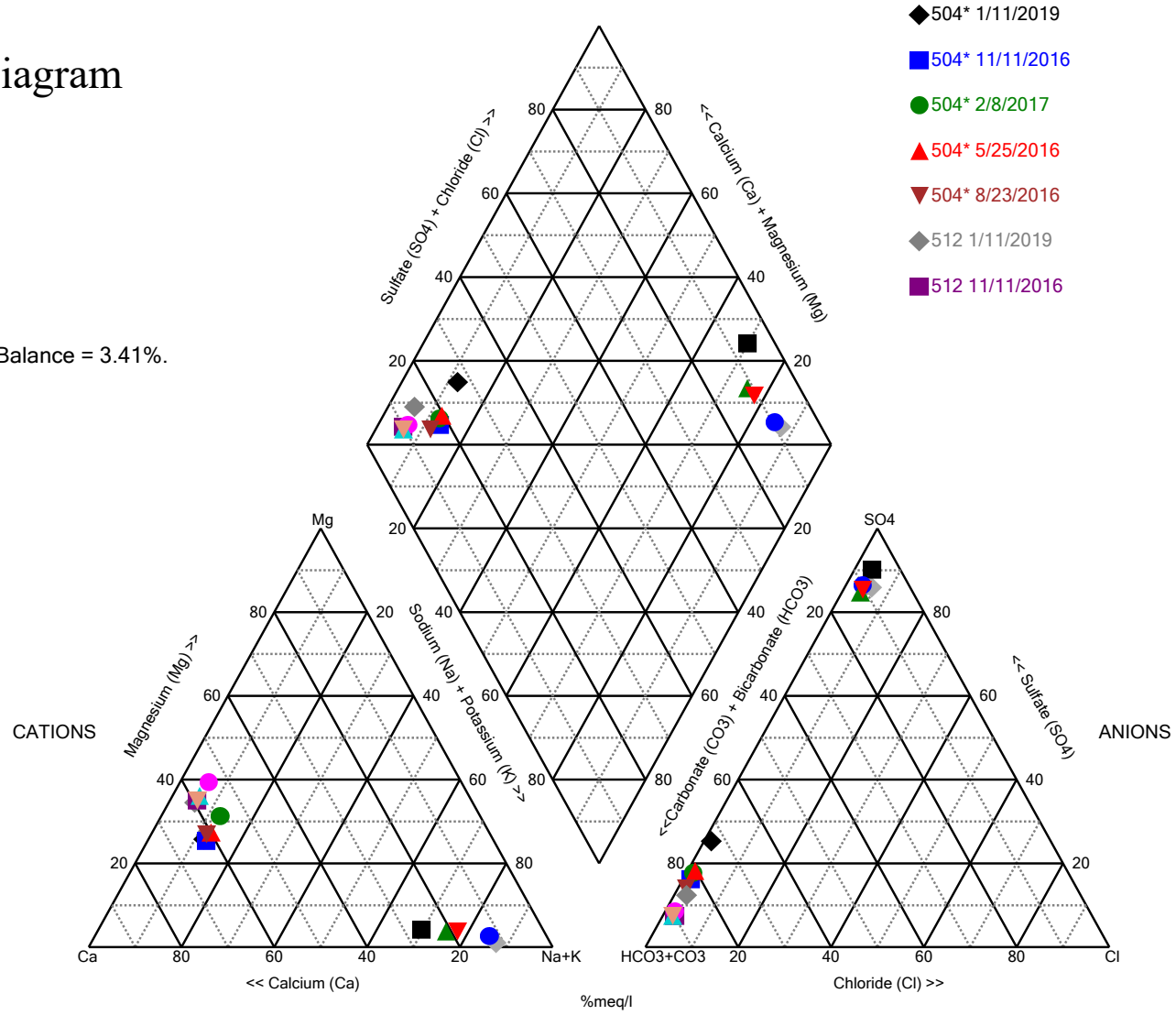
Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Calcium (mg/L)	504 (bg)	14	34.05	4.547	1.215	33.25	27.7	45	0
Calcium (mg/L)	505 (bg)	15	25.93	2.425	0.6261	25.7	21.6	30.8	0
Calcium (mg/L)	512	14	102.1	6.342	1.695	101.5	86.4	110	0
Calcium (mg/L)	514 (bg)	8	32.05	1.578	0.5577	31.95	30.2	33.9	0
Calcium (mg/L)	515 (bg)	8	35.9	7.629	2.697	35.2	25.6	45.1	0
Calcium (mg/L)	516 (bg)	8	26.49	1.067	0.3772	26.55	25.1	28	0
Calcium (mg/L)	PZ-03 (bg)	8	73.34	3.611	1.277	72.35	69.8	78.4	0
Chloride (mg/L)	504 (bg)	14	0.9507	0.9215	0.2463	0.5	0.5	3.91	64.29
Chloride (mg/L)	505 (bg)	14	1.096	0.764	0.2042	1.025	0.5	3.13	42.86
Chloride (mg/L)	512	15	3.648	0.9598	0.2478	3.58	2.55	6.59	0
Chloride (mg/L)	514 (bg)	8	0.855	1.004	0.355	0.5	0.5	3.34	87.5
Chloride (mg/L)	515 (bg)	8	5.43	2.636	0.932	4.56	2.63	9.33	0
Chloride (mg/L)	516 (bg)	8	4.503	0.739	0.2613	4.38	3.79	6.21	0
Chloride (mg/L)	PZ-03 (bg)	8	2.145	3.019	1.067	0.5	0.5	8.73	62.5
Sulfate (mg/L)	504 (bg)	15	24.68	7.767	2.005	23.3	14.3	35.1	0
Sulfate (mg/L)	505 (bg)	12	16.42	5.026	1.451	14.75	9.73	29.2	0
Sulfate (mg/L)	512	15	30.44	8.858	2.287	28.1	21	51.4	0
Sulfate (mg/L)	514 (bg)	7	24.94	0.7892	0.2983	24.9	23.8	25.9	0
Sulfate (mg/L)	515 (bg)	7	43.04	30.26	11.44	22.3	18.7	93.9	0
Sulfate (mg/L)	516 (bg)	7	20.64	1.258	0.4755	20.9	19.2	22.6	0
Sulfate (mg/L)	PZ-03 (bg)	7	24.91	1.165	0.4405	24.7	23.5	27	0

Appendix C

Piper Diagram

Piper Diagram

Cation-Anion Balance = 3.41%.



Analysis Run 4/2/2019 3:32 PM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Piper Diagram

Analysis Run 4/2/2019 3:32 PM View: LF III

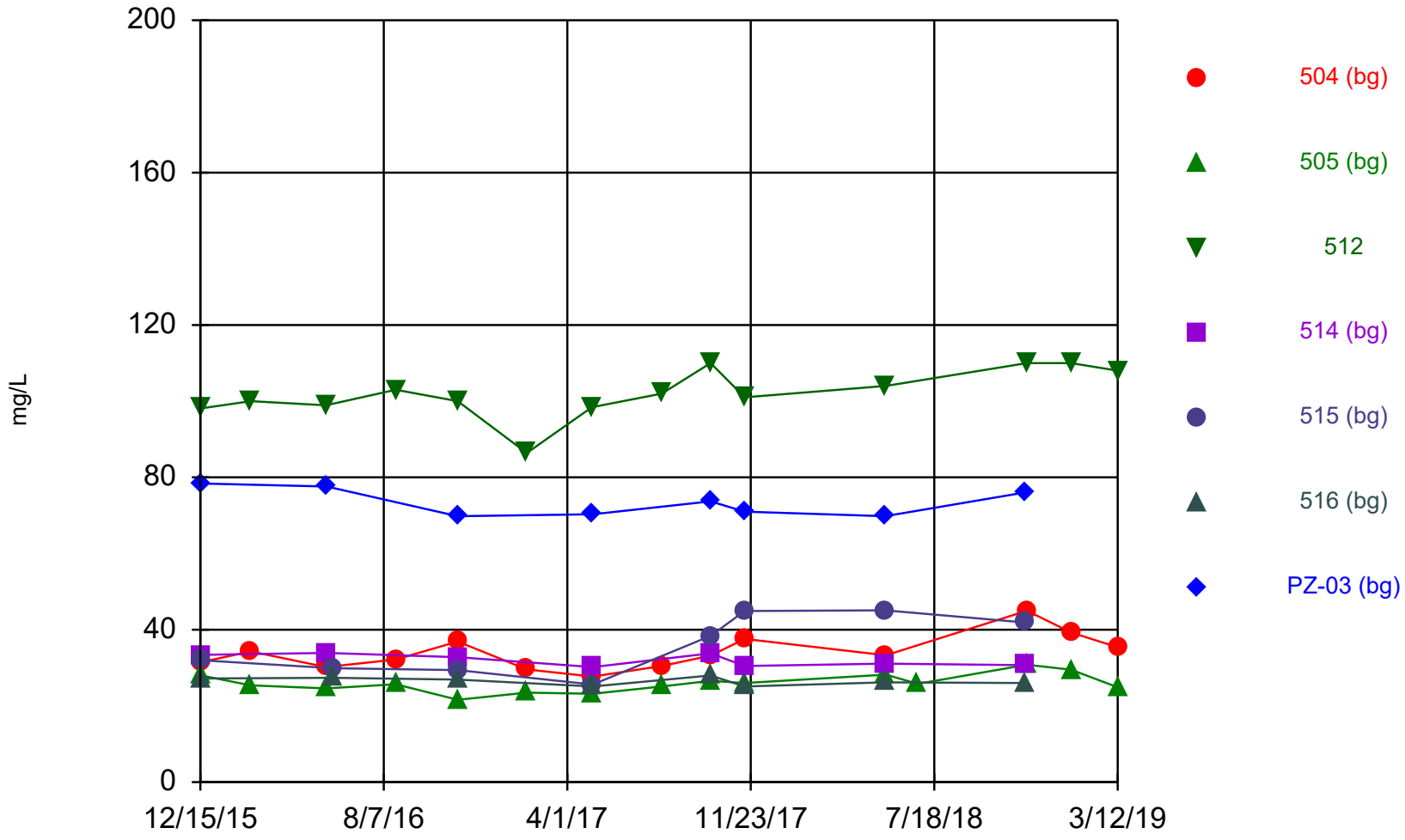
Sibley Client: SCS Engineers Data: Sibley

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
504* 5/25/2016	6.54	1.27	30.2	8.36	0.5	18.9	89	10
504* 8/23/2016	6.61	1.15	32.2	8.56	0.5	15.4	99.5	10
504* 11/11/2016	8.17	1.3	36.9	8.97	0.5	17.4	94.7	10
504* 2/8/2017	6.83	1.28	29.6	9.94	0.5	21	105	10
504* 1/11/2019	7.64	1.9	39.3	9.85	0.5	33.2	103	10
512 5/25/2016	10	2.24	98.9	36.8	2.55	23.1	356	10
512 8/23/2016	10.3	2.13	103	36.9	3.23	24.4	384	10
512 11/11/2016	9.96	2.16	100	35.6	3.17	24	352	10
512 2/8/2017	10	2.35	86.4	37.9	3.14	27.8	358	10
512 1/11/2019	10.6	2.25	110	37.8	3.85	43.3	366	10
LEACHATEPOND 5/25/2016	499	58.6	129	12.9	44.1	1440	10	119
LEACHATEPOND 8/23/2016	479	56.8	108	12.8	42.8	1320	10	104
LEACHATEPOND 11/10/2016	651	75.3	224	22.5	50.4	1820	30.5	68.3
LEACHATEPOND 2/9/2017	678	66.2	89.4	10.8	64.5	2200	38.9	146
LEACHATE 3/23/2018	741	70.3	88.5	4.66	79.1	1690	10	108

Appendix D

Time Series Plots

Time Series



Constituent: Calcium Analysis Run 4/12/2019 11:24 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Time Series

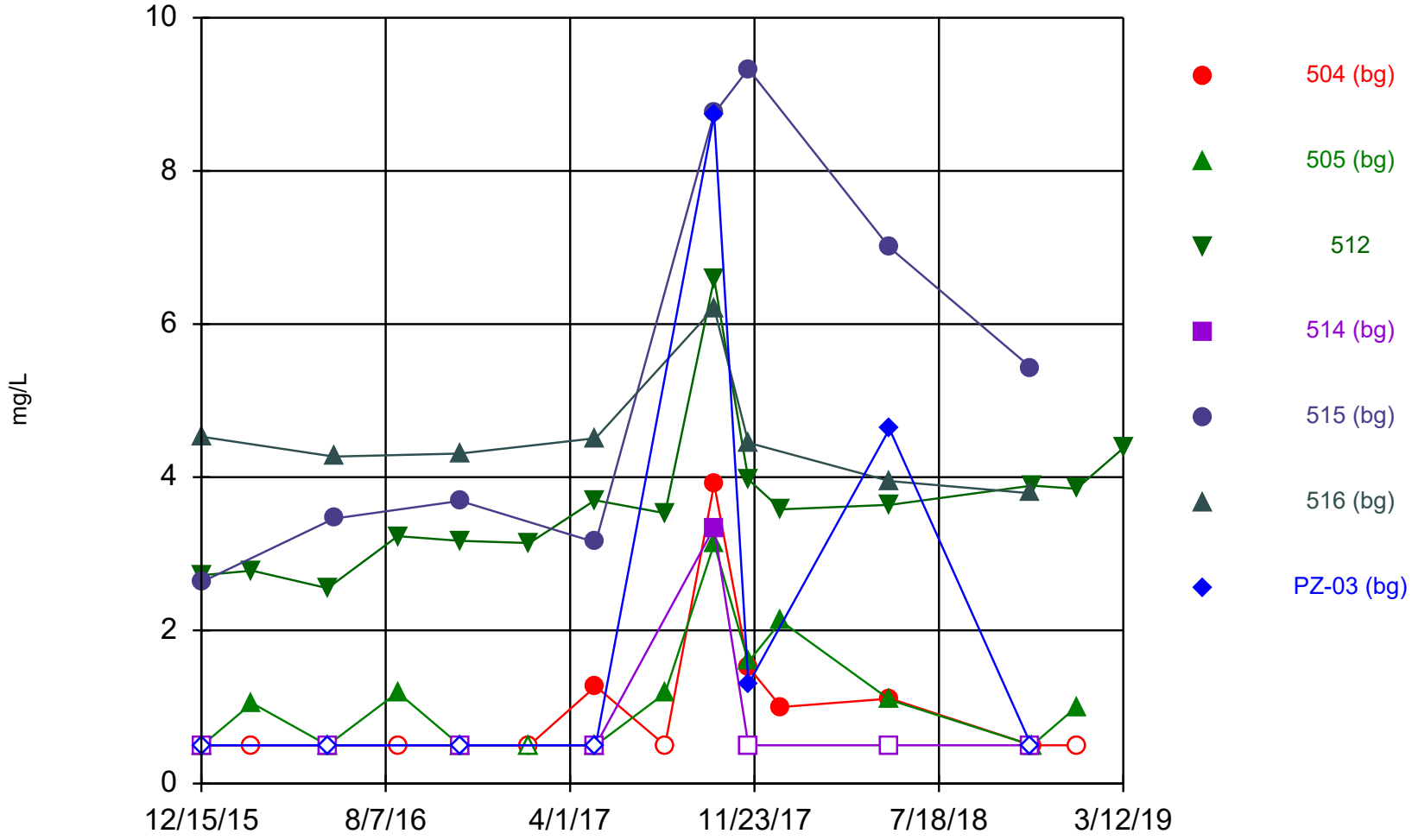
Constituent: Calcium (mg/L) Analysis Run 4/12/2019 11:25 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			98.1	33.4	32	27.2	78.4
12/16/2015	31.5	28					
2/18/2016	34.3	25.4	100				
5/25/2016	30.2	24.6	98.9				
5/26/2016				33.9			77.6
6/2/2016					29.9	27.4	
8/23/2016	32.2	25.7	103				
11/11/2016	36.9	21.6	100	32.8	29.4	26.9	69.8
2/8/2017	29.6	23.5	86.4				
5/3/2017			98.4				
5/4/2017	27.7	23.2		30.2	25.6	25.1	70.3
8/1/2017	30.5	25.1	102				
10/3/2017	33.2	26.6	110	33.8	38.4	28	73.7
11/16/2017	37.6 (i)	26	101	30.5	44.9	25.1	71
5/16/2018				31.1	45.1	26.2	69.8
5/17/2018	33.3	28.2	104				
6/27/2018		25.8					
11/14/2018				30.7	41.9	26	76.1
11/15/2018	45	30.8	110				
1/11/2019	39.3	29.5	110				
3/12/2019	35.4	24.9	108				

Hollow symbols indicate censored values.

Time Series



Constituent: Chloride Analysis Run 4/12/2019 11:24 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

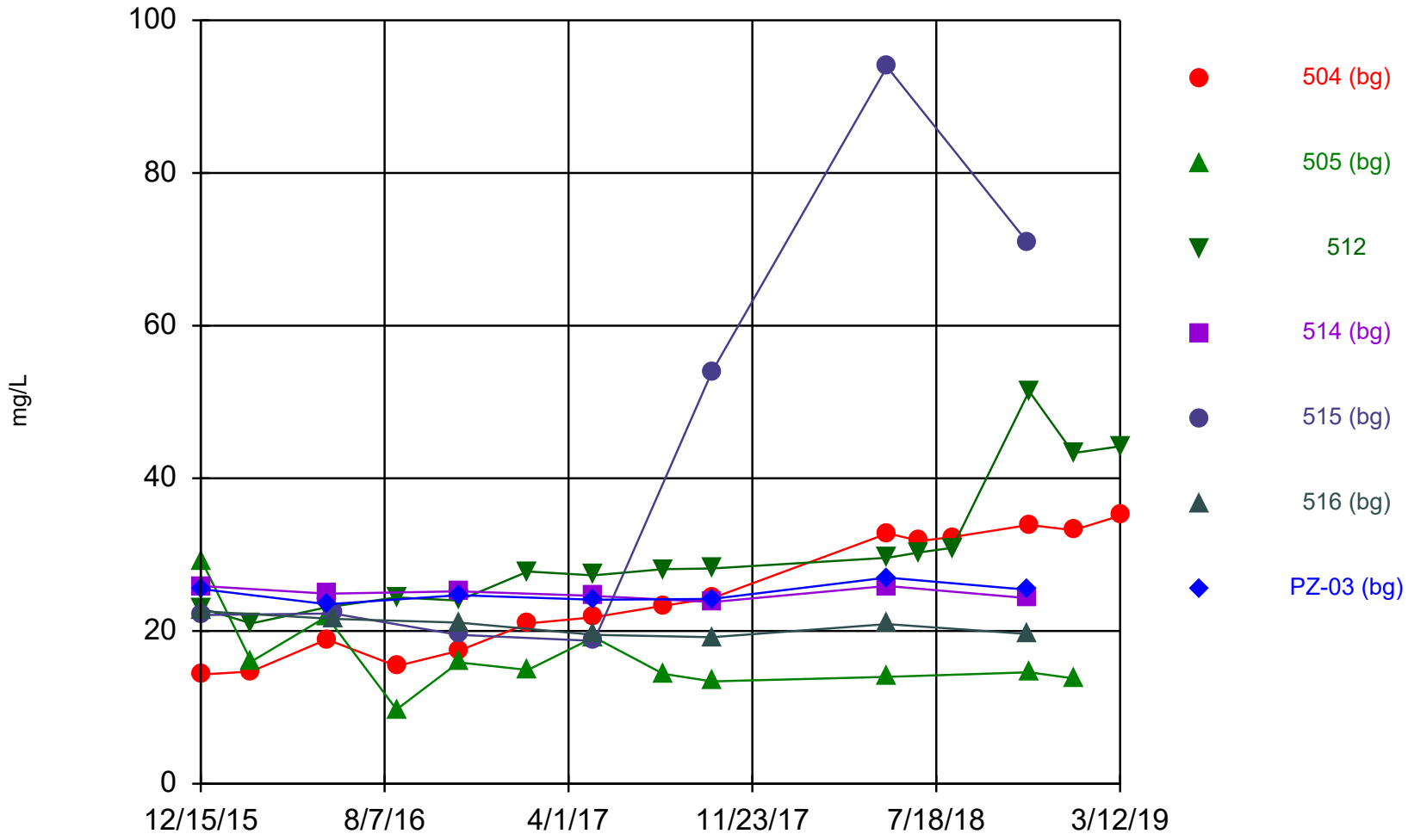
Time Series

Constituent: Chloride (mg/L) Analysis Run 4/12/2019 11:25 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			2.72	<1	2.63	4.53	<1
12/16/2015	<1	<1					
2/18/2016	<1	1.05	2.78				
5/25/2016	<1	<1	2.55				
5/26/2016				<1			<1
6/2/2016					3.46	4.27	
8/23/2016	<1	1.19	3.23				
11/11/2016	<1	<1	3.17	<1	3.69	4.31	<1
2/8/2017	<1	<1	3.14				
5/3/2017			3.7				
5/4/2017	1.27	<1		<1	3.15	4.51	<1
8/1/2017	<1	1.18	3.53				
10/3/2017	3.91	3.13	6.59	3.34	8.75	6.21	8.73
11/16/2017	1.52	1.59	3.97	<1	9.33	4.45	1.3
12/28/2017	1	2.12	3.58				
5/16/2018				<1	7	3.95	4.63
5/17/2018	1.11	1.09	3.64				
11/14/2018				<1	5.43	3.79	<1
11/15/2018	<1	<1	3.89				
1/11/2019	<1	1	3.85				
3/12/2019			4.38				

Time Series



Constituent: Sulfate Analysis Run 4/12/2019 11:24 AM View: LF III Sibley Client: SCS Engineers Data: Sibley

Time Series

Constituent: Sulfate (mg/L) Analysis Run 4/12/2019 11:25 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			23	25.9	22.1	22.6	25.5
12/16/2015	14.3	29.2					
2/18/2016	14.7	16	21				
5/25/2016	18.9	21.9	23.1				
5/26/2016				24.9			23.5
6/2/2016					22.3	21.6	
8/23/2016	15.4	9.73	24.4				
11/11/2016	17.4	15.9	24	25.2	19.5	21.1	24.7
2/8/2017	21	14.9	27.8				
5/3/2017			27.3				
5/4/2017	21.8	19.2		24.6	18.7	19.5	24.1
8/1/2017	23.3	14.4	28.1				
10/3/2017	24.3	13.4	28.2	23.8	54	19.2	24.2
5/16/2018				25.9	93.9	20.9	27
5/17/2018	32.8	14	29.6				
6/27/2018	31.8		30.3				
8/8/2018	32.3		30.9				
11/14/2018				24.3	70.8	19.6	25.4
11/15/2018	33.9	14.6	51.4				
1/11/2019	33.2	13.8	43.3				
3/12/2019	35.1		44.2				

C.2 Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, CCR Landfill, Sibley Generating Station (December 2019)

CCR GROUNDWATER MONITORING
ALTERNATIVE SOURCE DEMONSTRATION REPORT
MAY 2019 GROUNDWATER MONITORING EVENT

CCR LANDFILL
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

Presented To:

Evergy Missouri West, Inc.

Presented By:

SCS ENGINEERS

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

December 2019

File No. 27213169.18

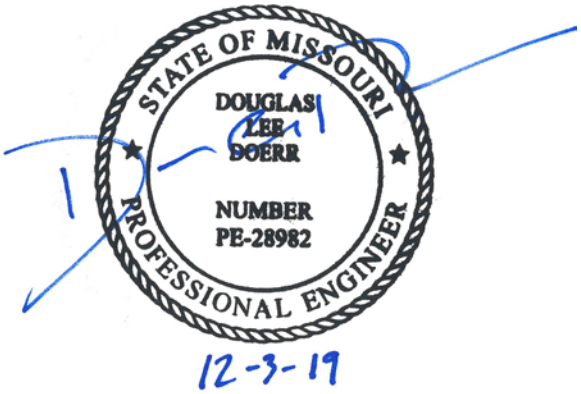
CERTIFICATIONS

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 CCR Landfill at the Sibley Generating Station. The Alternative Source Demonstration was prepared by me or under my direct supervision in accordance with generally accepted hydrogeological practices and the local standard of care.

John R. Rockhold, R.G.

SCS Engineers

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



Douglas L. Doerr, P.E.

SCS Engineers

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Appendices

1 REGULATORY FRAMEWORK

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

2 STATISTICAL RESULTS

Statistical analysis of monitoring data from the groundwater monitoring system for the CCR Landfill at the Sibley Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Detection monitoring groundwater samples were collected on May 22, 2019. Review and validation of the results from the May 2019 Detection Monitoring Event was completed on July 3, 2019, 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 July 16, 2019 and August 21, 2019.

The completed statistical evaluation identified two Appendix III constituents above their respective prediction limit in monitoring wells MW-504, MW-506, and MW-512.

Constituent/Monitoring Well	*UPL	Observation May 22, 2019	1st Verification July 16, 2019	2nd Verification August 21, 2019
Chloride				
506	6.573	7.05	7.33	7.17
512	3.826	4.17	4.35	4.91
Sulfate				
504	24.58	36.3	36.3	35.6
512	29.55	40.1	42.1	41.0

*UPL – Upper Prediction Limit

Determination: A statistical evaluation was completed for all Appendix III detection monitoring constituents in accordance with the certified statistical method. The statistical evaluation confirmed four SSIs above the background prediction limits. These include chloride in downgradient monitoring wells MW-506 and MW-512 and sulfate in upgradient monitoring well MW-504 and downgradient monitoring well MW-512.

3 ALTERNATIVE SOURCE DEMONSTRATION

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

3.1 UPGRADIENT WELL LOCATION

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

3.2 BOX AND WHISKERS PLOTS

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

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

Box and whiskers plots for chloride in monitoring wells MW-506 and MW-512 were compared to box and whisker plots for chloride in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes. Chloride comparisons indicate the concentrations in MW-506 and MW-512 are well within or below expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill.

Box and whiskers plots for sulfate in monitoring wells MW-504 and MW-512 were compared to box and whisker plots for sulfate in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes. Sulfate comparisons indicate the

concentrations in MW-504 and MW-512 are well within or below expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill.

Figure 1 in **Appendix A** shows these upgradient non-CCR monitoring system wells and their relationships to groundwater flow near and beneath the CCR Landfill. Because the non-CCR monitoring system wells are located in a nearby area that has not been impacted by the landfill, and exhibit variability that includes chloride and sulfate concentrations similar to those seen at MW-504, MW-506 and MW-512, the observed concentrations are within the range of expected natural spatial variation within and between wells. This demonstrates that a source other than the CCR Landfill caused the SSIs over background level, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots for chloride and sulfate are provided in **Appendix B**.

3.3 PIPER DIAGRAM PLOTS

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

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

A piper diagram generated for MW-504, MW-506, MW-512, and landfill leachate is provided in **Appendix C** and indicates the groundwater from these three wells does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for sulfate, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.4 TIME SERIES PLOTS

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

Times series plots for chloride in monitoring wells MW-506 and MW-512 and sulfate in monitoring wells MW-504 and MW-512 were compared to time series plots for chloride and sulfate in several upgradient and side-gradient non-CCR monitoring system wells installed for future state-permitted landfill expansion purposes.

Sulfate concentrations for MW-504 and MW-512 were plotted against sulfate concentrations in several upgradient and side-gradient non-CCR monitoring system wells. The sulfate concentrations in both upgradient well MW-504 and downgradient well MW-512 exhibit similar trends, are well within expected concentration levels for non-impacted groundwater in the vicinity of the CCR Landfill, and are even below side-gradient non-CCR monitoring system well MW-516.

Chloride concentrations for MW-506 and MW-512 were plotted against chloride concentrations in several upgradient and side-gradient non-CCR monitoring system wells. Chloride comparisons indicate the concentration in MW-506 and MW-512 are within the range of natural variation in the area and track similarly to that of side-gradient non-CCR monitoring well MW-516. There are natural fluctuations in concentration levels for many of the wells in the vicinity of the CCR Landfill beginning in 2017.

These time series plots demonstrate that a source other than the CCR Landfill caused the SSIs over background levels for chloride and sulfate or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots for calcium, chloride, and sulfate 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 CCR Landfill caused the SSIs over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the CCR Landfill may continue with the detection monitoring program under § 257.94.

5 GENERAL COMMENTS

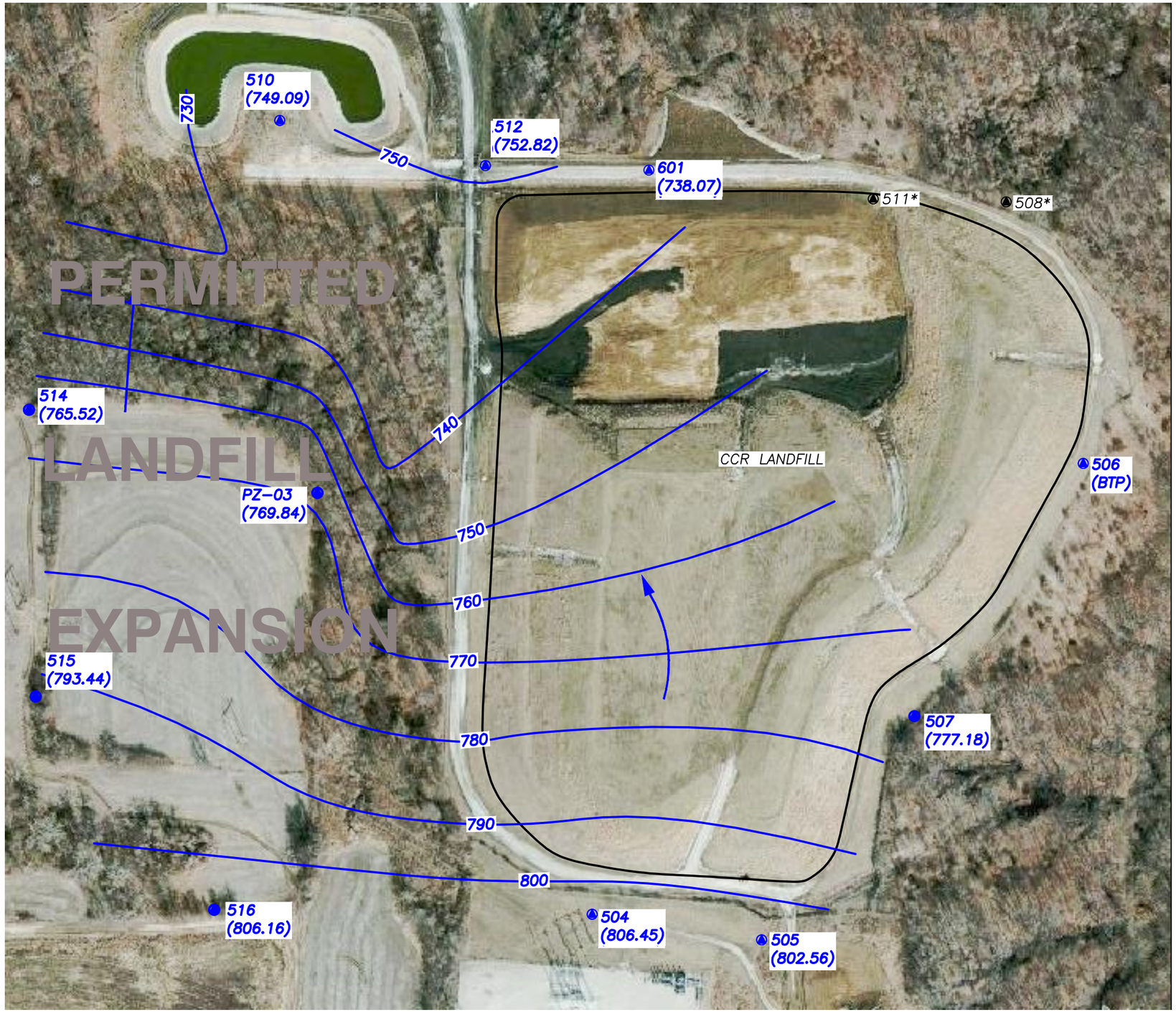
This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report.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

The signatures 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 their professional judgement in accordance with the standard of practice, it is their professional opinions 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 their 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)
- 601 (738.07) GROUNDWATER MONITORING SYSTEM WELLS (GROUNDWATER ELEVATION)
- CCR LANDFILL UNIT BOUNDARY
- GROUNDWATER FLOW DIRECTION
- * WELL(S) ABANDONED APRIL 2017 DUE TO INSUFFICIENT WATER
- BTP BELOW TOP OF PUMP

NOTES:

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

200 0 200 400
SCALE FEET

REV. | DATE
- | -

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (MAY 2019) CCR LANDFILL

PROJECT TITLE: ALTERNATIVE SOURCE DEMONSTRATION

CLIENT: EVERGY MISSOURI WEST, INC
SIBLEY GENERATING STATION
SIBLEY, MISSOURI

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

PROJ. NO. 27213167.19 | DSN. BY: TGW | DWN. BY: DAW | CHK. BY: JRR | Q/A RVW BY: JRR | PROJ. MGR.: JRF

CADD FILE: ALTERNATIVE SOURCE DEMONSTRATION.DWG

DATE: 11/01/19

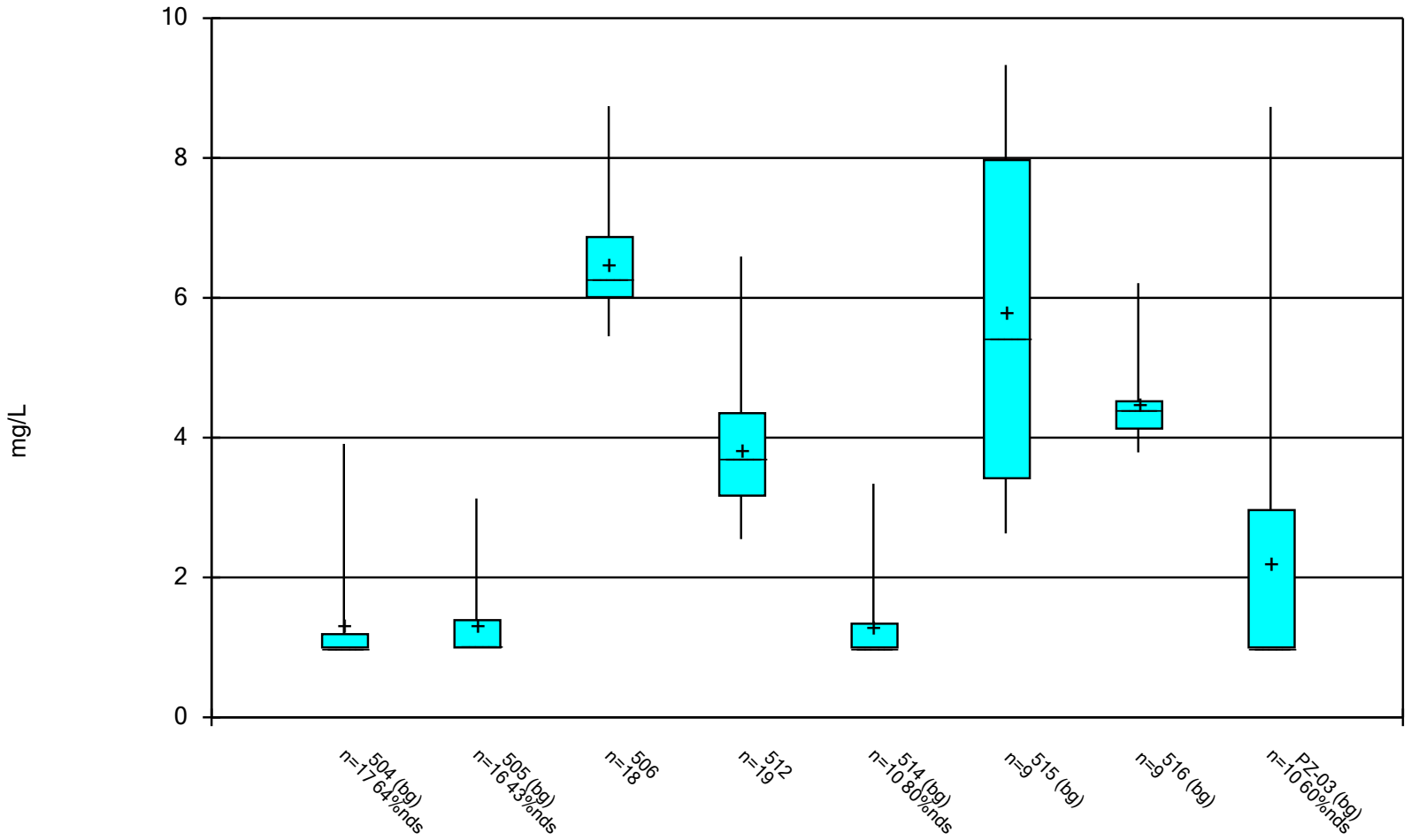
FIGURE NO. 1

N:\KCPL\Projects\Groundwater\DWG\Sibley\2019\GW\Alternative Source Demonstration.dwg Nov 01, 2019 - 2:32pm Layout Name: Fig 2 By: 4470daw

Appendix B

Box and Whiskers Plots

Box & Whiskers Plot



Constituent: Chloride Analysis Run 11/1/2019 10:20 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Box & Whiskers Plot

Constituent: Chloride (mg/L) Analysis Run 11/1/2019 10:21 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

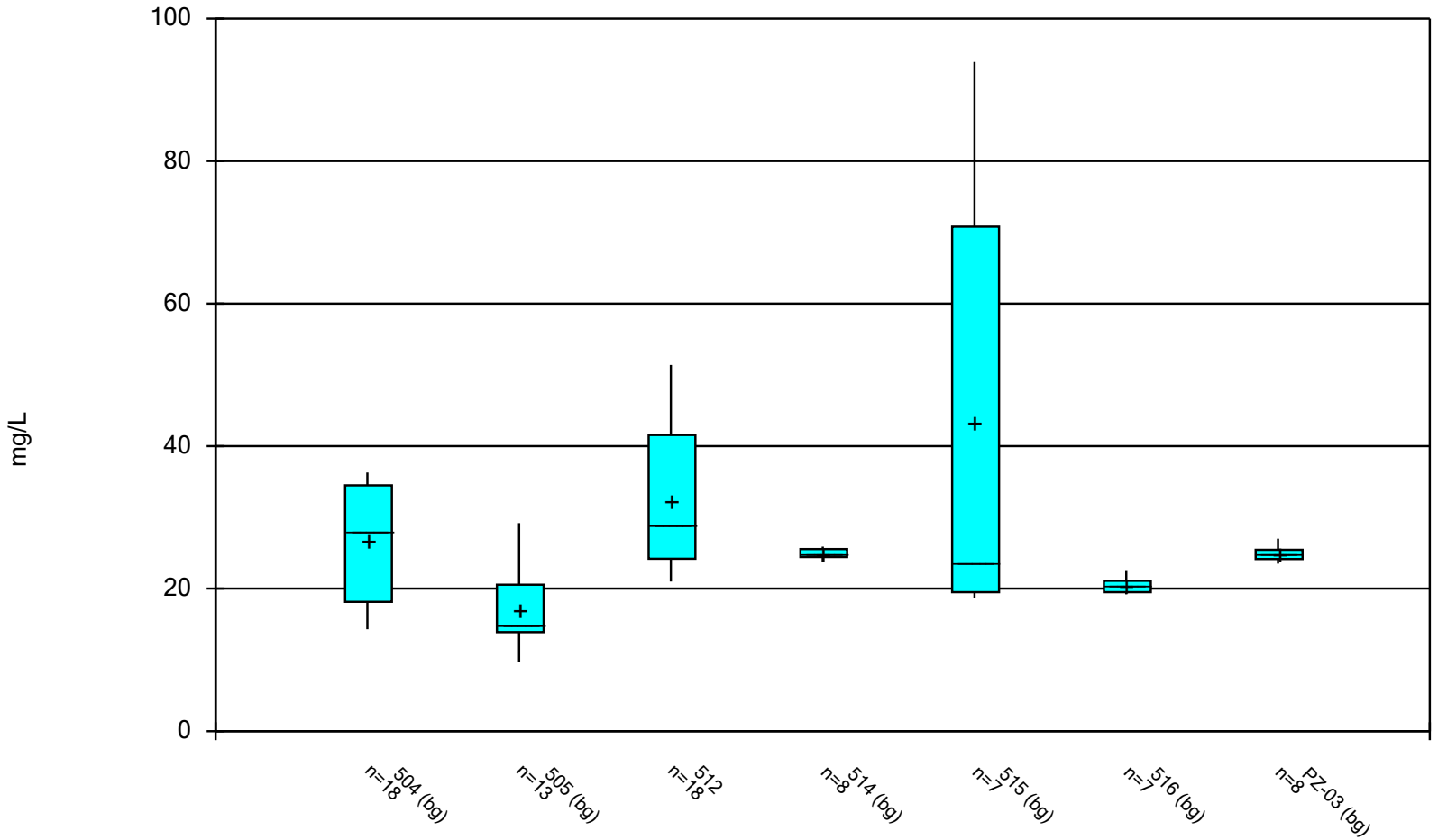
	504 (bg)	505 (bg)	506	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			6.45	2.72	<1	2.63	4.53	<1
12/16/2015	<1	<1						
2/18/2016	<1	1.05	6.15	2.78				
5/25/2016	<1	<1	5.76	2.55				
5/26/2016					<1			<1
8/23/2016	<1	1.19	6.16	3.23				
11/11/2016	<1	<1	6.13	3.17	<1	3.69	4.31	<1
2/8/2017	<1	<1	5.89	3.14				
5/3/2017				3.7				
5/4/2017	1.27	<1	6.15		<1	3.15	4.51	<1
8/1/2017	<1	1.18		3.53				
8/4/2017			5.45					
10/3/2017	3.91	3.13	8.74	6.59	3.34	8.75	6.21	8.73
10/5/2017	2.52	2.06	6.47	4.68	1.68	7.19	4.39	1.29
11/16/2017	1.52	1.59	6.15	3.97	<1	9.33	4.45	1.3
12/28/2017	1	2.12		3.58				
5/16/2018					<1	7	3.95	4.63
5/17/2018	1.11	1.09	6.69	3.64				
6/27/2018			5.8					
11/14/2018					<1	5.43	3.79	<1
11/15/2018	<1	<1	6.69	3.89				
1/11/2019	<1	1	6.39	3.85				
3/12/2019				4.38				
5/22/2019	<1	<1	7.05	4.17	<1	5.05	4.33	<1
7/16/2019	<1 (i)		7.33	4.35				
8/21/2019			7.17	4.91				
Median	1	1.025	6.275	3.7	1	5.43	4.39	1
LowerQ.	1	1	6.01	3.17	1	3.42	4.13	1
UpperQ.	1.19	1.39	6.87	4.35	1.34	7.97	4.52	2.965
Min	1	1	5.45	2.55	1	2.63	3.79	1
Max	3.91	3.13	8.74	6.59	3.34	9.33	6.21	8.73
Mean	1.314	1.338	6.479	3.833	1.302	5.802	4.497	2.195

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 11/1/2019, 10:21 AM

Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Chloride (mg/L)	504 (bg)	17	1.314	0.769	0.1865	1	1	3.91	64.71
Chloride (mg/L)	505 (bg)	16	1.338	0.6062	0.1516	1.025	1	3.13	43.75
Chloride (mg/L)	506	18	6.479	0.7542	0.1778	6.275	5.45	8.74	0
Chloride (mg/L)	512	19	3.833	0.933	0.214	3.7	2.55	6.59	0
Chloride (mg/L)	514 (bg)	10	1.302	0.7473	0.2363	1	1	3.34	80
Chloride (mg/L)	515 (bg)	9	5.802	2.418	0.8059	5.43	2.63	9.33	0
Chloride (mg/L)	516 (bg)	9	4.497	0.6902	0.2301	4.39	3.79	6.21	0
Chloride (mg/L)	PZ-03 (bg)	10	2.195	2.557	0.8085	1	1	8.73	60

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 11/1/2019 10:22 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Box & Whiskers Plot

Constituent: Sulfate (mg/L) Analysis Run 11/1/2019 10:23 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			23	25.9	22.1	22.6	25.5
12/16/2015	14.3	29.2					
2/18/2016	14.7	16	21				
5/25/2016	18.9	21.9	23.1				
5/26/2016				24.9			23.5
8/23/2016	15.4	9.73	24.4				
11/11/2016	17.4	15.9	24	25.2	19.5	21.1	24.7
2/8/2017	21	14.9	27.8				
5/3/2017			27.3				
5/4/2017	21.8	19.2		24.6	18.7	19.5	24.1
8/1/2017	23.3	14.4	28.1				
10/3/2017	24.3	13.4	28.2	23.8	54	19.2	24.2
5/16/2018				25.9	93.9	20.9	27
5/17/2018	32.8	14	29.6				
6/27/2018	31.8		30.3				
8/8/2018	32.3		30.9				
11/14/2018				24.3	70.8	19.6	25.4
11/15/2018	33.9	14.6	51.4				
1/11/2019	33.2	13.8	43.3				
3/12/2019	35.1		44.2				
5/22/2019	36.3	22.7	40.1	24.7	23.7	20.4	25.1
7/16/2019	36.3		42.1				
8/21/2019	35.6		41				
Median	28.05	14.9	28.9	24.8	23.7	20.4	24.9
LowerQ.	18.15	13.9	24.2	24.45	19.5	19.5	24.15
UpperQ.	34.5	20.55	41.55	25.55	70.8	21.1	25.45
Min	14.3	9.73	21	23.8	18.7	19.2	23.5
Max	36.3	29.2	51.4	25.9	93.9	22.6	27
Mean	26.58	16.9	32.21	24.91	43.24	20.47	24.94

Box & Whiskers Plot

Sibley Client: SCS Engineers Data: Sibley Printed 11/1/2019, 10:23 AM

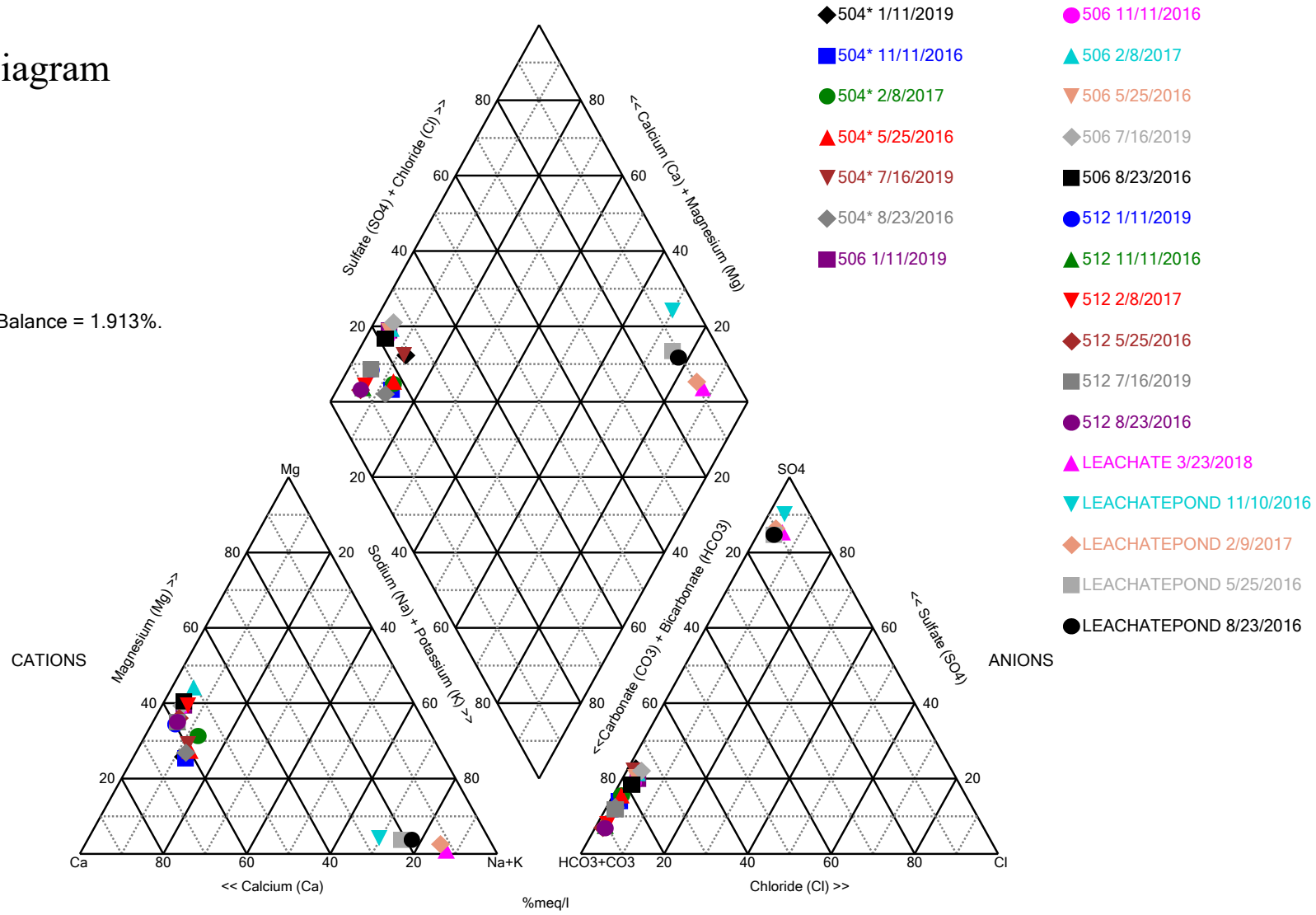
Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Sulfate (mg/L)	504 (bg)	18	26.58	8.293	1.955	28.05	14.3	36.3	0
Sulfate (mg/L)	505 (bg)	13	16.9	5.117	1.419	14.9	9.73	29.2	0
Sulfate (mg/L)	512	18	32.21	9.019	2.126	28.9	21	51.4	0
Sulfate (mg/L)	514 (bg)	8	24.91	0.7357	0.2601	24.8	23.8	25.9	0
Sulfate (mg/L)	515 (bg)	7	43.24	30.1	11.38	23.7	18.7	93.9	0
Sulfate (mg/L)	516 (bg)	7	20.47	1.186	0.4481	20.4	19.2	22.6	0
Sulfate (mg/L)	PZ-03 (bg)	8	24.94	1.081	0.3822	24.9	23.5	27	0

Appendix C

Piper Diagram

Piper Diagram

Cation-Anion Balance = 1.913%.



Analysis Run 11/1/2019 10:36 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Piper Diagram

Analysis Run 11/1/2019 10:38 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

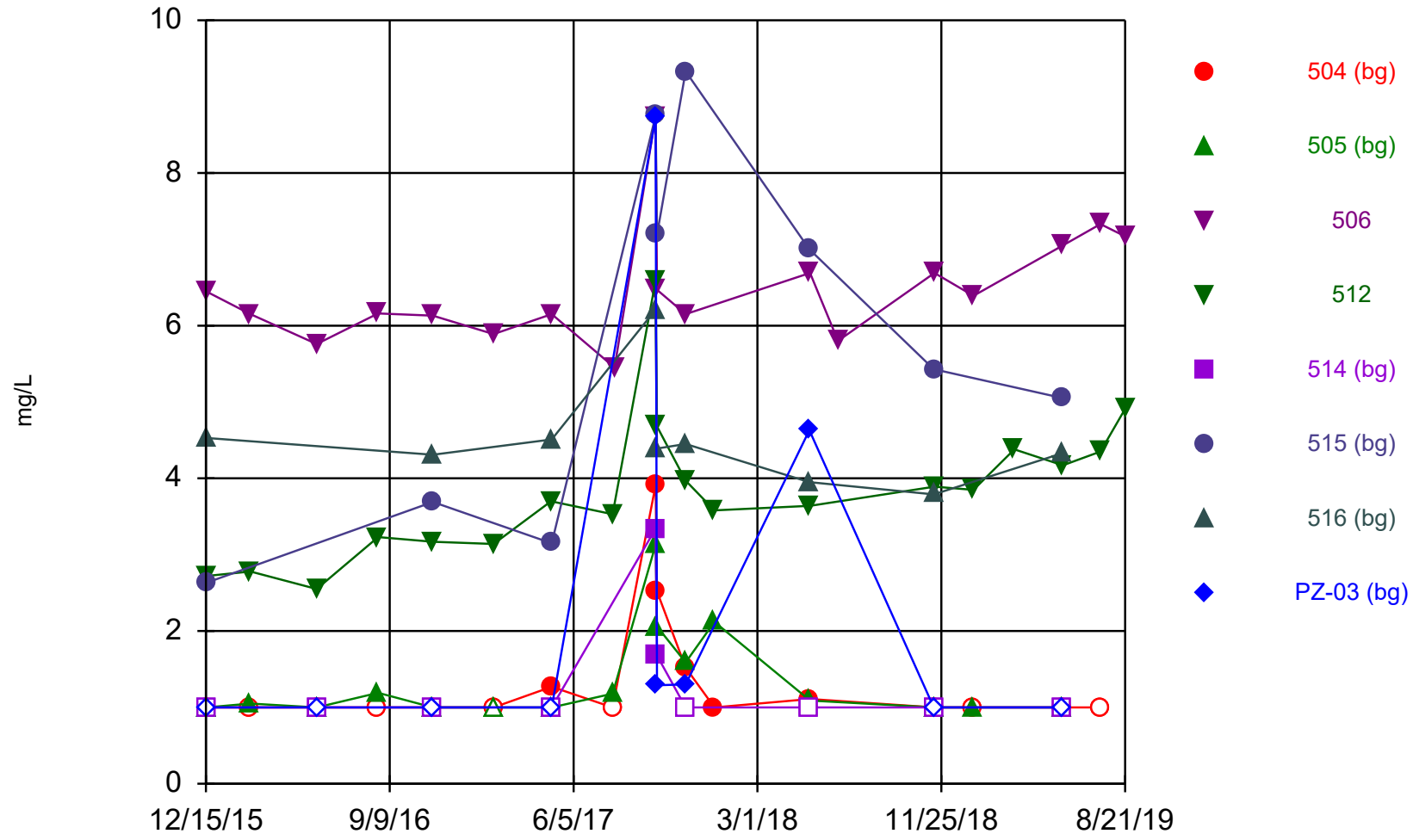
Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
504* 5/25/2016	6.54	1.27	30.2	8.36	1	18.9	89	20
504* 8/23/2016	6.61	1.15	32.2	8.56	1	15.4	99.5	20
504* 11/11/2016	8.17	1.3	36.9	8.97	1	17.4	94.7	20
504* 2/8/2017	6.83	1.28	29.6	9.94	1	21	105	20
504* 1/11/2019	7.64	1.9	39.3	9.85	1	33.2	103	20
504* 7/16/2019	7.92	1.49	40.6	11.8	1	36.3	124	20
506 5/25/2016	8.51	2.19	98.3	43.6	5.76	71	304	20
506 8/23/2016	8.28	1.79	97.2	42.8	6.16	65.8	326	20
506 11/11/2016	8.44	2.37	96.5	41.2	6.13	65	312	20
506 2/8/2017	8.25	2.04	83.6	43.9	5.89	76.5	307	20
506 1/11/2019	8.21	1.85	93	39.7	6.39	67.3	292	20
506 7/16/2019	8.24	1.89	95.3	40.7	7.33	76.1	291	20
512 5/25/2016	10	2.24	98.9	36.8	2.55	23.1	356	20
512 8/23/2016	10.3	2.13	103	36.9	3.23	24.4	384	20
512 11/11/2016	9.96	2.16	100	35.6	3.17	24	352	20
512 2/8/2017	10	2.35	86.4	37.9	3.14	27.8	358	20
512 1/11/2019	10.6	2.25	110	37.8	3.85	43.3	366	20
512 7/16/2019	10.4	2.33	108	38.6	4.35	42.1	363	20
LEACHATEPOND 5/25/2016	499	58.6	129	12.9	44.1	1440	20	119
LEACHATEPOND 8/23/2016	479	56.8	108	12.8	42.8	1320	20	104
LEACHATEPOND 11/10/2016	651	75.3	224	22.5	50.4	1820	30.5	68.3
LEACHATEPOND 2/9/2017	678	66.2	89.4	10.8	64.5	2200	38.9	146
LEACHATE 3/23/2018	741	70.3	88.5	4.66	79.1	1690	20	108

Appendix D

Time Series Plots

Hollow symbols indicate censored values.

Time Series



Constituent: Chloride Analysis Run 11/1/2019 10:21 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

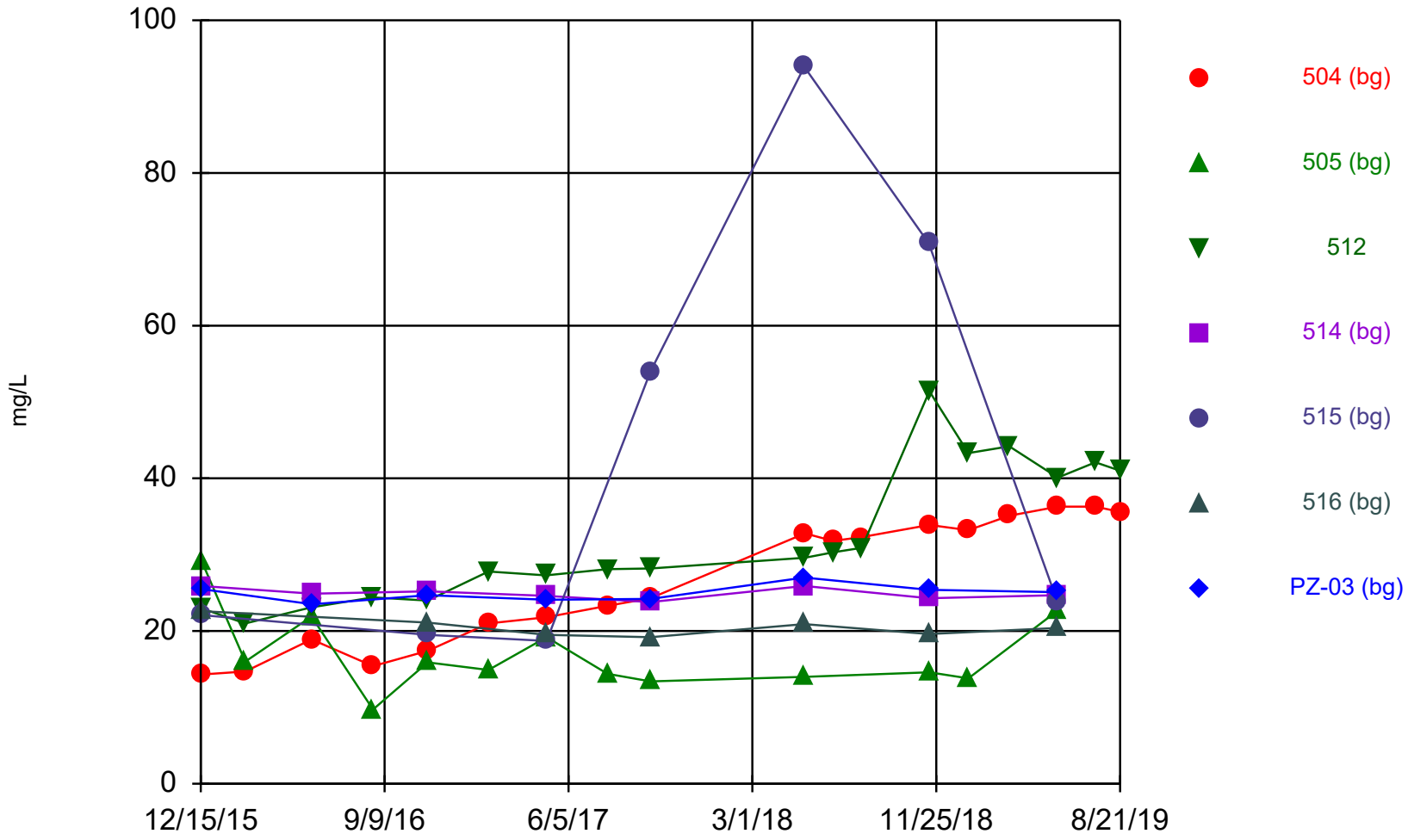
Time Series

Constituent: Chloride (mg/L) Analysis Run 11/1/2019 10:22 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	506	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			6.45	2.72	<1	2.63	4.53	<1
12/16/2015	<1	<1						
2/18/2016	<1	1.05	6.15	2.78				
5/25/2016	<1	<1	5.76	2.55				
5/26/2016					<1			<1
8/23/2016	<1	1.19	6.16	3.23				
11/11/2016	<1	<1	6.13	3.17	<1	3.69	4.31	<1
2/8/2017	<1	<1	5.89	3.14				
5/3/2017				3.7				
5/4/2017	1.27	<1	6.15		<1	3.15	4.51	<1
8/1/2017	<1	1.18		3.53				
8/4/2017			5.45					
10/3/2017	3.91	3.13	8.74	6.59	3.34	8.75	6.21	8.73
10/5/2017	2.52	2.06	6.47	4.68	1.68	7.19	4.39	1.29
11/16/2017	1.52	1.59	6.15	3.97	<1	9.33	4.45	1.3
12/28/2017	1	2.12		3.58				
5/16/2018					<1	7	3.95	4.63
5/17/2018	1.11	1.09	6.69	3.64				
6/27/2018			5.8					
11/14/2018					<1	5.43	3.79	<1
11/15/2018	<1	<1	6.69	3.89				
1/11/2019	<1	1	6.39	3.85				
3/12/2019				4.38				
5/22/2019	<1	<1	7.05	4.17	<1	5.05	4.33	<1
7/16/2019	<1 (i)		7.33	4.35				
8/21/2019			7.17	4.91				

Time Series



Constituent: Sulfate Analysis Run 11/1/2019 10:23 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/1/2019 10:24 AM View: LF III

Sibley Client: SCS Engineers Data: Sibley

	504 (bg)	505 (bg)	512	514 (bg)	515 (bg)	516 (bg)	PZ-03 (bg)
12/15/2015			23	25.9	22.1	22.6	25.5
12/16/2015	14.3	29.2					
2/18/2016	14.7	16	21				
5/25/2016	18.9	21.9	23.1				
5/26/2016				24.9			23.5
8/23/2016	15.4	9.73	24.4				
11/11/2016	17.4	15.9	24	25.2	19.5	21.1	24.7
2/8/2017	21	14.9	27.8				
5/3/2017			27.3				
5/4/2017	21.8	19.2		24.6	18.7	19.5	24.1
8/1/2017	23.3	14.4	28.1				
10/3/2017	24.3	13.4	28.2	23.8	54	19.2	24.2
5/16/2018				25.9	93.9	20.9	27
5/17/2018	32.8	14	29.6				
6/27/2018	31.8		30.3				
8/8/2018	32.3		30.9				
11/14/2018				24.3	70.8	19.6	25.4
11/15/2018	33.9	14.6	51.4				
1/11/2019	33.2	13.8	43.3				
3/12/2019	35.1		44.2				
5/22/2019	36.3	22.7	40.1	24.7	23.7	20.4	25.1
7/16/2019	36.3		42.1				
8/21/2019	35.6		41				