2019 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

CCR LANDFILL
IATAN GENERATING STATION
PLATTE COUNTY, MISSOURI

Presented To:
Evergy Metro, Inc. (f/k/a Kansas City Power & Light Co.)

SCS ENGINEERS

27213167.19 | January 2020

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

CERTIFICATIONS

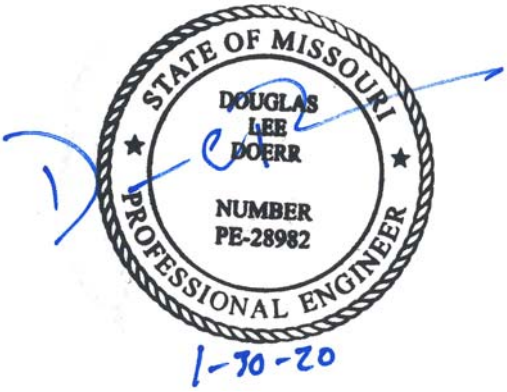
I, John R. Rockhold, being a qualified groundwater scientist and Registered Geologist in the State of Missouri, do hereby certify that the 2019 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Iatan Generating Station was prepared by me or under my direct supervision 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 Iatan 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 13:35:44 -06'00'



Douglas L. Doerr, P.E.

SCS Engineers

Revision Number	Revision Date	Revision Section	Summary of Revisions

Table of Contents

Section **Page**

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 Metro, Inc. (f/k/a Kansas City Power & Light Company) 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 Iatan 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.

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 as **Appendix C**:

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

C.2 CCR Landfill Groundwater Monitoring Alternative Source Demonstration Report May 2019 Groundwater Monitoring Event, CCR Landfill, Iatan 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

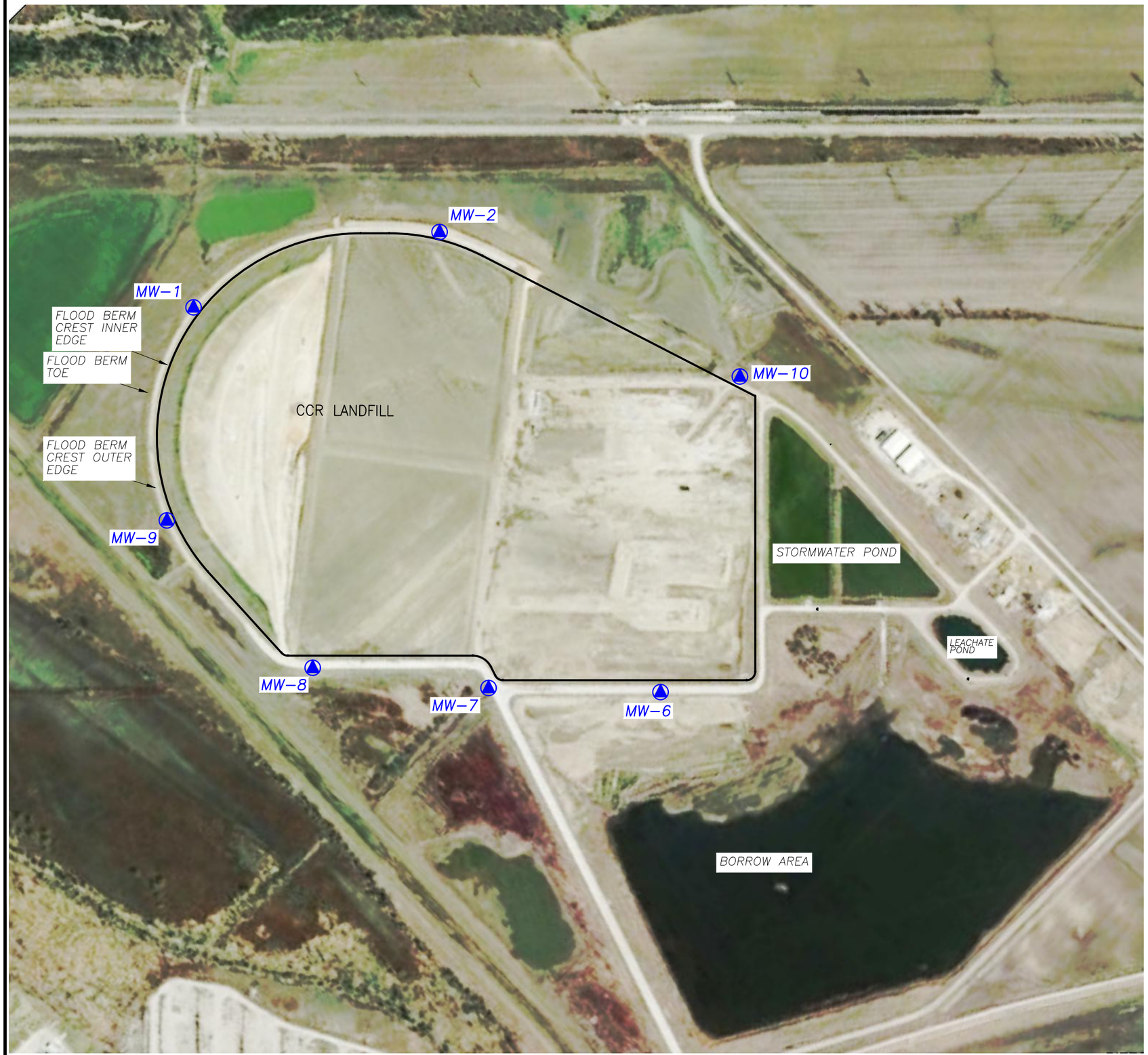
This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. The information contained in this report is a reflection of the conditions encountered at the Iatan Generating Station at the time of fieldwork. This report includes 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 Metro, Inc. for specific application to the Iatan Generating Station CCR Landfill. No warranties, express or implied, are intended or made.

APPENDIX A

FIGURES

Figure 1: Site Map

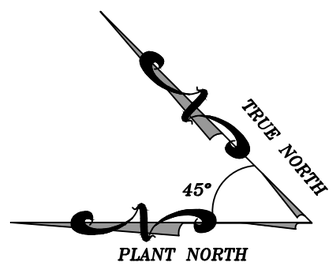


LEGEND:

- MW–1 — *CCR GROUNDWATER MONITORING WELL SYSTEM*
- ——— *CCR LANDFILL UNIT BOUNDARY*

NOTES:

1. *HORIZONTAL DATUM: MISSOURI STATE PLANE COORDINATE SYSTEM, WEST ZONE (NAD 83)*
2. *VERTICAL DATUM: NAVD 88*
3. *GOOGLE EARTH IMAGE DATED MARCH 27, 2017. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE*
4. *BOUNDARY AND MONITOR WELL LOCATIONS PROVIDED BY BURNS & MCDONNELL*
5. *CCR LANDFILL UNIT BOUNDARY SHOWN IS APPROXIMATE.*



500 0 500 1000

SCALE FEET

REV.	DATE	CK. BY
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–

SHEET TITLE: *SITE MAP CCR LANDFILL CCR GROUNDWATER MONITORING SYSTEM*

PROJECT TITLE: *2019 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT*

CLIENT: EVERGY METRO, INC
IATAN GENERATING STATION
WESTON, 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: TGW | CHK. BY: JRR | Q/A REVIEW BY: JRR | PROJ. MGR: JRR

CADD FILE: FIG 1_IATAN SITE MAP_2018 CCR.DWG

DATE: 1/07/20

FIGURE NO. 1

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 Iatan 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-1	05/20/19	<0.200	130	5.66	0.311	6.93	28.9	470
MW-1	11/04/19	<0.200	132	6.61	0.488	6.84	22.3	457
MW-2	05/20/19	<0.200	167	7.18	0.373	6.92	119	666
MW-2	07/11/19	---	---	---	*0.389	**7.33	---	---
MW-2	08/20/19	---	---	---	*0.333	**6.85	---	---
MW-2	11/04/19	<0.200	168	8.77	0.552	6.77	98.8	585
MW-6	05/20/19	<0.200	131	1.21	0.366	7.43	20.2	468
MW-6	07/11/19	---	---	---	*0.373	**7.29	---	---
MW-6	08/20/19	---	---	---	*0.328	**7.07	---	---
MW-6	11/04/19	<0.200	134	1.40	0.359	6.87	20.2	437
MW-7	01/10/19	---	*185	*23.3	---	**7.42	*159	*724
MW-7	03/14/19	---	*132	*4.77	---	**7.24	*33.9	*472
MW-7	05/20/19	<0.200	184	26.0	0.389	7.21	166	737
MW-7	07/11/19	---	*199	*31.9	---	**7.63	*186	*761
MW-7	08/20/19	---	*183	*28.7	---	**6.99	*166	*743
MW-7	11/04/19	<0.200	185	29.1	0.381	6.77	170	682
MW-8	01/10/19	---	*149	*5.63	---	**7.57	*48.4	*502
MW-8	03/14/19	---	*140	*4.79	---	**7.38	---	---
MW-8	05/20/19	<0.200	141	3.98	0.446	7.11	40.9	518
MW-8	11/04/19	<0.200	141	3.99	0.431	7.07	37.6	465
MW-9	05/20/19	<0.200	115	1.57	0.415	7.13	22.8	457
MW-9	11/04/19	<0.200	119	3.88	0.567	6.96	25.4	392
MW-10	01/10/19	---	*157	---	---	**7.36	*38.0	---
MW-10	03/14/19	---	*151	---	---	**7.27	*40.1	---
MW-10	05/20/19	<0.200	151	21.0	0.623	7.05	37.3	697
MW-10	07/11/19	---	*153	*22.5	---	**7.46	*33.0	---
MW-10	08/20/19	---	*143	*20.3	---	**6.99	*34.6	---
MW-10	11/04/19	<0.200	142	21.6	0.777	6.78	33.6	534

* 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
KCP&L Iatan 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-1	05/20/19	6.93	811	12.09	29.7	-165	0.00	15.60	773.09
MW-1	11/04/19	6.84	771	13.97	28.3	-101	0.49	16.39	772.30
MW-2	05/20/19	6.92	979	12.24	24.8	-127	0.00	16.38	773.23
MW-2	07/11/19	**7.33	1040	16.95	29.0	-119	0.83	16.08	773.53
MW-2	08/20/19	**6.85	993	16.08	3.4	-25	0.00	17.28	772.33
MW-2	11/04/19	6.77	955	14.53	10.8	-109	1.27	17.21	772.40
MW-6	05/20/19	7.43	785	13.94	2.9	-133	0.41	16.05	773.60
MW-6	07/11/19	**7.29	1100	26.58	5.3	-107	1.48	15.36	774.29
MW-6	08/20/19	**7.07	784	16.41	0.0	-33	0.00	17.09	772.56
MW-6	11/04/19	6.87	789	14.06	0.0	118	1.15	16.73	772.92
MW-7	01/10/19	**7.42	1090	13.09	16.0	-73	1.04	19.65	770.00
MW-7	03/14/19	**7.24	838	13.92	0.4	-91	0.47	20.37	769.28
MW-7	05/20/19	7.21	1050	13.43	0.0	-100	0.47	16.33	773.32
MW-7	07/11/19	**7.63	1160	14.91	0.6	-84	0.53	15.63	774.02
MW-7	08/20/19	**6.99	1090	15.58	0.0	-3	0.00	17.28	772.37
MW-7	11/04/19	6.77	1070	13.41	0.0	69	0.85	17.04	772.61
MW-8	01/10/19	**7.57	882	11.42	4.6	-90	1.48	19.47	770.24
MW-8	03/14/19	**7.38	868	13.91	0.2	-89	0.41	19.98	769.73
MW-8	05/20/19	7.11	802	12.53	0.0	-121	0.00	16.67	773.04
MW-8	11/04/19	7.07	784	13.94	11.0	-72	1.04	17.50	772.21
MW-9	05/20/19	7.13	755	12.23	0.5	-165	0.00	16.85	773.05
MW-9	11/04/19	6.96	733	13.66	42.9	-119	0.57	17.72	772.18
MW-10	01/10/19	**7.36	1140	12.68	3.7	-91	1.91	19.32	770.14
MW-10	03/14/19	**7.27	1180	11.97	11.0	-80	7.29	19.50	769.96
MW-10	05/20/19	7.05	1060	11.81	0.0	-14	0.00	16.15	773.31
MW-10	07/11/19	**7.46	1100	16.59	0.0	-57	0.83	15.77	773.69
MW-10	08/20/19	**6.99	1040	16.3	0.0	31	0.00	17.05	772.41
MW-10	11/04/19	6.78	999	13.4	8.3	49	0.92	16.96	772.50

* 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

APPENDIX C

ALTERNATIVE SOURCE DEMONSTRATION

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

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

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

CCR LANDFILL GROUNDWATER MONITORING

ALTERNATIVE SOURCE DEMONSTRATION REPORT

NOVEMBER 2018 GROUNDWATER MONITORING EVENT

CCR LANDFILL

IATAN GENERATING STATION

PLATTE COUNTY, MISSOURI

Presented To:

Kansas City Power & Light Company

Presented By:

SCS ENGINEERS

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

June 2019

File No. 27213167.18

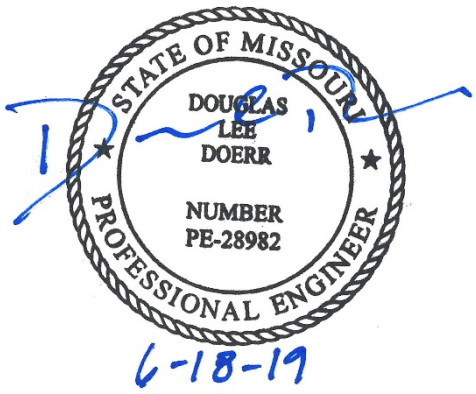
CERTIFICATIONS

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 Iatan 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 Iatan 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 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 Kansas City Power & Light Company's (KCP&L) Iatan 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 on November 12, 2018. Review and validation of the results from the November 2018 Detection Monitoring Event was completed on December 21, 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 January 10, 2019 and March 14, 2019.

The completed statistical evaluation identified two Appendix III constituents above their respective prediction limits. The prediction limit for calcium in monitoring well MW-10 is 131.1 mg/L. The detection monitoring sample was reported at 138 mg/L. The first verification re-sample was collected on January 10, 2019 with a result of 157 mg/L. The second verification re-sample was collected on March 14, 2019 with a result of 151 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for calcium from monitoring well MW-10 exceeds its prediction limit and is a confirmed statistically significant increase (SSI) over background.

The prediction limit for sulfate in monitoring well MW-10 is 27.78 mg/L. The detection monitoring sample was reported at 32.9 mg/L. The first verification re-sample was collected on January 10, 2019 with a result of 38.0 mg/L. The second verification re-sample was collected on March 14, 2019 with a result of 40.1 mg/L.

Therefore, in accordance with the Statistical Method Certification, the detection monitoring sample for sulfate from monitoring well MW-10 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 calcium and sulfate in monitoring well MW-10.

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 SSI for the CCR Landfill at the Iatan Generating Station, there are multiple lines of supporting evidence to indicate the above SSI was 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 the CCR Landfill at the time of sampling. Monitoring well MW-10 is generally located upgradient from the CCR Landfill depending on river stage. During this detection monitoring sampling event, MW-10 was upgradient and essentially on a groundwater ridge trending from MW-7 to MW-10. The primary direction of groundwater flow was away from the ridge to the southwest and to the northeast which makes MW-10 primarily upgradient from the CCR Landfill indicating the SSIs are not likely caused by a release from the CCR Landfill. This demonstrates that a source other than the CCR Landfill likely caused the SSI over background levels for calcium and sulfate, or that the SSIs 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.

Although an SSI was only identified in upgradient well MW-10, box and whiskers plots for calcium and sulfate in the CCR groundwater monitoring system wells were prepared to allow comparison of these constituent concentrations between wells. The comparison between wells indicates these constituent concentrations in upgradient well MW-10 are within or even below the range of concentrations from the other wells. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots are provided in **Appendix B**.

3.3 PIPER DIAGRAM PLOTS

Piper diagrams are a form of tri-linear diagram, and a widely-accepted method to provide a visual representation of the ion concentration of groundwater. Piper diagrams portray water compositions and facilitate the interpretation and presentation of chemical 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). Chloride was inadvertently not analyzed for the January 10, 2019 sample so the chloride concentration from the November 2018 sampling event (15.1 mg/L) and the May 20, 2019 sampling event (21 mg/L) were used to construct two piper diagrams to represent the January 10, 2019 piper plot for MW-10. The two different chloride concentrations made little difference in the piper plots.

A piper diagram generated for MW-10 and landfill leachate is provided in **Appendix C** and indicates the groundwater from this well has not changed and does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels for calcium and sulfate 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 calcium and sulfate concentrations in MW-10 are within the range of concentrations for the other wells. This demonstrates 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. 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 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.

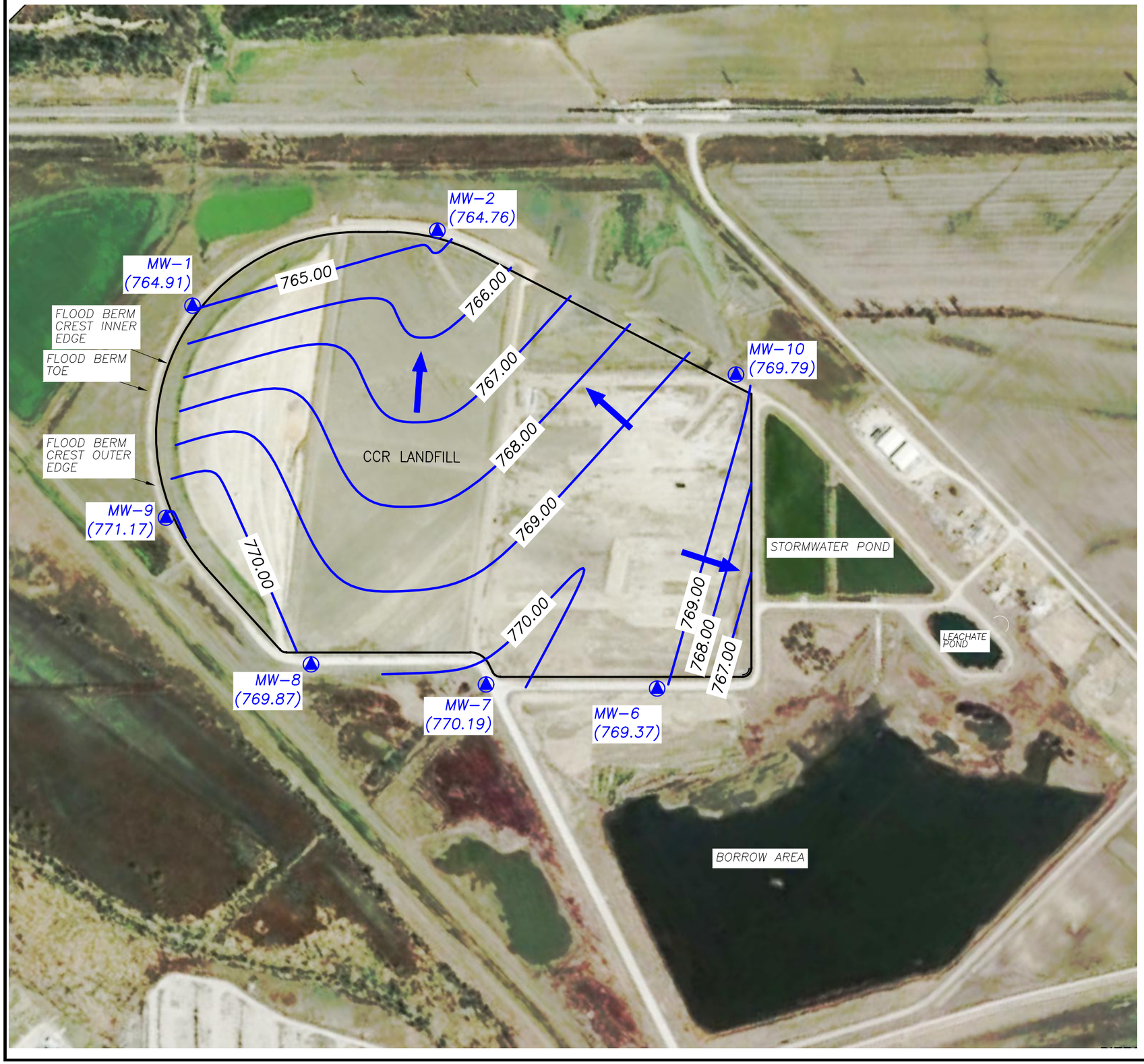
5 GENERAL COMMENTS

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 for specific application to the Iatan 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 signatures. 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

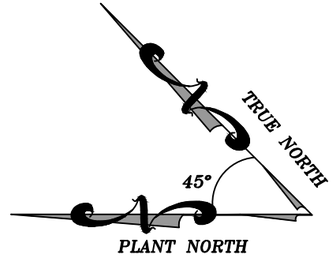


LEGEND:

- 765.00 — GROUNDWATER SURFACE ELEVATIONS
- MW-1 765.34 — CCR GROUNDWATER MONITORING WELL SYSTEM
- CCR LANDFILL UNIT BOUNDARY
- FLOW DIRECTION ARROW

NOTES:

1. HORIZONTAL DATUM: MISSOURI STATE PLANE COORDINATE SYSTEM, WEST ZONE (NAD 83)
2. VERTICAL DATUM: NAVD 88
3. GOOGLE EARTH IMAGE DATED MARCH 27, 2017. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE
4. BOUNDARY AND MONITOR WELL LOCATIONS PROVIDED BY BURNS & MCDONNELL
5. CCR LANDFILL UNIT BOUNDARY SHOWN IS APPROXIMATE.



500 0 500 1000

SCALE FEET

CK. BY	REV.	DATE
-	0	-
-	1	-
-	2	-
-	3	-
-	4	-

SHEET TITLE: POTENTIOMETRIC SURFACE MAP (NOVEMBER 2018)

PROJECT TITLE: CCR LANDFILL ALTERNATIVE SOURCE DEMONSTRATION

CLIENT: KANSAS CITY POWER & LIGHT COMPANY
IATAN GENERATING STATION
IATAN, MISSOURI

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

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

CADD FILE: 1 - CCR LANDFILL ALTERNATIVE SOURCE DEMONSTRATION.DWG

DATE: 6/18/19

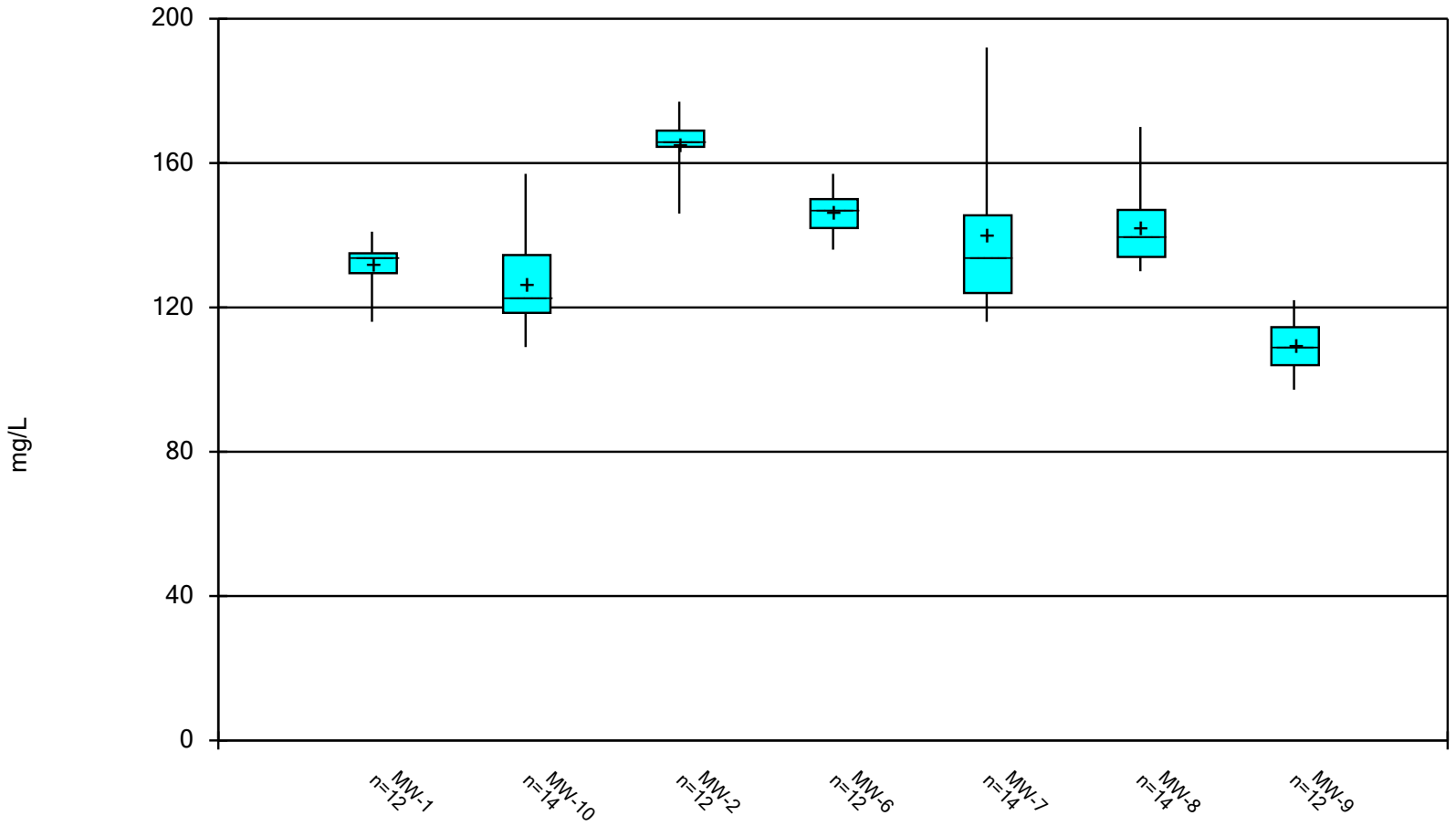
FIGURE NO. 1

N:\KCPL\Projects\Groundwater\DWG\Iatan\2018\GW Monitoring\Landfill\1 - CCR Landfill Alternative Source Demonstration.dwg - Jun 18, 2019 - 3:16pm Layout Name: Fig 2-CCR By: 4470daw

Appendix B

Box and Whiskers Plots

Box & Whiskers Plot



Constituent: Calcium Analysis Run 4/10/2019 11:49 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

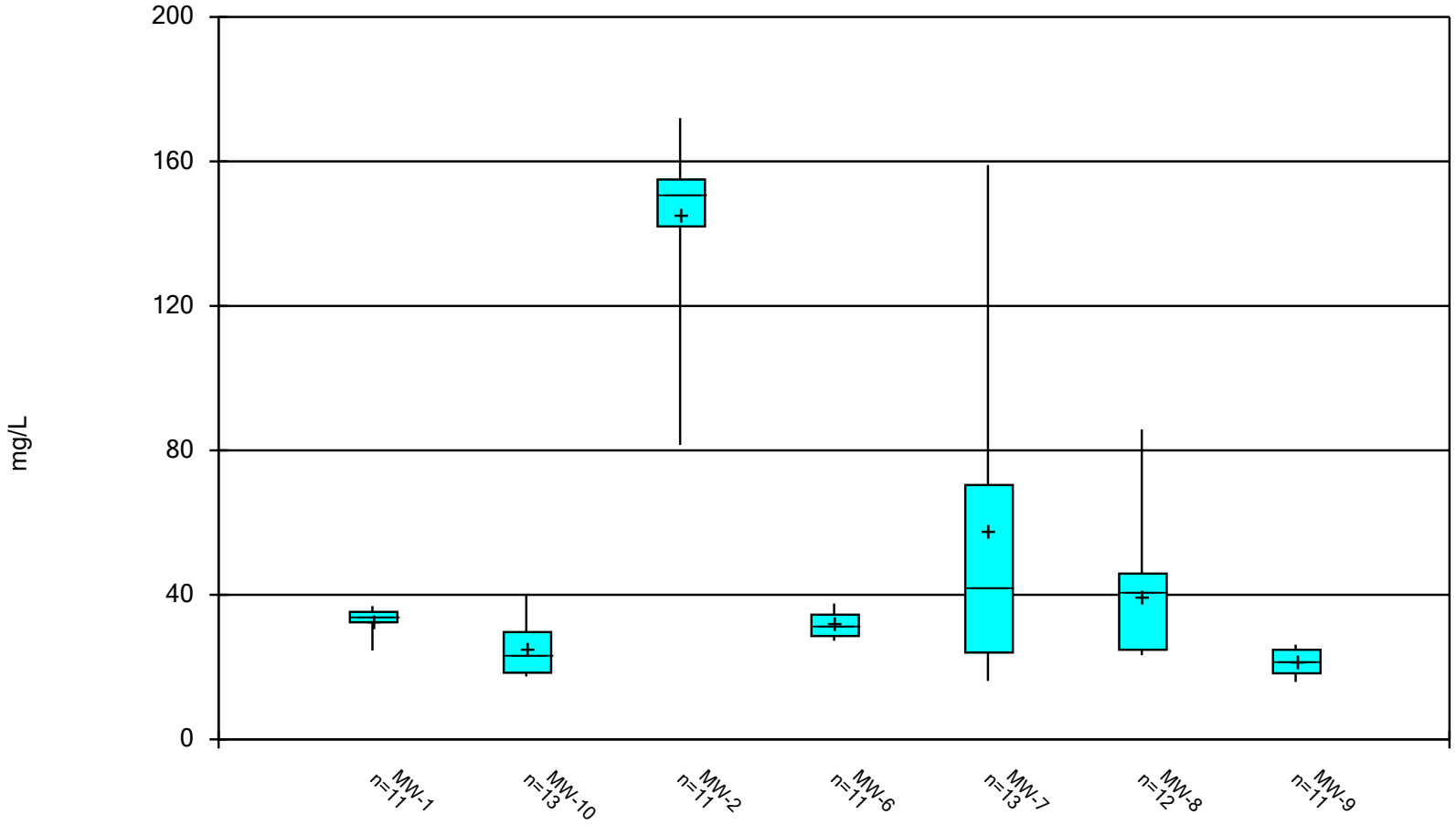
Box & Whiskers Plot

Constituent: Calcium (mg/L) Analysis Run 4/10/2019 11:52 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9
8/18/2016	134	123	170	142	145	136	119
9/29/2016	134	118	169	139	144	132	102
11/9/2016	136	124	169	142	146	135	103
12/21/2016	134	123	166	146	138	139	116
2/3/2017	116	109	146	136	116	133	105
5/24/2017	128	125	166	150	123	138	108
7/5/2017	129	120	165	147	125	142	97.2
8/17/2017	134	122	168	150	133	145	110
10/5/2017	141	131	177	157	135	155	113
11/14/2017	130	119	161	151	125	145	113
5/21/2018	131	115	164	150	123	130	105
11/12/2018	137	138	166	147	192	170	122
1/10/2019		157			185	149	
3/14/2019		151			132	140	
Median	134	123	166	147	134	139.5	109
LowerQ.	129.5	118.5	164.5	142	124	134	104
UpperQ.	135	134.5	169	150	145.5	147	114.5
Min	116	109	146	136	116	130	97.2
Max	141	157	177	157	192	170	122
Mean	132	126.8	165.6	146.4	140.1	142.1	109.4

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 4/10/2019 11:49 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Box & Whiskers Plot

Constituent: Sulfate (mg/L) Analysis Run 4/10/2019 11:52 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9
8/18/2016	32.4	17.8	142	30.2	70.2	23.3	16.7
9/29/2016	35.3	19.7	151	33.5	70.6	24.2	26.2
11/9/2016	33.2	17.4	155	31.4	62.6	23.8	23
12/21/2016	36.2	17.7	155	28.6	50	25.5	22.2
2/3/2017	36.9	19.1	150	28.5	41.9	39.6	21.1
5/24/2017	27.4	22.4	172	32.7	16.2	42.8	15.9
7/5/2017	34.2	24.7	158	37.2	19.5	54.8	24.8
8/17/2017	35.2	26.5	149	37.6	34.1	43	19.8
10/5/2017	34.5	26.4	151	34.5	24.3	43.4	21.5
5/21/2018	32.6	23.6	137	30.9	23.8	25.4	18.3
11/12/2018	24.6	32.9	81.5	27.3	149	85.8	25.8
1/10/2019		38			159	48.4	
3/14/2019		40.1			33.9		
Median	34.2	23.6	151	31.4	41.9	41.2	21.5
LowerQ.	32.4	18.45	142	28.6	24.05	24.8	18.3
UpperQ.	35.3	29.7	155	34.5	70.4	45.9	24.8
Min	24.6	17.4	81.5	27.3	16.2	23.3	15.9
Max	36.9	40.1	172	37.6	159	85.8	26.2
Mean	32.95	25.1	145.6	32.04	58.08	40	21.39

Box & Whiskers Plot

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr Printed 4/10/2019, 11:52 AM

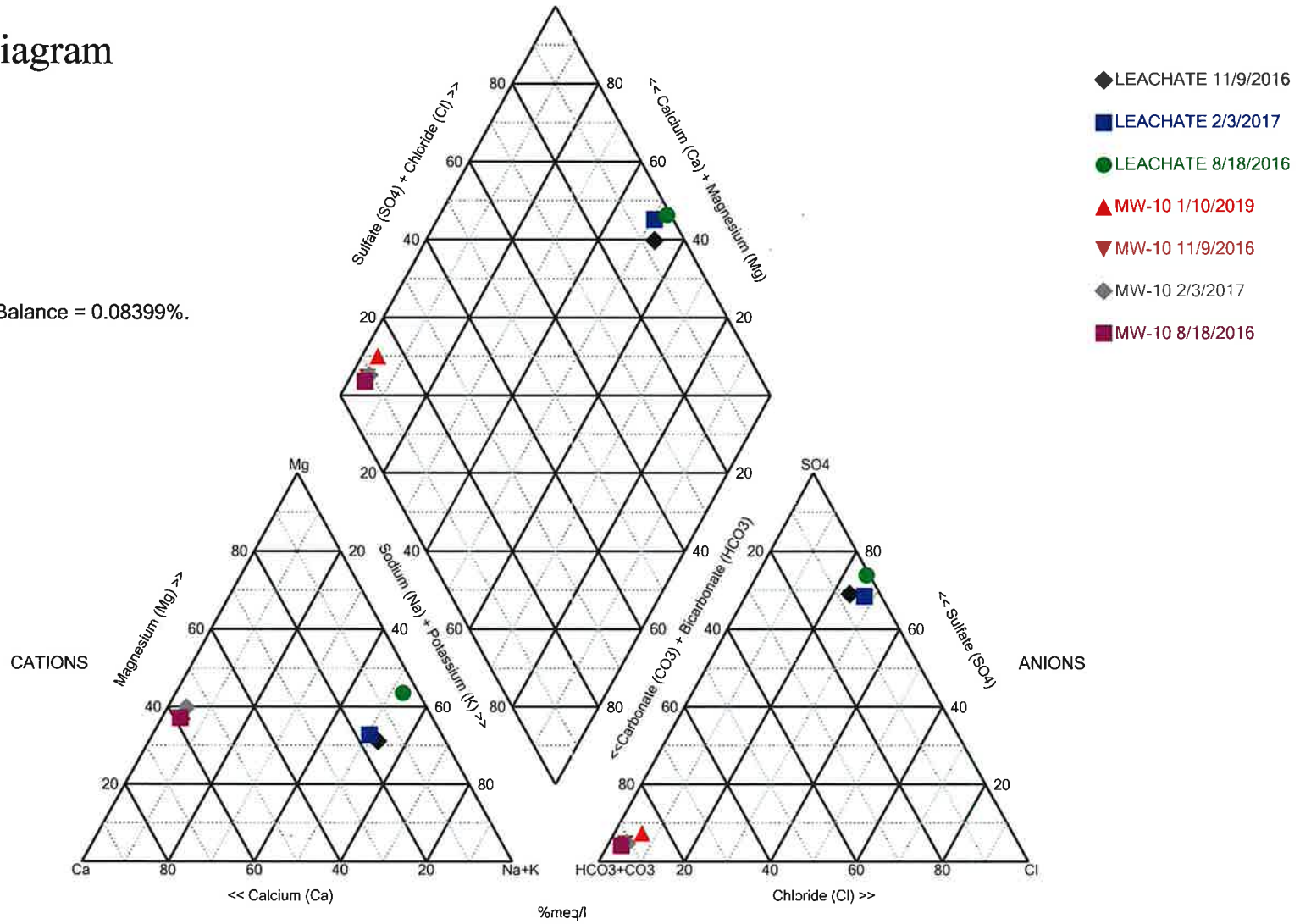
Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Calcium (mg/L)	MW-1	12	132	6.208	1.792	134	116	141	0
Calcium (mg/L)	MW-10	14	126.8	13.43	3.589	123	109	157	0
Calcium (mg/L)	MW-2	12	165.6	7.305	2.109	166	146	177	0
Calcium (mg/L)	MW-6	12	146.4	5.838	1.685	147	136	157	0
Calcium (mg/L)	MW-7	14	140.1	22.45	6	134	116	192	0
Calcium (mg/L)	MW-8	14	142.1	10.59	2.831	139.5	130	170	0
Calcium (mg/L)	MW-9	12	109.4	7.422	2.143	109	97.2	122	0
Sulfate (mg/L)	MW-1	11	32.95	3.765	1.135	34.2	24.6	36.9	0
Sulfate (mg/L)	MW-10	13	25.1	7.627	2.115	23.6	17.4	40.1	0
Sulfate (mg/L)	MW-2	11	145.6	23.05	6.949	151	81.5	172	0
Sulfate (mg/L)	MW-6	11	32.04	3.436	1.036	31.4	27.3	37.6	0
Sulfate (mg/L)	MW-7	13	58.08	46.39	12.87	41.9	16.2	159	0
Sulfate (mg/L)	MW-8	12	40	18.17	5.244	41.2	23.3	85.8	0
Sulfate (mg/L)	MW-9	11	21.39	3.49	1.052	21.5	15.9	26.2	0

Appendix C

Piper Diagram

Piper Diagram

Cation-Anion Balance = 0.08399%.



Analysis Run 6/4/2019 9:39 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Piper Diagram

Analysis Run 6/4/2019 9:39 AM View: CCR LF III

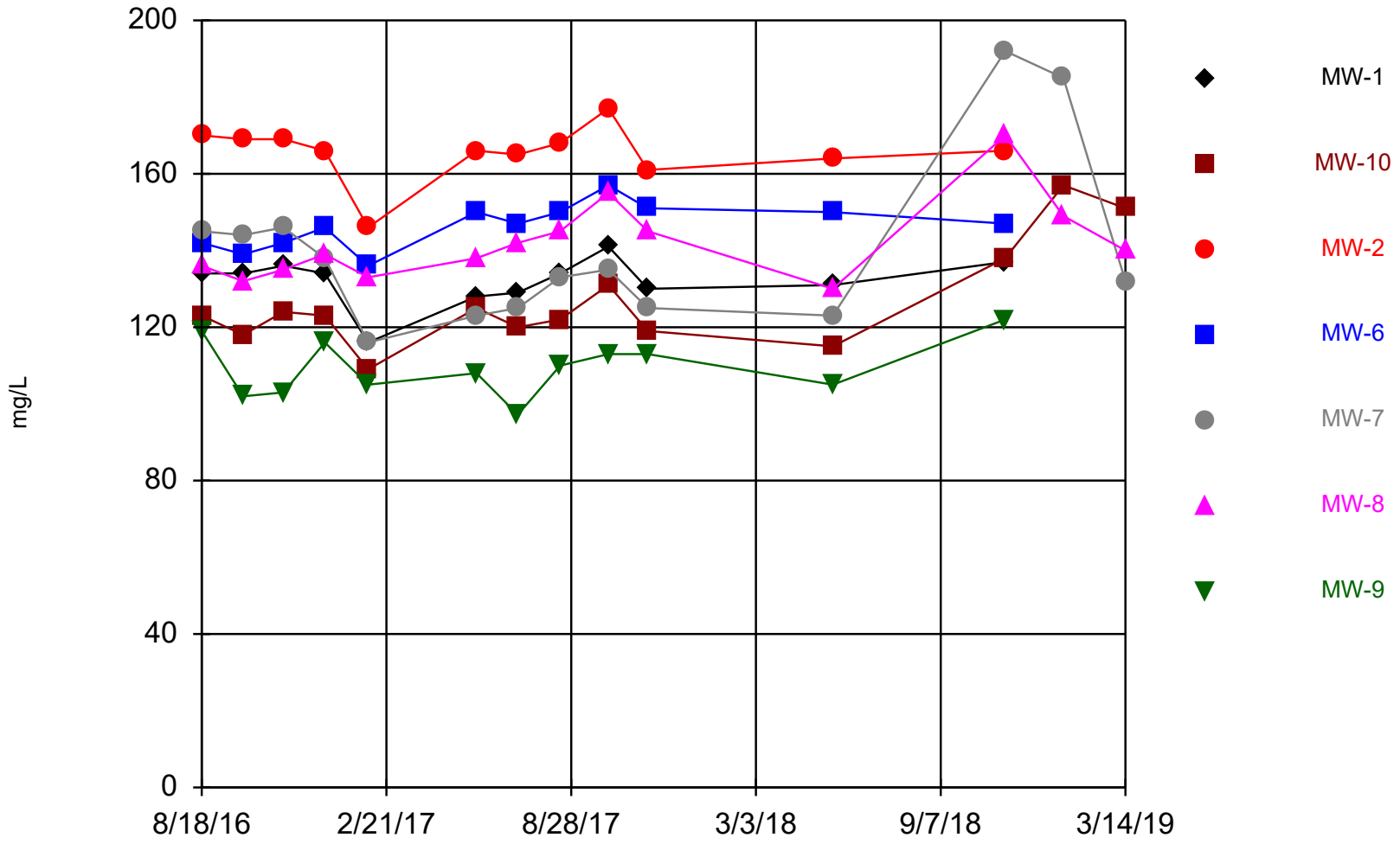
Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
MW-10 8/18/2016	7.77	4.45	123	47.3	7.47	17.8	480	10
MW-10 11/9/2016	7.11	4.02	124	47.3	9.15	17.4	428	10
MW-10 2/3/2017	7.2	3.93	109	46.7	10.3	19.1	442	10
MW-10 1/10/2019	8.51	5.08	157	64.3	21	38	555	10
LEACHATE 8/18/2016	9250	689	573	4240	6990	28000	644	10
LEACHATE 11/9/2016	1230	90.7	334	398	876	3460	480	10
LEACHATE 2/3/2017	1880	121	560	671	1760	6070	505	10

Appendix D

Time Series Plots

Time Series



Constituent: Calcium Analysis Run 4/10/2019 11:52 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

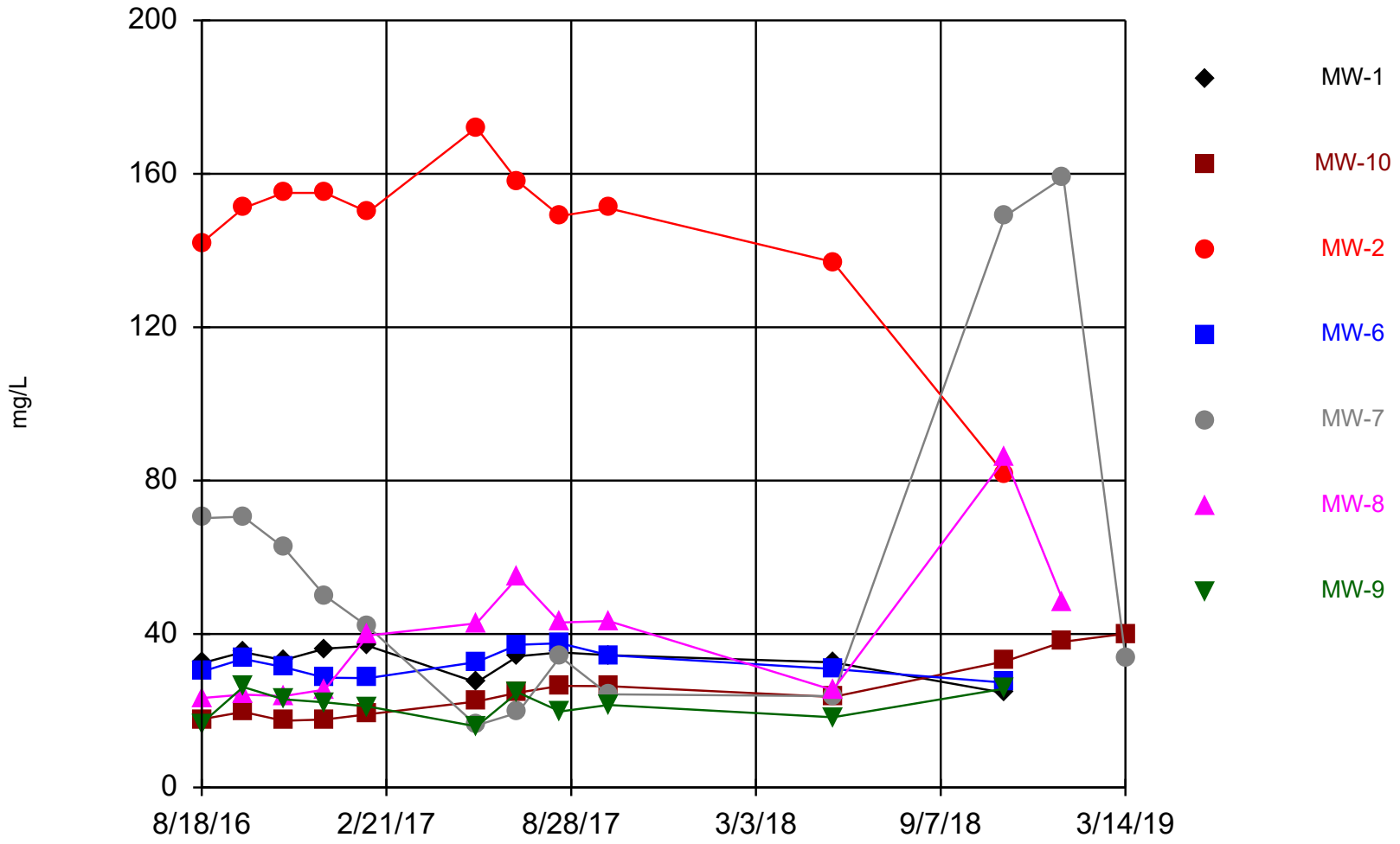
Time Series

Constituent: Calcium (mg/L) Analysis Run 4/10/2019 11:53 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9
8/18/2016	134	123	170	142	145	136	119
9/29/2016	134	118	169	139	144	132	102
11/9/2016	136	124	169	142	146	135	103
12/21/2016	134	123	166	146	138	139	116
2/3/2017	116	109	146	136	116	133	105
5/24/2017	128	125	166	150	123	138	108
7/5/2017	129	120	165	147	125	142	97.2
8/17/2017	134	122	168	150	133	145	110
10/5/2017	141	131	177	157	135	155	113
11/14/2017	130	119	161	151	125	145	113
5/21/2018	131	115	164	150	123	130	105
11/12/2018	137	138	166	147	192	170	122
1/10/2019		157			185	149	
3/14/2019		151			132	140	

Time Series



Constituent: Sulfate Analysis Run 4/10/2019 11:52 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Time Series

Constituent: Sulfate (mg/L) Analysis Run 4/10/2019 11:53 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9
8/18/2016	32.4	17.8	142	30.2	70.2	23.3	16.7
9/29/2016	35.3	19.7	151	33.5	70.6	24.2	26.2
11/9/2016	33.2	17.4	155	31.4	62.6	23.8	23
12/21/2016	36.2	17.7	155	28.6	50	25.5	22.2
2/3/2017	36.9	19.1	150	28.5	41.9	39.6	21.1
5/24/2017	27.4	22.4	172	32.7	16.2	42.8	15.9
7/5/2017	34.2	24.7	158	37.2	19.5	54.8	24.8
8/17/2017	35.2	26.5	149	37.6	34.1	43	19.8
10/5/2017	34.5	26.4	151	34.5	24.3	43.4	21.5
5/21/2018	32.6	23.6	137	30.9	23.8	25.4	18.3
11/12/2018	24.6	32.9	81.5	27.3	149	85.8	25.8
1/10/2019		38			159	48.4	
3/14/2019		40.1			33.9		

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

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

CCR LANDFILL
IATAN GENERATING STATION
PLATTE COUNTY, MISSOURI

Presented To:

Evergy Metro, Inc.

Presented By:

SCS ENGINEERS

8575 West 110th Street, Suite 100

Overland Park, Kansas 66210

December 2019

File No. 27213167.18

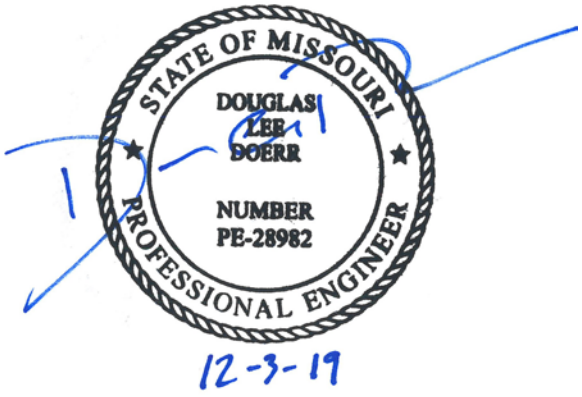
CERTIFICATIONS

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 Iatan 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 Iatan 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 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 Iatan Generating Station has been completed in substantial compliance with the "Statistical Method Certification by A Qualified Professional Engineer" dated October 12, 2017. Groundwater samples were collected on May 20, 2019. Review and validation of the results from the May 2019 Detection Monitoring Event was completed on June 28, 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 11, 2019 and August 20, 2019.

The completed statistical evaluation identified seven Appendix III constituents above their respective prediction limit in monitoring wells MW-7 and MW-10.

Constituent/Monitoring Well	*UPL	Observation May 20, 2019	1st Verification July 11, 2019	2nd Verification August 20, 2019
Calcium				
MW-7	157.1	184	199	183
MW-10	131.1	151	153	143
Chloride				
MW-7	17.12	26	31.9	28.7
MW-10	18.96	21	22.5	20.3

Constituent/Monitoring Well	*UPL	Observation May 20, 2019	1st Verification July 11, 2019	2nd Verification August 20, 2019
Sulfate				
MW-7	89.64	166	186	166
MW-10	27.78	37.3	33.0	34.6
Total Dissolved Solids				
MW-7	591.5	737	761	743

*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 identified SSIs above the background prediction limits for calcium, chloride, sulfate and total dissolved solids (TDS) in monitoring well MW-7 and for calcium, chloride, and sulfate in monitoring well MW-10.

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 Iatan 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/CROSS GRADIENT WELL LOCATION

Figure 1 in **Appendix A** shows a potentiometric surface contour map indicating the direction of groundwater flow at the CCR Landfill at the time of sampling. Monitoring wells MW-7 and MW-10 were generally located upgradient or cross gradient from the CCR Landfill at the time of the detection sampling event. During this detection monitoring sampling event, groundwater elevation in MW-7 and MW-10 were within 0.01 feet of each other even though the wells are located on opposite sides of the landfill. The primary direction of groundwater flow was to the north and west, which makes neither well downgradient from the CCR Landfill, indicating the SSIs are not likely caused by a release from the CCR Landfill. This demonstrates that a source other than the CCR Landfill likely caused the SSI over background levels for calcium, chloride, sulfate and total dissolved solids, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.2 REPRESENTATIVENES OF BACKGROUND

Representativeness is defined as the level of how well or how accurately a sample set reflects actual or natural conditions. If the upper and lower prediction limits for the background concentrations of calcium, chloride, sulfate and total dissolved solids in monitoring well MW-7 and for calcium, chloride, and sulfate in monitoring well MW-10, represents the entire population of historical concentrations in these wells and constituents under all natural conditions, including low river stages, high river stages, flooding, drought, etc., the background data set would have good representativeness. However, due to the inherent constraints of the CCR Final Rule, and the limited number of background data points over a

limited period of time, the background data set for these wells and constituents does not exhibit good representativeness. The background data set does not include data collected under the full spectrum of natural conditions such as those experienced during and after the historic Missouri River flooding in the spring and fall of 2019 in which the area around the landfill was inundated three times during parts of March-April, May-June, and September-October. A hydrograph of the Missouri River stage at St. Joseph, Missouri, showing the river stage during the time period in which background data was collected and the time period when compliance data points were collected is provided in **Appendix B**. This indicates that the river elevation and subsequently the groundwater elevation was significantly lower during background sampling than the May 2019 sampling event. Additionally, in **Appendix B** is a Google Maps aerial photograph of the landfill and surrounding area shortly after the peak river elevation in March. This indicates that the river water was encroaching on the landfill and well network during the May 2019 sampling event. Such significant fluctuation in river elevations and groundwater elevations impact the groundwater characteristics. The upper and lower prediction limits for these wells and constituents were calculated from eight data points between August 18, 2016 and August 17, 2017 and is not believed to be representative of the entire population of concentrations for these wells and constituents under the infrequent but naturally occurring condition of flooding. This demonstrates that a source other than the CCR Landfill could have caused the SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.3 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.

Although SSIs were only identified in monitoring wells MW-7 and MW-10, box and whiskers plots for calcium, chloride, sulfate, and TDS in all CCR groundwater monitoring system wells were prepared to allow comparison of these constituent concentrations between wells, surface water in the borrow area, and water from the facility's collector well near the river. The comparison of these constituents between wells, surface water, and the collector well indicates the constituent concentrations in MW-7 and MW-10 are generally near, within, or even below the range of concentrations from the other wells, surface water or the collector well. This demonstrates that a source other than the CCR Landfill could have caused the SSI over background levels, or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots are provided in **Appendix 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 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 (SO_4), Carbonate (CO_3), and Bicarbonate (HCO_3).

A piper diagram generated for MW-7, MW-10, the collector well, and leachate is provided in **Appendix** D and indicates the groundwater from the monitoring wells are similar and the collector well water plots slightly different from the monitoring wells but neither the groundwater nor the collector well water plot near the area the leachate plots. Therefore, these waters do not exhibit the same geochemical characteristics as the leachate. The groundwater, collector well and the leachate plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSIs over background levels or that the SSIs resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

4 CONCLUSION

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

5 GENERAL COMMENTS

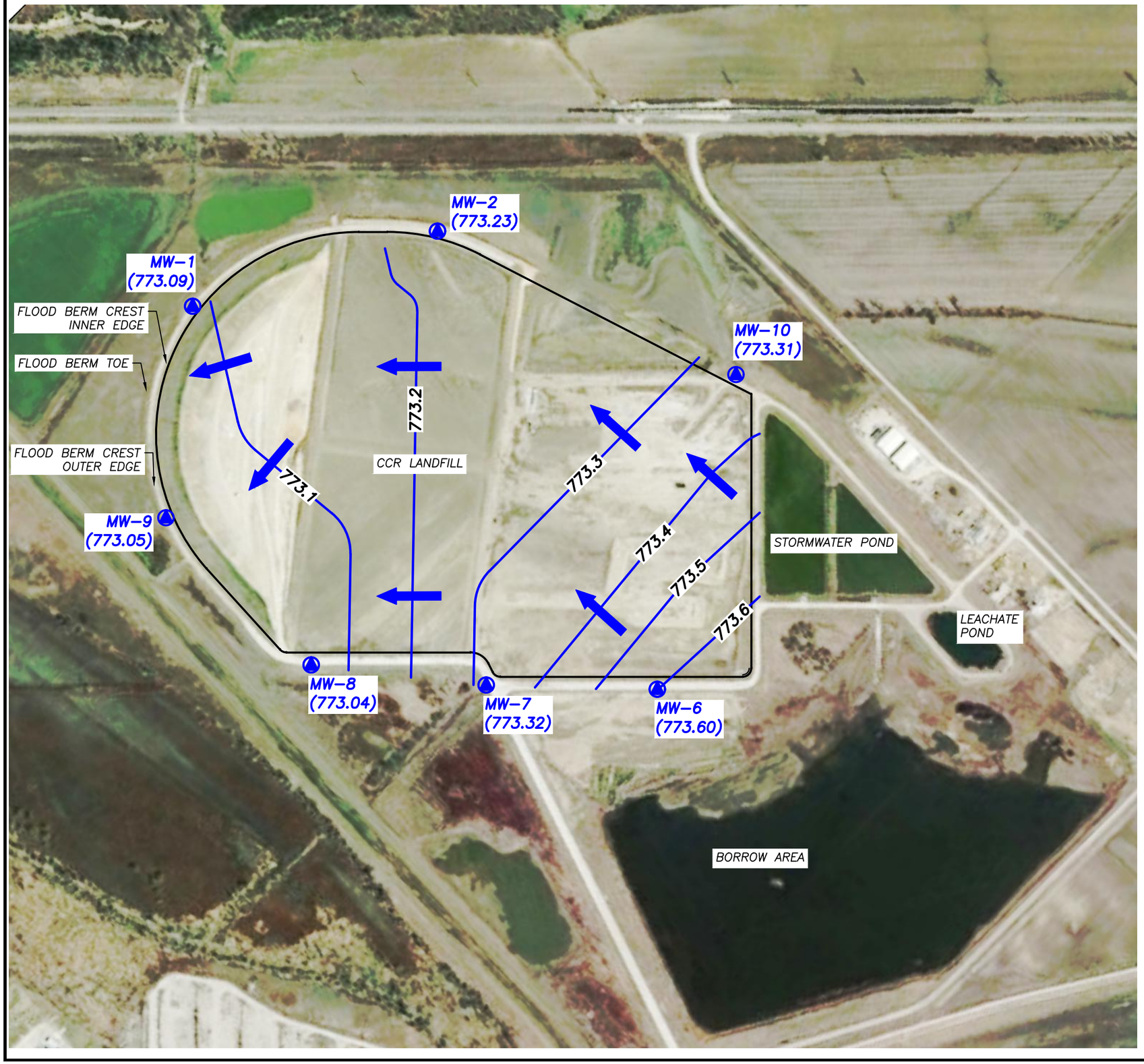
This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of Evergy Metro, Inc. for specific application to the Iatan 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 signatures. 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:

—773.0— GROUNDWATER SURFACE ELEVATIONS

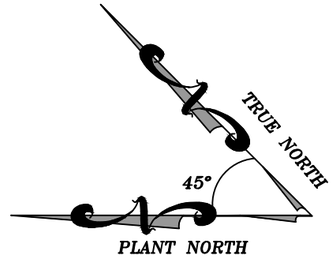
MW–1 773.09 CCR GROUNDWATER MONITORING WELL SYSTEM

UTILITY WASTE LANDFILL UNIT BOUNDARY

FLOW DIRECTION ARROW

NOTES:

1. HORIZONTAL DATUM: MISSOURI STATE PLANE COORDINATE SYSTEM, WEST ZONE (NAD 83)
2. VERTICAL DATUM: NAVD 88
3. GOOGLE EARTH IMAGE DATED MARCH 27, 2017. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE
4. BOUNDARY AND MONITOR WELL LOCATIONS PROVIDED BY BURNS & MCDONNELL
5. UTILITY WASTE LANDFILL UNIT BOUNDARY SHOWN IS APPROXIMATE.



500 0 500 1000

SCALE FEET

REV.	DATE	CK. BY
0	–	–
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–

SHEET TITLE
POTENTIOMETRIC SURFACE MAP
(MAY 2019)

PROJECT TITLE
CCR LANDFILL ALTERNATIVE SOURCE DEMONSTRATION

CLIENT
KANSAS CITY POWER & LIGHT COMPANY
IATAN GENERATING STATION
IATAN, MISSOURI

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

PROJ. NO.	DSN. BY:	Q/A RVW BY:
27213167.19	DAW	JRR
DSN. BY:	CHK. BY:	PROJ. MGR
JRR	JRR	JRR

CADD FILE:
CCR LANDFILL ALTERNATE SOURCE DEMONSTRATION.DWG

DATE:
10/21/19

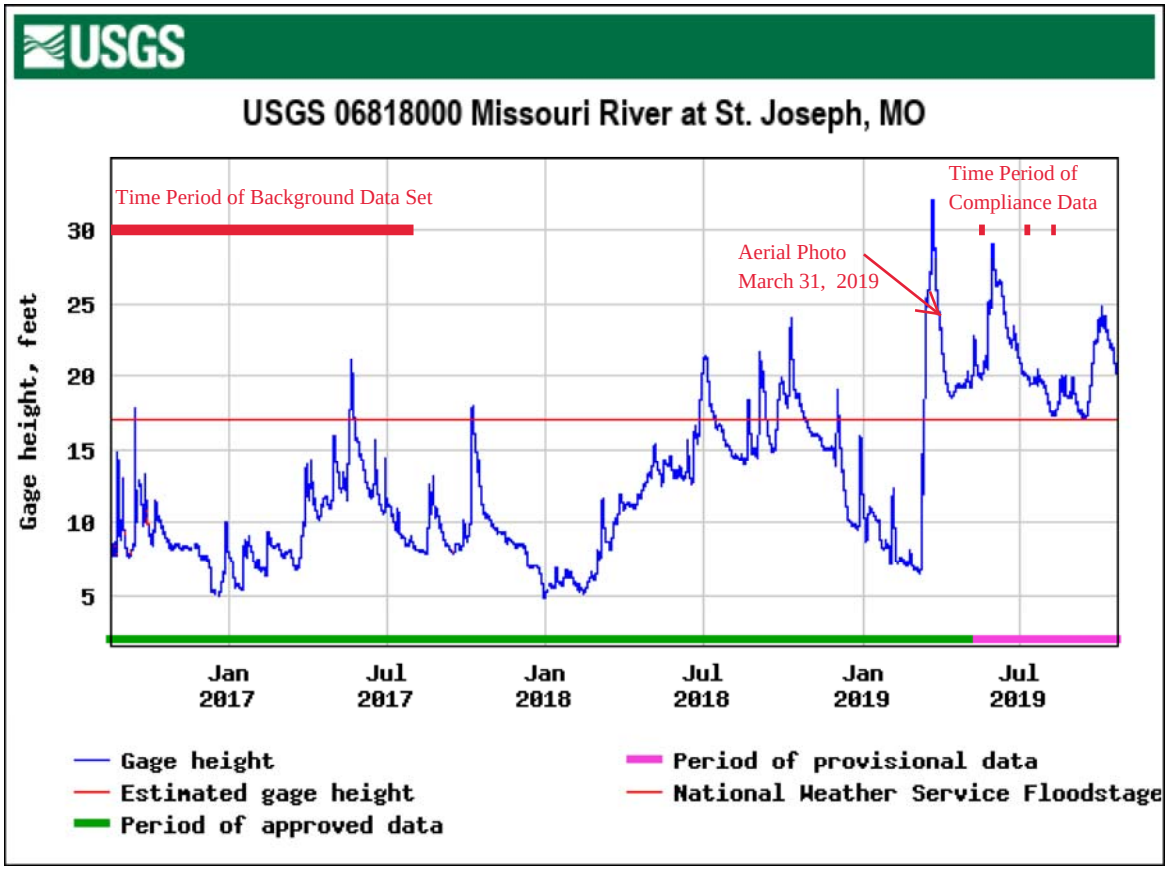
FIGURE NO.
1

Appendix B

Missouri River Stage Hydrograph

and

Google Maps Aerial Photograph

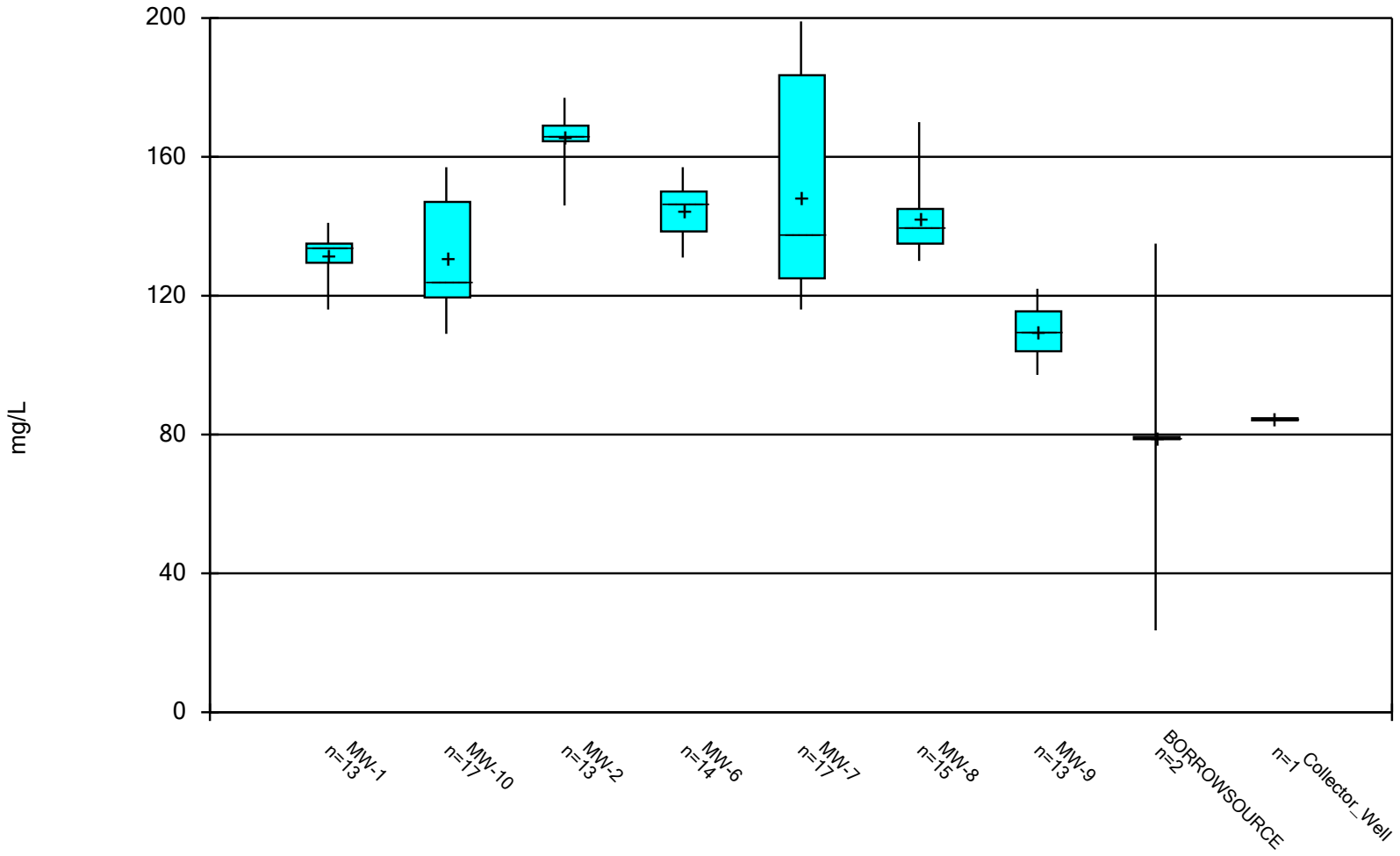

USGS
USGS 06818000 Missouri River at St. Joseph, MO
Time Period of Background Data Set
Time Period of Compliance Data
Aerial Photo March 31, 2019
Gage height, feet
30
25
20
15
10
5
Jan 2017
Jul 2017
Jan 2018
Jul 2018
Jan 2019
Jul 2019
Gage height
Estimated gage height
Period of approved data
Period of provisional data
National Weather Service Floodstage

3/31/19

Appendix C

Box and Whiskers Plots

Box & Whiskers Plot



Constituent: Calcium Analysis Run 10/21/2019 11:29 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

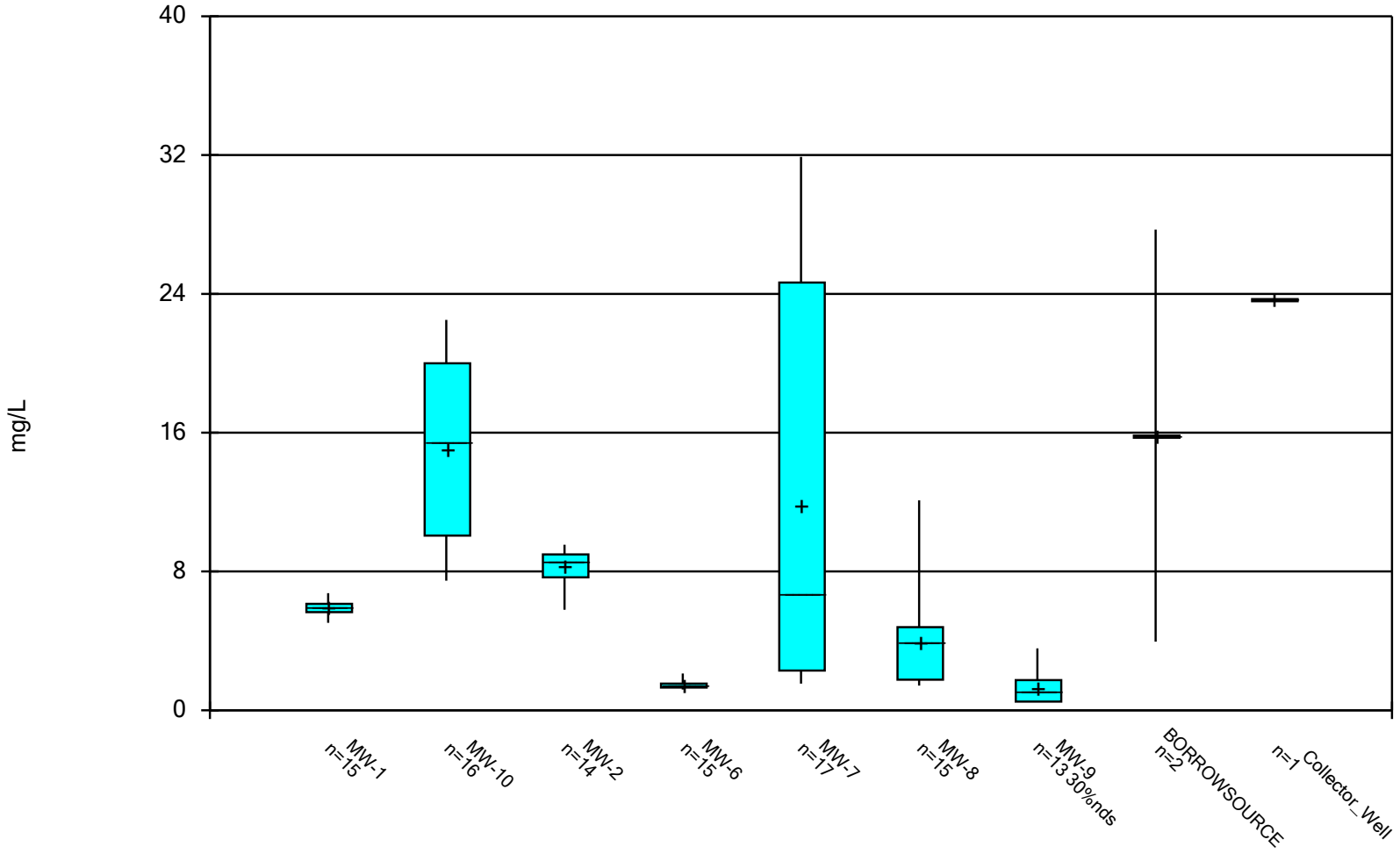
Box & Whiskers Plot

Constituent: Calcium (mg/L) Analysis Run 10/21/2019 12:39 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9	BORROWSOURCECollector_Well	
6/17/2016									84.7
8/18/2016	134	123	170	142	145	136	119		
9/29/2016	134	118	169	139	144	132	102		
11/9/2016	136	124	169	142	146	135	103		
12/21/2016	134	123	166	146	138	139	116		
2/3/2017	116	109	146	136	116	133	105		
5/24/2017	128	125	166	150	123	138	108		
7/5/2017	129	120	165	147	125	142	97.2		
8/17/2017	134	122	168	150	133	145	110	23.6	
10/5/2017	141	131	177	157	135	155	113	135	
11/14/2017	130	119	161	151	125	145	113		
5/21/2018	131	115	164	150	123	130	105		
11/12/2018	137	138	166	147	192	170	122		
1/10/2019		157			185	149			
3/14/2019		151			132	140			
5/20/2019	130	151	167	131	184	141	115		
7/11/2019		153	175 (i)	138	199				
8/20/2019		143			183				
Median	134	124	166	146.5	138	140	110	79.3	84.7
LowerQ.	129.5	119.5	164.5	138.5	125	135	104	79.3	84.7
UpperQ.	135	147	169	150	183.5	145	115.5	79.3	84.7
Min	116	109	146	131	116	130	97.2	23.6	84.7
Max	141	157	177	157	199	170	122	135	84.7
Mean	131.8	130.7	165.7	144.7	148.7	142	109.9	79.3	84.7

Box & Whiskers Plot



Constituent: Chloride Analysis Run 10/21/2019 11:30 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

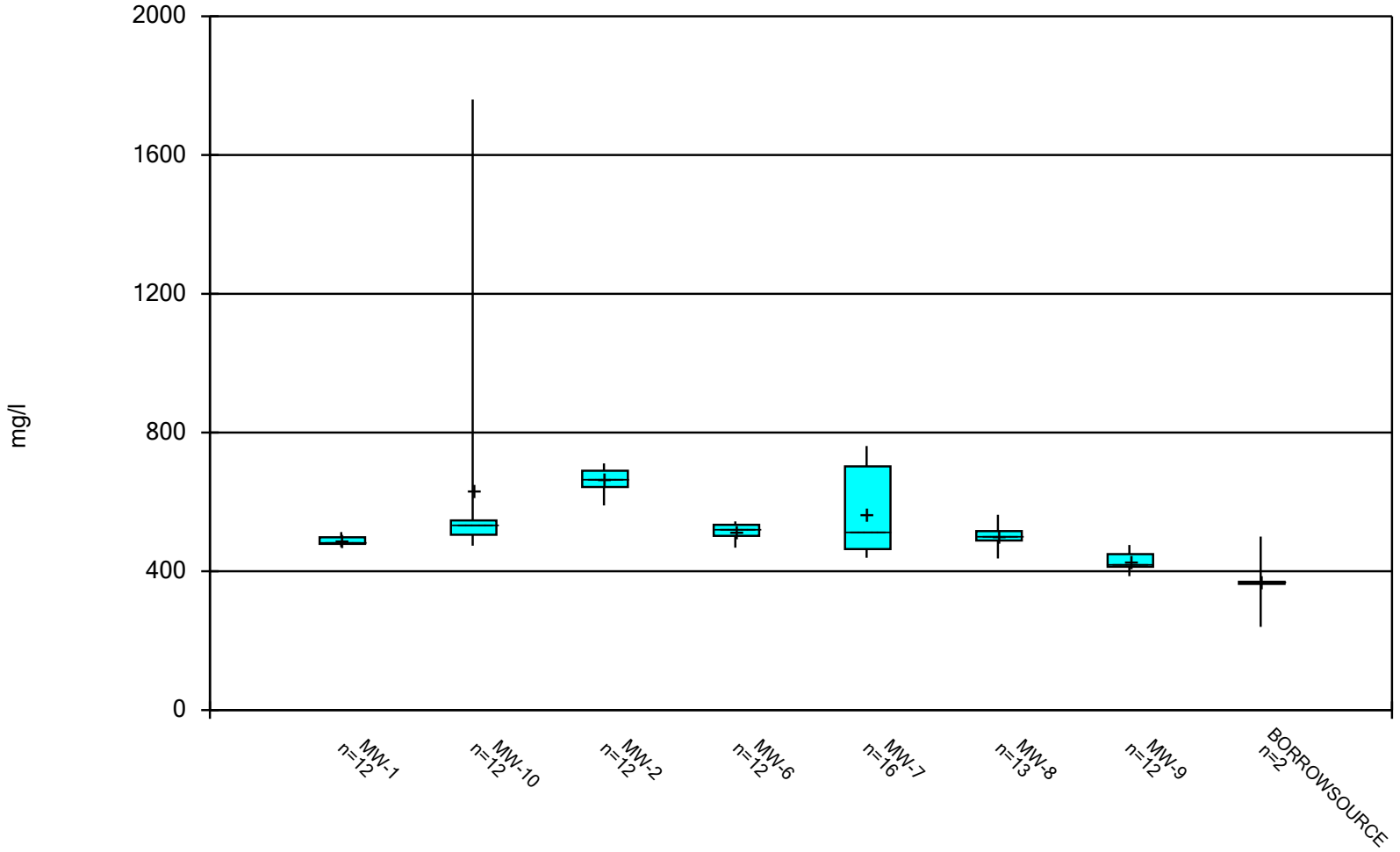
Box & Whiskers Plot

Constituent: Chloride (mg/L) Analysis Run 10/21/2019 12:39 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9	BORROWSOURCECollector_Well	
6/17/2016									23.7
8/18/2016	5.93	7.47	8.26	1.31	12.3	1.5	1.95		
9/29/2016	6.07	7.83	8.79	1.46	13.9	1.42	<1		
11/9/2016	5.95	9.15	8.76	1.29	11.1	1.76	<1		
12/21/2016	5.97	9.84	8.24	1.72	6.64	1.89	1.66		
2/3/2017	6	10.3	8.17	1.4	3.32	4.02	1.16		
5/24/2017	5.61	12.6	9.54	1.49	1.76	3.63	1.07		
7/5/2017	5.78	15.9	8.99	1.54	1.81	4.44	1.06		
8/17/2017	6.13	17.6	8.98	1.32	2	3.53	<1	3.96	
10/5/2017	6.75	19.7	9.23	2.09	3.32	4.55	3.57	27.7	
11/14/2017	6.73	17.6	8.97	2.12	2.58	4.86	1.82		
12/29/2017	6.27			1.45					
12/30/2017	5.99								
5/21/2018	5.63	14.1	8.14	1.45	1.54	1.5	<1		
11/12/2018	5.04	15.1	5.79	1.31	26.4	12.1	1.1		
1/10/2019		21			23.3	5.63			
3/14/2019					4.77	4.79			
5/20/2019	5.66	21	7.18	1.21	26	3.98	1.57		
7/11/2019		22.5	6.5	1.2	31.9				
8/20/2019		20.3			28.7				
Median	5.97	15.5	8.51	1.45	6.64	3.98	1.1	15.83	23.7
LowerQ.	5.66	10.07	7.66	1.31	2.29	1.76	0.5	15.83	23.7
UpperQ.	6.13	20	8.985	1.54	24.65	4.79	1.74	15.83	23.7
Min	5.04	7.47	5.79	1.2	1.54	1.42	0.5	3.96	23.7
Max	6.75	22.5	9.54	2.12	31.9	12.1	3.57	27.7	23.7
Mean	5.967	15.12	8.253	1.491	11.84	3.973	1.305	15.83	23.7

Box & Whiskers Plot



Constituent: Dissolved Solids Analysis Run 10/21/2019 11:30 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

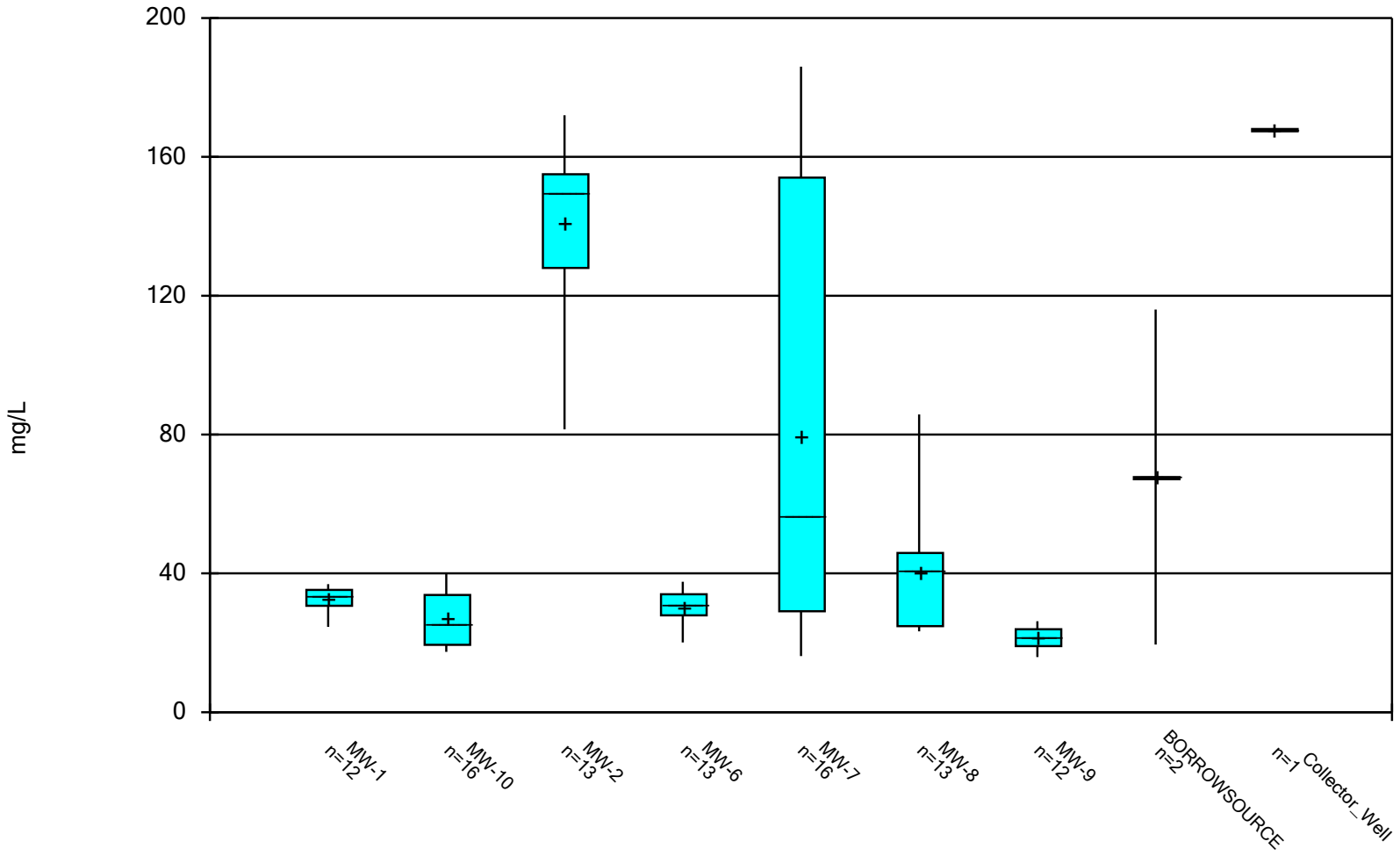
Box & Whiskers Plot

Constituent: Dissolved Solids (mg/l) Analysis Run 10/21/2019 12:39 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9	BORROWSOURCE
8/18/2016	513	532	696	522	560	494	475	
9/29/2016	486	502	651	498	554	517	398	
11/9/2016	484	516	711	506	538	471	476	
12/21/2016	493	497	636	519	492	493	415	
2/3/2017	506	531	661	527	487	515	442	
5/24/2017	477	1760	690	544	462	485	415	
7/5/2017	481	474	638	508	445	500	386	
8/17/2017	500	539	690	542	466	504	431	240
10/5/2017	472	539	683	528	459	505	414	500
5/21/2018	496	509	648	540	439	437	412	
11/12/2018	485	554	590	484	681	563	435	
1/10/2019					724	502		
3/14/2019					472			
5/20/2019	470	697	666	468	737	518	457	
7/11/2019					761			
8/20/2019					743			
Median	485.5	531.5	663.5	520.5	515	502	423	370
LowerQ.	479	505.5	643	502	464	489	413	370
UpperQ.	498	546.5	690	534	702.5	516	449.5	370
Min	470	474	590	468	439	437	386	240
Max	513	1760	711	544	761	563	476	500
Mean	488.6	637.5	663.3	515.5	563.8	500.3	429.7	370

Box & Whiskers Plot



Constituent: Sulfate Analysis Run 10/21/2019 11:30 AM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Box & Whiskers Plot

Constituent: Sulfate (mg/L) Analysis Run 10/21/2019 12:39 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

	MW-1	MW-10	MW-2	MW-6	MW-7	MW-8	MW-9	BORROWSOURCECollector_Well	
6/17/2016									168
8/18/2016	32.4	17.8	142	30.2	70.2	23.3	16.7		
9/29/2016	35.3	19.7	151	33.5	70.6	24.2	26.2		
11/9/2016	33.2	17.4	155	31.4	62.6	23.8	23		
12/21/2016	36.2	17.7	155	28.6	50	25.5	22.2		
2/3/2017	36.9	19.1	150	28.5	41.9	39.6	21.1		
5/24/2017	27.4	22.4	172	32.7	16.2	42.8	15.9		
7/5/2017	34.2	24.7	158	37.2	19.5	54.8	24.8		
8/17/2017	35.2	26.5	149	37.6	34.1	43	19.8	19.5	
10/5/2017	34.5	26.4	151	34.5	24.3	43.4	21.5	116	
5/21/2018	32.6	23.6	137	30.9	23.8	25.4	18.3		
11/12/2018	24.6	32.9	81.5	27.3	149	85.8	25.8		
1/10/2019		38			159	48.4			
3/14/2019		40.1			33.9				
5/20/2019	28.9	37.3	119	20.2	166	40.9	22.8		
7/11/2019		33	112	20.1	186				
8/20/2019		34.6			166				
Median	33.7	25.55	150	30.9	56.3	40.9	21.85	67.75	168
LowerQ.	30.65	19.4	128	27.9	29.1	24.8	19.05	67.75	168
UpperQ.	35.25	33.8	155	34	154	45.9	23.9	67.75	168
Min	24.6	17.4	81.5	20.1	16.2	23.3	15.9	19.5	168
Max	36.9	40.1	172	37.6	186	85.8	26.2	116	168
Mean	32.62	26.95	141	30.21	79.57	40.07	21.51	67.75	168

Box & Whiskers Plot

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr Printed 10/21/2019, 12:39 PM

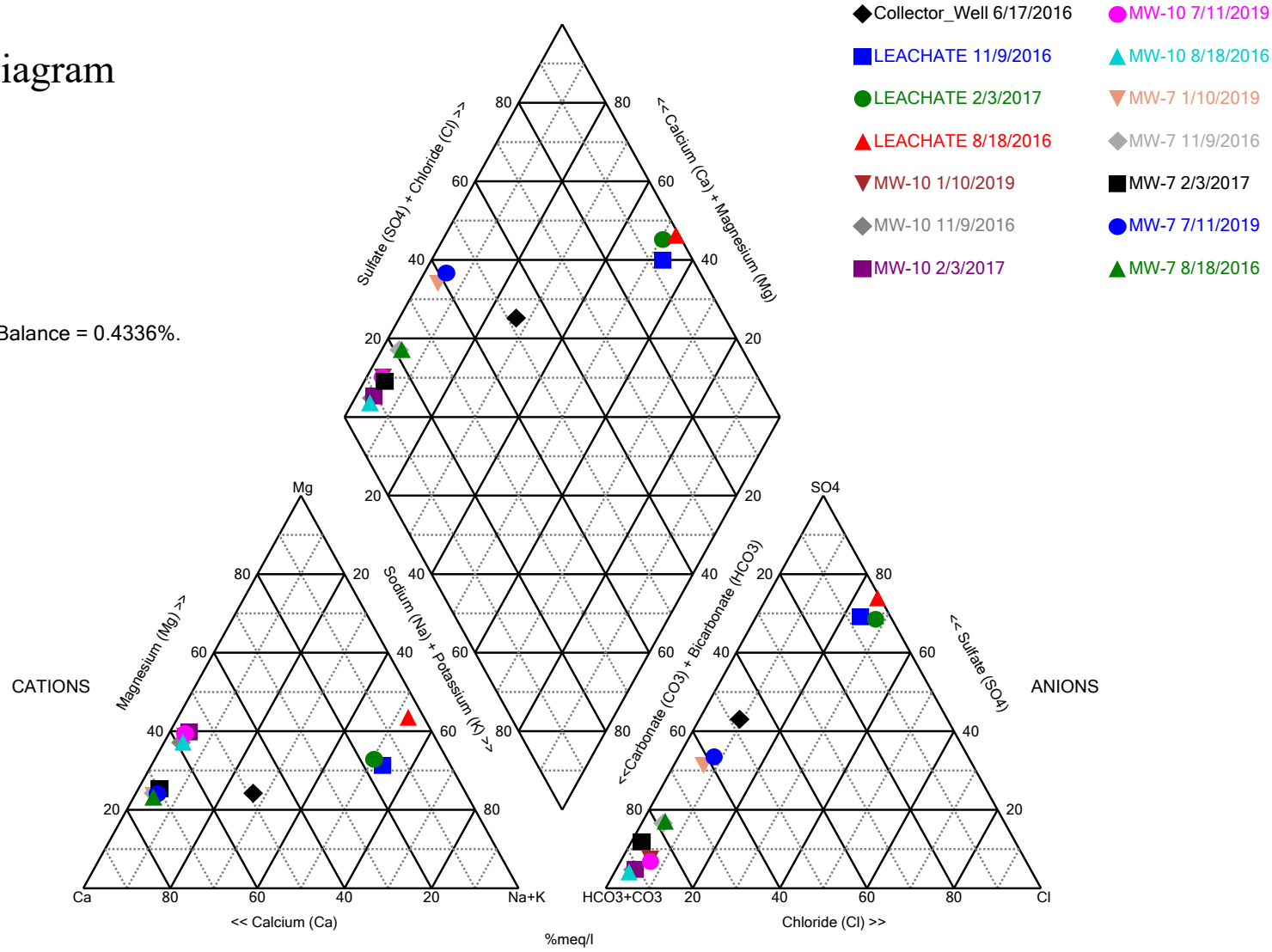
Constituent	Well	N	Mean	Std. Dev.	Std. Err.	Median	Min.	Max.	%NDs
Calcium (mg/L)	MW-1	13	131.8	5.97	1.656	134	116	141	0
Calcium (mg/L)	MW-10	17	130.7	15.04	3.648	124	109	157	0
Calcium (mg/L)	MW-2	13	165.7	7.005	1.943	166	146	177	0
Calcium (mg/L)	MW-6	14	144.7	7.032	1.879	146.5	131	157	0
Calcium (mg/L)	MW-7	17	148.7	27.98	6.787	138	116	199	0
Calcium (mg/L)	MW-8	15	142	10.21	2.637	140	130	170	0
Calcium (mg/L)	MW-9	13	109.9	7.272	2.017	110	97.2	122	0
Calcium (mg/L)	BORROWSOURCE	2	79.3	78.77	55.7	79.3	23.6	135	0
Calcium (mg/L)	Collector...	1	84.7	0	0	84.7	84.7	84.7	0
Chloride (mg/L)	MW-1	15	5.967	0.4274	0.1103	5.97	5.04	6.75	0
Chloride (mg/L)	MW-10	16	15.12	5.1	1.275	15.5	7.47	22.5	0
Chloride (mg/L)	MW-2	14	8.253	1.076	0.2876	8.51	5.79	9.54	0
Chloride (mg/L)	MW-6	15	1.491	0.2829	0.07305	1.45	1.2	2.12	0
Chloride (mg/L)	MW-7	17	11.84	11.04	2.677	6.64	1.54	31.9	0
Chloride (mg/L)	MW-8	15	3.973	2.661	0.687	3.98	1.42	12.1	0
Chloride (mg/L)	MW-9	13	1.305	0.8553	0.2372	1.1	0.5	3.57	30.77
Chloride (mg/L)	BORROWSOURCE	2	15.83	16.79	11.87	15.83	3.96	27.7	0
Chloride (mg/L)	Collector...	1	23.7	0	0	23.7	23.7	23.7	0
Dissolved Solids (mg/l)	MW-1	12	488.6	13.34	3.85	485.5	470	513	0
Dissolved Solids (mg/l)	MW-10	12	637.5	357.8	103.3	531.5	474	1760	0
Dissolved Solids (mg/l)	MW-2	12	663.3	33.46	9.659	663.5	590	711	0
Dissolved Solids (mg/l)	MW-6	12	515.5	23.66	6.831	520.5	468	544	0
Dissolved Solids (mg/l)	MW-7	16	563.8	121.5	30.36	515	439	761	0
Dissolved Solids (mg/l)	MW-8	13	500.3	28.83	7.995	502	437	563	0
Dissolved Solids (mg/l)	MW-9	12	429.7	28.65	8.27	423	386	476	0
Dissolved Solids (mg/l)	BORROWSOURCE	2	370	183.8	130	370	240	500	0
Sulfate (mg/L)	MW-1	12	32.62	3.775	1.09	33.7	24.6	36.9	0
Sulfate (mg/L)	MW-10	16	26.95	7.937	1.984	25.55	17.4	40.1	0
Sulfate (mg/L)	MW-2	13	141	23.93	6.636	150	81.5	172	0
Sulfate (mg/L)	MW-6	13	30.21	5.456	1.513	30.9	20.1	37.6	0
Sulfate (mg/L)	MW-7	16	79.57	62.23	15.56	56.3	16.2	186	0
Sulfate (mg/L)	MW-8	13	40.07	17.39	4.824	40.9	23.3	85.8	0
Sulfate (mg/L)	MW-9	12	21.51	3.352	0.9676	21.85	15.9	26.2	0
Sulfate (mg/L)	BORROWSOURCE	2	67.75	68.24	48.25	67.75	19.5	116	0
Sulfate (mg/L)	Collector...	1	168	0	0	168	168	168	0

Appendix D

Piper Diagram

Piper Diagram

Cation-Anion Balance = 0.4336%.



Analysis Run 10/21/2019 12:47 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Piper Diagram

Analysis Run 10/21/2019 12:49 PM View: CCR LF III

Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

Totals (ppm)	Na	K	Ca	Mg	Cl	SO4	HCO3	CO3
MW-10 8/18/2016	7.77	4.45	123	47.3	7.47	17.8	480	10
MW-10 11/9/2016	7.11	4.02	124	47.3	9.15	17.4	428	10
MW-10 2/3/2017	7.2	3.93	109	46.7	10.3	19.1	442	10
MW-10 1/10/2019	8.51	5.08	157	64.3	21	38	555	10
MW-10 7/11/2019	8.12	5.11	153	63.8	22.5	33	537	10
MW-7 8/18/2016	6.92	5.9	145	27.5	12.3	70.2	398	10
MW-7 11/9/2016	6.72	5.56	146	29.3	11.1	62.6	368	10
MW-7 2/3/2017	6.29	5.3	116	25.4	3.32	41.9	375	10
MW-7 1/10/2019	8.87	6.61	185	36.8	23.3	159	386	10
MW-7 7/11/2019	12.3	7.2	199	40.9	31.9	186	404	10
LEACHATE 8/18/2016	9250	689	573	4240	6990	28000	644	10
LEACHATE 11/9/2016	1230	90.7	334	398	876	3460	480	10
LEACHATE 2/3/2017	1880	121	560	671	1760	6070	505	10
Collector_Well 6/17/2016	49.6	6.96	84.7	25.3	23.7	168	221	10