# 2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

# CCR LANDFILL
# IATAN GENERATING STATION
# PLATTE COUNTY, MISSOURI

Presented To:
Evergy Metro, Inc.

SCS ENGINEERS

27213167.20 | January 2021 | Revision 1, April 2021

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 2020 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).

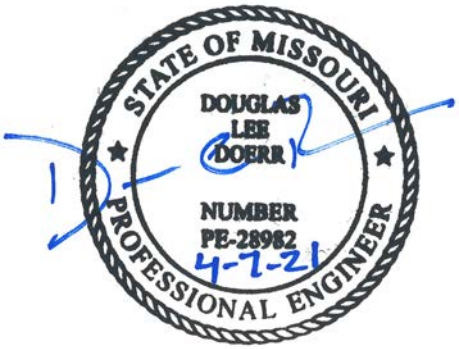
John R. Rockhold

Digitally signed by John R. Rockhold
Date: 2021.04.07 16:11:17 -05'00'


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 2020 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, P.E.

SCS Engineers

| Revision Number | Revision Date | Revision Sections | Summary of Revisions |
|---|---|---|---|
| 1 | April 7, 2021 | Table of Contents<br>Appendix A | Addition of Potentiometric Surface Maps to Appendix A |
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## Appendices

# 1 INTRODUCTION

This 2020 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), and subsequent revisions. Specifically, this report was prepared for Evergy Metro, Inc. (Evergy) 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 2020 Annual Groundwater Monitoring and Corrective Action Report for the CCR Landfill at the Iatan Generating Station.

## 1.1 § 257.90(e)(6) SUMMARY

*A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:*

### 1.1.1 § 257.90(e)(6)(i) Initial Monitoring Program

*At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;*

At the start of the current annual reporting period, (January 1, 2020), the CCR Landfill was operating under a detection monitoring program in compliance with § 257.94.

### 1.1.2 § 257.90(e)(6)(ii) Final Monitoring Program

*At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;*

At the end of the current annual reporting period, (December 31, 2020), the CCR Landfill was operating under a detection monitoring program in compliance with § 257.94.

### 1.1.3 § 257.90(e)(6)(iii) Statistically Significant Increases

*If it was determined that there was a statistically significant increase over background for one or more constituents listed in Appendix III to this part pursuant to § 257.94(e):*

*(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and*

| Monitoring Event | Monitoring Well | Constituent | ASD |
|---|---|---|---|
| Fall 2019 | MW-1 | Fluoride | Successful |
| Spring 2020 | MW-10 | Sulfate | Successful |

*(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.*

Not applicable because an assessment monitoring program was not initiated.

### 1.1.4 § 257.90(e)(6)(iv) Statistically Significant Levels

*If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in Appendix IV to this part pursuant to § 257.95(g) include all of the following:*

*(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;*

Not applicable because there was no assessment monitoring conducted.

*(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;*

Not applicable because there was no assessment of corrective measures initiated for the CCR Unit.

*(C) Provide the date when the public meeting was held for the assessment of corrective measures for the* CCR unit*; and*

Not applicable because there was no assessment of corrective measures initiated for the CCR Unit.

*(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.*

Not applicable because there was no assessment of corrective measures initiated for the CCR Unit.

### 1.1.5 § 257.90(e)(6)(v) Selection of Remedy

*Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and*

Not applicable because corrective measures are not required.

### 1.1.6 § 257.90(e)(6)(vi) Remedial Activities

*Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.*

Not applicable because corrective measures are not required.

# 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 2020.

## 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 required to be conducted during the reporting period (2020). Samples collected in 2020 were collected and analyzed for Appendix III detection monitoring constituents. Additionally, Appendix IV constituents were analyzed with the spring event for potential future updating of background data in conformance with EPA Unified Guidance and industry standards. Results of the sampling events are provided in **Appendix B**, **Table 1** (Appendix III with Supplemental Appendix IV Detection Monitoring Results), and **Table 2** (Detection Monitoring Field Measurements). These tables include Fall 2019 semiannual detection monitoring event verification sample data collected and analyzed in 2020; Spring 2020 semiannual detection monitoring data, verification sample data, and supplementary

Appendix IV sample data; and, the initial Fall 2020 semiannual detection monitoring data. The dates of sample collection and the monitoring program requiring the sample are also provided in these tables.

## 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 2020. Only detection monitoring was conducted in 2020.

## 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 2019 verification sampling and analyses per the certified statistical method,

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

c. completion of the 2019 Annual Groundwater Monitoring and Corrective Action Report,

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

e. completion of the Spring 2020 semiannual detection monitoring sampling and analysis event with subsequent verification sampling per the certified statistical method, and supplemental Appendix IV sample analysis,

f. completion of the statistical evaluation of the Spring 2020 semiannual detection monitoring sampling and analysis event per the certified statistical method,

g. completion of a successful alternative source demonstration for the Spring 2020 semiannual detection monitoring sampling and analysis event, and

*h.* initiation of the Fall 2020 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 (2021).*

Completion of verification sampling and data analysis, and the statistical evaluation of Fall 2020 detection monitoring sampling and analysis event. Semiannual Spring and Fall 2021 groundwater sampling and analysis. Completion of the statistical evaluation of the Spring 2021 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 Groundwater Monitoring Alternative Source Demonstration Report November 2019 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (June 2020).

C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2020 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (December 2020).

### 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.

## 2.6 § 257.90(e)(6) OVERVIEW SUMMARY

*A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit.*

§ 257.90(e)(6) is addressed in Section 1.1 of this report.

# 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.

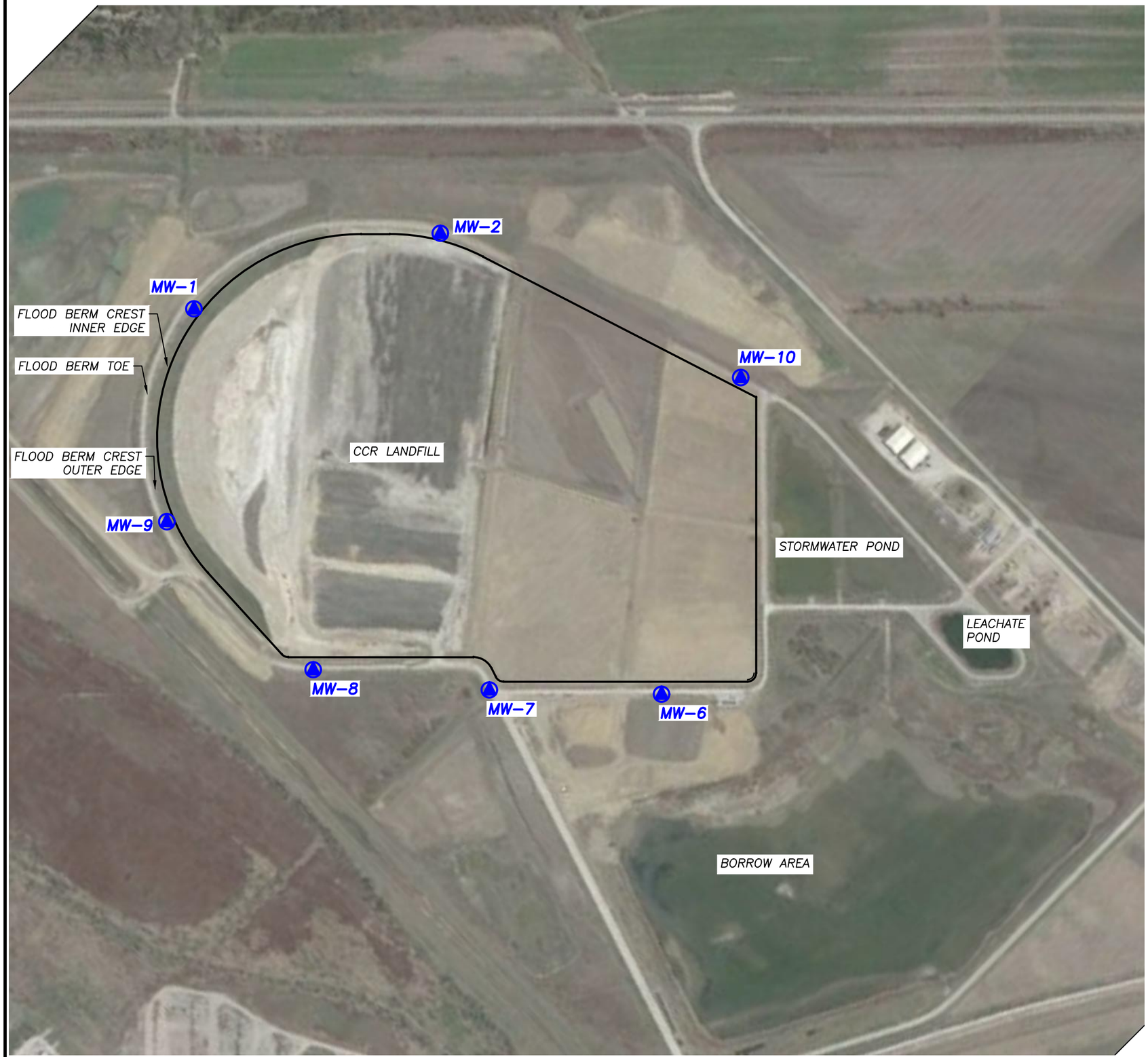
# APPENDIX A

## FIGURES

Figure 1: Site Map

Figure 2: Potentiometric Surface Map (May 2020)

Figure 3: Potentiometric Surface Map (November 2020)

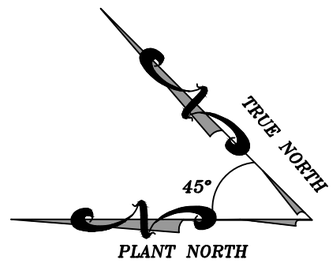



*LEGEND:*

- 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 APRIL 2018. 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.

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SHEET TITLE: SITE MAP
CCR LANDFILL
CCR GROUNDWATER MONITORING SYSTEM

PROJECT TITLE: 2020 GROUNDWATER MONITORING AND CORRECTION ACTION REPORT

CLIENT: EVERGY METRO, INC.
IATAN GENERATING STATION
WESTON, MISSOURI

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8575 W. 110th St, Ste. 100
Overland Park, Kansas 66210
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PROJ. NO. 27213167.20
DSN. BY: ALR
CHK. BY: JRR
Q/A REVIEW BY: JRR
PROJ. MGR: JRR

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DATE: 1/14/21

FIGURE NO. 1

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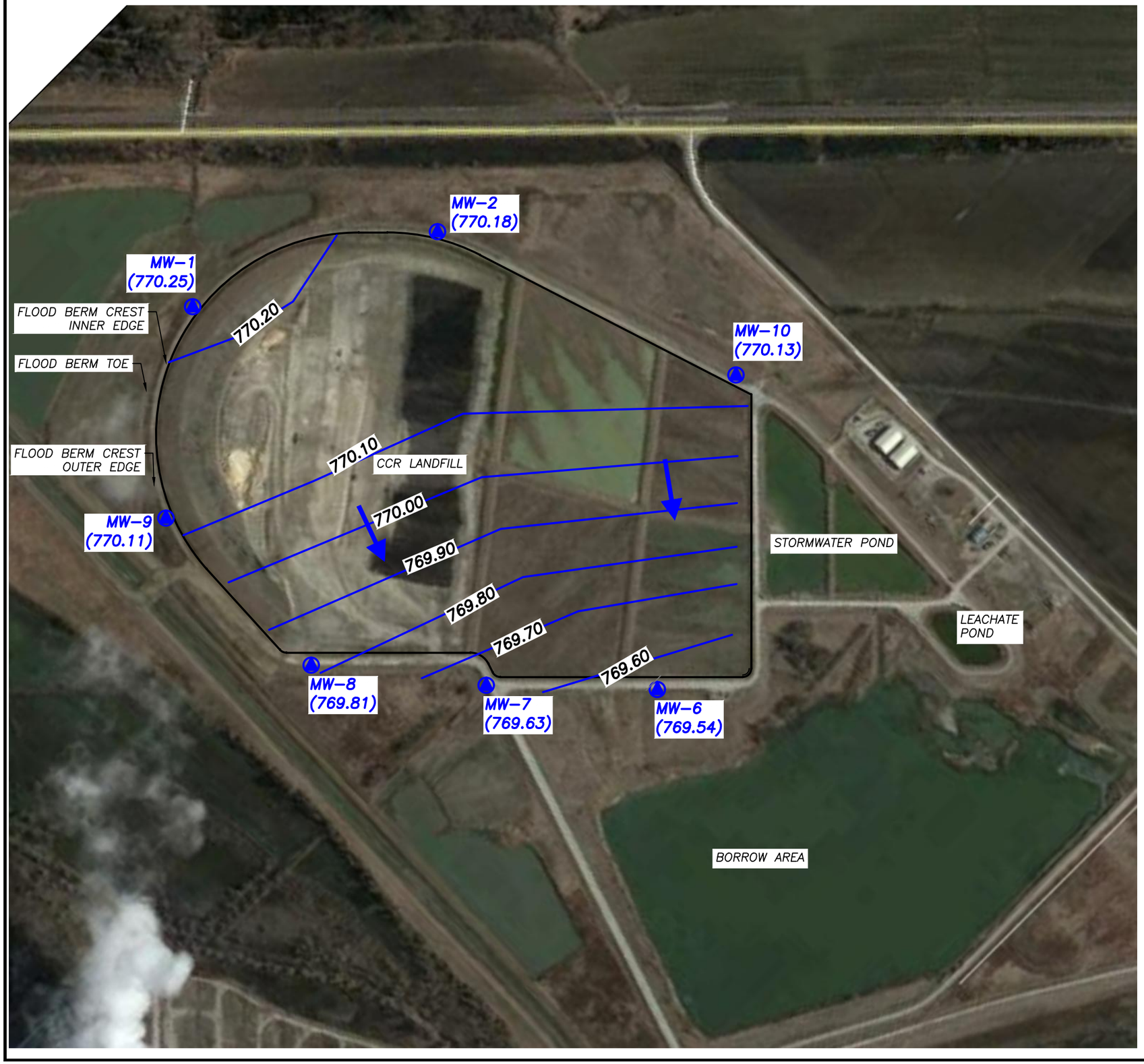



*LEGEND:*

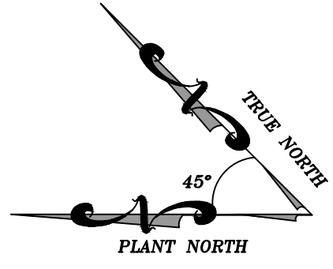
—773.0— GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS

MW–1 773.09 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 FEBRUARY 20, 2020. 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.

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SHEET TITLE: POTENTIOMETRIC SURFACE MAP (MAY 2020)

PROJECT TITLE: IATAN GROUNDWATER 2020

CLIENT: EVERGY METRO, INC.
IATAN GENERATING STATION
IATAN, MISSOURI

SCS ENGINEERS
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Overland Park, Kansas 66210
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| 27213167.20 | MBJ | JRR |
| DSN. BY: | CHK. BY: | PROJ. MGR |
| TGW | JRR | JRR |

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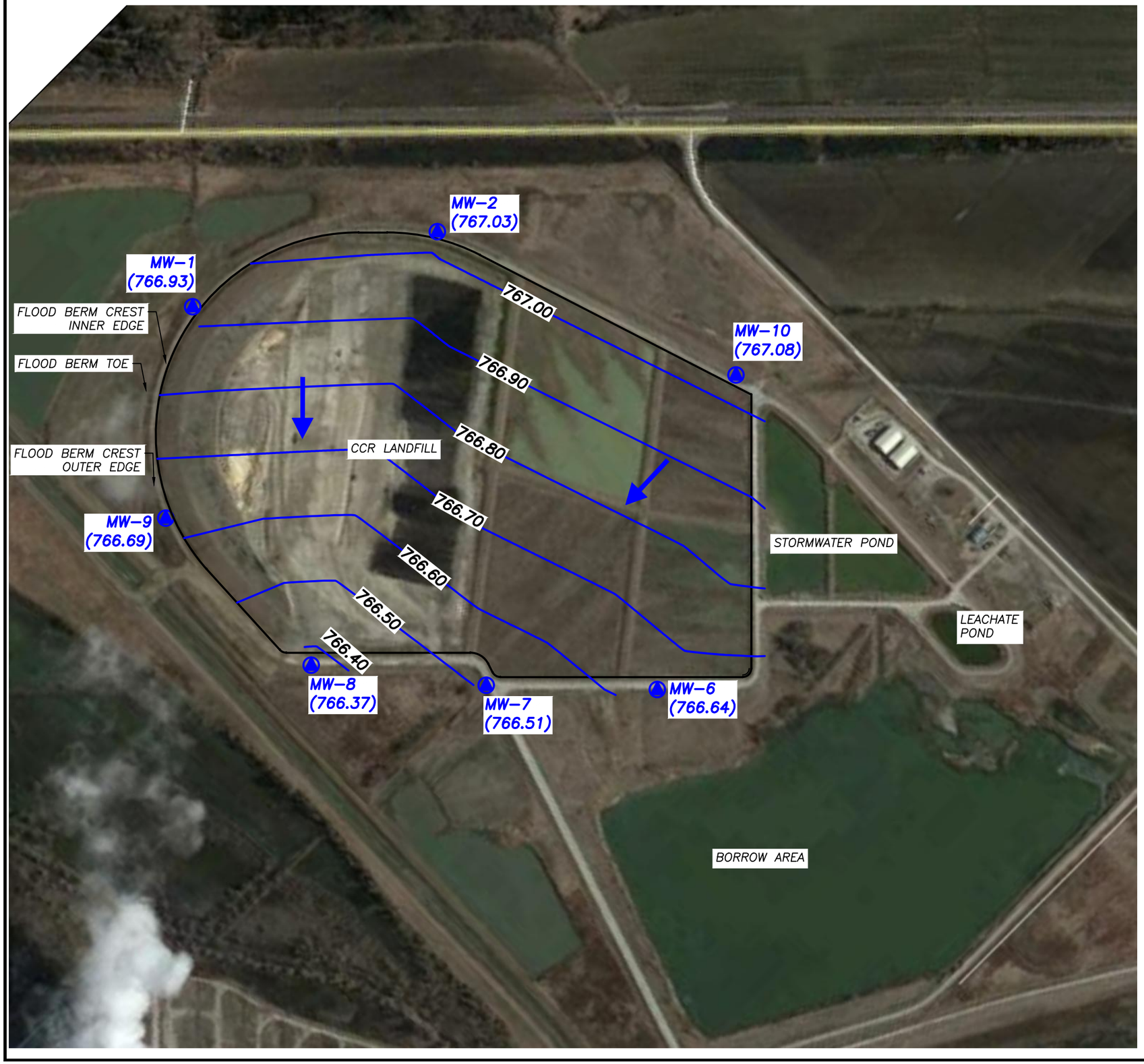
DATE: 7/1/20

FIGURE NO. 2




LEGEND:

—767.0— GROUNDWATER POTENTIOMETRIC SURFACE ELEVATIONS

MW–1 773.09 CCR GROUNDWATER MONITORING WELL SYSTEM

UTILITY WASTE 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 FEBRUARY 20, 2020. BOUNDARY AND MONITOR WELL LOCATIONS ARE APPROXIMATE
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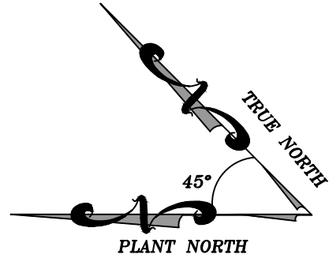
5. CCR LANDFILL UNIT BOUNDARY SHOWN IS APPROXIMATE.

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| 5 | - | - |

SHEET TITLE
POTENTIOMETRIC SURFACE MAP
(NOVEMBER 2020)

PROJECT TITLE
IATAN GROUNDWATER 2020

CLIENT
EVERGY METRO, INC.
IATAN GENERATING STATION
IATAN, MISSOURI

SCS ENGINEERS
8575 W. 110th St, Ste. 100
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PROJ. NO. 27213167.20
DSN. BY: TGW
DWN. BY: ALR
CHK. BY: JRR
Q/A REW BY: JRR
PROJ. MGR JRR

CADD FILE:
IATAN LF CCR MDNR FIG 2 NOV20 V3.DWG

DATE:
1/15/21

FIGURE NO.
3

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# APPENDIX B

## TABLES

Table 1: Appendix III with Supplemental Appendix IV Detection Monitoring Results

Table 2: Detection Monitoring Field Measurements

**Table 1**
**CCR Landfill**
**Appendix III with Supplemental Appendix IV Detection Monitoring Results**
**Evergy Iatan Generating Station**

| | | Appendix III Constituents | | | | | | | Appendix IV Constituents | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Number | Sample Date | Boron (mg/L) | Calcium (mg/L) | Chloride (mg/L) | Fluoride (mg/L) | pH (S.U.) | Sulfate (mg/L) | Total Dissolved Solids (mg/L) | Antimony (mg/L) | Arsenic (mg/L) | Barium (mg/L) | Beryllium (mg/L) | Cadmium (mg/L) | Chromium (mg/L) | Cobalt (mg/L) | Fluoride (mg/L) | Lead (mg/L) | Lithium (mg/L) | Mercury (mg/L) | Molybdenum (mg/L) | Selenium (mg/L) | Thallium (mg/L) | Radium Combined (pCi/L) |
| MW-1 | 01/15/20 | --- | --- | --- | *0.326 | **7.04 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-1 | 02/04/20 | --- | --- | --- | *0.329 | **6.91 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-1 | 05/20/20 | <0.200 | 131 | 5.60 | 0.240 | 6.81 | 27.6 | 507 | <0.00400 | 0.0136 | 0.239 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.240 | <0.00500 | 0.0515 | <0.000200 | <0.00500 | <0.00200 | <0.00200 | 1.88 |
| MW-1 | 11/09/20 | <0.200 | 134 | 5.24 | 0.271 | 7.34 | 30.9 | 520 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-2 | 01/15/20 | --- | --- | --- | *0.374 | **7.02 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-2 | 05/20/20 | <0.200 | 164 | 7.28 | 0.286 | 6.81 | 126 | 659 | <0.00400 | 0.0219 | 0.216 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.286 | <0.00500 | 0.0528 | <0.000200 | <0.00500 | <0.00200 | <0.00200 | 1.91 |
| MW-2 | 11/09/20 | <0.200 | 167 | 7.03 | 0.313 | 7.26 | 129 | 640 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-6 | 01/15/20 | --- | --- | --- | --- | *7.26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-6 | 05/20/20 | <0.200 | 138 | 1.55 | 0.264 | 6.83 | 20.4 | 491 | <0.00400 | 0.0215 | 0.281 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.264 | <0.00500 | 0.0342 | <0.000200 | <0.00500 | <0.00200 | <0.00200 | 0.737 |
| MW-6 | 07/13/20 | --- | --- | --- | --- | *6.84 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-6 | 08/25/20 | --- | --- | --- | --- | *7.15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-6 | 11/09/20 | <0.200 | 160 | 1.60 | 0.308 | 7.09 | 24.8 | 548 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-7 | 01/15/20 | --- | --- | --- | --- | *7.15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-7 | 05/20/20 | <0.200 | 140 | 8.49 | 0.291 | 6.82 | 54.4 | 525 | <0.00400 | 0.00768 | 0.223 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.291 | <0.00500 | 0.0394 | <0.000200 | <0.00500 | <0.00200 | <0.00200 | 1.81 |
| MW-7 | 07/13/20 | --- | --- | --- | --- | *6.87 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-7 | 11/09/20 | <0.200 | 132 | 3.18 | 0.288 | 7.45 | 34.0 | 453 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-8 | 01/15/20 | --- | --- | --- | --- | *7.31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-8 | 05/20/20 | <0.200 | 144 | 4.89 | 0.336 | 6.98 | 45.0 | 516 | <0.00400 | 0.0115 | 0.217 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.336 | <0.00500 | 0.0401 | <0.000200 | <0.00500 | <0.00200 | <0.00200 | 1.23 |
| MW-8 | 08/25/20 | --- | --- | --- | --- | *7.23 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-8 | 11/09/20 | <0.200 | 158 | 9.92 | 0.357 | 7.52 | 58.5 | 571 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-9 | 01/15/20 | --- | --- | *<1.00 | *0.445 | **7.24 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-9 | 05/20/20 | <0.200 | 105 | <1.00 | 0.389 | 7.02 | 20.7 | 385 | <0.00400 | 0.0196 | 0.109 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.389 | <0.00500 | 0.0320 | <0.000200 | 0.0117 | <0.00200 | <0.00200 | 1.30 |
| MW-9 | 11/09/20 | <0.200 | 123 | 1.30 | 0.324 | 7.00 | 17.4 | 475 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10 | 01/15/20 | --- | --- | --- | *0.637 | **7.18 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10 | 05/20/20 | <0.200 | 150 | 16.4 | 0.517 | 6.92 | 43.1 | 585 | <0.00400 | 0.0153 | 0.187 | <0.00200 | <0.00100 | <0.0100 | <0.0100 | 0.517 | <0.00500 | 0.0230 | <0.000200 | 0.0253 | <0.00200 | <0.00200 | 0.857 |
| MW-10 | 07/13/20 | --- | --- | --- | --- | **6.96 | *47.7 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10 | 08/25/20 | --- | --- | --- | --- | **7.00 | *47.9 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10 | 11/09/20 | <0.200 | 158 | 16.7 | 0.476 | 7.02 | 42.3 | 645 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

* 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 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 | 01/15/20 | **7.04 | 899 | 13.12 | 1.2 | -100 | 0.00 | 17.42 | 771.27 |
| MW-1 | 02/04/20 | **6.91 | 895 | 12.77 | 7.0 | -99 | 0.00 | 17.70 | 770.99 |
| MW-1 | 05/20/20 | 6.81 | 892 | 14.71 | 12.9 | -123 | 0.00 | 18.44 | 770.25 |
| MW-1 | 11/09/20 | 7.34 | 792 | 15.75 | 0.6 | -116 | 0.73 | 21.76 | 766.93 |
| MW-2 | 01/15/20 | **7.02 | 1110 | 13.71 | 0.9 | -100 | 0.00 | 18.30 | 771.31 |
| MW-2 | 05/20/20 | 6.81 | 1090 | 15.15 | 11.2 | -112 | 0.00 | 19.43 | 770.18 |
| MW-2 | 11/09/20 | 7.26 | 941 | 15.94 | 10.7 | -111 | 0.69 | 22.58 | 767.03 |
| MW-6 | 01/15/20 | *7.26 | 915 | 13.12 | 10.5 | -100 | 0.00 | 18.80 | 770.85 |
| MW-6 | 05/20/20 | 6.83 | 890 | 15.27 | 15.7 | -74 | 0.00 | 20.11 | 769.54 |
| MW-6 | 07/13/20 | *6.84 | 857 | 15.44 | 28.1 | -65 | 0.00 | 20.81 | 768.84 |
| MW-6 | 08/25/20 | *7.15 | 821 | 18.68 | 17.5 | -117 | 2.55 | 20.69 | 768.96 |
| MW-6 | 11/09/20 | 7.09 | 1010 | 16.16 | 9.9 | -103 | 0.19 | 23.01 | 766.64 |
| MW-7 | 01/15/20 | *7.15 | 1120 | 14.21 | 6.5 | -71 | 0.00 | 18.83 | 770.82 |
| MW-7 | 05/20/20 | 6.82 | 897 | 14.69 | 5.0 | 5 | 0.00 | 20.02 | 769.63 |
| MW-7 | 07/13/20 | *6.87 | 814 | 14.58 | 13.8 | -35 | 0.00 | 20.84 | 768.81 |
| MW-7 | 11/09/20 | 7.45 | 719 | 16 | 5.8 | -60 | 0.60 | 23.14 | 766.51 |
| MW-8 | 01/15/20 | *7.31 | 915 | 12.25 | 8.7 | -71 | 0.00 | 18.81 | 770.90 |
| MW-8 | 05/20/20 | 6.98 | 904 | 15.19 | 0.0 | -62 | 0.00 | 19.90 | 769.81 |
| MW-8 | 08/25/20 | *7.23 | 915 | 18.86 | 0.0 | -75 | 1.69 | 20.45 | 769.26 |
| MW-8 | 11/09/20 | 7.52 | 879 | 15.8 | 0.0 | -91 | 1.43 | 23.34 | 766.37 |
| MW-9 | 01/15/20 | **7.24 | 768 | 12.29 | 15.2 | -100 | 0.00 | 18.75 | 771.15 |
| MW-9 | 05/20/20 | 7.02 | 726 | 17.05 | 24.0 | -17 | 0.00 | 19.79 | 770.11 |
| MW-9 | 11/09/20 | 7.00 | 850 | 15.69 | 23.5 | -112 | 0.16 | 23.21 | 766.69 |
| MW-10 | 01/15/20 | **7.18 | 1080 | 12.74 | 4.2 | -49 | 0.00 | 18.23 | 771.23 |
| MW-10 | 05/20/20 | 6.92 | 1040 | 15.51 | 0.0 | -83 | 0.61 | 19.33 | 770.13 |
| MW-10 | 07/13/20 | **6.96 | 1070 | 15.36 | 15.3 | -49 | 0.00 | 20.20 | 769.26 |
| MW-10 | 08/25/20 | **7.00 | 1120 | 19.34 | 0.0 | -64 | 8.83 | 20.03 | 769.43 |
| MW-10 | 11/09/20 | 7.02 | 1110 | 15.75 | 0.0 | -59 | 1.34 | 22.38 | 767.08 |

* 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 Groundwater Monitoring Alternative Source Demonstration Report November 2019 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (June 2020)

C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2020 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (December 2020)

# C.1 CCR Groundwater Monitoring Alternative Source Demonstration Report November 2019 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (June 2020)

# CCR GROUNDWATER MONITORING
# ALTERNATIVE SOURCE DEMONSTRATION REPORT
# NOVEMBER 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

June 2020

File No. 27213167.20

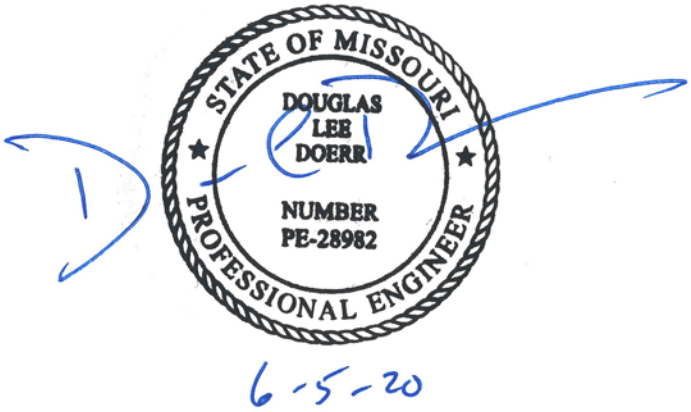
# CERTIFICATIONS

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

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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 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 November 4, 2019. Review and validation of the results from the November 2019 Detection Monitoring Event was completed on December 12, 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 15, 2020 and February 4, 2020.

The completed statistical evaluation identified one Appendix III constituent above the prediction limit established for monitoring well MW-1.

| Constituent/Monitoring Well | *UPL | Observation November 4, 2019 | 1st Verification January 15, 2020 | 2nd Verification February 4, 2020 |
|---|---|---|---|---|
| **Fluoride** | | | | |
| MW-1 | 0.3201 | 0.488 | 0.326 | 0.329 |

*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 a SSI above the background prediction limit for fluoride in monitoring well MW-1.**

# 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 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, 25$^{th}$ and 75$^{th}$ 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 all of the groundwater monitoring system wells were prepared to allow comparison of the fluoride concentrations between MW-1 and the other monitoring wells both upgradient and downgradient. The fluoride box and whiskers plot for MW-1 indicates the fluoride concentrations in MW-1 are generally below the concentrations in the other wells although there can be some overlap as indicated by the whiskers. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots are provided in **Appendix A**.

## 3.2 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-1 and leachate is provided in **Appendix B** along with analytical results. The piper diagram indicates the groundwater from monitoring well MW-1 does not plot near where the leachate plots. Therefore, the groundwater from MW-1 does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSI over background levels or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

## 3.3 TIME SERIES PLOTS

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

The times series plot for fluoride in monitoring well MW-1 was compared to the time series plot for fluoride in the other monitoring wells both upgradient and downgradient. The fluoride time series plot for MW-1 indicates the fluoride concentrations in MW-1 are generally below the concentrations in the other wells both upgradient and downgradient. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots are provided in **Appendix C**.

# 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 SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the 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.

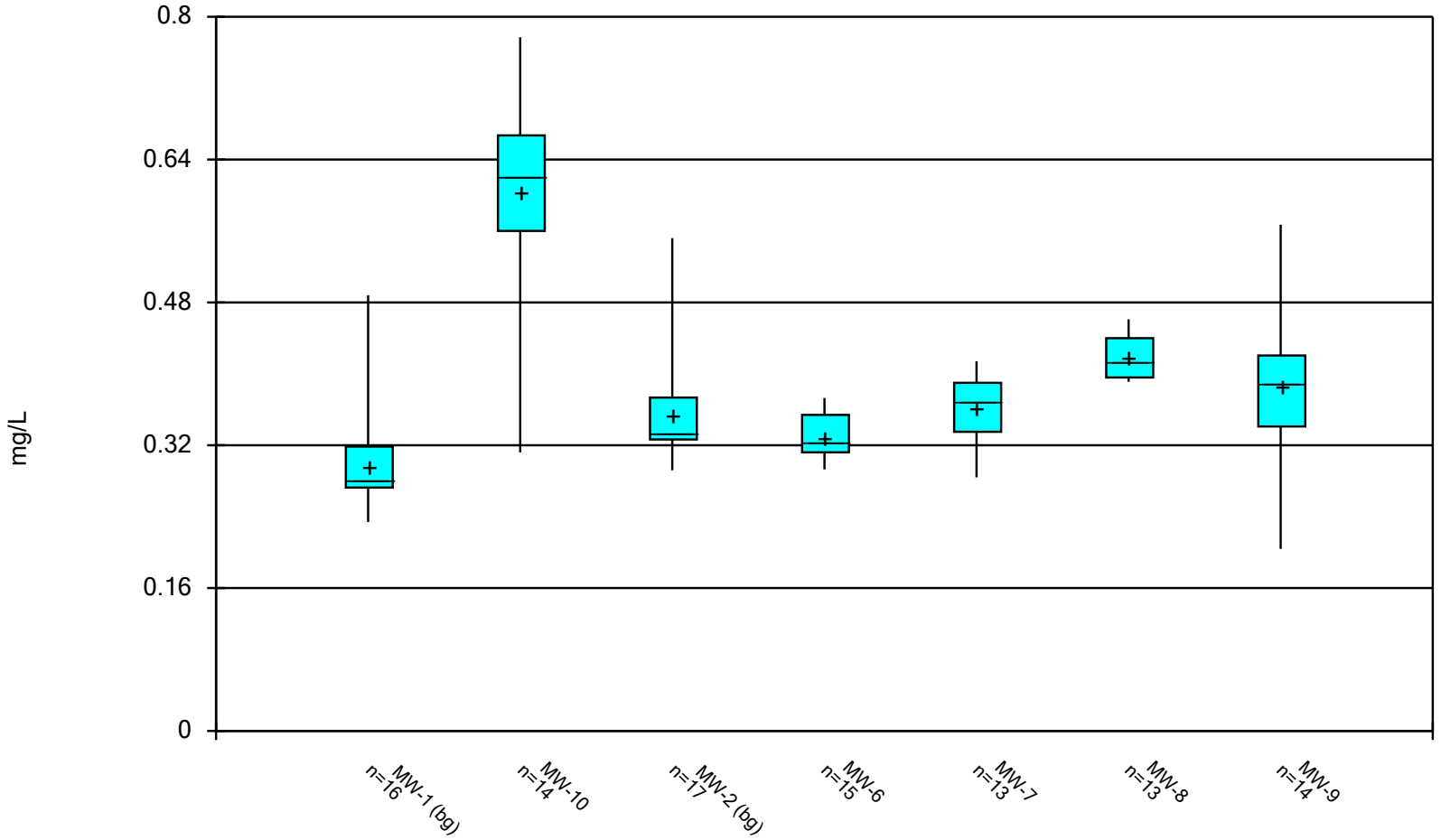
The signatures of the certifying registered geologist and professional engineer on this document represents that to the best of their knowledge, information, and belief in the exercise of their professional

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

## Box and Whiskers Plots

# Box & Whiskers Plot




Constituent: Fluoride Analysis Run 3/17/2020 12:15 PM View: CCR LF III

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

# Box & Whiskers Plot

Iatan Utility Waste LF  Client: SCS Engineers  Data: Iatan jrr  Printed 3/17/2020, 12:18 PM

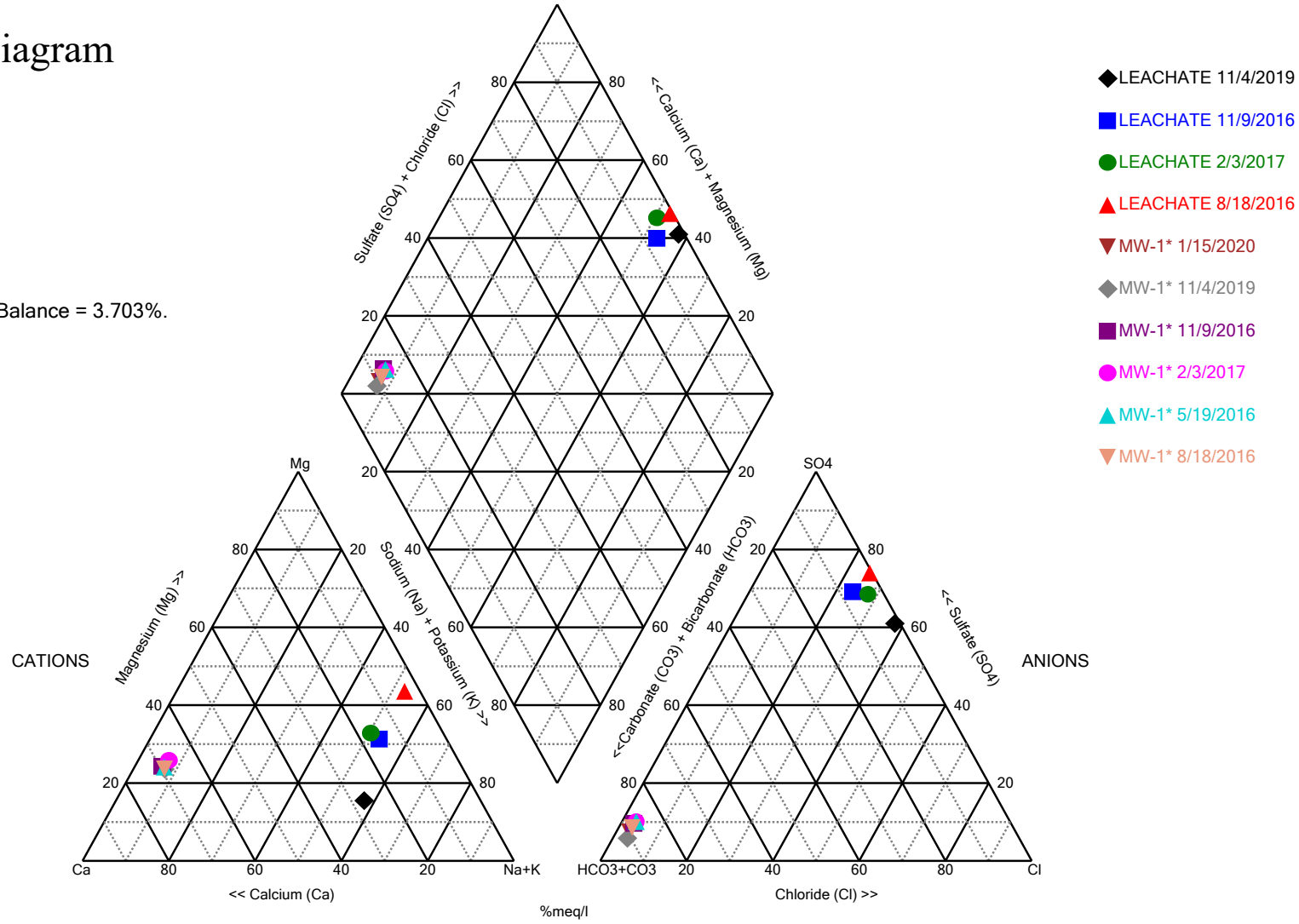
| Constituent | Well | N | Mean | Std. Dev. | Std. Err. | Median | Min. | Max. | %NDs |
|---|---|---|---|---|---|---|---|---|---|
| Fluoride (mg/L) | MW-1 (bg) | 16 | 0.2973 | 0.05805 | 0.01451 | 0.282 | 0.234 | 0.488 | 0 |
| Fluoride (mg/L) | MW-10 | 14 | 0.6032 | 0.1056 | 0.02823 | 0.6225 | 0.312 | 0.777 | 0 |
| Fluoride (mg/L) | MW-2 (bg) | 17 | 0.3526 | 0.05801 | 0.01407 | 0.333 | 0.292 | 0.552 | 0 |
| Fluoride (mg/L) | MW-6 | 15 | 0.33 | 0.02589 | 0.006685 | 0.325 | 0.293 | 0.373 | 0 |
| Fluoride (mg/L) | MW-7 | 13 | 0.3618 | 0.03574 | 0.009914 | 0.369 | 0.284 | 0.414 | 0 |
| Fluoride (mg/L) | MW-8 | 13 | 0.4198 | 0.02385 | 0.006616 | 0.415 | 0.391 | 0.461 | 0 |
| Fluoride (mg/L) | MW-9 | 14 | 0.3854 | 0.0788 | 0.02106 | 0.3885 | 0.204 | 0.567 | 0 |

# Appendix B

## Piper Diagram Plots and Analytical Results

# Piper Diagram

Cation-Anion Balance = 3.703%.




Analysis Run 3/17/2020 12:53 PM View: CCR LF III

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

# Piper Diagram

Analysis Run 3/17/2020 12:53 PM View: CCR LF III

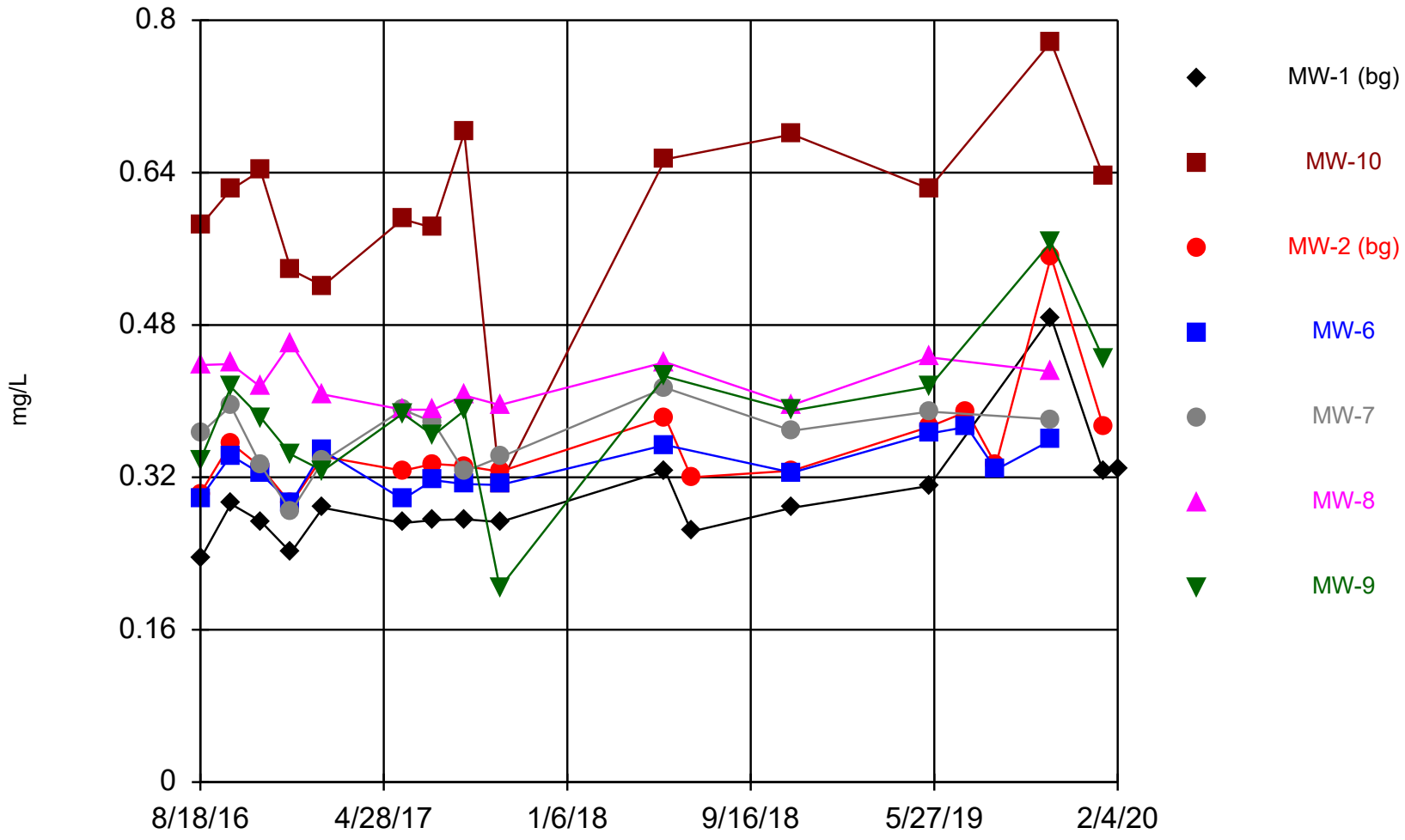
Iatan Utility Waste LF Client: SCS Engineers Data: Iatan jrr

| Totals (ppm) | Na | K | Ca | Mg | Cl | SO4 | HCO3 | CO3 |
|---|---|---|---|---|---|---|---|---|
| MW-1* 5/19/2016 | 11.3 | 6.56 | 130 | 27.3 | 6.02 | 34.4 | 374 | 10 |
| MW-1* 8/18/2016 | 11.7 | 6.56 | 134 | 27.4 | 5.93 | 32.4 | 436 | 10 |
| MW-1* 11/9/2016 | 11.1 | 6 | 136 | 28.4 | 5.95 | 33.2 | 383 | 10 |
| MW-1* 2/3/2017 | 11 | 5.93 | 116 | 26.8 | 6 | 36.9 | 394 | 10 |
| MW-1* 11/4/2019 | 11.8 | 6.49 | 132 | 27 | 6.61 | 22.3 | 420 | 10 |
| MW-1* 1/15/2020 | 11.6 | 6.17 | 129 | 26.7 | 5.32 | 27.3 | 406 | 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 |
| LEACHATE 11/4/2019 | 1110 | 51.7 | 460 | 163 | 2340 | 5230 | 206 | 10 |

# Appendix C

## Time Series Plots

# Time Series




Constituent: Fluoride Analysis Run 3/17/2020 12:19 PM View: CCR LF III

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

## C.2 CCR Groundwater Monitoring Alternative Source Demonstration Report May 2020 Groundwater Monitoring Event, CCR Landfill, Iatan Generating Station (December 2020)

# CCR GROUNDWATER MONITORING
# ALTERNATIVE SOURCE DEMONSTRATION REPORT
# MAY 2020 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 2020

File No. 27213167.20

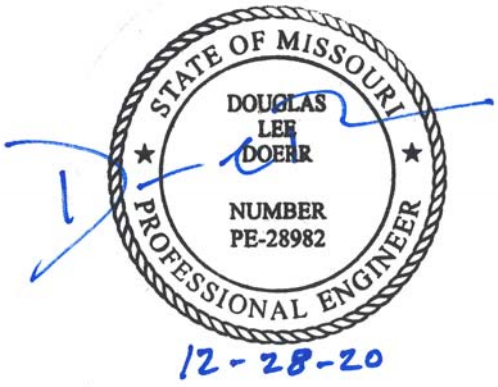
# CERTIFICATIONS

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

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## Section Page



# Appendices

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# 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, 2020. Review and validation of the results from the May 2020 Detection Monitoring Event was completed on June 29, 2020, 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 13, 2020 and August 25, 2020.

The completed statistical evaluation identified one Appendix III constituent above the prediction limit established for monitoring well MW-10.

| Constituent/Monitoring Well | *UPL | Observation May 20, 2020 | 1st Verification July 13, 2020 | 2nd Verification August 25, 2020 |
|---|---|---|---|---|
| **Sulfate** | | | | |
| MW-10 | 39.5 | 43.1 | 47.7 | 47.9 |

*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 a SSI above the background prediction limit for 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 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, 25$^{th}$ and 75$^{th}$ 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 all of the groundwater monitoring system wells were prepared to allow comparison of the sulfate concentrations between MW-10 and the other monitoring wells both upgradient and downgradient. The sulfate box and whiskers plot for MW-10 indicates the sulfate concentrations in MW-10 are within or below the concentration ranges for the other wells. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Box and whisker plots are provided in **Appendix A**.

## 3.2 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-10 and leachate is provided in **Appendix B** along with analytical results. The piper diagram indicates the groundwater from monitoring well MW-10 does not plot near

where the leachate plots. Therefore, the groundwater from MW-10 does not exhibit the same geochemical characteristics as the leachate. The groundwater and the leachate plot in totally different hydrochemical facies indicating there is no mixing of the two types of water (groundwater and leachate). This demonstrates that a source other than the CCR Landfill caused the SSI over background levels or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

## 3.3 TIME SERIES PLOTS

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

The time series plot for sulfate in monitoring well MW-10 was compared to the time series plot for sulfate in the other monitoring wells both upgradient and downgradient. The sulfate time series plot for MW-10 indicates the sulfate concentrations in MW-10 are generally below the concentrations in the other wells both upgradient and downgradient. This demonstrates that a source other than the CCR Landfill caused the SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Time series plots are provided in **Appendix C**.

# 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 SSI over background levels, or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Based on the successful ASD, the owner or operator of the 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.

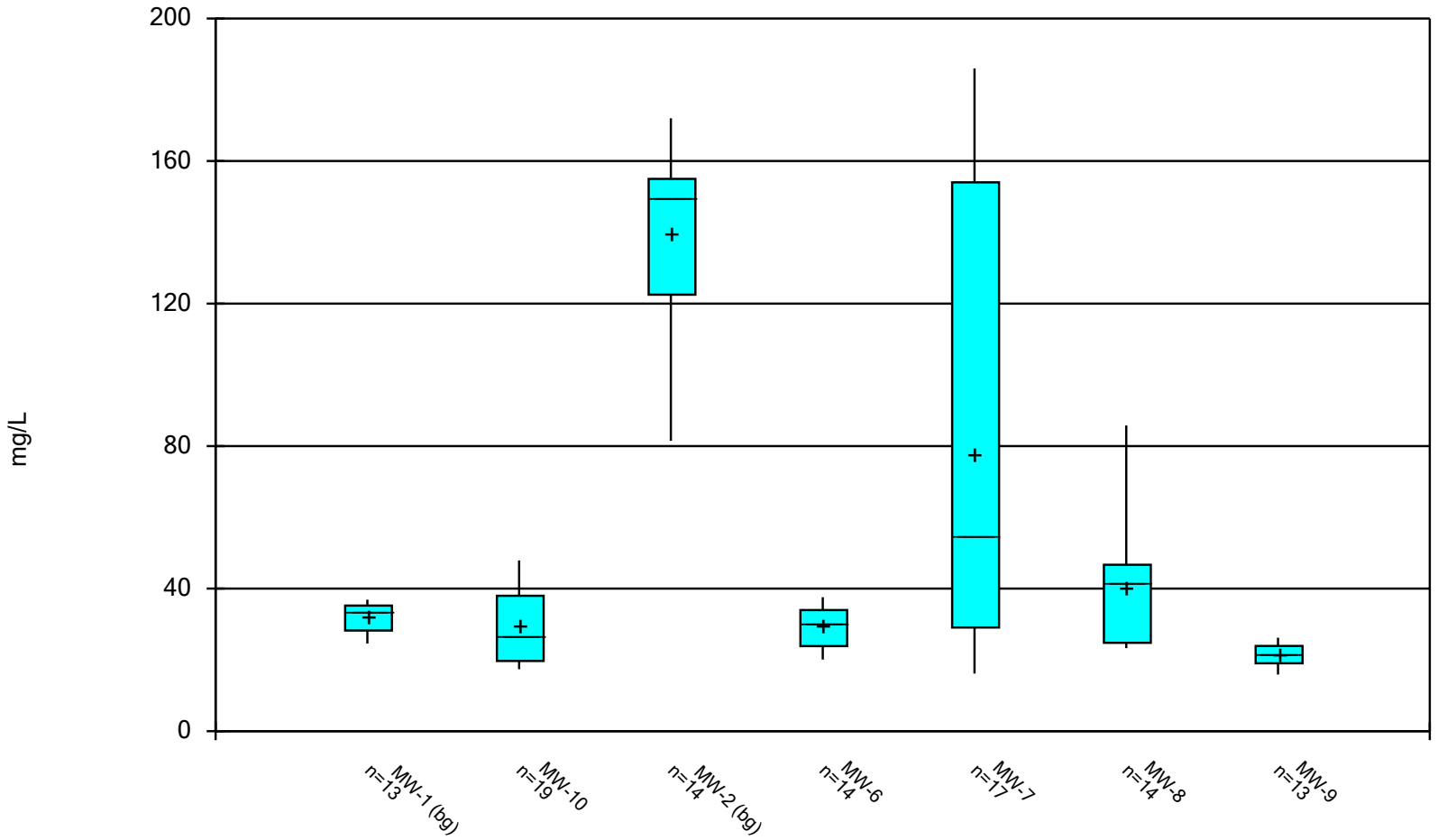
The signatures of the certifying registered geologist and professional engineer on this document represents that to the best of their knowledge, information, and belief in the exercise of their professional judgement in accordance with the standard of practice, it is their professional opinions that 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

## Box and Whiskers Plots

# Box & Whiskers Plot




Constituent: Sulfate  Analysis Run 10/6/2020 9:06 AM  View: CCR LF III

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

# Box & Whiskers Plot

Iatan Utility Waste LF  Client: SCS Engineers  Data: Iatan jrr  Printed 10/6/2020, 9:07 AM

| Constituent | Well | N | Mean | Std. Dev. | Std. Err. | Median | Min. | Max. | %NDs |
|---|---|---|---|---|---|---|---|---|---|
| Sulfate (mg/L) | MW-1 (bg) | 13 | 32.23 | 3.873 | 1.074 | 33.2 | 24.6 | 36.9 | 0 |
| Sulfate (mg/L) | MW-10 | 19 | 29.99 | 10.27 | 2.356 | 26.5 | 17.4 | 47.9 | 0 |
| Sulfate (mg/L) | MW-2 (bg) | 14 | 139.9 | 23.33 | 6.236 | 149.5 | 81.5 | 172 | 0 |
| Sulfate (mg/L) | MW-6 | 14 | 29.51 | 5.861 | 1.566 | 30.55 | 20.1 | 37.6 | 0 |
| Sulfate (mg/L) | MW-7 | 17 | 78.09 | 60.56 | 14.69 | 54.4 | 16.2 | 186 | 0 |
| Sulfate (mg/L) | MW-8 | 14 | 40.42 | 16.76 | 4.48 | 41.85 | 23.3 | 85.8 | 0 |
| Sulfate (mg/L) | MW-9 | 13 | 21.45 | 3.217 | 0.8922 | 21.5 | 15.9 | 26.2 | 0 |

# Appendix B

## Piper Diagram Plots and Analytical Results

# Piper Diagram

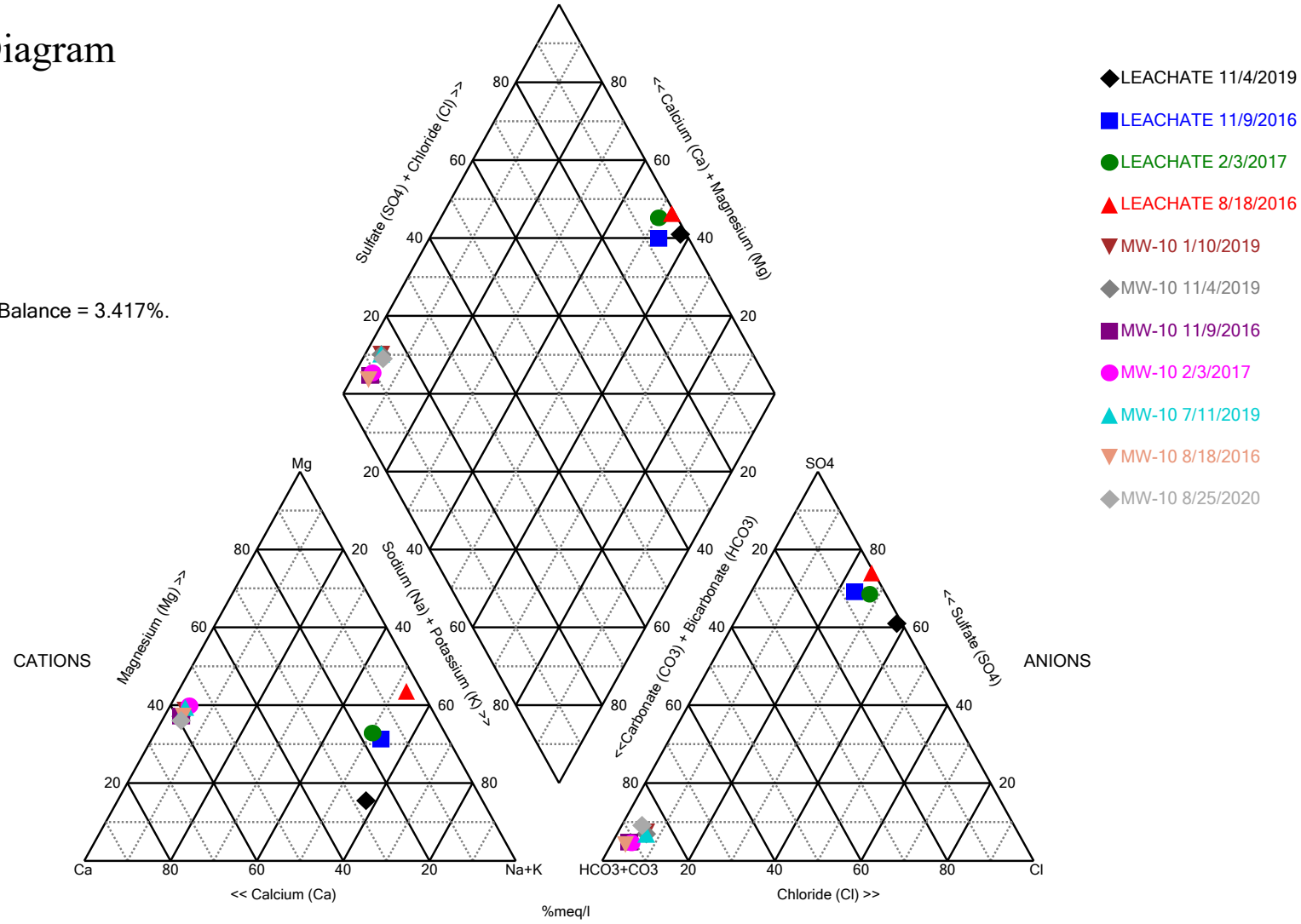
Analysis Run 10/6/2020 9:24 AM  View: CCR LF III

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 |
| MW-10 7/11/2019 | 8.12 | 5.11 | 153 | 63.8 | 22.5 | 33 | 537 | 10 |
| MW-10 11/4/2019 | 7.41 | 4.57 | 142 | 54.2 | 21.6 | 33.6 | 526 | 10 |
| MW-10 8/25/2020 | 11.9 | 4.51 | 163 | 59.1 | 16.4 | 47.9 | 589 | 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 |
| LEACHATE 11/4/2019 | 1110 | 51.7 | 460 | 163 | 2340 | 5230 | 206 | 10 |

# Piper Diagram

Cation-Anion Balance = 3.417%.



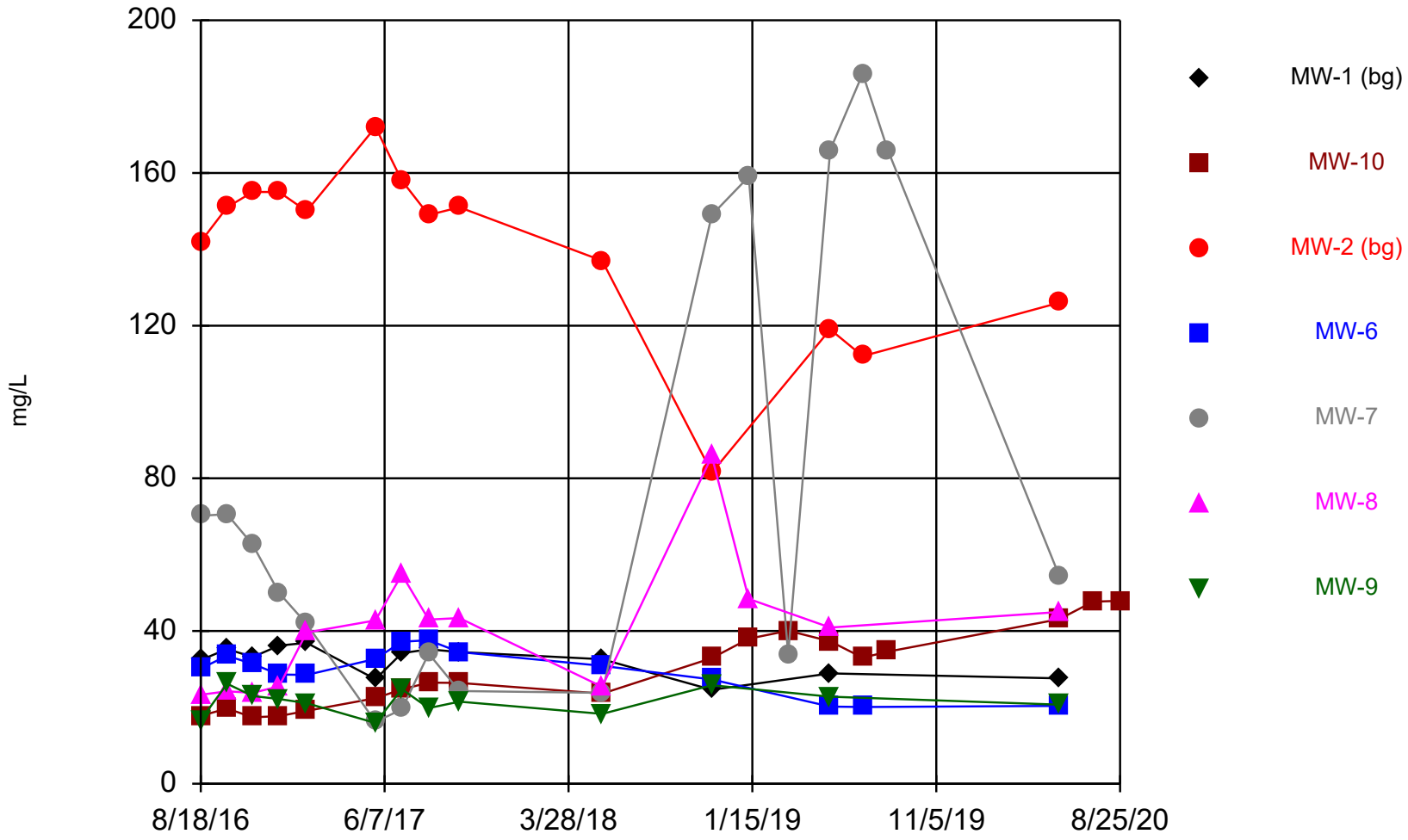

Analysis Run 10/6/2020 9:22 AM View: CCR LF III

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

# Appendix C

## Time Series Plots

# Time Series




Constituent: Sulfate  Analysis Run 10/6/2020 9:12 AM  View: CCR LF III

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