

2021 ANNUAL GROUNDWATER MONITORING AND  
CORRECTIVE ACTION REPORT  
BOTTOM ASH SETTLING AREA/BOTTOM ASH LANDFILL  
JEFFREY ENERGY CENTER  
ST. MARYS, KANSAS

by  
Haley & Aldrich, Inc.  
Cleveland, Ohio

for  
Evergy Kansas Central, Inc.  
Topeka, Kansas

File No. 129778-041  
January 2022



## Table of Contents

	Page
<b>1. Introduction</b>	<b>1</b>
1.1 40 CFR § 257.90(E)(6) SUMMARY	1
1.1.1 40 CFR § 257.90(e)(6)(i) – Initial Monitoring Program	1
1.1.2 40 CFR § 257.90(e)(6)(ii) – Final Monitoring Program	1
1.1.3 40 CFR § 257.90(e)(6)(iii) – Statistically Significant Increases	1
1.1.4 40 CFR § 257.90(e)(6)(iv) – Statistically Significant Levels	2
1.1.5 40 CFR § 257.90(e)(6)(v) – Selection of Remedy	3
1.1.6 40 CFR § 257.90(e)(6)(vi) – Remedial Activities	3
<b>2. 40 CFR § 257.90 Applicability</b>	<b>4</b>
2.1 40 CFR § 257.90(A)	4
2.2 40 CFR § 257.90(E) – SUMMARY	4
2.2.1 Status of the Groundwater Monitoring Program	4
2.2.2 Key Actions Completed	4
2.2.3 Problems Encountered	5
2.2.4 Actions to Resolve Problems	5
2.2.5 Project Key Activities for Upcoming Year	5
2.3 40 CFR § 257.90(E) – INFORMATION	5
2.3.1 40 CFR § 257.90(e)(1)	5
2.3.2 40 CFR § 257.90(e)(2) – Monitoring System Changes	5
2.3.3 40 CFR § 257.90(e)(3) – Summary of Sampling Events	6
2.3.4 40 CFR § 257.90(e)(4) – Monitoring Transition Narrative	6
2.3.5 40 CFR § 257.90(e)(5) – Other Requirements	6

Revision No.	Date	Notes

## **List of Tables**

<b>Table No.</b>	<b>Title</b>
I	Summary of Analytical Results – Detection Monitoring

## **List of Figures**

<b>Figure No.</b>	<b>Title</b>
1	Bottom Ash Settling Area/Bottom Ash Landfill Monitoring Well Location Map
2	Bottom Ash Settling Area/Bottom Ash Landfill Groundwater Potentiometric Elevation Contour Map – March 4, 2021
3	Bottom Ash Settling Area/Bottom Ash Landfill Groundwater Potentiometric Elevation Contour Map – September 14, 2021

**2021 Annual Groundwater Monitoring  
and Corrective Action Report**

This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Jeffrey Energy Center (JEC) Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL) consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2021) and documents compliance with the U.S. Environmental Protection Agency Coal Combustion Residual Rule. I certify that the 2021 Annual Groundwater Monitoring and Corrective Action Report for the JEC BASA/BAL is, to the best of my knowledge, accurate and complete.

Signed:   
Professional Geologist

Print Name: Mark Nicholls  
Kansas License No.: Professional Geologist No. 881  
Title: Technical Expert 2  
Company: Haley & Aldrich, Inc.



## 1. Introduction

This 2021 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) addresses the Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL) at the Jeffrey Energy Center (JEC), operated by Evergy Kansas Central, Inc. (Evergy). This Annual Report was developed in accordance with the U.S. Environmental Protection Agency Coal Combustion Residual (CCR) Rule (Rule) effective October 19, 2015, including subsequent revisions, specifically Code of Federal Regulations Title 40 (40 CFR), subsection 257.90(e). The Annual Report documents the groundwater monitoring system for the BASA/BAL consistent with applicable sections of 257.90 through 257.98, and describes activities conducted in the prior calendar year (2021) and documents compliance with the Rule. The specific requirements for the Annual Report listed in § 257.90(e) of the Rule are provided in Sections 1 and 2 of this Annual Report and are in bold italic font, followed by a narrative describing how each Rule requirement has been met.

### 1.1 40 CFR § 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 40 CFR § 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, 2021), the BASA/BAL was operating under a detection monitoring program in compliance with 40 CFR § 257.94.

#### 1.1.2 40 CFR § 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, 2021), the BASA/BAL was operating under a detection monitoring program in compliance with 40 CFR § 257.94.

#### 1.1.3 40 CFR § 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):*

**2021 Annual Groundwater Monitoring  
and Corrective Action Report**

**1.1.3.1 40 CFR § 257.90(e)(6)(iii)(a)**

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

No statistically significant increases (SSI) over background were identified during the previous calendar year (2021).

**1.1.3.2 40 CFR § 257.90(e)(6)(iii)(b)**

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

No SSIs over background were identified during the previous calendar year (2021); therefore, an assessment monitoring program was not initiated for the BASA/BAL in 2021.

**1.1.4 40 CFR § 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:**

**1.1.4.1 40 CFR § 257.90(e)(6)(iv)(A) – Statistically Significant Level Constituents**

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

The BASA/BAL remains in detection monitoring, and no appendix IV constituents were collected or analyzed in 2021. Therefore, no statistically significant levels above the groundwater protection standard were identified for the BASA/BAL.

**1.1.4.2 40 CFR § 257.90(e)(6)(iv)(B) – Initiation of the Assessment of Corrective Measures**

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

No assessment of corrective measures was required to be initiated in 2021 for this unit. The BASA/BAL remained in detection monitoring during 2021.

**1.1.4.3 40 CFR § 257.90(e)(6)(iv)(C) – Assessment of Corrective Measures Public Meeting**

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

An assessment of corrective measures was not required for the BASA/BAL in 2021; therefore, a public meeting was not held.

**1.1.4.4 40 CFR § 257.90(e)(6)(iv)(D) – Completion of the Assessment of Corrective Measures**

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

No assessment of corrective measures was required to be initiated in 2021 for this unit. The BASA/BAL remained in detection monitoring during 2021.

**2021 Annual Groundwater Monitoring  
and Corrective Action Report**

**1.1.5 40 CFR § 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***

The BASA/BAL remains in detection monitoring, and no remedy was required to be selected.

**1.1.6 40 CFR § 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.***

No remedial activities were required in 2021.

## 2. 40 CFR § 257.90 Applicability

### 2.1 40 CFR § 257.90(a)

***All CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under §§ 257.90 through 257.99, except as provided in paragraph (g) [Suspension of groundwater monitoring requirements] of this section.***

Evergy has installed and certified a groundwater monitoring system at the JEC BASA/BAL. The BASA/BAL is a multi-unit system subject to the groundwater monitoring and corrective action requirements described under 40 CFR §§ 257.90 through 257.98. This document addresses the requirement for the Owner/Operator to prepare an Annual Report per § 257.90(e).

### 2.2 40 CFR § 257.90(e) – SUMMARY

***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).***

This Annual Report describes monitoring completed and actions taken for the groundwater monitoring system at the JEC BASA/BAL as required by the Rule. Groundwater sampling and analysis was conducted in accordance with requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.94 is provided in this report. This Annual Report documents the applicable groundwater-related activities completed in the calendar year 2021.

#### 2.2.1 Status of the Groundwater Monitoring Program

The BASA/BAL remained in the detection monitoring program during 2021.

#### 2.2.2 Key Actions Completed

The 2020 Annual Groundwater Monitoring and Corrective Action Report was completed in January 2021. Statistical evaluation was completed in January 2021 on analytical data from the September 2020 detection monitoring sampling event. Semi-annual detection monitoring

## 2021 Annual Groundwater Monitoring and Corrective Action Report

events were completed in March and September of 2021. Statistical evaluation was completed in July 2021 on analytical data from the March 2021 semi-annual detection monitoring sampling event. Statistical evaluation of the results from the September 2021 semi-annual detection monitoring sampling event are due to be completed in January 2022 and will be reported in the next annual report.

### 2.2.3 Problems Encountered

One problem encountered during groundwater monitoring activities in 2021 consisted of a laboratory analytical error that required the laboratory to reanalyze select analytical results. Calcium was reanalyzed for monitoring well MW-3 in the March 2021 semi-annual detection monitoring sampling event. The analytical result was revised accordingly. This was the only issue that needed to be addressed at the BASA/BAL in 2021.

### 2.2.4 Actions to Resolve Problems

The resolution to problems encountered in 2021 included additional laboratory analyses, as described above. The analytical results were revised accordingly. No other problems were encountered at the BASA/BAL in 2021; therefore, no actions to resolve problems were required.

### 2.2.5 Project Key Activities for Upcoming Year

Key activities planned for 2022 include completion of the 2021 Annual Groundwater Monitoring and Corrective Action Report, statistical evaluation of semi-annual detection monitoring analytical data collected in September 2021, and semi-annual detection monitoring and subsequent statistical evaluations.

## 2.3 40 CFR § 257.90(e) – INFORMATION

***At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:***

### 2.3.1 40 CFR § 257.90(e)(1)

***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;***

As required by § 257.90(e)(1), a map showing the locations of the CCR unit and associated upgradient and downgradient monitoring wells for the BASA/BAL is included in this report as Figure 1.

### 2.3.2 40 CFR § 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 monitoring wells were installed or decommissioned in 2021.

**2.3.3 40 CFR § 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;***

In accordance with § 257.94(b), two independent detection monitoring samples from each background and downgradient monitoring well were collected during 2021. A summary including the sample names, dates of sample collection, field parameters, and monitoring data obtained for the groundwater monitoring program for the BASA/BAL is presented in Table I of this report. Groundwater potentiometric elevation contour maps associated with each groundwater monitoring sampling event in 2021 are provided in Figures 2 and 3.

**2.3.4 40 CFR § 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 2021. Only detection monitoring was conducted in 2021.

**2.3.5 40 CFR § 257.90(e)(5) – Other Requirements**

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

This Annual Report documents activities conducted to comply with § 257.90 through § 257.94 of the Rule. It is understood that there are supplemental references in § 257.90 through § 257.98 that must be placed in the Annual Report. The following requirements include relevant and required information in the Annual Report for the activities completed in calendar year 2021.

**2.3.5.1 40 CFR § 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).***

An alternative groundwater detection monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

**2.3.5.2**     **40 CFR § 257.94(e)(2) – Detection Monitoring Alternate Source Demonstration**

***The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase 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 statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority 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 this section. 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 or approval from the Participating State Director or approval from EPA where EPA is the permitting authority.***

No alternate source demonstration or certification was required in 2021; therefore, no demonstration or certification is applicable.

**2.3.5.3**     **40 CFR § 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 approval from EPA where EPA is the permitting authority in the annual groundwater monitoring and corrective action report required by § 257.90(e).***

The BASA/BAL remains in detection monitoring and an alternative groundwater assessment monitoring sampling and analysis frequency has not been established for this CCR unit; therefore, no demonstration or certification is applicable.

**2.3.5.4**     **40 CFR § 257.95(d)(3) – Assessment Monitoring Concentrations and Groundwater Protection Standards**

***Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).***

The BASA/BAL remains in detection monitoring, and no assessment monitoring samples were collected or analyzed in 2021. Consequently, Evergy is not required to establish groundwater protection standards for this CCR unit, and this criterion is not applicable.

**2.3.5.5**     **40 CFR § 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 or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. 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.*

No assessment monitoring alternate source demonstration or certification was required in 2021. The BASA/BAL remained in detection monitoring during 2021.

**2.3.5.6**     **40 CFR § 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 or approval from the Participating State Director or approval from EPA where EPA is the permitting authority 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.*

No assessment of corrective measures was required to be initiated in 2021; therefore, no demonstration or certification is applicable for this unit.

## TABLE

**TABLE I**  
**SUMMARY OF ANALYTICAL RESULTS - 2021 DETECTION MONITORING**  
EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL  
ST. MARYS, KANSAS

Location	Upgradient		Downgradient							
	MW-BAA-6		MW-BAA-2		MW-BAA-3		MW-BAA-7			
Measure Point (TOC)	1301.81		1226.56		1222.00		1213.15			
Sample Name	MW-6-030421	BAA-6-091421	MW-2-030421	BAA-2-091421	MW-3-030421	BAA-3-091421	MW-7-030421	BAA-DUP-030421	BAA-7-091421	DUP-BAA-091421
Sample Date	3/4/2021	9/14/2021	3/4/2021	9/14/2021	3/4/2021	9/14/2021	3/4/2021	3/4/2021	9/14/2021	9/14/2021
Final Lab Report Date	3/16/2021	10/29/2021	3/16/2021	10/29/2021	3/16/2021	10/29/2021	3/16/2021	3/16/2021	10/29/2021	10/29/2021
Final Lab Report Revision Date	3/23/2021	N/A	3/23/2021	N/A	3/23/2021	N/A	3/23/2021	3/23/2021	N/A	N/A
Lab Data Reviewed and Validated	4/16/2021	12/10/2021	4/16/2021	12/10/2021	4/16/2021	12/10/2021	4/16/2021	4/16/2021	12/10/2021	12/10/2021
Depth to Water (ft btoc)	79.28	81.67	14.41	17.20	14.52	15.75	18.55	-	20.96	-
Temperature (Deg C)	15.36	17.03	17.35	16.21	14.30	15.64	17.20	-	16.23	-
Conductivity, Field (µS/cm)	3980	4450	2739	1920	3540	3270	5654	-	2060	-
Turbidity, Field (NTU)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-
pH, Field (su)	7.03	7.40	7.52	7.90	7.23	7.08	7.70	-	7.31	-
Boron, Total (mg/L)	<b>4.0</b>	<b>3.8</b>	<b>0.92</b>	<b>1.4</b>	<b>2.5</b>	<b>2.3</b>	<b>0.61</b>	<b>0.62</b>	<b>0.56</b>	<b>0.53</b>
Calcium, Total (mg/L)	<b>545</b>	<b>557</b>	<b>149</b>	<b>190</b>	<b>495</b>	<b>542</b>	<b>207</b>	<b>209</b>	<b>242</b>	<b>233</b>
Chloride (mg/L)	<b>249</b>	<b>310</b>	<b>104</b>	<b>162</b>	<b>157</b>	<b>189</b>	<b>196</b>	<b>198</b>	<b>174</b>	<b>180</b>
Fluoride (mg/L)	<b>0.44</b>	<b>0.71</b>	<b>0.50</b>	<b>0.47</b>	<b>0.69</b>	<b>0.99</b>	<b>0.69</b>	<b>0.70</b>	<b>0.61</b>	<b>0.61</b>
Sulfate (mg/L)	<b>1940</b>	<b>1870</b>	<b>507</b>	<b>654</b>	<b>2000</b>	<b>1850</b>	<b>845</b>	<b>849</b>	<b>756</b>	<b>750</b>
pH (lab) (su)	<b>6.9</b>	<b>7.3</b>	<b>7.2</b>	<b>7.3</b>	<b>6.7</b>	<b>7.1</b>	<b>7.0</b>	<b>7.0</b>	<b>7.2</b>	<b>7.5</b>
TDS (mg/L)	<b>3500</b>	<b>3060</b>	<b>1170</b>	<b>1410</b>	<b>3400</b>	<b>3330</b>	<b>1800</b>	<b>1780</b>	<b>1670</b>	<b>1680</b>

**Notes and Abbreviations:**

**Bold value:** Detection above laboratory reporting limit.

Data presented in this table were verified against the laboratory and validation reports.

µS/cm = micro Siemens per centimeter

Deg C = degrees Celsius

ft btoc = feet below top of casing

mg/L = milligrams per liter

N/A = Not Applicable

NTU = Nephelometric Turbidity Unit

su = standard unit

TDS = total dissolved solids

TOC = top of casing

## FIGURES



**LEGEND**

-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
4. AERIAL IMAGERY SOURCE: ESRI, SEPTEMBER 3, 2019



EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
ST. MARY'S, KANSAS

**BOTTOM ASH SETTLING  
AREA/BOTTOM ASH LANDFILL  
MONITORING WELL LOCATION MAP**



JANUARY 2022

FIGURE 1



**LEGEND**

- MW-BAA-1** 1219.84 WELL NAME AND GROUNDWATER ELEVATION (FEET AMSL), MARCH 2021
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION CONTOUR, 5-FT INTERVAL (AMSL)
-  GROUNDWATER FLOW DIRECTION
-  BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 04 MARCH 2021.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, 3 SEPTEMBER 2019



EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
ST. MARY'S, KANSAS

BOTTOM ASH SETTLING AREA /  
BOTTOM ASH LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
MARCH 4, 2021



JANUARY 2022

FIGURE 2



**LEGEND**

- MW-BAA-1** 1219.84 WELL NAME AND GROUNDWATER ELEVATION (SEPTEMBER 2021)
- MONITORING WELL
- PIEZOMETER OBSERVATION ONLY
- ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 5-FT INTERVAL (AMSL)
- INFERRED GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 14 SEPTEMBER 2021.
3. AMSL = ABOVE MEAN SEA LEVEL
4. AERIAL IMAGERY SOURCE: ESRI, 3 SEPTEMBER 2019



EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
ST. MARY'S, KANSAS

**BOTTOM ASH SETTLING AREA /  
BOTTOM ASH LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
SEPTEMBER 14, 2021**



JANUARY 2022

FIGURE 3



HALEY & ALDRICH, INC.  
6500 Rockside Road  
Suite 200  
Cleveland, OH 44131  
216.739.0555



November 3, 2022  
Project No. 0204993-000

TO: Evergy Kansas Central, Inc.  
Jared Morrison – Director, Water and Waste Programs

FROM: Haley & Aldrich, Inc.  
Steven F. Putrich, P.E., Principal Consultant – Engineering Principal  
Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

SUBJECT: 2021 Annual Groundwater Monitoring and Corrective Action Report Addendum  
Evergy Kansas Central, Inc.  
Jeffrey Energy Center  
Bottom Ash Settling Area/Bottom Ash Landfill

The Evergy Kansas Central, Inc. (Evergy) Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL) at the Jeffrey Energy Center is subject to the groundwater monitoring and corrective action requirements described under Code of Federal Regulations Title 40 (40 CFR) §257.90 through §257.98 (Rule). An Annual Groundwater Monitoring and Corrective Action (GWMCA) Report documenting the activities completed in 2021 for the BASA/BAL was completed and placed in the facility’s operating record on January 28, 2022, as required by the Rule. The Annual GWMCA Report contained the specific information listed in 40 CFR §257.90(e).

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

- Results of laboratory analysis of groundwater or other environmental media samples for the presence of constituents of Appendices III and IV to 40 CFR Part 257 (or of other constituents, such as those supporting characterization of site conditions that may ultimately affect a remedy);
- Required statistical analyses performed on those (laboratory analysis) results;
- Measured groundwater elevations; and
- Calculated groundwater flow rate and direction.

While this information is not specifically referred to in 40 CFR §257.90(e) for inclusion in the GWMCA Report, it has been routinely collected and maintained in Evergy’s files and is being provided in the attachments to this addendum. The applicable laboratory analysis reports for 2021 sampling events are included in Attachment 1, and a discussion of the applicable statistical analyses completed in 2021 are included in Attachment 2 of this addendum. The 2021 GWMCA Report does include a “Groundwater

Potentiometric Elevation Contour Map” for each of the 2021 sampling events as Figures 2 and 3. In those figures, the measured groundwater elevations for each well are listed. Those maps have been duplicated in this addendum and were modified to include the calculated groundwater flow rate and direction (Attachment 3).

The Attachments to this addendum are described below:

- Attachment 1 – Laboratory Analytical Reports: Includes laboratory data packages with supporting information such as case narrative, sample and method summary, analytical results, quality control, and chain-of-custody documentation. The laboratory data packages for the sampling events completed in March and September 2021 are provided.
- Attachment 2 – Statistical Analyses: Includes a discussion of the statistical analyses utilized along with a table summarizing the statistical outputs (e.g., frequency of detection, maximum detection, variance, standard deviation, coefficient of variance, outlier tests, trends, upper and lower confidence limits, and comparison against Groundwater Protection Standards), and supporting backup for statistical analyses completed in 2021. Statistical analyses completed in 2021 included:
  - Overview of the January 2021 statistical analyses for data obtained in the September 2020 sampling event; and
  - Overview of the July 2021 statistical analyses for data obtained in the March 2021 sampling event.
- Attachment 3 – Groundwater Potentiometric Maps: Includes the measured groundwater elevations at each well and the generalized groundwater flow direction and calculated flow rate. Maps for the sampling events completed in March and September 2021 are provided.

**ATTACHMENT 1**  
**Laboratory Analytical Reports**

**ATTACHMENT 1-1**  
**March 2021 Sampling Event**  
**Laboratory Analytical Report**

March 23, 2021

Melissa Michels  
Evergy, Inc.  
818 Kansas Avenue  
Topeka, KS 66612

RE: Project: JEC BASA/BAL CCR  
Pace Project No.: 60362964

Dear Melissa Michels:

Enclosed are the analytical results for sample(s) received by the laboratory on March 05, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

Revised Report REV\_1

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jasmine Amerin  
jasmine.amerin@pacelabs.com  
(913)599-5665  
Project Manager

Enclosures

cc: Sarah Hazelwood, Evergy, Inc.  
Laura Hines, Evergy, Inc.  
Jake Humphrey, Evergy, Inc.  
Dustin Kadous, Evergy Kansas Central, Inc. Jeffrey Energy  
Center  
Samantha Kaney, Haley & Aldrich  
Jared Morrison, Evergy, Inc.  
Danielle Oberbroeckling, Haley & Aldrich  
Melanie Sataneck, Haley & Aldrich, Inc.  
JD Schlegel, Evergy, Inc.



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## CERTIFICATIONS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 20-020-0

Arkansas Drinking Water

Illinois Certification #: 200030

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212019-9

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

---

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE SUMMARY

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60362964001	MW-2-030421	Water	03/04/21 12:00	03/05/21 17:00
60362964002	MW-3-030421	Water	03/04/21 12:35	03/05/21 17:00
60362964003	MW-6-030421	Water	03/04/21 13:30	03/05/21 17:00
60362964004	MW-7-030421	Water	03/04/21 12:55	03/05/21 17:00
60362964005	BAA-DUP-030421	Water	03/04/21 12:55	03/05/21 17:00

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### SAMPLE ANALYTE COUNT

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60362964001	MW-2-030421	EPA 200.7	TDS	2	PASI-K
		SM 2540C	AJS	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	AJS	3	PASI-K
60362964002	MW-3-030421	EPA 200.7	JLH, TDS	2	PASI-K
		SM 2540C	AJS	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	AJS	3	PASI-K
60362964003	MW-6-030421	EPA 200.7	TDS	2	PASI-K
		SM 2540C	AJS	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	AJS	3	PASI-K
60362964004	MW-7-030421	EPA 200.7	TDS	2	PASI-K
		SM 2540C	AJS	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	AJS	3	PASI-K
60362964005	BAA-DUP-030421	EPA 200.7	TDS	2	PASI-K
		SM 2540C	AJS	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	AJS	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR  
Pace Project No.: 60362964

---

**Date:** March 23, 2021

Amended report revised to include calcium rerun result for sample 60362964002 (MW-3-030421).

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** Evergy Kansas Central, Inc.

**Date:** March 23, 2021

**General Information:**

5 samples were analyzed for EPA 200.7 by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 707827

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60362960004,60362963003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2850597)
  - Calcium
- MS (Lab ID: 2850599)
  - Calcium
- MSD (Lab ID: 2850598)
  - Calcium

QC Batch: 707888

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60362962001,60362965003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2850769)
  - Calcium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** Evergy Kansas Central, Inc.

**Date:** March 23, 2021

QC Batch: 709552

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60364095001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2856868)
- Calcium

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

**Method:** SM 2540C

**Description:** 2540C Total Dissolved Solids

**Client:** Evergy Kansas Central, Inc.

**Date:** March 23, 2021

**General Information:**

5 samples were analyzed for SM 2540C by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

**Method:** SM 4500-H+B

**Description:** 4500H+ pH, Electrometric

**Client:** Evergy Kansas Central, Inc.

**Date:** March 23, 2021

### General Information:

5 samples were analyzed for SM 4500-H+B by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

- BAA-DUP-030421 (Lab ID: 60362964005)
- MW-2-030421 (Lab ID: 60362964001)
- MW-3-030421 (Lab ID: 60362964002)
- MW-6-030421 (Lab ID: 60362964003)
- MW-7-030421 (Lab ID: 60362964004)

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** Evergy Kansas Central, Inc.

**Date:** March 23, 2021

**General Information:**

5 samples were analyzed for EPA 300.0 by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-2-030421      Lab ID: 60362964001      Collected: 03/04/21 12:00      Received: 03/05/21 17:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b>								
Analytical Method: EPA 200.7      Preparation Method: EPA 200.7								
Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>0.92</b>	mg/L	0.10	1	03/10/21 12:01	03/15/21 23:56	7440-42-8	
Calcium, Total Recoverable	<b>149</b>	mg/L	0.20	1	03/10/21 12:01	03/15/21 23:56	7440-70-2	
<b>2540C Total Dissolved Solids</b>								
Analytical Method: SM 2540C								
Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>1170</b>	mg/L	13.3	1		03/11/21 13:30		
<b>4500H+ pH, Electrometric</b>								
Analytical Method: SM 4500-H+B								
Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>7.2</b>	Std. Units	0.10	1		03/12/21 10:42		H6
<b>300.0 IC Anions 28 Days</b>								
Analytical Method: EPA 300.0								
Pace Analytical Services - Kansas City								
Chloride	<b>104</b>	mg/L	20.0	20		03/09/21 16:46	16887-00-6	
Fluoride	<b>0.50</b>	mg/L	0.20	1		03/09/21 15:59	16984-48-8	
Sulfate	<b>507</b>	mg/L	50.0	50		03/10/21 15:14	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-3-030421      Lab ID: 60362964002      Collected: 03/04/21 12:35      Received: 03/05/21 17:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b>								
Analytical Method: EPA 200.7      Preparation Method: EPA 200.7								
Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>2.5</b>	mg/L	0.10	1	03/10/21 16:37	03/16/21 14:24	7440-42-8	
Calcium, Total Recoverable	<b>495</b>	mg/L	0.20	1	03/18/21 15:58	03/19/21 15:52	7440-70-2	
<b>2540C Total Dissolved Solids</b>								
Analytical Method: SM 2540C								
Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>3400</b>	mg/L	66.7	1		03/11/21 13:30		
<b>4500H+ pH, Electrometric</b>								
Analytical Method: SM 4500-H+B								
Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>6.7</b>	Std. Units	0.10	1		03/12/21 10:46		H6
<b>300.0 IC Anions 28 Days</b>								
Analytical Method: EPA 300.0								
Pace Analytical Services - Kansas City								
Chloride	<b>157</b>	mg/L	20.0	20		03/09/21 17:50	16887-00-6	
Fluoride	<b>0.69</b>	mg/L	0.20	1		03/09/21 17:34	16984-48-8	
Sulfate	<b>2000</b>	mg/L	200	200		03/10/21 15:58	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-6-030421      Lab ID: 60362964003      Collected: 03/04/21 13:30      Received: 03/05/21 17:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b>								
Analytical Method: EPA 200.7      Preparation Method: EPA 200.7								
Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>4.0</b>	mg/L	0.10	1	03/10/21 16:37	03/16/21 14:27	7440-42-8	
Calcium, Total Recoverable	<b>545</b>	mg/L	0.20	1	03/10/21 16:37	03/16/21 14:27	7440-70-2	
<b>2540C Total Dissolved Solids</b>								
Analytical Method: SM 2540C								
Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>3500</b>	mg/L	66.7	1		03/11/21 13:30		
<b>4500H+ pH, Electrometric</b>								
Analytical Method: SM 4500-H+B								
Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>6.9</b>	Std. Units	0.10	1		03/12/21 10:52		H6
<b>300.0 IC Anions 28 Days</b>								
Analytical Method: EPA 300.0								
Pace Analytical Services - Kansas City								
Chloride	<b>249</b>	mg/L	20.0	20		03/09/21 18:53	16887-00-6	
Fluoride	<b>0.44</b>	mg/L	0.20	1		03/09/21 18:37	16984-48-8	
Sulfate	<b>1940</b>	mg/L	200	200		03/10/21 16:12	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Sample: MW-7-030421	Lab ID: 60362964004	Collected: 03/04/21 12:55	Received: 03/05/21 17:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City						
Boron, Total Recoverable	<b>0.61</b>	mg/L	0.10	1	03/10/21 16:37	03/16/21 14:30	7440-42-8	
Calcium, Total Recoverable	<b>207</b>	mg/L	0.20	1	03/10/21 16:37	03/16/21 14:30	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City						
Total Dissolved Solids	<b>1800</b>	mg/L	20.0	1		03/11/21 13:31		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City						
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		03/12/21 10:49		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City						
Chloride	<b>196</b>	mg/L	20.0	20		03/09/21 19:25	16887-00-6	
Fluoride	<b>0.69</b>	mg/L	0.20	1		03/09/21 19:09	16984-48-8	
Sulfate	<b>845</b>	mg/L	100	100		03/10/21 16:27	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: BAA-DUP-030421      Lab ID: 60362964005      Collected: 03/04/21 12:55      Received: 03/05/21 17:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b> Analytical Method: EPA 200.7      Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>0.62</b>	mg/L	0.10	1	03/10/21 16:37	03/16/21 14:33	7440-42-8	
Calcium, Total Recoverable	<b>209</b>	mg/L	0.20	1	03/10/21 16:37	03/16/21 14:33	7440-70-2	
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>1780</b>	mg/L	20.0	1		03/11/21 13:31		
<b>4500H+ pH, Electrometric</b> Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>7.0</b>	Std. Units	0.10	1		03/12/21 10:50		H6
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>198</b>	mg/L	20.0	20		03/09/21 19:57	16887-00-6	
Fluoride	<b>0.70</b>	mg/L	0.20	1		03/09/21 19:41	16984-48-8	
Sulfate	<b>849</b>	mg/L	100	100		03/10/21 16:42	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**QUALITY CONTROL DATA**

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

QC Batch: 707827

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Total

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60362964001

METHOD BLANK: 2850595

Matrix: Water

Associated Lab Samples: 60362964001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	03/15/21 22:34	
Calcium	mg/L	<0.20	0.20	03/15/21 22:34	

LABORATORY CONTROL SAMPLE: 2850596

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	0.96	96	85-115	
Calcium	mg/L	10	10.2	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2850597 2850598

Parameter	Units	60362960004		2850597		2850598		% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec				
Boron	mg/L	0.40	1	1	1.4	1.4	96	96	70-130	0	20
Calcium	mg/L	355	10	10	352	351	-28	-39	70-130	0	20 M1

MATRIX SPIKE SAMPLE: 2850599

Parameter	Units	60362963003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1.7	1	2.7	96	70-130	
Calcium	mg/L	537	10	555	179	70-130 M1	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**QUALITY CONTROL DATA**

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

QC Batch: 707888 Analysis Method: EPA 200.7  
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total  
 Laboratory: Pace Analytical Services - Kansas City  
 Associated Lab Samples: 60362964002, 60362964003, 60362964004, 60362964005

METHOD BLANK: 2850767 Matrix: Water  
 Associated Lab Samples: 60362964002, 60362964003, 60362964004, 60362964005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	03/16/21 13:53	
Calcium	mg/L	<0.20	0.20	03/16/21 13:53	

LABORATORY CONTROL SAMPLE: 2850768

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	1.0	100	85-115	
Calcium	mg/L	10	9.8	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2850769 2850770

Parameter	Units	60362592001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	3980 ug/L	1	1	5.1	5.0	115	98	70-130	3	20	
Calcium	mg/L	283000 ug/L	10	10	300	293	163	101	70-130	2	20 M1	

MATRIX SPIKE SAMPLE: 2850771

Parameter	Units	60362965003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	0.44	1	1.5	101	70-130	
Calcium	mg/L	200	10	208	80	70-130	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
 without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

QC Batch: 709552

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Total

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60362964002

METHOD BLANK: 2856866

Matrix: Water

Associated Lab Samples: 60362964002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	mg/L	<0.20	0.20	03/19/21 15:47	

LABORATORY CONTROL SAMPLE: 2856867

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	mg/L	10	9.5	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2856868 2856869

Parameter	Units	60364095001		2856869		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Calcium	mg/L	40.0	10	10	53.5	52.0	136	121	70-130	3	20 M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

QC Batch: 707981

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

METHOD BLANK: 2851183

Matrix: Water

Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	6.5	5.0	03/11/21 13:29	

LABORATORY CONTROL SAMPLE: 2851184

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1000	100	80-120	

SAMPLE DUPLICATE: 2851185

Parameter	Units	60362963004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2280	2240	2	10	

SAMPLE DUPLICATE: 2851186

Parameter	Units	60362965004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1280	1290	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

QC Batch: 708291

Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B

Analysis Description: 4500H+B pH

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

SAMPLE DUPLICATE: 2852390

Parameter	Units	60362961004 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.3	1	5	H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR  
Pace Project No.: 60362964

QC Batch: 707525 Analysis Method: EPA 300.0  
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

METHOD BLANK: 2849686 Matrix: Water  
Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/09/21 08:56	
Fluoride	mg/L	<0.20	0.20	03/09/21 08:56	
Sulfate	mg/L	<1.0	1.0	03/09/21 08:56	

METHOD BLANK: 2852187 Matrix: Water  
Associated Lab Samples: 60362964001, 60362964002, 60362964003, 60362964004, 60362964005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/10/21 14:45	
Fluoride	mg/L	<0.20	0.20	03/10/21 14:45	
Sulfate	mg/L	<1.0	1.0	03/10/21 14:45	

LABORATORY CONTROL SAMPLE: 2849687

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.3	94	90-110	
Sulfate	mg/L	5	4.8	95	90-110	

LABORATORY CONTROL SAMPLE: 2852188

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.3	94	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2849688 2849689

Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60362964001 Result	Spike Conc.	Spike Conc.	Conc.								
Chloride	mg/L	104	100	100	205	209	101	105	80-120	2	15		
Fluoride	mg/L	0.50	2.5	2.5	2.8	2.8	93	92	80-120	1	15		
Sulfate	mg/L	507	250	250	753	757	99	100	80-120	1	15		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

MATRIX SPIKE SAMPLE:		2849690					
Parameter	Units	60362965005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	64.9	100	159	94	80-120	
Fluoride	mg/L	0.44	2.5	3.1	105	80-120	
Sulfate	mg/L	592	250	850	103	80-120	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALIFIERS

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC BASA/BAL CCR

Pace Project No.: 60362964

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60362964001	MW-2-030421	EPA 200.7	707827	EPA 200.7	707926
60362964002	MW-3-030421	EPA 200.7	707888	EPA 200.7	708029
60362964002	MW-3-030421	EPA 200.7	709552	EPA 200.7	709631
60362964003	MW-6-030421	EPA 200.7	707888	EPA 200.7	708029
60362964004	MW-7-030421	EPA 200.7	707888	EPA 200.7	708029
60362964005	BAA-DUP-030421	EPA 200.7	707888	EPA 200.7	708029
60362964001	MW-2-030421	SM 2540C	707981		
60362964002	MW-3-030421	SM 2540C	707981		
60362964003	MW-6-030421	SM 2540C	707981		
60362964004	MW-7-030421	SM 2540C	707981		
60362964005	BAA-DUP-030421	SM 2540C	707981		
60362964001	MW-2-030421	SM 4500-H+B	708291		
60362964002	MW-3-030421	SM 4500-H+B	708291		
60362964003	MW-6-030421	SM 4500-H+B	708291		
60362964004	MW-7-030421	SM 4500-H+B	708291		
60362964005	BAA-DUP-030421	SM 4500-H+B	708291		
60362964001	MW-2-030421	EPA 300.0	707525		
60362964002	MW-3-030421	EPA 300.0	707525		
60362964003	MW-6-030421	EPA 300.0	707525		
60362964004	MW-7-030421	EPA 300.0	707525		
60362964005	BAA-DUP-030421	EPA 300.0	707525		

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



Sample Condition Upon Receipt

WO#: 60362964



Client Name: Evergy KS Central

Courier: FedEx  UPS  VIA  Clay  PEX  ECI  Pace  Xroads  Client  Other

Tracking #: \_\_\_\_\_ Pace Shipping Label Used? Yes  No

Custody Seal on Cooler/Box Present: Yes  No  Seals intact: Yes  No

Packing Material: Bubble Wrap  Bubble Bags  Foam  None  Other

Thermometer Used: T-298 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 2.0 Corr. Factor 0.0 Corrected 2.0

Date and initials of person examining contents:

PN3/5/21

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>All containers ED start with BAA and not MW.</u>
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Client Notification/ Resolution: Copy COC to Client? Y N Field Data Required? Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: \_\_\_\_\_ Date: \_\_\_\_\_



**ATTACHMENT 1-2**  
**September 2021 Sampling Event**  
**Laboratory Analytical Report**

October 29, 2021

Melissa Michels  
Evergy, Inc.  
818 Kansas Avenue  
Topeka, KS 66612

RE: Project: JEC BASA/BAL CCR  
Pace Project No.: 60380630

Dear Melissa Michels:

Enclosed are the analytical results for sample(s) received by the laboratory on September 17, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Hank Kapka  
hank.kapka@pacelabs.com  
(913)599-5665  
PM Lab Management

Enclosures

cc: Laura Hines, Evergy, Inc.  
Jake Humphrey, Evergy, Inc.  
Samantha Kaney, Haley & Aldrich  
Jared Morrison, Evergy, Inc.  
Danielle Oberbroeckling, Haley & Aldrich  
Melanie Sataneck, Haley & Aldrich, Inc.  
JD Schlegel, Evergy, Inc.  
Jacob Will, Evergy Kansas Central, Jeffrey Energy Center



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## CERTIFICATIONS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219

Missouri Inorganic Drinking Water Certification #: 10090

Arkansas Drinking Water

Arkansas Certification #: 20-020-0

Arkansas Drinking Water

Illinois Certification #: 2000302021-3

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212020-2

Oklahoma Certification #: 9205/9935

Florida: Cert E871149 SEKS WET

Texas Certification #: T104704407-19-12

Utah Certification #: KS000212019-9

Illinois Certification #: 004592

Kansas Field Laboratory Accreditation: # E-92587

Missouri SEKS Micro Certification: 10070

---

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## SAMPLE SUMMARY

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60380630001	BAA-2-091421	Water	09/14/21 19:25	09/17/21 00:00
60380630002	BAA-3-091421	Water	09/14/21 18:25	09/17/21 00:00
60380630003	BAA-6-091421	Water	09/14/21 18:55	09/17/21 00:00
60380630004	BAA-7-091421	Water	09/14/21 17:35	09/17/21 00:00
60380630005	DUP-BAA-091421	Water	09/14/21 17:35	09/17/21 00:00

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### SAMPLE ANALYTE COUNT

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60380630001	BAA-2-091421	EPA 200.7	JLH	2	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	KB	1	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K
60380630002	BAA-3-091421	EPA 200.7	JLH	2	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	KB	1	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K
60380630003	BAA-6-091421	EPA 200.7	JLH	2	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	KB	1	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K
60380630004	BAA-7-091421	EPA 200.7	JLH	2	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	KB	1	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K
60380630005	DUP-BAA-091421	EPA 200.7	JLH	2	PASI-K
		SM 2540C	BLA	1	PASI-K
		SM 4500-H+B	KB	1	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K
		EPA 300.0	ALH, LDB	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** Evergy Kansas Central, Inc.

**Date:** October 29, 2021

**General Information:**

5 samples were analyzed for EPA 200.7 by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 745516

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60380630002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2986175)
  - Calcium
- MS (Lab ID: 2986177)
  - Boron
  - Calcium
- MSD (Lab ID: 2986176)
  - Calcium

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

**Method:** EPA 200.7

**Description:** 200.7 Metals, Total

**Client:** Evergy Kansas Central, Inc.

**Date:** October 29, 2021

Analyte Comments:

QC Batch: 745516

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 2986173)
- Calcium

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

**Method:** SM 2540C

**Description:** 2540C Total Dissolved Solids

**Client:** Evergy Kansas Central, Inc.

**Date:** October 29, 2021

**General Information:**

5 samples were analyzed for SM 2540C by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Duplicate Sample:**

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

**Additional Comments:**

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

**Method:** SM 4500-H+B

**Description:** 4500H+ pH, Electrometric

**Client:** Evergy Kansas Central, Inc.

**Date:** October 29, 2021

### General Information:

5 samples were analyzed for SM 4500-H+B by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated outside of the 15 minute EPA required holding time.

- BAA-2-091421 (Lab ID: 60380630001)
- BAA-3-091421 (Lab ID: 60380630002)
- BAA-6-091421 (Lab ID: 60380630003)
- BAA-7-091421 (Lab ID: 60380630004)
- DUP-BAA-091421 (Lab ID: 60380630005)

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

### Additional Comments:

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## PROJECT NARRATIVE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** Evergy Kansas Central, Inc.

**Date:** October 29, 2021

**General Information:**

5 samples were analyzed for EPA 300.0 by Pace Analytical Services Kansas City. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 744822

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s):  
60380628002,60380631002,60380635001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2983704)
  - Chloride

R1: RPD value was outside control limits.

- MSD (Lab ID: 2983705)
  - Chloride

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Sample: <b>BAA-2-091421</b>	Lab ID: <b>60380630001</b>	Collected: 09/14/21 19:25	Received: 09/17/21 00:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City						
Boron, Total Recoverable	<b>1.4</b>	mg/L	0.10	1	09/24/21 16:45	09/27/21 18:45	7440-42-8	
Calcium, Total Recoverable	<b>190</b>	mg/L	0.20	1	09/24/21 16:45	09/27/21 18:45	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City						
Total Dissolved Solids	<b>1410</b>	mg/L	13.3	1		09/21/21 13:52		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City						
pH at 25 Degrees C	<b>7.3</b>	Std. Units	0.10	1		09/20/21 13:42		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City						
Chloride	<b>162</b>	mg/L	20.0	20		09/22/21 16:24	16887-00-6	
Fluoride	<b>0.47</b>	mg/L	0.20	1		09/22/21 16:06	16984-48-8	
Sulfate	<b>654</b>	mg/L	100	100		09/23/21 20:45	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: BAA-3-091421      Lab ID: 60380630002      Collected: 09/14/21 18:25      Received: 09/17/21 00:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b> Analytical Method: EPA 200.7      Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>2.3</b>	mg/L	0.10	1	09/24/21 16:45	09/27/21 18:48	7440-42-8	M1
Calcium, Total Recoverable	<b>542</b>	mg/L	0.20	1	09/24/21 16:45	09/27/21 18:48	7440-70-2	M1
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>3330</b>	mg/L	66.7	1		09/21/21 13:53		
<b>4500H+ pH, Electrometric</b> Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>7.1</b>	Std. Units	0.10	1		09/20/21 13:36		H6
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>189</b>	mg/L	20.0	20		09/22/21 17:01	16887-00-6	
Fluoride	<b>0.99</b>	mg/L	0.20	1		09/22/21 16:43	16984-48-8	
Sulfate	<b>1850</b>	mg/L	500	500		09/23/21 20:57	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Sample: BAA-6-091421	Lab ID: 60380630003	Collected: 09/14/21 18:55	Received: 09/17/21 00:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City						
Boron, Total Recoverable	<b>3.8</b>	mg/L	0.10	1	09/24/21 16:45	09/27/21 19:04	7440-42-8	
Calcium, Total Recoverable	<b>557</b>	mg/L	0.20	1	09/24/21 16:45	09/27/21 19:04	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City						
Total Dissolved Solids	<b>3060</b>	mg/L	66.7	1		09/21/21 13:53		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City						
pH at 25 Degrees C	<b>7.3</b>	Std. Units	0.10	1		09/20/21 13:38		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City						
Chloride	<b>310</b>	mg/L	20.0	20		09/22/21 17:38	16887-00-6	
Fluoride	<b>0.71</b>	mg/L	0.20	1		09/22/21 17:19	16984-48-8	
Sulfate	<b>1870</b>	mg/L	500	500		09/23/21 21:09	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: BAA-7-091421      Lab ID: 60380630004      Collected: 09/14/21 17:35      Received: 09/17/21 00:00      Matrix: Water</b>								
<b>200.7 Metals, Total</b> Analytical Method: EPA 200.7      Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Boron, Total Recoverable	<b>0.56</b>	mg/L	0.10	1	09/24/21 16:45	09/27/21 19:06	7440-42-8	
Calcium, Total Recoverable	<b>242</b>	mg/L	0.20	1	09/24/21 16:45	09/27/21 19:06	7440-70-2	
<b>2540C Total Dissolved Solids</b> Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	<b>1670</b>	mg/L	20.0	1		09/21/21 13:53		
<b>4500H+ pH, Electrometric</b> Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City								
pH at 25 Degrees C	<b>7.2</b>	Std. Units	0.10	1		09/20/21 13:28		H6
<b>300.0 IC Anions 28 Days</b> Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	<b>174</b>	mg/L	20.0	20		09/22/21 18:14	16887-00-6	
Fluoride	<b>0.61</b>	mg/L	0.20	1		09/22/21 17:56	16984-48-8	
Sulfate	<b>756</b>	mg/L	100	100		09/23/21 21:21	14808-79-8	

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### ANALYTICAL RESULTS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Sample: DUP-BAA-091421	Lab ID: 60380630005	Collected: 09/14/21 17:35	Received: 09/17/21 00:00	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>200.7 Metals, Total</b>		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City						
Boron, Total Recoverable	<b>0.53</b>	mg/L	0.10	1	09/24/21 16:45	09/27/21 19:09	7440-42-8	
Calcium, Total Recoverable	<b>233</b>	mg/L	0.20	1	09/24/21 16:45	09/27/21 19:09	7440-70-2	
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C Pace Analytical Services - Kansas City						
Total Dissolved Solids	<b>1680</b>	mg/L	20.0	1		09/21/21 13:53		
<b>4500H+ pH, Electrometric</b>		Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City						
pH at 25 Degrees C	<b>7.5</b>	Std. Units	0.10	1		09/20/21 13:31		H6
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City						
Chloride	<b>180</b>	mg/L	20.0	20		09/22/21 19:28	16887-00-6	
Fluoride	<b>0.61</b>	mg/L	0.20	1		09/22/21 19:10	16984-48-8	
Sulfate	<b>750</b>	mg/L	100	100		09/23/21 21:33	14808-79-8	

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

QC Batch:	745516	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
		Laboratory:	Pace Analytical Services - Kansas City

Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

METHOD BLANK: 2986173 Matrix: Water

Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	09/27/21 18:40	
Calcium	mg/L	0.29	0.20	09/28/21 11:53	P8

LABORATORY CONTROL SAMPLE: 2986174

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	0.95	95	85-115	
Calcium	mg/L	10	10.2	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2986175 2986176

Parameter	Units	60380630002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	2.3	1	1	3.4	3.3	108	97	70-130	3	20	
Calcium	mg/L	542	10	10	572	556	292	135	70-130	3	20 M1	

MATRIX SPIKE SAMPLE: 2986177

Parameter	Units	60380630002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	2.3	1	12.3	999	70-130	M1
Calcium	mg/L	542	10	664	1210	70-130	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**QUALITY CONTROL DATA**

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

QC Batch: 744455	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60380630001, 60380630002

METHOD BLANK: 2982535 Matrix: Water

Associated Lab Samples: 60380630001, 60380630002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	09/21/21 13:50	

LABORATORY CONTROL SAMPLE: 2982536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	968	97	80-120	

SAMPLE DUPLICATE: 2982537

Parameter	Units	60380469003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1040	1070	3	10	

SAMPLE DUPLICATE: 2982538

Parameter	Units	60380625002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1340	1340	0	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**QUALITY CONTROL DATA**

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

QC Batch: 744456	Analysis Method: SM 2540C
QC Batch Method: SM 2540C	Analysis Description: 2540C Total Dissolved Solids
	Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60380630003, 60380630004, 60380630005

METHOD BLANK: 2982539 Matrix: Water

Associated Lab Samples: 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	09/21/21 13:53	

LABORATORY CONTROL SAMPLE: 2982540

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	956	96	80-120	

SAMPLE DUPLICATE: 2982541

Parameter	Units	60380630003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3060	3380	10	10	

SAMPLE DUPLICATE: 2982542

Parameter	Units	60380632001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	74400	72800	2	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

QC Batch: 744326

Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B

Analysis Description: 4500H+B pH

Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

SAMPLE DUPLICATE: 2982165

Parameter	Units	60380628001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.4	7.3	1	5	H6

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

**QUALITY CONTROL DATA**

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

QC Batch: 744822 Analysis Method: EPA 300.0  
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
 Laboratory: Pace Analytical Services - Kansas City  
 Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

METHOD BLANK: 2983702 Matrix: Water  
 Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/22/21 08:26	
Fluoride	mg/L	<0.20	0.20	09/22/21 08:26	
Sulfate	mg/L	<1.0	1.0	09/22/21 08:26	

METHOD BLANK: 2985972 Matrix: Water  
 Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/23/21 08:02	
Fluoride	mg/L	<0.20	0.20	09/23/21 08:02	
Sulfate	mg/L	<1.0	1.0	09/23/21 08:02	

METHOD BLANK: 2988412 Matrix: Water  
 Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/27/21 09:57	
Fluoride	mg/L	<0.20	0.20	09/27/21 09:57	
Sulfate	mg/L	<1.0	1.0	09/27/21 09:57	

METHOD BLANK: 2988943 Matrix: Water  
 Associated Lab Samples: 60380630001, 60380630002, 60380630003, 60380630004, 60380630005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/28/21 10:43	
Fluoride	mg/L	<0.20	0.20	09/28/21 10:43	
Sulfate	mg/L	<1.0	1.0	09/28/21 10:43	

LABORATORY CONTROL SAMPLE: 2983703

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.4	108	90-110	
Fluoride	mg/L	2.5	2.7	107	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

**REPORT OF LABORATORY ANALYSIS**

This report shall not be reproduced, except in full,  
 without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

LABORATORY CONTROL SAMPLE: 2983703

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.5	110	90-110	

LABORATORY CONTROL SAMPLE: 2985973

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.6	106	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

LABORATORY CONTROL SAMPLE: 2988413

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	
Fluoride	mg/L	2.5	2.6	103	90-110	
Sulfate	mg/L	5	4.8	97	90-110	

LABORATORY CONTROL SAMPLE: 2988944

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	98	90-110	
Fluoride	mg/L	2.5	2.5	102	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2983704 2983705

Parameter	Units	60380628002		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Chloride	mg/L	83.8	100	100	237	193	153	109	109	80-120	21	15	M1, R1
Fluoride	mg/L	0.38	2.5	2.5	2.9	2.9	99	101	101	80-120	1	15	
Sulfate	mg/L	488	500	500	985	1000	99	103	103	80-120	2	15	

MATRIX SPIKE SAMPLE: 2983706

Parameter	Units	60380631002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L		80.7	100	183	102	80-120
Fluoride	mg/L		0.28	2.5	2.3	82	80-120
Sulfate	mg/L		430	250	686	102	80-120

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2988049												2988050	
Parameter	Units	60380635001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
			Spike Conc.	MS Result	MSD Result								
Chloride	mg/L	4530	5000	5000	9270	9470	95	99	80-120	2	15		
Fluoride	mg/L	0.26	2500	2500	2460	2450	98	98	80-120	0	15		
Sulfate	mg/L	184	5000	5000	4940	4960	95	95	80-120	0	15		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

## QUALIFIERS

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

---

### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

P8 Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

R1 RPD value was outside control limits.

## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.

### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: JEC BASA/BAL CCR

Pace Project No.: 60380630

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60380630001	BAA-2-091421	EPA 200.7	745516	EPA 200.7	745589
60380630002	BAA-3-091421	EPA 200.7	745516	EPA 200.7	745589
60380630003	BAA-6-091421	EPA 200.7	745516	EPA 200.7	745589
60380630004	BAA-7-091421	EPA 200.7	745516	EPA 200.7	745589
60380630005	DUP-BAA-091421	EPA 200.7	745516	EPA 200.7	745589
60380630001	BAA-2-091421	SM 2540C	744455		
60380630002	BAA-3-091421	SM 2540C	744455		
60380630003	BAA-6-091421	SM 2540C	744456		
60380630004	BAA-7-091421	SM 2540C	744456		
60380630005	DUP-BAA-091421	SM 2540C	744456		
60380630001	BAA-2-091421	SM 4500-H+B	744326		
60380630002	BAA-3-091421	SM 4500-H+B	744326		
60380630003	BAA-6-091421	SM 4500-H+B	744326		
60380630004	BAA-7-091421	SM 4500-H+B	744326		
60380630005	DUP-BAA-091421	SM 4500-H+B	744326		
60380630001	BAA-2-091421	EPA 300.0	744822		
60380630002	BAA-3-091421	EPA 300.0	744822		
60380630003	BAA-6-091421	EPA 300.0	744822		
60380630004	BAA-7-091421	EPA 300.0	744822		
60380630005	DUP-BAA-091421	EPA 300.0	744822		

### REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, LLC.



Sample Condition Upon Receipt

WO#: 60380630



Client Name: Everast

Courier: FedEx [ ] UPS [ ] VIA [ ] Clay [ ] PEX [ ] ECI [ ] Pace [ ] Xroads [ ] Client [ ] Other [ ]

Tracking #: \_\_\_\_\_ Pace Shipping Label Used? Yes [ ] No [ ]

Custody Seal on Cooler/Box Present: Yes [x] No [ ] Seals intact: Yes [x] No [ ]

Packing Material: Bubble Wrap [ ] Bubble Bags [ ] Foam [ ] None [x] Other [ ]

Thermometer Used: \_\_\_\_\_ Type of Ice: Wet [x] Blue [ ] None [ ]

Cooler Temperature (°C): As-read 2.1 Corr. Factor \_\_\_\_\_ Corrected \_\_\_\_\_

Date and initials of person examining contents: 10.9.18.21

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: wt	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT#	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

Project Manager Review: \_\_\_\_\_ Date: \_\_\_\_\_



**ATTACHMENT 2**  
**Statistical Analyses**

**ATTACHMENT 2-1**  
**September 2020 Statistical Analyses**



HALEY & ALDRICH, INC.  
6500 Rockside Road  
Suite 200  
Cleveland, OH 44131  
216.739.0555

## TECHNICAL MEMORANDUM

November 3, 2022  
File No. 129778

TO: Evergy Kansas Central, Inc.  
Jared Morrison – Director, Water and Waste Programs

FROM: Haley & Aldrich, Inc.  
Steven F. Putrich, P.E., Senior Associate – Engineering Principal  
Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

SUBJECT: September 2020 Semi-Annual Groundwater Detection Monitoring Data  
Statistical Evaluation  
**Completed January 15, 2021**  
Jeffrey Energy Center  
Bottom Ash Settling Area/Bottom Ash Landfill

Pursuant to Title 40 Code of Federal Regulations (40 CFR) §§ 257.93 and 257.94 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the **September 2020** semi-annual detection monitoring groundwater sampling event for the Jeffrey Energy Center (JEC) Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL). This semi-annual detection monitoring groundwater sampling event was completed on **September 14, 2020**, with laboratory results received and validated on **October 21, 2020**.

The statistical evaluation discussed in this memorandum was conducted to determine if Appendix III groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant increase (SSI) above background or upgradient wells consistent with the requirements in 40 CFR § 257.94.

### Statistical Evaluation of Appendix III Constituents

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residual (CCR) unit (40 CFR § 257.93(f) (1-4)). The two statistical methods used for these evaluations, prediction limits (PL) and Parametric Analysis of Variance, were certified by Haley & Aldrich, Inc. on April 17, 2019. The PL method, as determined applicable for this sampling event, was used to evaluate potential SSIs above background. Background levels for each constituent listed in Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) were computed as upper prediction limits (UPL), considering one future observation, and a minimum 95 percent confidence coefficient. The most recent groundwater sampling event from each compliance well was compared to the corresponding background PL to determine if an SSI existed.

## STATISTICAL EVALUATION

An interwell evaluation using the PL method was used to complete the statistical evaluation of the referenced dataset. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data (MW-BAA-6). A PL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a specified confidence level (e.g., 95 percent). The upper endpoint of a concentration limit is called the UPL. Depending on the background data distribution, parametric or non-parametric PL procedures are used to evaluate groundwater monitoring data using this method. Parametric PLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the PL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UPL.

The statistical evaluation was conducted using the background dataset for all Appendix III constituents. The UPLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

## BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (MW-BAA-6) were combined to calculate the UPL for each Appendix III constituent. The variability and distribution of the pooled dataset were evaluated to determine the method for UPL calculation. Per the document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*, March 2009, background concentrations were updated based on statistical evaluation of analytical results collected through **September 2019**.

## RESULTS OF APPENDIX III DOWNGRADIANT STATISTICAL COMPARISONS

The sample concentrations from the downgradient wells for each of the Appendix III constituents from the **September 2020** semi-annual detection monitoring sampling event were compared to their respective background UPLs (Table I). A sample concentration greater than the background UPL is considered to represent an SSI. The results of the groundwater detection monitoring statistical evaluation are provided in Table I. **Based on this statistical evaluation on groundwater sampling data collected in September 2020, no SSIs above background PLs occurred at the JEC BASA/BAL.**

Enclosures:

Table I – Summary of Semi-Annual Detection Groundwater Monitoring Statistical Evaluation

## TABLE

**TABLE I**  
**SUMMARY OF SEMI-ANNUAL DETECTION GROUNDWATER MONITORING STATISTICAL EVALUATION**  
 SEPTEMBER 2020 SAMPLING EVENT  
 JEFFREY ENERGY CENTER BOTTOM ASH SETTLING AREA/BOTTOM ASH LANDFILL  
 ST. MARYS, KANSAS

Location Id	Frequency of Detection	Percent Non-Detects	Range of Non-Detect	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	Outlier Presence	Outlier Removed	Trend	Distribution Well	September 2020 Concentration (mg/L)	Interwell Analysis	
													Background Limits <sup>1</sup> (UPL) mg/L	SSI
<b>CCR Appendix-III: Boron, Total (mg/L)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	5.92	1.888	1.374	0.3618	No	No	Stable			10.44	
MW-BAA-2	14/14	0%	-	1.38	0.03313	0.182	0.1695	No	No	Stable	Normal	1.1		No
MW-BAA-3	14/14	0%	-	2.4	0.007007	0.08371	0.03699	No	No	Stable	Normal	2.3		No
MW-BAA-7	14/14	0%	-	1.3	0.09568	0.3093	0.3163	No	No	Stable	Normal	0.55		No
<b>CCR Appendix-III: Calcium, Total (mg/L)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	551	3538	59.48	0.1202	Yes	No	Stable			551	
MW-BAA-2	14/14	0%	-	224	567.1	23.81	0.1328	No	No	Stable	Normal	168		No
MW-BAA-3	15/15	0%	-	559	730.1	27.02	0.05232	No	No	Stable	Normal	532		No
MW-BAA-7	14/14	0%	-	260	308.4	17.56	0.07773	No	No	Decreasing	Normal	208		No
<b>CCR Appendix-III: Chloride (mg/L)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	314	1810	42.54	0.1792	Yes	No	Stable			426	
MW-BAA-2	14/14	0%	-	220	1984	44.54	0.3428	No	No	Stable	Normal	106		No
MW-BAA-3	14/14	0%	-	179	82.68	9.093	0.05729	Yes	No	Increase	Normal	150		No
MW-BAA-7	14/14	0%	-	211	728.6	26.99	0.143	Yes	No	Increase	Non-parametric	188		No
<b>CCR Appendix-III: Fluoride (mg/L)</b>														
MW-BAA-6 (upgradient)	12/14	14%	0.2-0.2	0.88	0.04658	0.2158	0.3986	No	No	Stable			1.464	
MW-BAA-2	14/14	0%	-	0.63	0.00333	0.0577	0.1095	No	No	Stable	Normal	0.58		No
MW-BAA-3	13/14	7%	0.2-0.2	1	0.04473	0.2115	0.2533	Yes	No	Stable	Normal	< 0.20		Yes
MW-BAA-7	14/14	0%	-	0.9	0.005849	0.07648	0.1003	No	No	Stable	Normal	0.74		No
<b>CCR Appendix-III: pH (lab) (SU)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	7.3	0.01962	0.1401	0.01987	No	No	Stable			7.76	
MW-BAA-2	14/14	0%	-	8.5	0.1007	0.3173	0.04246	Yes	No	Stable	Non-parametric	7.2		No
MW-BAA-3	14/14	0%	-	7.6	0.02571	0.1604	0.02241	Yes	No	Stable	Normal	7.1		No
MW-BAA-7	14/14	0%	-	7.5	0.01033	0.1016	0.01381	Yes	No	Stable	Normal	7.3		No
<b>CCR Appendix-III: Sulfate (mg/L)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	2190	113700	337.2	0.1864	Yes	No	Stable			3391	
MW-BAA-2	14/14	0%	-	983	37590	193.9	0.2944	No	No	Stable	Normal	536		No
MW-BAA-3	14/14	0%	-	2290	12640	112.4	0.05529	No	No	Stable	Normal	2050		No
MW-BAA-7	14/14	0%	-	958	1083	32.91	0.03602	Yes	No	Stable	Normal	910		No
<b>CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)</b>														
MW-BAA-6 (upgradient)	14/14	0%	-	3670	168000	409.9	0.1276	Yes	No	Stable			5050	
MW-BAA-2	14/14	0%	-	1790	55180	234.9	0.184	No	No	Stable	Normal	1000		No
MW-BAA-3	14/14	0%	-	3780	62230	249.5	0.07546	No	No	Stable	Normal	3130		No
MW-BAA-7	14/14	0%	-	1990	7303	85.46	0.04733	Yes	No	Stable	Normal	1660		No

**Notes and Abbreviations:**

<sup>1</sup> Based on background data collected from 08/25/2016 through 09/12/2019.

CCR = coal combustion residual

mg/L = milligrams per liter

SSI = statistically significant increase

SU = standard unit

UPL = upper prediction limit

**ATTACHMENT 2-2**  
**March 2021 Statistical Analysis**



HALEY & ALDRICH, INC.  
6500 Rockside Road  
Suite 200  
Cleveland, OH 44131  
216.739.0555

## TECHNICAL MEMORANDUM

November 3, 2022

File No. 129778

TO: Evergy Kansas Central, Inc.  
Jared Morrison – Director, Water and Waste Programs

FROM: Haley & Aldrich, Inc.  
Steven F. Putrich, P.E., Principal Consultant – Engineering Principal  
Mark Nicholls, P.G., Senior Associate – Senior Hydrogeologist

SUBJECT: March 2021 Semi-Annual Groundwater Detection Monitoring Data  
Statistical Evaluation  
**Completed July 15, 2021**  
Jeffrey Energy Center  
Bottom Ash Settling Area/Bottom Ash Landfill

Pursuant to Title 40 Code of Federal Regulations (40 CFR) §§ 257.93 and 257.94 (Rule), this memorandum summarizes the statistical evaluation of the analytical results for the **March 2021** semi-annual detection monitoring groundwater sampling event for the Jeffrey Energy Center (JEC) Bottom Ash Settling Area/Bottom Ash Landfill (BASA/BAL). This semi-annual detection monitoring groundwater sampling event was completed on **March 4, 2021**, with laboratory results received and validated on **April 16, 2021**.

The statistical evaluation discussed in this memorandum was conducted to determine if Appendix III groundwater monitoring constituents have been detected in downgradient wells at concentrations that represent a statistically significant increase (SSI) above background or upgradient wells consistent with the requirements in 40 CFR § 257.94.

### Statistical Evaluation of Appendix III Constituents

The Rule provides four specific options for statistical evaluation of groundwater quality data collected at a coal combustion residual (CCR) unit (40 CFR § 257.93(f) (1-4)). The two statistical methods used for these evaluations, prediction limits (PL) and Parametric Analysis of Variance, were certified by Haley & Aldrich, Inc. on April 17, 2019. The PL method, as determined applicable for this sampling event, was used to evaluate potential SSIs above background. Background levels for each constituent listed in Appendix III (boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids) were computed as upper prediction limits (UPL), considering one future observation, and a minimum 95 percent confidence coefficient. The most recent groundwater sampling event from each compliance well was compared to the corresponding background PL to determine if a SSI existed.

## STATISTICAL EVALUATION

An interwell evaluation using the PL method was used to complete the statistical evaluation of the referenced dataset. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data (MW-BAA-6). A PL procedure is one in which a concentration limit for each constituent is established from the distribution of the background data, with a specified confidence level (e.g., 95 percent). The upper endpoint of a concentration limit is called the UPL. Depending on the background data distribution, parametric or non-parametric PL procedures are used to evaluate groundwater monitoring data using this method. Parametric PLs utilize normally distributed data or normalized data via a transformation of the sample background data used to construct the limit. If the data are non-normal and a transformation is not indicated, non-parametric procedures (order statistics or bootstrap methods) are used to calculate the PL. If all the background data are non-detect, a maximum reporting limit may serve as an appropriate UPL.

The statistical evaluation was conducted using the background dataset for all Appendix III constituents. The UPLs were calculated from the background well dataset using Chemstat software after testing for outlier sample results that would warrant removal from the dataset based on likely error in sampling or measurement. Both visual and statistical outlier tests for the background data were performed using Chemstat and U.S. Environmental Protection Agency's ProUCL 5.1 software, and a visual inspection of the data was performed using box plots and distribution plots for the downgradient sample data. No sample data were identified as outliers that warranted removal from the dataset.

## BACKGROUND DISTRIBUTIONS

The groundwater analytical results for each sampling event from the background sample location (MW-BAA-6) were combined to calculate the UPL for each Appendix III constituent. The variability and distribution of the pooled dataset were evaluated to determine the method for UPL calculation. Per the document, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*, March 2009, background concentrations were updated based on statistical evaluation of analytical results collected through **September 2019**.

## RESULTS OF APPENDIX III DOWNGRADIANT STATISTICAL COMPARISONS

The sample concentrations from the downgradient wells for each of the Appendix III constituents from the March 2021 semi-annual detection monitoring sampling event were compared to their respective background UPLs (Table I). A sample concentration greater than the background UPL is considered to represent a SSI. The results of the groundwater detection monitoring statistical evaluation are provided in Table I. **Based on this statistical evaluation on groundwater sampling data collected in March 2021, no SSIs above background PLs occurred at the JEC BASA/BAL.**

Enclosures:

Table I – Summary of Semi-Annual Detection Groundwater Monitoring Statistical Evaluation

## TABLE

**TABLE I**  
**SUMMARY OF SEMI-ANNUAL DETECTION GROUNDWATER MONITORING STATISTICAL EVALUATION**  
MARCH 2021 SAMPLING EVENT  
JEFFREY ENERGY CENTER BOTTOM ASH SETTLING AREA/BOTTOM ASH LANDFILL  
ST. MARYS, KANSAS

Location Id	Frequency of Detection	Percent Non-Detects	Range of Non-Detect	Maximum Detect	Variance	Standard Deviation	Coefficient of Variance	Outlier Presence	Outlier Removed	Trend	Distribution Well	March 2021 Concentration (mg/L)	Interwell Analysis	
													Background Limits <sup>1</sup> (UPL) mg/L	SSI
<b>CCR Appendix-III: Boron, Total (mg/L)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	5.92	1.756	1.325	0.3477	No	No	Stable			10.44	
MW-BAA-2	15/15	0%	-	1.38	0.03234	0.1798	0.1691	No	No	Stable	Normal	0.92		No
MW-BAA-3	15/15	0%	-	2.5	0.01026	0.1013	0.04444	No	No	Stable	Normal	2.5		No
MW-BAA-7	15/15	0%	-	1.3	0.09788	0.3129	0.3281	No	No	Stable	Normal	0.61		No
<b>CCR Appendix-III: Calcium, Total (mg/L)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	551	3454	58.77	0.118	Yes	No	Stable			551	
MW-BAA-2	15/15	0%	-	224	587.8	24.24	0.1368	No	No	Stable	Normal	149		No
MW-BAA-3	16/16	0%	-	559	710.1	26.65	0.05174	No	No	Stable	Normal	495		No
MW-BAA-7	15/15	0%	-	260	310.2	17.61	0.0784	No	No	Decreasing	Normal	207		No
<b>CCR Appendix-III: Chloride (mg/L)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	314	1690	41.11	0.1726	Yes	No	Stable			426	
MW-BAA-2	15/15	0%	-	220	1887	43.44	0.3388	No	No	Stable	Normal	104		No
MW-BAA-3	15/15	0%	-	179	76.97	8.773	0.05532	Yes	No	Increase	Normal	157		No
MW-BAA-7	15/15	0%	-	211	680	26.08	0.1378	Yes	No	Increase	Non-parametric	196		No
<b>CCR Appendix-III: Fluoride (mg/L)</b>														
MW-BAA-6 (upgradient)	13/15	13%	0.2-0.2	0.88	0.04394	0.2096	0.3921	No	No	Stable			1.464	
MW-BAA-2	15/15	0%	-	0.63	0.003141	0.05604	0.1067	No	No	Stable	Normal	0.50		No
MW-BAA-3	14/15	7%	0.2-0.2	1	0.04294	0.2072	0.2511	Yes	No	Stable	Normal	0.69		No
MW-BAA-7	15/15	0%	-	0.9	0.005778	0.07601	0.1004	No	No	Stable	Normal	0.69		No
<b>CCR Appendix-III: pH (lab) (SU)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	7.3	0.01971	0.1404	0.01994	No	No	Stable			7.76	
MW-BAA-2	15/15	0%	-	8.5	0.09838	0.3137	0.04208	Yes	No	Stable	Non-parametric	7.2		No
MW-BAA-3	15/15	0%	-	7.6	0.03781	0.1944	0.02728	Yes	No	Stable	Normal	6.7		No
MW-BAA-7	15/15	0%	-	7.5	0.0181	0.1345	0.01834	Yes	No	Stable	Normal	7.0		No
<b>CCR Appendix-III: Sulfate (mg/L)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	2190	106700	326.7	0.1798	Yes	No	Stable			3391	
MW-BAA-2	15/15	0%	-	983	36440	190.9	0.2944	No	No	Stable	Normal	507		No
MW-BAA-3	15/15	0%	-	2290	11810	108.7	0.0535	No	No	Stable	Normal	2000		No
MW-BAA-7	15/15	0%	-	958	1320	36.34	0.03997	Yes	No	Stable	Normal	845		No
<b>CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)</b>														
MW-BAA-6 (upgradient)	15/15	0%	-	3670	161500	401.9	0.1243	Yes	No	Stable			5050	
MW-BAA-2	15/15	0%	-	1790	52000	228	0.1796	No	No	Stable	Normal	1170		No
MW-BAA-3	15/15	0%	-	3780	58370	241.6	0.07295	No	No	Stable	Normal	3400		No
MW-BAA-7	15/15	0%	-	1990	6784	82.36	0.04562	Yes	No	Stable	Normal	1800		No

**Notes and Abbreviations:**

<sup>1</sup> Based on background data collected from 08/25/2016 through 09/12/2019.

CCR = coal combustion residual

mg/L = milligrams per liter

SSI = statistically significant increase

SU = standard unit

UPL = upper prediction limit

**ATTACHMENT 3**  
**Groundwater Potentiometric Maps**



**LEGEND**

- MW-BAA-1** 1219.84 WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), MARCH 2021
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 5-FT INTERVAL (AMSL), DASHED WHERE INFERRED
-  GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
-  BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 04 MARCH 2021.
3. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 04 MARCH 2021 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.
4. AERIAL IMAGERY SOURCE: ESRI, 3 SEPTEMBER 2019



EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
ST. MARY'S, KANSAS

**BOTTOM ASH SETTLING AREA /  
BOTTOM ASH LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
MARCH 4, 2021**



NOVEMBER 2022

FIGURE 2



**LEGEND**

- MW-BAA-1** 1219.84 WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), SEPTEMBER 2021
-  MONITORING WELL
-  PIEZOMETER OBSERVATION ONLY
-  ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 5-FT INTERVAL (AMSL), DASHED WHERE INFERRED
-  GROUNDWATER FLOW DIRECTION AND APPROXIMATE GROUNDWATER FLOW RATE (FEET/YEAR)
-  BOTTOM ASH SETTLING AREA / BOTTOM ASH LANDFILL

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 14 SEPTEMBER 2021.
3. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 14 SEPTEMBER 2021 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.
4. AERIAL IMAGERY SOURCE: ESRI, 3 SEPTEMBER 2019



EVERGY KANSAS CENTRAL, INC.  
JEFFREY ENERGY CENTER  
ST. MARY'S, KANSAS

**BOTTOM ASH SETTLING AREA /  
BOTTOM ASH LANDFILL  
GROUNDWATER POTENTIOMETRIC  
ELEVATION CONTOUR MAP  
SEPTEMBER 14, 2021**



NOVEMBER 2022

FIGURE 3