HALEY ALDRICH

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2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
847 LANDFILL
LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Evergy Kansas Central, Inc.
Topeka, Kansas

File No. 129778-041
January 2022

Table of Contents

Revision No.	Date	Notes

List of Tables

List of Figures

This Annual Groundwater Monitoring and Corrective Action Report documents the groundwater monitoring program for the Lawrence Energy Center (LEC) 847 Landfill 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 LEC 847 Landfill 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 847 Landfill (also known as Ash Landfill 847) at the Lawrence Energy Center (LEC), 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 847 Landfill 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 short 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 847 Landfill 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 847 Landfill 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):

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 847 Landfill 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 847 Landfill 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 847 Landfill.

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 847 Landfill 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 847 Landfill 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 847 Landfill remained in detection monitoring during 2021.

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 847 Landfill 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 LEC 847 Landfill. The 847 Landfill is 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 LEC 847 Landfill 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 847 Landfill 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 semi-annual detection monitoring sampling event. Semi-annual detection

monitoring events were completed in March and September 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 laboratory analytical errors that required the laboratory to reanalyze the following analytical results for the March 2021 semi-annual detection monitoring sampling event:

- Sulfate for monitoring wells MW-33, MW-34, and MW-35,
- Chloride and fluoride for monitoring well MW-33, and
- Total dissolved solids for monitoring well MW-35.

These were the only issues that needed to be addressed at the 847 Landfill 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 847 Landfill 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 847 Landfill 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 during 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 847 Landfill 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 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 847 Landfill 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 847 Landfill 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 847 Landfill 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.
LAWRENCE ENERGY CENTER
847 LANDFILL
LAWRENCE, KANSAS

Location	Upgradient					Downgradient						
	MW-32			MW-35		MW-31R			MW-33		MW-34	
Measure Point (TOC)	861.96			862.52		857.67			855.44		871.96	
Sample Name	MW-32-031021	DUP-847LF-031021	MW-32-091521	MW-35-030921	MW-35-091521	MW-31R-031021	MW-31R-091521	LEC-847LF-DUP-091521	MW-33-031021	MW-33-091521	MW-34-031021	MW-34-091521
Sample Date	3/10/2021	3/10/2021	9/15/2021	3/9/2021	9/15/2021	3/10/2021	9/15/2021	9/15/2021	3/10/2021	9/15/2021	3/10/2021	9/15/2021
Final Lab Report Date	3/22/2021	3/22/2021	10/6/2021	3/22/2021	10/6/2021	3/22/2021	10/6/2021	10/6/2021	3/22/2021	10/6/2021	3/22/2021	10/6/2021
Final Lab Report Revision Date	3/30/2021	3/30/2021	N/A	3/30/2021	N/A	3/30/2021	N/A	N/A	3/30/2021	N/A	3/30/2021	N/A
Lab Data Reviewed and Validated	4/16/2021	4/16/2021	12/9/2021	4/16/2021	12/9/2021	4/16/2021	12/9/2021	12/9/2021	4/16/2021	12/9/2021	4/16/2021	12/9/2021
Depth to Water (ft btoc)	45.71	-	45.20	48.07	47.50	42.01	41.38	-	39.71	39.00	56.05	55.34
Temperature (Deg C)	15.20	-	16.75	15.20	17.69	15.95	17.64	-	16.30	16.90	16.85	19.39
Conductivity, Field (µS/cm)	1765	-	957	7163	3760	1622	1390	-	4789	2010	3634	1850
Turbidity, Field (NTU)	0.0	-	0.0	4.41	0.0	10.1	0.0	-	1.5	0.0	23.8	0.0
pH, Field (su)	7.78	-	8.18	7.07	7.98	7.48	7.97	-	7.11	8.35	7.38	8.62
Boron, Total (mg/L)	**0.18**	**0.19**	**0.20**	**1.8**	**1.8**	**0.35**	**0.74**	**0.74**	**1.6**	**1.6**	**2.0**	**2.1**
Calcium, Total (mg/L)	**57.5**	**60.3**	**66.6**	**478**	**501**	**192**	**275**	**269**	**220**	**267**	**185**	**216**
Chloride (mg/L)	**104**	**110**	**108**	**16300**	**12100**	**3570**	**4530**	**4430**	**6900**	**6000**	**6680**	**5380**
Fluoride (mg/L)	**0.29**	< 0.20	**0.26**	< 0.20	< 0.20	**0.29**	**0.26**	**0.28**	**0.41**	**0.57**	**1.0**	**1.1**
Sulfate (mg/L)	**6.0**	**6.0**	**6.4**	**648**	**617**	**122**	**184**	**254**	**285**	**297**	**429**	**561**
pH (lab) (su)	**7.3**	**7.3**	**7.5**	**7.0**	**7.1**	**7.1**	**7.3**	**7.5**	**7.0**	**7.5**	**7.2**	**7.6**
TDS (mg/L)	**530**	**525**	**511**	**28600**	**26600**	**7720**	**9270**	**9200**	**13300**	**12800**	**13000**	**11100**

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
- WATER QUALITY ONLY
- 847 LANDFILL AREA
- FUTURE 847 LANDFILL DISPOSAL AREA

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI, 04 MARCH 2020

N

0 300 600

SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

847 LANDFILL MONITORING WELL LOCATION MAP

evergy

JANUARY 2022

FIGURE 1

LEGEND

- **MW-32 817.60** — WELL NAME AND GROUNDWATER ELEVATION (MARCH 2021)
- MONITORING WELL
- WATER QUALITY ONLY
- ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION, 0.25-FT INTERVAL (AMSL)
- SITE GROUNDWATER FLOW DIRECTION
- 847 LANDFILL
- FUTURE 847 LANDFILL DISPOSAL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 10 MARCH 2021.
3. MW-35 WAS NOT INCLUDED IN THE DATA SET TO CREATED THE DISPLAYED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION LINES.
4. AMSL = ABOVE MEAN SEA LEVEL
5. AERIAL IMAGERY SOURCE: ESRI, 04 MARCH 2020

N

0 300 600
SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

847 LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP MARCH 10, 2021

evergy

JANUARY 2022

FIGURE 2

LEGEND

- **MW-32 817.60** WELL NAME AND GROUNDWATER ELEVATION (SEPTEMBER 2021)
- MONITORING WELL
- WATER QUALITY ONLY
- ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION, 0.20-FT INTERVAL (AMSL)
- SITE GROUNDWATER FLOW DIRECTION
- 847 LANDFILL
- FUTURE 847 LANDFILL DISPOSAL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 15 SEPTEMBER 2021.
3. MW-35 WAS NOT INCLUDED IN THE DATA SET TO CREATED THE DISPLAYED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION LINES.
4. AMSL = ABOVE MEAN SEA LEVEL
5. AERIAL IMAGERY SOURCE: ESRI, 04 MARCH 2020

N

0 300 600
SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

847 LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP SEPTEMBER 15, 2021

evergy

JANUARY 2022

FIGURE 3

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

October 7, 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

Mark Nicholls Digitally signed by Mark Nicholls Date: 2022.10.07 14:38:33 -07'00'

SUBJECT: 2021 Annual Groundwater Monitoring and Corrective Action Report Addendum
Evergy Kansas Central, Inc. (Evergy)
847 Landfill
Lawrence Energy Center – Lawrence, Kansas

The Evergy Kansas Central, Inc. (Evergy) 847 Landfill at the Lawrence 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 847 Landfill was completed and placed in the facility's operating record on January 31, 2021, 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. For each of the 2021 sampling events, the measured groundwater elevations, with calculated groundwater flow rates and directions, have been included in Attachment 3.

The attachments to this addendum are as follows providing the additional information:

- 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 analysis for data obtained in the September 2020 sampling event; and
  - Overview of the July 2021 statistical analysis 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

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

March 30, 2021

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

RE: Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Dear Melissa Michels:

Enclosed are the analytical results for sample(s) received by the laboratory on March 11, 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_2

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: Andrew Hare, Evergy, Inc.
Laura Hines, Evergy, Inc.
Jake Humphrey, Evergy, Inc.
Tabitha Hylton, Evergy Kansas Central, Inc. Lawrence Energy Center
Samantha Kaney, Haley & Aldrich
Jared Morrison, Evergy, Inc.
Danielle Oberbroeckling, Haley & Aldrich
Melanie Satanek, Haley & Aldrich, Inc.

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CERTIFICATIONS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

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

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SAMPLE SUMMARY

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60363587001	**MW-31R-031021**	Water	03/10/21 09:40	03/11/21 14:30
60363587002	**MW-32-031021**	Water	03/10/21 08:40	03/11/21 14:30
60363587003	**MW-33-031021**	Water	03/10/21 10:30	03/11/21 14:30
60363587004	**MW-34-031021**	Water	03/10/21 11:30	03/11/21 14:30
60363587005	**MW-35-030921**	Water	03/09/21 16:50	03/11/21 14:30
60363587006	**DUP-847LF-031021**	Water	03/10/21 08:45	03/11/21 14:30

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SAMPLE ANALYTE COUNT

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60363587001	**MW-31R-031021**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	VRP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60363587002	**MW-32-031021**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	VRP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60363587003	**MW-33-031021**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	VRP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60363587004	**MW-34-031021**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	VRP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60363587005	**MW-35-030921**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	MAP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60363587006	**DUP-847LF-031021**	EPA 200.7	JLH	2	PASI-K
		SM 2540C	VRP	1	PASI-K
		SM 4500-H+B	LDB	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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PROJECT NARRATIVE

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Date: March 30, 2021

3/25/21 - Amended report revised to include rush rerun results for sulfate on both samples 60363587004 and 60363587005, and TDS on sample 60363587005.

3/30/21 - Amended report revised to include anions rerun results for sample 60363587003.

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: MW-31R-031021 **Lab ID: 60363587001** Collected: 03/10/21 09:40 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.35**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:20	7440-42-8	
Calcium, Total Recoverable	**192**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:20	7440-70-2	M1
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**7720**	mg/L	200	1		03/16/21 10:16		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.1**	Std. Units	0.10	1		03/15/21 11:18		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**3570**	mg/L	500	500		03/19/21 11:18	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	1		03/17/21 21:43	16984-48-8	
Sulfate	**122**	mg/L	20.0	20		03/19/21 10:49	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: MW-32-031021 **Lab ID: 60363587002** Collected: 03/10/21 08:40 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.18**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:28	7440-42-8	
Calcium, Total Recoverable	**57.5**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:28	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**530**	mg/L	10.0	1		03/16/21 10:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.3**	Std. Units	0.10	1		03/15/21 11:20		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**104**	mg/L	10.0	10		03/17/21 23:02	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	1		03/17/21 22:46	16984-48-8	
Sulfate	**6.0**	mg/L	1.0	1		03/17/21 22:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: MW-33-031021 **Lab ID: 60363587003** Collected: 03/10/21 10:30 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**1.6**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:31	7440-42-8	
Calcium, Total Recoverable	**220**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:31	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**13300**	mg/L	500	1		03/16/21 10:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		03/15/21 11:24		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**6900**	mg/L	1000	1000		03/30/21 11:13	16887-00-6	
Fluoride	**0.41**	mg/L	0.20	1		03/30/21 09:38	16984-48-8	M1,R1
Sulfate	**285**	mg/L	50.0	50		03/30/21 10:25	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: MW-34-031021 **Lab ID: 60363587004** Collected: 03/10/21 11:30 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**2.0**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:34	7440-42-8	
Calcium, Total Recoverable	**185**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:34	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**13000**	mg/L	500	1		03/16/21 10:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.2**	Std. Units	0.10	1		03/15/21 11:26		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**6680**	mg/L	1000	1000		03/18/21 23:24	16887-00-6	
Fluoride	**1.0**	mg/L	0.20	1		03/18/21 00:21	16984-48-8	
Sulfate	**429**	mg/L	100	100		03/24/21 16:46	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: MW-35-030921 **Lab ID: 60363587005** Collected: 03/09/21 16:50 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**1.8**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:37	7440-42-8	
Calcium, Total Recoverable	**478**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:37	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**28600**	mg/L	2000	1		03/24/21 10:44		H1
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.0**	Std. Units	0.10	1		03/15/21 11:27		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**16300**	mg/L	2000	2000		03/18/21 23:53	16887-00-6	
Fluoride	**<0.20**	mg/L	0.20	1		03/18/21 00:53	16984-48-8	
Sulfate	**648**	mg/L	100	100		03/25/21 09:32	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Sample: DUP-847LF-031021 **Lab ID: 60363587006** Collected: 03/10/21 08:45 Received: 03/11/21 14:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.19**	mg/L	0.10	1	03/16/21 10:18	03/19/21 20:45	7440-42-8	
Calcium, Total Recoverable	**60.3**	mg/L	0.20	1	03/16/21 10:18	03/19/21 20:45	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**525**	mg/L	10.0	1		03/16/21 10:17		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.3**	Std. Units	0.10	1		03/15/21 11:29		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**110**	mg/L	10.0	10		03/18/21 01:40	16887-00-6	
Fluoride	**<0.20**	mg/L	0.20	1		03/18/21 01:25	16984-48-8	
Sulfate	**6.0**	mg/L	1.0	1		03/18/21 01:25	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 708836
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587001, 60363587002, 60363587003, 60363587004, 60363587005, 60363587006

METHOD BLANK: 2854514 Matrix: Water
Associated Lab Samples: 60363587001, 60363587002, 60363587003, 60363587004, 60363587005, 60363587006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Boron	mg/L	<0.10	0.10	03/19/21 20:13	
Calcium	mg/L	<0.20	0.20	03/19/21 20:13	

LABORATORY CONTROL SAMPLE: 2854515

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	mg/L	1	0.97	97	85-115	
Calcium	mg/L	10	9.5	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2854516 2854517

Parameter	Units	60363587001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	mg/L	0.35	1	1	1.3	1.3	97	100	70-130	3	20	
Calcium	mg/L	192	10	10	204	206	123	137	70-130	1	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 708645 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587001, 60363587002, 60363587003, 60363587004, 60363587006

METHOD BLANK: 2854132 Matrix: Water
Associated Lab Samples: 60363587001, 60363587002, 60363587003, 60363587004, 60363587006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/16/21 10:16	

LABORATORY CONTROL SAMPLE: 2854133

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1040	104	80-120	

SAMPLE DUPLICATE: 2854134

Parameter	Units	60363707004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1100	1070	3	10	

SAMPLE DUPLICATE: 2854135

Parameter	Units	60363608012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4350	4530	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 710476
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587005

METHOD BLANK: 2859754 Matrix: Water
Associated Lab Samples: 60363587005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	03/24/21 10:44	

LABORATORY CONTROL SAMPLE: 2859755

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	992	99	80-120	

SAMPLE DUPLICATE: 2859756

Parameter	Units	60363587005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	28600	31600	10	10	H1

SAMPLE DUPLICATE: 2859757

Parameter	Units	60364213009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	343	378	10	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 708501
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587001, 60363587002, 60363587003, 60363587004, 60363587005, 60363587006

SAMPLE DUPLICATE: 2853772

Parameter	Units	60363585001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	6.8	7.2	5	5	H6

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 708923
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587001, 60363587002, 60363587004, 60363587005, 60363587006

METHOD BLANK: 2854866 Matrix: Water
Associated Lab Samples: 60363587001, 60363587002, 60363587004, 60363587005, 60363587006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/17/21 09:29	
Fluoride	mg/L	<0.20	0.20	03/17/21 09:29	
Sulfate	mg/L	<1.0	1.0	03/17/21 09:29	

METHOD BLANK: 2857386 Matrix: Water
Associated Lab Samples: 60363587001, 60363587002, 60363587004, 60363587005, 60363587006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/18/21 17:40	
Fluoride	mg/L	<0.20	0.20	03/18/21 17:40	
Sulfate	mg/L	<1.0	1.0	03/18/21 17:40	

METHOD BLANK: 2857667 Matrix: Water
Associated Lab Samples: 60363587001, 60363587002, 60363587004, 60363587005, 60363587006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/19/21 08:52	
Fluoride	mg/L	<0.20	0.20	03/19/21 08:52	
Sulfate	mg/L	<1.0	1.0	03/19/21 08:52	

LABORATORY CONTROL SAMPLE: 2854867

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

LABORATORY CONTROL SAMPLE: 2857387

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	5.1	101	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

LABORATORY CONTROL SAMPLE: 2857668

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.5	100	90-110	
Sulfate	mg/L	5	5.2	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2854868 2854869

Parameter	Units	60363693001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	19.3	5	5	24.9	24.9	111	111	80-120	0	15	E
Fluoride	mg/L	0.68	2.5	2.5	3.2	3.2	100	100	80-120	0	15	
Sulfate	mg/L	13.1	5	5	18.2	18.2	104	104	80-120	0	15	

MATRIX SPIKE SAMPLE: 2854870

Parameter	Units	60363587001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	3570	2500	6200	105	80-120	
Fluoride	mg/L	0.29	2.5	2.5	90	80-120	
Sulfate	mg/L	122	100	255	133	80-120	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 710331
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60363587004, 60363587005

METHOD BLANK: 2859329 Matrix: Water
Associated Lab Samples: 60363587004, 60363587005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	<1.0	1.0	03/23/21 16:16	

METHOD BLANK: 2860784 Matrix: Water
Associated Lab Samples: 60363587004, 60363587005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	<1.0	1.0	03/24/21 09:33	

METHOD BLANK: 2861026 Matrix: Water
Associated Lab Samples: 60363587004, 60363587005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	<1.0	1.0	03/25/21 09:01	

LABORATORY CONTROL SAMPLE: 2859330

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.2	103	90-110	

LABORATORY CONTROL SAMPLE: 2860785

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	102	90-110	

LABORATORY CONTROL SAMPLE: 2861027

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	101	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

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2859331 2859332

Parameter	Units	60363587004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	429	500	500	1190	1110	153	137	80-120	7	15	M1

MATRIX SPIKE SAMPLE: 2859333

Parameter	Units	60364181004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	0.72J	5	5.8	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

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

QC Batch: 711556
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60363587003

METHOD BLANK: 2863777 Matrix: Water
Associated Lab Samples: 60363587003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	03/30/21 09:06	
Fluoride	mg/L	<0.20	0.20	03/30/21 09:06	
Sulfate	mg/L	<1.0	1.0	03/30/21 09:06	

LABORATORY CONTROL SAMPLE: 2863778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.5	98	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2863779 2863780

Parameter	Units	60363587003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	6900	5000	5000	11800	11500	99	92	80-120	3	15	
Fluoride	mg/L	0.41	2.5	2.5	2.8	1.9	96	61	80-120	38	15	M1,R1
Sulfate	mg/L	285	250	250	611	540	130	102	80-120	12	15	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

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

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

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the EPA method holding time.
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.
R1	RPD value was outside control limits.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LEC 847 LANDFILL CCR
Pace Project No.: 60363587

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60363587001	**MW-31R-031021**	EPA 200.7	708836	EPA 200.7	708952
60363587002	**MW-32-031021**	EPA 200.7	708836	EPA 200.7	708952
60363587003	**MW-33-031021**	EPA 200.7	708836	EPA 200.7	708952
60363587004	**MW-34-031021**	EPA 200.7	708836	EPA 200.7	708952
60363587005	**MW-35-030921**	EPA 200.7	708836	EPA 200.7	708952
60363587006	**DUP-847LF-031021**	EPA 200.7	708836	EPA 200.7	708952
60363587001	**MW-31R-031021**	SM 2540C	708645		
60363587002	**MW-32-031021**	SM 2540C	708645		
60363587003	**MW-33-031021**	SM 2540C	708645		
60363587004	**MW-34-031021**	SM 2540C	708645		
60363587005	**MW-35-030921**	SM 2540C	710476		
60363587006	**DUP-847LF-031021**	SM 2540C	708645		
60363587001	**MW-31R-031021**	SM 4500-H+B	708501		
60363587002	**MW-32-031021**	SM 4500-H+B	708501		
60363587003	**MW-33-031021**	SM 4500-H+B	708501		
60363587004	**MW-34-031021**	SM 4500-H+B	708501		
60363587005	**MW-35-030921**	SM 4500-H+B	708501		
60363587006	**DUP-847LF-031021**	SM 4500-H+B	708501		
60363587001	**MW-31R-031021**	EPA 300.0	708923		
60363587002	**MW-32-031021**	EPA 300.0	708923		
60363587003	**MW-33-031021**	EPA 300.0	711556		
60363587004	**MW-34-031021**	EPA 300.0	708923		
60363587004	**MW-34-031021**	EPA 300.0	710331		
60363587005	**MW-35-030921**	EPA 300.0	708923		
60363587005	**MW-35-030921**	EPA 300.0	710331		
60363587006	**DUP-847LF-031021**	EPA 300.0	708923		

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www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60363587

60363587

Client Name: Evergy Kansas 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 ☒ Zplc

Thermometer Used: T298 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.5 **Corr. Factor** 0.0 **Corrected** 2.5

Date and initials of person examining contents: 3/12/21 SM

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT# 663173	☒Yes ☐No ☐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)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒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: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A — **Required** Client Information:

Company:	EVERGY KANSAS CENTRAL, INC.
Address:	Lawrence Energy Center (LEC)
	818 Kansas Ave, Topeka, KS 66612
Email To:	melissa.michels@evergy.com
Phone: 785-575-8113	Fax:
Requested Due Date/TAT:	7 day

Section B — **Required** Project Information:

Report To:	Melissa Michels, Samantha Kaney, Danielle Ober
Copy To:	Jared Morrison, Jake Humphrey, Laura Hines
	Andrew Hare, Tabitha Hylton, Samantha Kaney
Purchase Order No.:	
Project Name:	LEC 847 Landfill CCR
Project Number:	

Section C — Invoice Information:

Attention:	Accounts Payable
Company Name:	EVERGY KANSAS CENTRAL, INC
Address:	SAME AS A
Pace Quote Reference:	
Pace Project Manager:	Jasmine Amerin, 913-563-1403
Pace Profile #:	9655, 2

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location — **STATE:** KS

Section D — **Required** Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	Section D Required Client Information	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Total Metals*	300: Cl, F, SO4	2540C TDS	4500 H+B pH	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N		
1	MW-31R-031021	WT	G	-	-	03/10/21	9:40		3	2		1							x	x	x	x		
2	MW-32-031021	WT	G	-	-	03/10/21	8:40		3	2		1							x	x	x	x		
3	MW-33-031021	WT	G	-	-	03/10/21	10:30		3	2		1							x	x	x	x		
4	MW-34-031021	WT	G	-	-	03/10/21	11:30		3	2		1							x	x	x	x		
5	MW-35-030921	WT	G	-	-	03/09/21	16:50		3	2		1							x	x	x	x		
6	DUP-847LF-031021	WT	G	-	-	03/10/21	8:45		3	2		1							x	x	x	x		
7																								
8																								
9																								
10																								
11																								
12																								

Requested Analysis Filtered (Y/N)

UD343587

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
200.7 Total Metals*: B, Ca	Jason R. Franks / SCS	3/11/21	14:30	Pace	3/11/21	1430	2.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jason R. Franks

SIGNATURE of SAMPLER: Jason R. Franks **DATE Signed (MM/DD/YY):** 3/10/21

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

ATTACHMENT 1-2
September 2021 Sampling Event
Laboratory Analytical Report

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 06, 2021

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

RE: Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

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: Andrew Hare, Evergy, Inc.
Laura Hines, Evergy, Inc.
Jake Humphrey, Evergy, Inc.
Tabitha Hylton, Evergy Kansas Central, Inc. Lawrence Energy Center
Samantha Kaney, Haley & Aldrich
Jared Morrison, Evergy, Inc.
Danielle Oberbroeckling, Haley & Aldrich
Melanie Satanek, Haley & Aldrich, Inc.

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

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

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SAMPLE SUMMARY

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60380635001	**MW-31R-091521**	Water	09/15/21 13:45	09/17/21 00:00
60380635002	**MW-32-091521**	Water	09/15/21 12:40	09/17/21 00:00
60380635003	**MW-33-091521**	Water	09/15/21 14:55	09/17/21 00:00
60380635004	**MW-34-091521**	Water	09/15/21 15:45	09/17/21 00:00
60380635005	**MW-35-091521**	Water	09/15/21 11:35	09/17/21 00:00
60380635006	**LEC-847LF-DUP-091521**	Water	09/15/21 13:50	09/17/21 00:00

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SAMPLE ANALYTE COUNT

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60380635001	**MW-31R-091521**	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	3	PASI-K
60380635002	**MW-32-091521**	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	3	PASI-K
60380635003	**MW-33-091521**	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	3	PASI-K
60380635004	**MW-34-091521**	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, JDS	3	PASI-K
60380635005	**MW-35-091521**	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, JDS	3	PASI-K
60380635006	**LEC-847LF-DUP-091521**	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, JDS	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: MW-31R-091521 **Lab ID: 60380635001** Collected: 09/15/21 13:45 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.74**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:06	7440-42-8	
Calcium, Total Recoverable	**275**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:06	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**9270**	mg/L	333	1		09/22/21 13:34		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.3**	Std. Units	0.10	1		09/20/21 13:56		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**4530**	mg/L	1000	1000		09/28/21 11:02	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	1		09/23/21 03:07	16984-48-8	
Sulfate	**184**	mg/L	20.0	20		09/23/21 03:26	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: MW-32-091521 **Lab ID: 60380635002** Collected: 09/15/21 12:40 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.20**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:09	7440-42-8	
Calcium, Total Recoverable	**66.6**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:09	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**511**	mg/L	10.0	1		09/22/21 13:34		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.5**	Std. Units	0.10	1		09/20/21 13:53		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**108**	mg/L	20.0	20		09/30/21 15:05	16887-00-6	
Fluoride	**0.26**	mg/L	0.20	1		09/30/21 14:47	16984-48-8	
Sulfate	**6.4**	mg/L	1.0	1		09/30/21 14:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: MW-33-091521 **Lab ID: 60380635003** Collected: 09/15/21 14:55 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**1.6**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:19	7440-42-8	
Calcium, Total Recoverable	**267**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:19	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**12800**	mg/L	500	1		09/22/21 13:35		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.5**	Std. Units	0.10	1		09/20/21 14:01		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**6000**	mg/L	1000	1000		09/28/21 11:42	16887-00-6	
Fluoride	**0.57**	mg/L	0.20	1		09/23/21 04:21	16984-48-8	
Sulfate	**297**	mg/L	20.0	20		09/23/21 04:39	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: MW-34-091521 **Lab ID: 60380635004** Collected: 09/15/21 15:45 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**2.1**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:22	7440-42-8	
Calcium, Total Recoverable	**216**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:22	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**11100**	mg/L	500	1		09/22/21 13:35		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.6**	Std. Units	0.10	1		09/20/21 14:03		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**5380**	mg/L	1000	1000		09/24/21 13:55	16887-00-6	
Fluoride	**1.1**	mg/L	0.20	1		09/23/21 15:22	16984-48-8	M1,R1
Sulfate	**561**	mg/L	50.0	50		09/24/21 13:20	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: MW-35-091521 **Lab ID: 60380635005** Collected: 09/15/21 11:35 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**1.8**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:25	7440-42-8	
Calcium, Total Recoverable	**501**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:25	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**26600**	mg/L	2000	1		09/22/21 13:35		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.1**	Std. Units	0.10	1		09/20/21 13:48		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**12100**	mg/L	2000	2000		09/24/21 14:42	16887-00-6	
Fluoride	**<0.20**	mg/L	0.20	1		09/23/21 17:12	16984-48-8	
Sulfate	**617**	mg/L	100	100		09/24/21 14:30	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Sample: LEC-847LF-DUP-091521 **Lab ID: 60380635006** Collected: 09/15/21 13:50 Received: 09/17/21 00:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City							
Boron, Total Recoverable	**0.74**	mg/L	0.10	1	09/24/21 16:45	09/28/21 12:28	7440-42-8	
Calcium, Total Recoverable	**269**	mg/L	0.20	1	09/24/21 16:45	09/28/21 12:28	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City							
Total Dissolved Solids	**9200**	mg/L	250	1		09/22/21 13:35		
4500H+ pH, Electrometric	Analytical Method: SM 4500-H+B Pace Analytical Services - Kansas City							
pH at 25 Degrees C	**7.5**	Std. Units	0.10	1		09/20/21 13:58		H6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City							
Chloride	**4430**	mg/L	1000	1000		09/24/21 15:18	16887-00-6	
Fluoride	**0.28**	mg/L	0.20	1		09/23/21 18:25	16984-48-8	
Sulfate	**254**	mg/L	20.0	20		09/23/21 18:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

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: 60380635001, 60380635002, 60380635003, 60380635004, 60380635005, 60380635006

METHOD BLANK: 2986173 Matrix: Water
Associated Lab Samples: 60380635001, 60380635002, 60380635003, 60380635004, 60380635005, 60380635006

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

QC Batch: 744750 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60380635001, 60380635002, 60380635003, 60380635004, 60380635005, 60380635006

METHOD BLANK: 2983405 Matrix: Water
Associated Lab Samples: 60380635001, 60380635002, 60380635003, 60380635004, 60380635005, 60380635006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	09/22/21 13:31	

LABORATORY CONTROL SAMPLE: 2983406

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	985	98	80-120	

SAMPLE DUPLICATE: 2983407

Parameter	Units	60380532002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1200	1230	2	10	

SAMPLE DUPLICATE: 2983408

Parameter	Units	60380635001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	9270	9100	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

QC Batch: 744326
QC Batch Method: SM 4500-H+B
Analysis Method: SM 4500-H+B
Analysis Description: 4500H+B pH
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60380635001, 60380635002, 60380635003, 60380635004, 60380635005, 60380635006

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

QC Batch: 744822
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60380635001, 60380635003

METHOD BLANK: 2983702 Matrix: Water
Associated Lab Samples: 60380635001, 60380635003

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: 60380635001, 60380635003

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: 60380635001, 60380635003

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: 60380635001, 60380635003

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	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

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

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2988049 2988050

Parameter	Units	60380635001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
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	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

QC Batch: 745151
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60380635004, 60380635005, 60380635006

METHOD BLANK: 2984845 Matrix: Water
Associated Lab Samples: 60380635004, 60380635005, 60380635006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/23/21 08:20	
Fluoride	mg/L	<0.20	0.20	09/23/21 08:20	
Sulfate	mg/L	<1.0	1.0	09/23/21 08:20	

METHOD BLANK: 2987551 Matrix: Water
Associated Lab Samples: 60380635004, 60380635005, 60380635006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/24/21 08:25	
Fluoride	mg/L	<0.20	0.20	09/24/21 08:25	
Sulfate	mg/L	<1.0	1.0	09/24/21 08:25	

LABORATORY CONTROL SAMPLE: 2984846

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.4	107	90-110	
Fluoride	mg/L	2.5	2.7	107	90-110	
Sulfate	mg/L	5	5.5	109	90-110	

LABORATORY CONTROL SAMPLE: 2987552

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2984847 2984848

Parameter	Units	60380635004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5380	5000	5000	10300	10400	98	99	80-120	1	15	
Fluoride	mg/L	1.1	2.5	2.5	2.8	3.5	67	93	80-120	21	15	M1,R1
Sulfate	mg/L	561	250	250	900	859	136	119	80-120	5	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

MATRIX SPIKE SAMPLE: 2984849

Parameter	Units	60380682005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	369	250	613	98	80-120	
Fluoride	mg/L	3.6	2.5	6.5	116	80-120	
Sulfate	mg/L	1330	1000	2270	94	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

QC Batch: 746413
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60380635002

METHOD BLANK: 2989770 Matrix: Water
Associated Lab Samples: 60380635002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	09/30/21 10:48	
Fluoride	mg/L	<0.20	0.20	09/30/21 10:48	
Sulfate	mg/L	<1.0	1.0	09/30/21 10:48	

METHOD BLANK: 2993021 Matrix: Water
Associated Lab Samples: 60380635002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	10/01/21 09:19	
Fluoride	mg/L	<0.20	0.20	10/01/21 09:19	
Sulfate	mg/L	<1.0	1.0	10/01/21 09:19	

METHOD BLANK: 2993760 Matrix: Water
Associated Lab Samples: 60380635002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	<1.0	1.0	10/04/21 09:05	
Fluoride	mg/L	<0.20	0.20	10/04/21 09:05	
Sulfate	mg/L	<1.0	1.0	10/04/21 09:05	

LABORATORY CONTROL SAMPLE: 2989771

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.2	103	90-110	
Fluoride	mg/L	2.5	2.6	102	90-110	
Sulfate	mg/L	5	5.3	106	90-110	

LABORATORY CONTROL SAMPLE: 2993022

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Fluoride	mg/L	2.5	2.7	108	90-110	
Sulfate	mg/L	5	5.3	106	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

LABORATORY CONTROL SAMPLE: 2993761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.3	92	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2989772 2989773

Parameter	Units	60381176001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	51.8	50	50	103	104	103	104	80-120	0	15	
Fluoride	mg/L	ND	25	25	25.7	26.0	103	104	80-120	1	15	
Sulfate	mg/L	195	50	50	251	251	113	113	80-120	0	15	E

SAMPLE DUPLICATE: 2989774

Parameter	Units	60381176001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	51.8	51.2	1	15	
Fluoride	mg/L	ND	<2.0		15	
Sulfate	mg/L	195	194	0	15	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

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

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
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.

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: LEC 847 Landfill CCR
Pace Project No.: 60380635

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60380635001	**MW-31R-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635002	**MW-32-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635003	**MW-33-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635004	**MW-34-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635005	**MW-35-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635006	**LEC-847LF-DUP-091521**	EPA 200.7	745516	EPA 200.7	745589
60380635001	**MW-31R-091521**	SM 2540C	744750		
60380635002	**MW-32-091521**	SM 2540C	744750		
60380635003	**MW-33-091521**	SM 2540C	744750		
60380635004	**MW-34-091521**	SM 2540C	744750		
60380635005	**MW-35-091521**	SM 2540C	744750		
60380635006	**LEC-847LF-DUP-091521**	SM 2540C	744750		
60380635001	**MW-31R-091521**	SM 4500-H+B	744326		
60380635002	**MW-32-091521**	SM 4500-H+B	744326		
60380635003	**MW-33-091521**	SM 4500-H+B	744326		
60380635004	**MW-34-091521**	SM 4500-H+B	744326		
60380635005	**MW-35-091521**	SM 4500-H+B	744326		
60380635006	**LEC-847LF-DUP-091521**	SM 4500-H+B	744326		
60380635001	**MW-31R-091521**	EPA 300.0	744822		
60380635002	**MW-32-091521**	EPA 300.0	746413		
60380635003	**MW-33-091521**	EPA 300.0	744822		
60380635004	**MW-34-091521**	EPA 300.0	745151		
60380635005	**MW-35-091521**	EPA 300.0	745151		
60380635006	**LEC-847LF-DUP-091521**	EPA 300.0	745151		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60380635

60380635

Client Name: Eversafe

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: _____ **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.7 **Corr. Factor** _____ **Corrected** _____

Date and initials of person examining contents: 10.9.19-2

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☐Yes ☑No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT#	☑Yes ☐No ☐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)	☐Yes ☐No ☑N/A	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑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: _____

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A — **Required** Client Information:

Company:	EVERGY KANSAS CENTRAL, INC.
Address:	Lawrence Energy Center (LEC)
	818 Kansas Ave, Topeka, KS 66612
Email To:	melissa.michels@evergy.com
Phone: 785-575-8113	Fax:
Requested Due Date/TAT:	7 day

Section B — **Required** Project Information:

Report To:	Melissa Michels, Samantha Kaney, Danielle Ober
Copy To:	Jared Morrison, Jake Humphrey, Laura Hines
	Andrew Hare, Tabitha Hylton, Samantha Kaney
Purchase Order No.:	
Project Name:	LEC 847 Landfill CCR
Project Number:	

Section C — Invoice Information:

Attention:	Accounts Payable
Company Name:	EVERGY KANSAS CENTRAL, INC
Address:	SAME AS A
Pace Quote Reference:	
Pace Project Manager:	Hank Kapka, 913-563-1404
Pace Profile #:	9655, 2

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location **STATE:** KS

Section D — **Required** Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

ITEM #	Section D Required Client Information (SAMPLE ID)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COLLECTED: COMPOSITE START TIME	COLLECTED: COMPOSITE END/GRAB DATE	COLLECTED: COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	Preservatives: H_2SO_4	Preservatives: HNO_3	Preservatives: HCl	Preservatives: NaOH	Preservatives: $Na_2S_2O_3$	Preservatives: Methanol	Preservatives: Other	Y/N	Analysis Test: 200.7 Total Metals*	Analysis Test: 300: Cl, F, SO4	Analysis Test: 2540C TDS	Analysis Test: 4500 H+B pH	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-31R-091521	WT	G	-	-	09/15/21	13:45	-	4	3		1					N	X	X	X	X		
2	MW-32-091521	WT	G	-	-	09/15/21	12:40	-	4	3		1					N	X	X	X	X		
3	MW-33-091521	WT	G	-	-	09/15/21	14:55	-	4	3		1					N	X	X	X	X		
4	MW-34-091521	WT	G	-	-	09/15/21	15:45	-	4	3		1					N	X	X	X	X		
5	MW-35-091521	WT	G	-	-	09/15/21	11:35	-	4	3		1					N	X	X	X	X		
6	LEC-847LF-DUP-091521	WT	G	-	-	09/15/21	13:50	-	4	3		1					N	X	X	X	X		
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
200.7 Total Metals*: B, Ca	Jason R. Franks / SCS	9/16/21	15:00		9-17-21		2.7

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jason R. Franks

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 9/16/21

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

ATTACHMENT 2
Statistical Analyses

ATTACHMENT 2-1
September 2020 Statistical Analysis

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

TECHNICAL MEMORANDUM

October 7, 2022
File No. 129778-049

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: September 2020 Semi-Annual Groundwater Detection Monitoring Data Statistical Evaluation
Completed January 15, 2021
Lawrence Energy Center
847 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 Lawrence Energy Center (LEC) 847 Landfill. This semi-annual detection monitoring groundwater sampling event was completed on **September 15, 2020**, with laboratory results received and validated on **October 23, 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 the coal combustion residuals (CCR) unit (40 CFR § 257.93(f) (1-4)). One statistical method used for these evaluations, the prediction limits (PL) method, was 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

Either an interwell or intrawell evaluation was used to complete the statistical evaluation of the referenced data set. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data (MW-32 and MW-35), and the intrawell evaluation compares the most recent values from each compliance well against a background dataset composed of its own historical data.

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 locations (MW-32 and MW-35 for interwell evaluation) 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 2020 (interwell evaluation)** or through **September 2019 (intrawell evaluation).**

RESULTS OF APPENDIX III DOWNGRADIENT 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 PLs (Table I). A sample concentration greater than the background UPL is considered to represent an SSI. Based on previous compliance sampling events, statistical evaluations, and associated alternative source demonstrations, an intrawell comparison is utilized for MW-34 for boron and fluoride statistical evaluations. Interwell comparisons are being utilized for all other well and

constituent evaluations. The results of the groundwater assessment 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 LEC 847 Landfill.**

Tables:

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
LAWRENCE ENERGY CENTER - 847 LANDFILL
LAWRENCE, KANSAS

													Inter-well Analysis		Intra-well Analysis	
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)**	**Background Limits[1] (UPL) mg/L**	**SSI**	**Background Limit[2] (UPL) mg/L**	**SSI**
	CCR Appendix-III: Boron, Total (mg/L)															
MW-32	14/14	0%	-	0.19	0.00003515	0.005929	0.03277	No	No	Stable			2.050			
MW-35	14/14	0%	-	2.05	0.02246	0.1499	0.08167	No	No	Stable						
MW-31R	14/14	0%	-	0.75	0.005623	0.07499	0.1173	No	No	Decreasing	Normal	0.75		N		
MW-33	14/14	0%	-	1.7	0.009849	0.09924	0.06134	No	No	Stable	Non-parametric	1.6		N		
MW-34	14/14	0%	-	2.2	0.01925	0.1388	0.06906	No	No	Increasing	Normal	2.2			2.508	N
	CCR Appendix-III: Calcium, Total (mg/L)															
MW-32	14/14	0%	-	61.9	2.968	1.723	0.02917	No	No	Stable			545			
MW-35	14/14	0%	-	545	1403	37.46	0.07333	Yes	No	Stable						
MW-31R	14/14	0%	-	264	393	19.82	0.08786	No	No	Stable	Normal	253		N		
MW-33	14/14	0%	-	265	110.2	10.5	0.04202	No	No	Stable	Normal	246		N		
MW-34	14/14	0%	-	243	205.9	14.35	0.06544	No	No	Decreasing	Normal	203		N		
	CCR Appendix-III: Chloride (mg/L)															
MW-32	14/14	0%	-	113	39.07	6.251	0.06358	No	No	Stable			16700			
MW-35	14/14	0%	-	16700	1632000	1277	0.08902	No	No	Stable						
MW-31R	13/14	7%	1-1	5210	1428000	1195	0.3095	Yes	No	Stable	Normal	4840		N		
MW-33	14/14	0%	-	8700	353200	594.3	0.08011	Yes	No	Decreasing	Normal	6960		N		
MW-34	14/14	0%	-	6960	156600	395.8	0.06365	No	No	Stable	Normal	6340		N		
	CCR Appendix-III: Fluoride (mg/L)															
MW-32	11/14	21%	0.2-0.2	0.38	0.00256	0.0506	0.2047	Yes	No	Increasing			1.700			
MW-35	2/14	86%	0.1-10	1.6	6.881	2.623	2.481	Yes	No	Stable						
MW-31R	9/14	36%	0.2-0.2	0.73	0.03881	0.197	0.4813	No	No	Stable	Normal	< 0.20		N		
MW-33	7/14	50%	0.2-0.2	1.5	0.3184	0.5643	0.7845	No	No	Stable	Non-parametric	< 0.20		N		
MW-34	11/14	21%	0.2-0.2	1.9	0.4332	0.6582	0.5632	No	No	Stable	Normal	< 0.20			3.539	N
	CCR Appendix-III: pH (lab) (SU)															
MW-32	14/14	0%	-	7.9	0.02066	0.1437	0.01898	Yes	No	Stable			8.22			
MW-35	14/14	0%	-	7.4	0.01077	0.1038	0.01441	No	No	Stable						
MW-31R	14/14	0%	-	7.5	0.01104	0.1051	0.01435	Yes	No	Stable	Normal	7.2		N		
MW-33	14/14	0%	-	7.8	0.01495	0.1222	0.01639	Yes	No	Stable	Non-parametric	7.4		N		
MW-34	14/14	0%	-	7.9	0.02335	0.1528	0.02005	No	No	Stable	Normal	7.6		N		
	CCR Appendix-III: Sulfate (mg/L)															
MW-32	14/14	0%	-	9.1	0.9914	0.9957	0.1417	No	No	Decreasing			666			
MW-35	14/14	0%	-	666	707.8	26.6	0.04266	No	No	Stable						
MW-31R	14/14	0%	-	187	672	25.92	0.1708	No	No	Stable	Normal	187		N		
MW-33	14/14	0%	-	462	2558	50.58	0.1587	Yes	No	Stable	Normal	277		N		
MW-34	14/14	0%	-	535	1625	40.31	0.0866	No	No	Stable	Normal	449		N		
	CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)															
MW-32	14/14	0%	-	525	323.9	18	0.03634	No	No	Increasing			27100			
MW-35	14/14	0%	-	27100	41440000	6437	0.2749	Yes	No	Stable						
MW-31R	14/14	0%	-	8420	754000	868.3	0.119	No	No	Stable	Normal	8420		N		
MW-33	14/14	0%	-	14100	1395000	1181	0.09375	No	No	Stable	Normal	12900		N		
MW-34	14/14	0%	-	12300	5399000	2324	0.2185	Yes	No	Stable	Non-parametric	11400		N		

Notes and Abbreviations:

[1] Interwell background data collected from 08/16/2016 through 09/15/2020, unless otherwise noted.

[2] Intrawell background data collected from 08/16/2016 through 09/03/2019.

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

October 7, 2022
File No. 129778-049

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
Lawrence Energy Center
847 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 Lawrence Energy Center (LEC) 847 Landfill. This semi-annual detection monitoring groundwater sampling event was completed on **March 9 and 10, 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 the coal combustion residuals (CCR) unit (40 CFR § 257.93(f) (1-4)). One statistical method used for these evaluations, the prediction limits (PL) method, was 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

Either an interwell or intrawell evaluation was used to complete the statistical evaluation of the referenced data set. Interwell evaluation compares the most recent values from downgradient compliance wells against a background dataset composed of upgradient well data (MW-32 and MW-35), and the intrawell evaluation compares the most recent values from each compliance well against a background dataset composed of its own historical data.

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 locations (MW-32 and MW-35 for interwell evaluation) 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 2020 (interwell evaluation)** or through **September 2019 (intrawell evaluation).**

RESULTS OF APPENDIX III DOWNGRADIENT 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 PLs (Table I). A sample concentration greater than the background UPL is considered to represent an SSI. Based on previous compliance sampling events, statistical evaluations, and associated alternative source demonstrations, an intrawell comparison is utilized for MW-34 for boron and fluoride statistical evaluations. Interwell comparisons are being utilized for all other well and constituent evaluations. The results of the groundwater assessment 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 LEC 847 Landfill.**

Tables:

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
LAWRENCE ENERGY CENTER - 847 LANDFILL
LAWRENCE, KANSAS

												Inter-well Analysis		Intra-well Analysis	
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)**	**Background Limits[1] (UPL) mg/L**	**SSI**	**Background Limit[2] (UPL) mg/L**	**SSI**
	CCR Appendix-III: Boron, Total (mg/L)															
MW-32	15/15	0%	-	0.19	0.0000327	0.005718	0.03161	No	No	Stable			2.050			
MW-35	15/15	0%	-	2.05	0.02094	0.1447	0.07895	Yes	No	Stable						
MW-31R	15/15	0%	-	0.75	0.01081	0.104	0.1676	No	No	Decreasing	Normal	0.35		N		
MW-33	15/15	0%	-	1.7	0.009167	0.09574	0.05922	No	No	Stable	Non-parametric	1.6		N		
MW-34	15/15	0%	-	2.2	0.01788	0.1337	0.06658	No	No	Increasing	Normal	2.0			2.508	N
	CCR Appendix-III: Calcium, Total (mg/L)															
MW-32	15/15	0%	-	61.9	2.921	1.709	0.02898	No	No	Stable			545			
MW-35	15/15	0%	-	545	1375	37.07	0.0729	Yes	No	Stable						
MW-31R	15/15	0%	-	264	440.4	20.99	0.09394	No	No	Stable	Normal	192		N		
MW-33	15/15	0%	-	265	161.5	12.71	0.05128	No	No	Stable	Normal	220		N		
MW-34	15/15	0%	-	243	269.6	16.42	0.07566	No	No	Decreasing	Normal	185		N		
	CCR Appendix-III: Chloride (mg/L)															
MW-32	15/15	0%	-	113	38.44	6.2	0.06282	No	No	Increasing			16700			
MW-35	15/15	0%	-	16700	1769000	1330	0.09185	No	No	Increasing						
MW-31R	14/15	7%	1-1	5210	1332000	1154	0.3004	Yes	No	Stable	Normal	3570		N		
MW-33	15/15	0%	-	8700	345800	588.1	0.07965	Yes	No	Stable	Normal	6900		N		
MW-34	15/15	0%	-	6960	159700	399.6	0.06395	No	No	Stable	Normal	6680		N		
	CCR Appendix-III: Fluoride (mg/L)															
MW-32	12/15	20%	0.2-0.2	0.38	0.0025	0.05	0.2	No	No	Increasing			1.700			
MW-35	2/15	87%	0.1-10	1.6	6.439	2.537	2.537	No	No	Stable						
MW-31R	10/15	33%	0.2-0.2	0.73	0.03698	0.1923	0.4792	No	No	Stable	Normal	0.29		N		
MW-33	8/15	47%	0.2-0.2	1.5	0.3021	0.5496	0.7867	No	No	Stable	Non-parametric	0.41		N		
MW-34	12/15	20%	0.2-0.2	1.9	0.4042	0.6357	0.5493	No	No	Stable	Normal	1.00			3.539	N
	CCR Appendix-III: pH (lab) (SU)															
MW-32	15/15	0%	-	7.9	0.0241	0.1552	0.02055	Yes	No	Stable			6.55, 8.22			
MW-35	15/15	0%	-	7.4	0.01267	0.1125	0.01566	Yes	No	Stable						
MW-31R	15/15	0%	-	7.5	0.01352	0.1163	0.01592	Yes	No	Stable	Normal	7.1		N		
MW-33	15/15	0%	-	7.8	0.02781	0.1668	0.02245	Yes	No	Stable	Normal	7.0		N		
MW-34	15/15	0%	-	7.9	0.03352	0.1831	0.02411	No	No	Increasing	Normal	7.2		N		
	CCR Appendix-III: Sulfate (mg/L)															
MW-32	15/15	0%	-	9.1	0.9911	0.9956	0.143	No	No	Decreasing			666			
MW-35	15/15	0%	-	666	696.8	26.4	0.04222	No	No	Stable						
MW-31R	15/15	0%	-	187	683.2	26.14	0.1745	No	No	Stable	Normal	122		N		
MW-33	15/15	0%	-	462	2451	49.51	0.1564	Yes	No	Stable	Normal	285		N		
MW-34	15/15	0%	-	535	1597	39.96	0.08632	No	No	Stable	Normal	429		N		
	CCR Appendix-III: Total Dissolved Solids (TDS) (mg/L)															
MW-32	15/15	0%	-	530	381.4	19.53	0.03925	No	No	Increasing			27100			
MW-35	15/15	0%	-	28600	40270000	6346	0.2671	Yes	No	Stable						
MW-31R	15/15	0%	-	8420	712000	843.8	0.1152	No	No	Stable	Normal	7720		N		
MW-33	15/15	0%	-	14100	1328000	1153	0.09114	Yes	No	Stable	Normal	13300		N		
MW-34	15/15	0%	-	13000	5386000	2321	0.215	Yes	No	Stable	Non-parametric	13000		N		

Notes and Abbreviations:

[1] Interwell background data collected from 08/16/2016 through 09/15/2020.

[2] Intrawell background data collected from 08/16/2016 through 09/03/2019.

CCR = coal combustion residuals

mg/L = milligrams per Liter

SSI = statistically significant increase

SU = standard unit

UPL = upper prediction limits

ATTACHMENT 3
Groundwater Potentiometric Maps

LEGEND

MW-L 815.26	WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), MARCH 2021
	MONITORING WELL
	WATER QUALITY ONLY
	ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 0.20-FT INTERVAL (AMSL)
	GROUNDWATER FLOW DIRECTION
	847 LANDFILL
	FUTURE 847 LANDFILL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 10 MARCH 2021.

3. MW-35 WAS NOT INCLUDED IN THE DATA SET USED TO CREATE THE DISPLAYED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION LINES.

4. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 10 MARCH 2021 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 04 MARCH 2020

N

0 250 500

SCALE IN FEET

HALEY ALDRICH

EVERGY KANSAS CENTRAL, INC.
LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

847 LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP MARCH 10, 2021

evergy

OCTOBER 2022

FIGURE 2

LEGEND

MW-L 815.26	WELL NAME AND GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (AMSL), SEPTEMBER 2021
	MONITORING WELL
	WATER QUALITY ONLY
	ESTIMATED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION CONTOUR, 0.20-FT INTERVAL (AMSL)
	GROUNDWATER FLOW DIRECTION
	847 LANDFILL
	FUTURE 847 LANDFILL

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. GROUNDWATER POTENTIOMETRIC ELEVATIONS WERE MEASURED 15 SEPTEMBER 2021.

3. MW-35 WAS NOT INCLUDED IN THE DATA SET USED TO CREATE THE DISPLAYED GROUNDWATER POTENTIOMETRIC OBSERVATION ELEVATION LINES.

4. THE GROUNDWATER FLOW RATE WAS APPROXIMATED USING THE HYDRAULIC GRADIENT CALCULATED FROM GROUNDWATER POTENTIOMETRIC ELEVATIONS MEASURED 15 SEPTEMBER 2021 AND THE CONDUCTIVITY VALUES AND EFFECTIVE POROSITY VALUES OBTAINED FROM SLUG TESTS COMPLETED APRIL 2016.

5. AERIAL IMAGERY SOURCE: ESRI, 04 MARCH 2020

N

0 250 500

SCALE IN FEET

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LAWRENCE ENERGY CENTER
LAWRENCE, KANSAS

847 LANDFILL GROUNDWATER POTENTIOMETRIC ELEVATION CONTOUR MAP SEPTEMBER 15, 2021

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OCTOBER 2022

FIGURE 3