

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

by
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Cleveland, Ohio

for
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Topeka, Kansas

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

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):

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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.

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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

2021 Annual Groundwater Monitoring and Corrective Action Report

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

**2021 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



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**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



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LAWRENCE, KANSAS

**847 LANDFILL
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
MARCH 10, 2021**

evergy

JANUARY 2022

FIGURE 2



LEGEND

- MW-32** WELL NAME AND GROUNDWATER ELEVATION (SEPTEMBER 2021)
- 817.60**
- 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



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847 LANDFILL
GROUNDWATER POTENTIOMETRIC
ELEVATION CONTOUR MAP
SEPTEMBER 15, 2021

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