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WRITER'S DIRECT DIAL NO:
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December 6, 2025

Delivered Electronically

Mr. Clinton Woods
Commissioner
Indiana Department of Environmental Management
100 N. Senate Avenue
Mail Code 50-01
Indianapolis, IN 46204-2251

Re: Indiana-Kentucky Electric Corporation
December 2025 Semi-Annual Selection of Remedy for
Clifty Creek Station Type I Landfill

Dear Mr. Woods:

As required by 40 CFR 257.106(h)(9), the Indiana-Kentucky Electric Corporation (IKEC) is providing notification to the Commissioner of the Indiana Department of Environmental Management that the second Semi-Annual Selection of Remedy has been completed in compliance with 40 CFR 257.97(a) for the Clifty Creek Station's Type I Landfill. The intent of the report is to provide an update on the progress of selecting a remedy for confirmed Appendix IV SSIs above the groundwater protection standard in the groundwater at the Type I Landfill. The report has been placed on the facility's operating record in accordance with 40 CFR 257.105(h)(12), as well as, on the company's publicly accessible internet site in accordance with 40 CFR 257.107(h)(9), which can be viewed at http://www.ovec.com/CCRCompliance.php .

If you have any questions, or require any additional information, please call me at (740) 289-7259.

Sincerely,

Jeremy Galloway
Environmental Specialist

JDG:zsh

Semi-Annual Report on the Progress of Remedy Selection

40 CFR 257.97(a)

Type I Landfill

Clifty Creek Station

Madison, Indiana

December 2025

Prepared by: Indiana-Kentucky Electric Corporation

3932 U.S. Route 23

Piketon, OH 45661

OVEC/IKEC

Ohio Valley Electric Corporation / Indiana-Kentucky Electric Corporation

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1 INTRODUCTION

In accordance with 40 CFR § 257.97(a), the Indiana-Kentucky Electric Corporation (IKEC) has prepared this Semi-Annual report to document progress toward remedy selection, design and implementation of corrective actions associated with groundwater monitoring exceedances at the Clifty Creek Station's Type I Landfill. This report summarizes activities during the period of June 1, 2025 through December 1, 2025. Updates to the report will be published semi-annually, until such time a remedy has been selected. Upon selection, a final report will be prepared describing the selected remedy and how it meets the standards specified in the rule.

1.1 REGULATORY BACKGROUND

On December 19, 2014, the United States Environmental Protection Agency (U.S. EPA) issued their final Coal Combustion Residuals (CCR) regulation which regulates CCR as a non-hazardous waste under Subtitle D of Resource Conservation and Recovery Act (RCRA) and became effective six (6) months from the date of its publication (April 17, 2015) in the Federal Register, referred to as the "CCR Rule." The rule applies to new and existing landfills, and surface impoundments used to dispose of or otherwise manage CCR generated by electric utilities and independent power producers. The rule includes requirements for monitoring groundwater and assessing corrective measures if constituents listed in Appendix IV of the rule are detected in groundwater samples collected from downgradient monitoring wells at Statistically Significant Levels (SSL) greater than the established Groundwater Protection Standard (GWPS).

The Type I Landfill and adjacent Landfill Runoff Collection Pond (LRCP) share a common groundwater monitoring network. During Detection Monitoring in 2018, an Appendix III Statistically Significant Increase (SSI) was observed for Boron at the LRCP and Type I Landfill. Based on these results, the LRCP entered Assessment Monitoring at that time. However, based on a review of current and historic data, the Type I Landfill was not believed to be the source of Boron in groundwater in the area, and an ASD was completed in general accordance with guidelines presented in the *Solid Waste Disposal Facility Criteria Technical Manual* (U.S. EPA 1993). The ASD concluded that the Type I Landfill was not the source of Boron detected in the area and the Type I Landfill remained in Detection Monitoring.

In May 2019, IKEC initiated an Assessment of Corrective Measures (ACM) at the LRCP as a result of a confirmed SSL of Appendix IV constituent Molybdenum in monitoring well CF-15-08 during October 2018 Assessment Monitoring Activities, as required by 40 CFR § 257.97(a). In accordance with 40 CFR § 257.96(a), IKEC prepared an ACM report for the LRCP. It was placed in the facility's operating record and uploaded to IKEC's CCR Rule Compliance internet site on September 19, 2019. A revised ACM report, which contains supplemental information, was placed on IKEC's CCR Rule

Compliance internet site on November 30, 2020. The ACM Report provides an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in 40 CFR § 257.96(c). Multiple strategies were evaluated to address groundwater exhibiting concentrations of Molybdenum above the GWPS, with two technically feasible options identified. Both options, which presently appear to be feasible, require the removal of free water from the pond, followed by the execution of an engineered cap and closure of the LRCP facility, and are as follows:

- Monitored Natural Attenuation (MNA); and
- Conventional Vertical Well System (Groundwater Extraction and Treatment) (Ex-Situ).

From 2018 through 2023, the Type I Landfill remained in Detection Monitoring under the CCR program. In March 2024, a confirmed Appendix III SSI over background for Chloride was observed in groundwater at the LRCP and Type I Landfill. A successful ASD could not be completed for Chloride at the Type I Landfill; therefore, in accordance with 40 CFR § 257.94(e), IKEC established an Assessment Monitoring Program meeting the requirements of 40 CFR § 257.95 at the unit in October 2024. As a result of confirmed SSLs for Appendix IV constituents Molybdenum and Arsenic, as required by 40 CFR § 257.97(a), IKEC initiated an ACM at the Type I Landfill. In accordance with 40 CFR § 257.96(a), IKEC prepared an ACM report for the Type I Landfill, which was placed in the facility's operating record and uploaded to IKEC's CCR Rule Compliance internet site on March 25, 2025.

The ACM Report provides an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in 40 CFR § 257.96(c). Multiple strategies were evaluated to address groundwater exhibiting concentrations of Molybdenum and Arsenic above the GWPS, with three technically feasible options identified:

- MNA;
- Phytoremediation; and
- Conventional Vertical Well System (Groundwater Extraction and Treatment) (Ex-Situ).

Semi-annual reports are required pursuant to 40 CFR § 257.97(a) to document progress toward remedy selection and design. The CCR Rule provides flexibility for additional field investigation, which is still ongoing, data analysis and consideration prior to the selection of a remedy. IKEC will continue to review new data as it becomes available from active site evaluation and implement changes to the groundwater monitoring and corrective action program as necessary to maintain compliance with the rule.

1.2 Report Contents

This second semi-annual progress report provides regulatory background, an overview of site characteristics and ACM findings, and summarizes activities supporting the

selection and implementation of a remedy during the period of June 1, 2025 through December 1, 2025.

2 SITE BACKGROUND

The Clifty Creek Station, located in Madison, Indiana, is a 1.3-gigawatt coal-fired generating plant operated by IKEC, a subsidiary of the Ohio Valley Electric Corporation (OVEC). The Clifty Creek Station has six (6) 217.26-MW generating units and has been in operation since 1955. Ash products were sluiced to disposal ponds located in the plant site since it began operation. During the course of plant operations, CCRs have been managed and disposed of in various units at the station. The Type I Landfill and LRCP occupy an approximately 200-acre area situated within an eroded bedrock channel. To allow for more disposal capacity, an on-site fly ash pond was developed into a Type III Landfill in 1988. All required permits for the Type III Landfill were obtained from the Indiana Department of Environmental Management (IDEM) and the Type III Landfill went operational in 1991. In March 1994, IDEM approved a pH variance for the disposal of low-sulfur coal ash in the fly ash Type III Landfill. Emplacement of low-sulfur coal ash in the Type III Landfill began in January 1995. In April 2007, IKEC submitted a permit application to IDEM to upgrade the former Type III landfill to a Type I landfill. In 2013, IDEM issued a renewed permit and approved IKEC's request to upgrade the landfill to a Type I landfill.

The Type I Landfill and the LRCP occupy an approximately 159.7-acre area situated within an eroded bedrock channel. The Type I Landfill consists of approximately 109 acres and has been approved by IDEM as a Type I Residual Waste Landfill. The remaining 50.7 acres consist of the LRCP located at the southwest end of the Type I Landfill.

2.1 UNIT SPECIFIC GEOLOGY AND HYDROGEOLOGY

Bedrock beneath the Type I Landfill and LRCP consist of impermeable limestone and shale of the Ordovician Dillsboro formation, overlain by fly ash, structural fill, and foundation soils. A limestone ridge known as the Devil's Backbone runs northeast to southwest along the length of the Type I Landfill & LRCP. Southwest (downgradient) of the Type I Landfill and LRCP, bedrock is overlain by approximately 20 feet of clayey gravel with sand. The clayey gravel with sand is overlain by a lean clay with sand, which is overlain by a fine to medium sand with gravel, silt and clay; the uppermost unit in the area is a surficial layer of silty clay.

As presented above, an aquifer is not present beneath the Type I Landfill or the LRCP. Based on historic aquifer testing conducted on wells southwest (downgradient) of the Type I Landfill and LRCP, the upper lean clay deposits exhibit low permeability, do not yield adequate quantities of water to wells, and are considered an aquitard. The

underlying fine-medium sand with silt is considered an unconfined or possibly semi-confined aquifer and is, therefore, designated as the uppermost aquifer at the Type I Landfill.

During periods when the water level in the Ohio River rises significantly and flooding occurs, groundwater flow in the uppermost aquifer will temporarily change direction of flow. The impact of this change in groundwater flow direction is still being evaluated in regard to the impact it may have on the ultimate selected remedy

2.2 Potential Receptor Review

IKEC completed an assessment of the proximity of public and private drinking water supplies to the Type I Landfill in response to SSLs above the GWPS. It was determined that the withdrawal wells designated by the Indiana Department of Natural Resources (IDNR) as drinking water wells within a one-mile radius are not hydraulically connected to the groundwater at the Type I Landfill or are located upgradient from the facility.

3 Groundwater Assessment Monitoring Program

Groundwater assessment monitoring for the Type I Landfill is conducted in accordance with 40 CFR § 257.95.

3.1 Groundwater Monitoring Well Network

In compliance with 40 CFR § 257.91, the CCR groundwater monitoring network for the LRCP consists of the following eight (8) wells:

- CF-15-04 (Background);
- CF-15-05 (Background);
- CF-15-06 (Background);
- CF-15-07 (Downgradient);
- CF-15-08 (Downgradient);
- CF-15-09 (Downgradient);
- WBSP-15-01 (Background); and
- WBSP-15-02 (Background).

Additionally, two (2) monitoring wells that were installed as part of assessment activities for the LRCP were also added to the CCR groundwater monitoring network for the Type I Landfill as follows:

- CF-19-14 (Downgradient); and
- CF-19-15 (Downgradient).

3.2 Groundwater Characterization

Groundwater assessment monitoring was first conducted at the Type I Landfill during the September 2024 sampling event. Molybdenum and Arsenic, Appendix IV constituents, were detected and confirmed to exceed the GWPSs of 100 micrograms per liter (µg/L) and 10 µg/L, respectively, at well CF-15-08. In response, IKEC was required to characterize the extent of the release, pursuant to 40 CFR § 257.95(g)(1). To accomplish this, IKEC sampled existing groundwater monitoring wells at the property boundary (CF-19-14 and CF-19-15). Based on the sampling, neither Molybdenum nor Arsenic was leaving the property at levels higher than the GWPS, and therefore, the potential remediation zone was confined to the Type I Landfill complex. Semi-annual sampling at the property boundary wells for Molybdenum and Arsenic will continue.

4 Assessment of Corrective Measures

In accordance with 40 CFR § 257.96(a), IKEC prepared an ACM report for Molybdenum and Arsenic in groundwater at the Type I Landfill and placed it in the facility's operating record, as well as uploaded it to IKEC's CCR Rule Compliance internet site. The ACM Report provided an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in 40 CFR § 257.96(c) for Molybdenum and Arsenic.

4.1 Planned Source Control Measures

Per 40 CFR § 257.96(a), the objectives of the corrective measures evaluated in this ACM Report are "to prevent further releases, to remediate any releases, and to restore affected area to original conditions." As required in 40 CFR § 257.97(b), corrective measures, at minimum, must:

> *(1) Be protective of human health and the environment;*
>
> *(2) Attain the groundwater protection standard as specified pursuant to § 257.95(h);*
>
> *(2) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;*
>
> *(5) Comply with standards for management of wastes as specified in § 257.98(d).*

4.2 Potential Remedial Technologies

During the ACM development process, several in-situ and ex-situ remedial technologies were evaluated to address Molybdenum and Arsenic in groundwater at the Type I Landfill, and screened against evaluation criteria requirements in 40 CFR § 257.96(c). The three (3) technologies that appear to be most technically feasible, and therefore most likely for selection as a remedy are:

- MNA;
- Phytoremediation; and
- Conventional Vertical Well System (Groundwater Extraction) (Ex-Situ).

As a source control measure, the Clifty Creek LRCP will be closed in accordance with CFR § 257.102 prior to implementation of further groundwater remediation efforts. The effectiveness of each potential corrective measure for Molybdenum and Arsenic was assessed in accordance with 40 CFR § 257.96 (c). All three options listed above are considered technically feasible for both Molybdenum and Arsenic and appropriate for groundwater remediation efforts at the Type I Landfill. Phytoremediation would typically be implemented as a supplemental technology that can support another primary technology, such as MNA.

5 Selection of Remedy: Current Progress

IKEC's hydrogeologist conducted the semi-annual groundwater sampling and testing during this reporting period. In addition to sampling the monitoring wells in the CCR groundwater monitoring network, the sentinel wells installed to aid in ACM activities were also sampled. A total of 10 wells (8 Network and 2 Sentinel) were sampled near the LRCP; the results will be summarized in the 2025 Groundwater Monitoring and Corrective Action Report. Results to date indicate that concentrations of Molybdenum and Arsenic at the sentinel wells are below the unit's GWPS. In addition to the semi-annual monitoring, IKEC's hydrogeologist also collected monthly depth-to-groundwater readings at wells in the area of the LRCP.

In 2022, IKEC opted to conduct a groundwater model (MODFLOW-NWT) to evaluate the installation of groundwater extraction wells to capture groundwater from areas where Molybdenum concentrations exceed the GWPS. Groundwater modeling analyses were performed by an engineering firm (under subcontract to IKEC' s hydrogeologist) to estimate pumping rates and other design parameters for the proposed system. Based on successive model runs, a series of seven (7) extraction wells with a total pumping rate of approximately 46 gallons per minute would likely be effective for capturing groundwater where Molybdenum exceeds the GWPS.

In December 2022 and January 2023, IKEC contracted a consultant (with a licensed drilling subcontractor) to install seven (7) extraction wells at the LRCP and Type I Landfill at locations specified in the groundwater flow model. The well depths ranged from 28 to 43 feet below ground surface; the wells were constructed of 6-inch diameter, 10-foot long, 20-slot stainless-steel wire-wrapped screen with attached 6-inch diameter PVC riser. After completion, all of the wells were developed by surging and over pumping.

In July 2023, IKEC retained an engineering firm (under subcontract to IKEC's hydrogeologist) to prepare a preliminary design package for the groundwater extraction and treatment system for the LRCP and Type I Landfill. However, that design was rendered obsolete given the significant modifications to the LRCP dam and toe of the dam. In November 2023, a site visit was held to review the site modifications and how they will impact the design.

During the reporting period, design work on the groundwater extraction and treatment system was paused as the 2024 Effluent Limitation Guidelines Rule placed new requirements on facilities that produce what is considered “unmanaged combustion residual leachate.” Before further evaluation of this option, IKEC must evaluate how to comply with the requirements of this new rule and do so in an efficient manner. IKEC may determine that an alternative remedy to the traditional pump and treat system is most prudent, given USEPA’s ever-changing determination of the best available treatment for various wastewater streams.

5.1 Planned Work

IKEC and their hydrogeologist will continue to evaluate the technology options identified in the ACM, and engage the site’s Qualified Professional Engineer to ensure the alternatives meet the criteria set forth in 40 CFR 257.97.

IKEC’s hydrogeologist will continue to sample and test all of the monitoring wells as part of the semi-annual requirement.

IKEC’s hydrogeologist will continue to collect monthly depth-to-groundwater readings at wells in the area of the Type I Landfill. This will help to better understand the dynamic nature of groundwater flow at the unit, which is a function of unique site geologic formations.

IKEC’s hydrogeologist will continue to develop the Time-Series evaluations to determine if the concentrations of Molybdenum and Arsenic are increasing, decreasing, or are asymptotic.

IKEC will continue to work with industry experts to determine how its selection of remedy may be impacted by the 2024 ELG Rule, as well as work with state regulatory agencies to determine what permitting or permit modifications must be secured.

Work by IKEC's hydrogeologist and engineering subcontractor on the design package for the groundwater extraction and treatment system for the Type I Landfill will continue to be on hold pending further evaluation of the ELG Rule.

IKEC's hydrogeologist will continue to evaluate the effects of flood events on the site.

IKEC will submit the next progress report in June 2026.

A final report will be prepared after the remedy is selected. This report will describe the proposed solution and how it meets the standards specified in 40 CFR § 257.97(b) and 257.97(c). Recordkeeping requirements specified in 40 CFR § 257.105(h), notification requirements specified in 40 CFR § 257.106(h), and internet requirements specified in 40 CFR § 257.107(h) will be complied with as required by 40 CFR § 257.96(f).